Bryant University

HONORS THESIS

The True Cost of College: The Impact of Student Loan Debt on Academic Performance

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ABSTRACT

The cost of college has increased disproportionately compared to wages over the last several decades and as a result, student debt has become more prominent. This study aims to identify and examine the relationship between student loan debt and academic performance. Using an online survey, Bryant Alumni and current juniors and seniors were asked questions pertaining to cumulative GPA at graduation, their financial stress level, demographics, student information, personal finances (including family background), and further education. GPA serves as the dependent variable and factors such as gender, race/ethnicity, the amount of debt, and siblings served as independent variables. The results of the survey are analyzed using a linear regression equation with GPA serving as a function of the various attributes in the study. These results indicate that debt beyond a certain point (in this case ≥$30,000), the presence of financially dependent siblings, and/or siblings in college at the same time as them in addition to debt negatively impacts academic performance. Financial stress is also found to take a toll on academic performance.

INTRODUCTION

The cost of college has skyrocketed, rising faster than previous decades. Between 1989 and 2016, the average cost of a four-year degree doubled, even after inflation (Maldonado, 2018). Over the same period, the annual growth rate of the cost to attend a four-year university was 2.6%, while wages only grew a mere 0.3% per year, meaning that, the cost of college grew nearly eight times faster than wages did (Maldonado, 2018). Each year since 2011-12, net prices have risen at public two-year and private nonprofit four-year institutions, as well as at public four-year institutions, as the growth in grant aid slowed relative to the growth in tuition and fees ("Trends in College Pricing 2017"). By this data, we see that the ability to pay for a college education has become increasingly harder in the last few decades. As a result, students have been forced to find more outside funding sources to finance their education, primarily through educational loans, both from the government and private lenders.

In many ways, student loan debt is one of the worst debts you can have, as it cannot be easily discharged in bankruptcy and, some student loans are not forgiven even in the event of death (Farrington, 2019). A report by Lewis (2019) provides a comprehensive overview of the various legal issues related to whether— and under what circumstances—a debtor may discharge a student loan. After explaining how the legislation applies (or does not apply) to student loan debt, suggestions/considerations for Congress were made pertaining to allowing private loans to be dischargeable and updating the terms of "undue hardship," as this is often ambiguous. This report helps to understand the long-term financial burden of debt and the lack of options for students who default. =

"Leaders will come to realize that you can't have a successful program" of encouraging college graduation "if you are saddling people with unworkable debt" to do it (Clemmitt, 2011). Clemmit (2011) takes a comprehensive look at the college-loan system, specifically the issues with student debt, the background of the loan system, the timeline, and the current standing on the issues. The outlook from the article states that the nature of higher education will change because the current system requires a college education to earn higher wages but is making it increasingly more difficult to do so.

Bryant University is a private, four-year institution with an annual sticker price of about $62,000, including room and board (Bryant University, 2020). The cost of attendance requires outside financing for most students to attend. This case study on Bryant University aims to examine the relationship and impact of student loans and academic performance. The cost of a college education might come at more than just the sticker price.

LITERATURE REVIEW

College, one of the first major decisions of a young person's life, has a lifelong impact, especially financially. With many different choices from scholarships and family contributions to private and public loans, the way in which one finances college impacts their life. This literature review looks at previous studies that have attempted to identify a potential relationship between student loans (debt) and a person's life, with a particular focus on academic performance in college and overall financial wellbeing.

Academic Performance

Many different factors help to understand the causal mechanisms that link financial concerns to college outcomes. A potential relationship can be found by analyzing cumulative GPA,

number of credits, choice of major (STEM vs non-STEM), retention rate, ACT Scores (as a baseline for academic ability), the source of funds (federal, institutional, state, etc.), the amount and type of the award (need-based, merit-based, athletic payments, work study, loans, etc.), and the fraction of tuition covered by the loans. Student achievement appears to be related to the level of student loans held, but it may be the case that students with a higher fraction of loans choose to take a different number of credits per semester or choose different types of majors. Overall, students with loans generally had lower GPAs than those who had no loans or non-loan assistance in paying for college (Stoddard, 2018). The data from this study was collected over the course of 2002-2012 (36 consecutive semesters) and comes from the Administrative Panel Data from the Montana University System (MUS). Within this data it includes student's high school information, demographic information, the Montana post-secondary campus attended, and the degree pursued. The sample consisted of in-state students at Montana State University and the University of Montana. However, this does not include private loan data and neglects the potential for other factors that may result in a student's academic performance.

Variations between findings suggest that solely focusing on the relationship between the "average" student and debt-to-income ratios may not be enough to control the debt burden of bachelor's degree earners (Baker, 2019). So, it is important to control for variables such as race, ethnicity, and gender in any study. Using similar indicators as Stoddard (2018), GPA (cumulative and current) and expected student loan debt, Baker and Montalto (2019) considered financial stress, asking about general financial stress, stress over monthly expenses, and stress overpaying for school. Students then rated their level of stress on a scale of 1 (strongly disagree) to 4 (strongly agree) and answers were broken down into three

categories, low stress (first and second quartile), medium stress (third quartile), and high (top quartile). By adding this element, they were able to control for student attitudes and how they affect academic performance, and they were able to find evidence of a relationship between financial stress and academic performance. Specifically, financial stress has a significant effect on GPA--students reporting high financial stress had significantly lower GPAs than students reporting low financial stress (Baker and Montalto, 2019). While the amount of loans a student expects to have and their financial stress level are considered, the study neglects to account for the socioeconomic status of an individual, which can heavily impact academic performance and their attitude toward stress.

Using data from the National Longitudinal Survey of Youth 1997 (NLSY97) to examine the proposed relationships between educational loans and graduation rates among racial and ethnic minority students, a study done by Zhan, Xiang, & Elliott (2018) suggests educational loans are positively related to college graduation rates, but only up to a point (about $19,753). Regarding differences by race and ethnicity, Black and Hispanic students were half as likely (compared to White students) to have graduated college by the end of the study. Essentially, educational loans do not appear to serve as an "equalizer" in college success among different racial groups (Zhan, Xiang, & Elliott, 2018).

Unlike Baker and Montalto (2019), Zhan, Xiang, & Elliott (2018) considered the socioeconomic status of the student and was therefore able to determine other significant predictors of college graduation that included family income, having a prepaid college tuition account, marital status during enrollment, grades in high school, enrollment status, working hours during enrollment, numbers of terms receiving grants and scholarships, and number of terms participated in the FWS program . These factors point to the importance of academic

and financial preparation and resources for completing college. This study does not, however, examine the possible mechanisms through which college graduation rates among different racial and ethnic groups, including financial, attitudinal, and cultural factors are impacted by educational loans, but rather, addresses the issues individually.

Financial Wellbeing

There are predictors of debt beyond financial need or demographic factors that can be found by exploring the role of several psychological and attitudinal variables in student loan debt. A survey that asked students to classify themselves into a category of debt, their attitude toward student loans, if they have an internal or external locus of control (using the IPIP Locus of Control Scale), their delay of gratification, parental financial education, and social financial comparison indicated that loan attitudes were associated with higher levels of debt. Most students (71%) reported that they had taken out a federal or private loan at some point to finance their education and overall, students believed that they could pay their loans off if they work hard, and students felt that loans are inevitable if one wants a college education. (Norvilitis and Batt, 2016).

Similarly, when looking at personal debt, both education loan debt and credit card debt were statistically significant in explaining financial satisfaction. The results support a negative relationship between holding personal debt (student loan or credit card) and financial satisfaction (Solis & Ferguson, 2017). Both these studies are limited in that they only represent a person's attitude at that specific time, making it impossible to know if these attitudes lead to different outcomes in the future and all these attitudes are self-reported rather than observed.

Boomeranging is defined as a person who becomes residentially independent then later reports a parent on the household roster. A study utilizing NLSY97[1] data found that student debt increases the risk of boomeranging because it creates economic strain, increases the risk of college noncompletion, delays adult transitions, and undermines mental health; second, that the association between debt and boomeranging is stronger for people who identify as black than for those who identify as white because for those who identify as black, debt is more burdensome due in part to discrimination and hardship in credit, college, and labor markets; third, that college completion, rather than debt, is most consequential for boomeranging (Houle & Warner, 2017). The findings suggest that college completion, transitioning into adult social roles, and labor market success may better explain rising rates of boomeranging among college-going youth than student debt, but student debt may be exacerbating racial inequalities in transition to adulthood outcomes. The study also asked questions about types and amounts of debt holdings and assets, including student debt and includes other potential factors that could affect debt and boomeranging, such as socioeconomic status, race, sex, etc. Like other studies, it explores the potential inequalities associated with debt due to different demographics.

A study that focuses on the economic value of bachelor's Degrees from the University of Texas (UT) System indicates a need to understand better how students use available information to make decisions about college and careers, the extent to which their interests and life goals inform their decisions, and the role that social capital plays in educational and career outcomes (Fasules, Huie, and Troutman, 2017). A data sharing agreement with the

[1] NLSY97 is the National Longitudinal Study of Youth which consists of a nationally representative sample of men and women born 1980-1984 in the U.S. and collects extensive information on respondents' labor market behavior and educational experiences

Texas Workforce Commission (TWC), the University of Texas (UT) System matched bachelor's degree recipients to state earnings and employment data, specifically TWC unemployment insurance (UI) wage data, allowing them access to the necessary information for this study. The study sample consists of 50,984 UT System graduates between the ages of 21 and 25 at the time of their graduation from the UT System academic institutions. The UT study is limited to only those enrolled in a public university system. Fasules, Huie, and Troutman (2017) highlight the importance of college major and the importance of information availability to students entering college. In other words, students need to be more aware of the choice of major they're making when they enter college.

The "Student Financial Wellness Survey" (Klepfer, et al., 2018) was developed to help inform discussions about college affordability, student debt, and financial wellness at the campus level and among policymakers. The study aggregates information regarding Financial Security, Basic Needs Security, Paying for College and Student Debt, and Perceptions of Institutional Support. The survey was able to conclude that learning and interacting in an academic setting requires time and concentration, both of which are made harder by financial worries. Many colleges are financially tied to the outcomes of their students, which can be enhanced or undermined by a school's attentiveness to student financial wellness. Institutions can minimize student financial stress with cost-effective measures and would thus be likely to see improvements in their student outcomes.

Many of these studies look at case studies of individuals or a group of public four-year institutions and due to lack of available information, neglect to include private loan data. This study will aim to bridge this gap in knowledge by providing a case study on Bryant

University, a private four-year institution and allowing survey respondents to self-report and identify their debt, which will ultimately include private loan data.

RESEARCH QUESTION & HYPOTHESES

At this time, two primary questions are being tested in this study: *Is there a relationship between GPA and the amount of student loan debt?* and *Does financial stress impact academic performance?*

To explore the relationship between student loan debt and GPA, an online survey was administered to Bryant University Alumni (2009-2020) and current Juniors and Seniors (Class of 2021 and 2022) in the Fall of 2020.

Of the literature reviewed, many studies have determined a relationship between academic performance and student loan debt, with Zhan, Xiang, & Elliott (2018) suggesting that educational loans are positively related to college graduation rates, but only up to a point (about $19,753). However, all studies done have been on public institutions and often, do not include private loan data. By having alumni self-report this data in a survey, this study hopes to shed light on the relationship student loans and academic performance have at a private university. These studies lead to the following hypothesis:

Hypothesis 1: At a private university student loan debt will negatively affect academic performance.

Many previous studies suggest that financial stress takes a toll on students and their overall wellbeing. Specifically, that learning requires student focus and concentration which is more difficult when they are plagued by financial worry. (Klepfer, et al., 2018) Therefore, the

relationship between financial stress and academic performance is being examined with the following hypothesis in mind:

Hypothesis 2: Those that report higher levels of financial stress will experience a negative effect on academic performance.

DATA SOURCE AND SAMPLE

An online survey was distributed to a sample of students who graduated from Bryant University in the last 10 years (2009-2020). The survey asks about 28 questions pertaining to GPA at the time of college, financial stress, demographics, student information, personal finances (including parent background), and further education (see *Appendix A* for the complete list of questions).

An additional survey was distributed to a sample of current Juniors and Seniors at Bryant University. This survey asks 25 questions, many of which were the same as the alumni survey. Both groups are surveyed for comparison.

Measures

There are a few very important variables and measures to control for outside factors that may impact academic performance besides student loan debt. These factors include things like family background, such as siblings and household income, gender, first generations students, type of high school attended and immigrant status. Appendix B lists all variables that were surveyed for data collection and previous literature supporting the need for each variable. GPA is the most universal indication of academic performance among students and is used in this study to compare among students.

Statistical Analysis

The relationship between GPA and student loan debt is examined using a regression model with GPA as a function of the various attributes in the study. GPA serves as the dependent variable and factors such as gender, race/ethnicity, siblings, and the amount of debt served as independent variables

DESCRIPTIVE STATS

Alumni

This study contains 336 participants of which 57.4% were female. The average GPA for this sample is 3.427 while the median GPA is slightly higher at 3.475. Out of all alumni surveyed, 15.1% are immigrants, while 24.4% are first-generation college students. Approximately 18.1% attended a private high school prior to college.

In this study debt and/or the presence of loans to finance education is measured in one of three ways: debt, loans, and high debt. The variable debt is measured as the amount of debt at the time of graduation. The variable loans is an indicator variable equal to one if the participant selected that they financed their education with any type of loan (public or private). The variable high debt is an indicator variable equal to one if the amount of debt is above the median. The median debt for this study was $25,000-$29,999, so high debt is characterized as ≥$30,000 in student loan debt. Of the 336 alumni surveyed, 76.7% of them had at least $1 in debt at the time that they graduated from college, while 75.8% stated they financed their education with loans. Slightly less than half the dataset possesses high debt, or >$30,000 in student loan debt. High debt was assessed because it has been found in other studies that student loan debt can be positively related to academic performance and graduation rates, but

only up until a point (Zhan, Xiang, & Elliott, 2018). While the median debt for this study was $25,000-$29,999, the average debt per participant was $39,715.

Figure 1

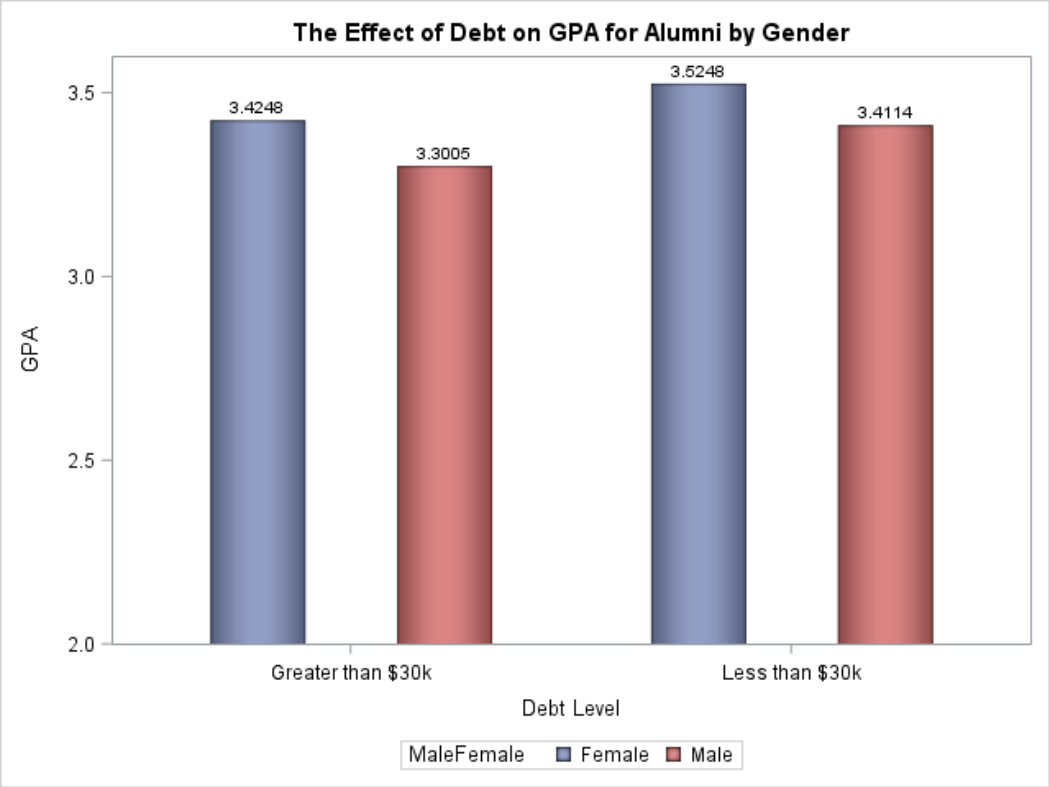
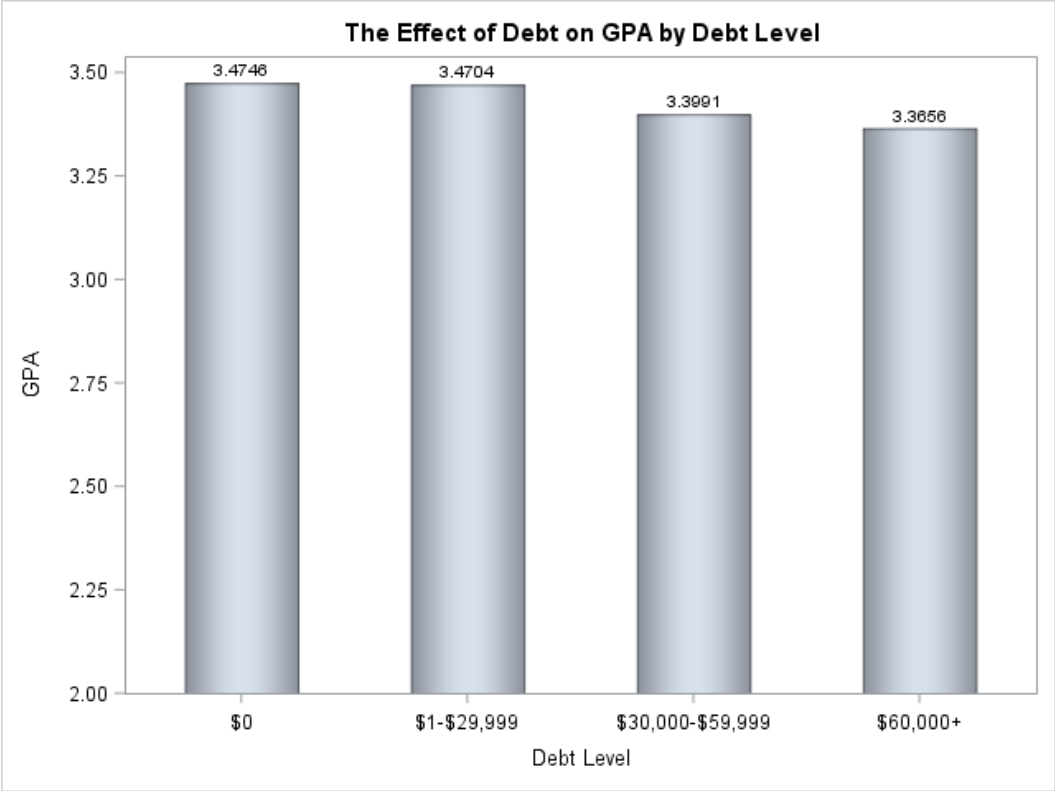


Figure 1 shows the breakdown of debt and the effect of high debt vs regular by gender. As shown in that graph, there is a decline in academic performance for both males and females as they exceed the threshold of $30,000 of debt. The graph also denotes the discrepancy that exists in GPA by gender in this study. Females in this study demonstrate an already higher GPA than males, or in other words, on average, males perform worse academically in this study.

Figure 2



Similarly, *Figure 2* shows the difference in academic performance as the amount of debt increases. This graph is not broken down by gender but supports the relevance of the variable "high debt" as shown by the decline in GPA beyond $30,000. Before that debt level, there does not appear to be a difference between academic performance for those with no debt, or those with under $30,000 of debt. On the other hand, beyond that $30,000 threshold, GPA declines from lower levels of debt, but does not show much difference as student loan debt increases further.

Figure 3

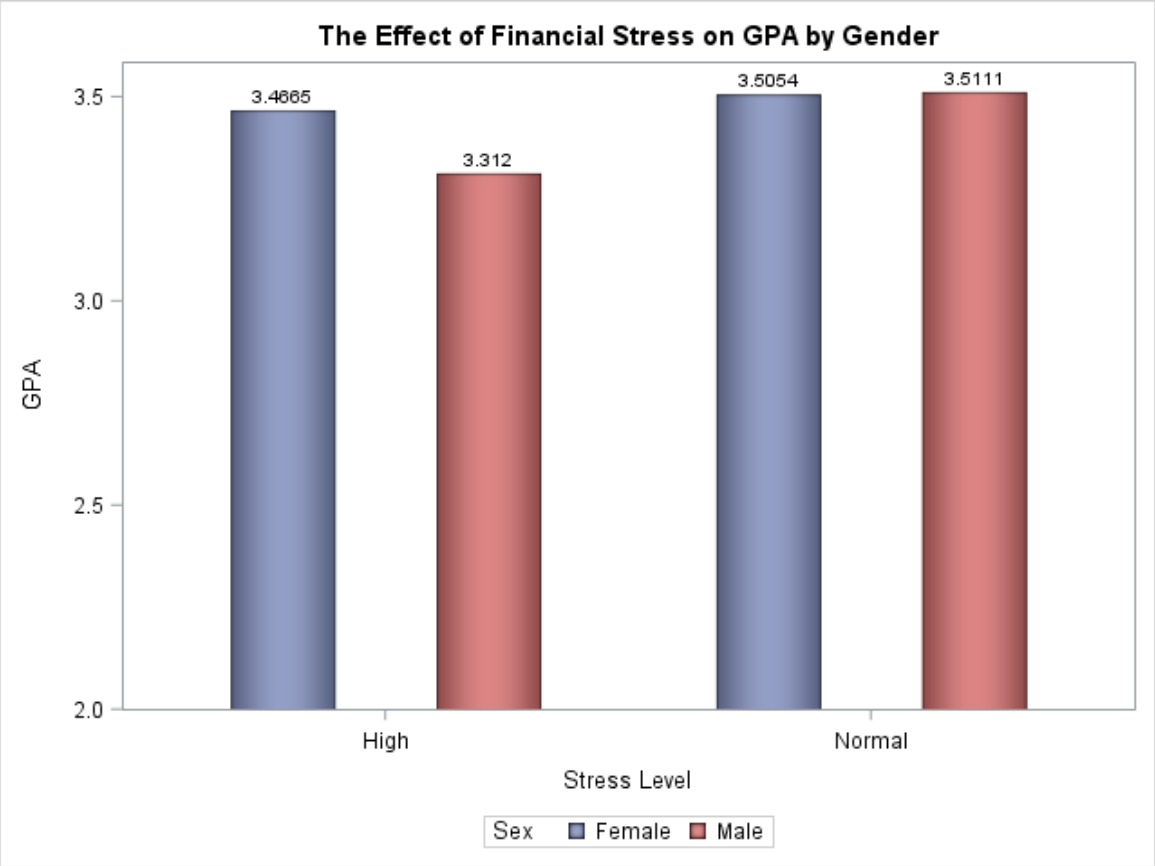


Figure 3 shows the implications of financial stress by gender. As shown with "normal" financial stress, or students who were not worried about their finances while in college, academic performance is nearly identical male vs female. Students who reported high stress show a decline in academic performance, with males being disproportionately impacted by financial stress.

Siblings were assessed in two ways in this study: college sibling which means the participant had at least one sibling in college at the same time as them (older or younger) and dependent sibling which accounts for any financially dependent siblings they had while attending college. For purposes of regression, an indicator variable was created to state that the participant had at least one college or dependent sibling. Of the alumni surveyed, 56.8% had

at least one sibling in college at the same time as them and 69.3% had at least one financially dependent sibling while they were attending college. These variables are assessed separately as a much younger (non-college age) sibling possesses a much less financial burden than a sibling who is simultaneously in college. Using the original variable, we can see the actual breakdown of siblings. The average number of dependent siblings in this data set is 1.982 with a median of 2 financially dependent siblings. While the average number of siblings in college is slightly lower at 1.669 with a median of 2 siblings in college at the same time.

Undergraduate

The undergraduate study contained 176 survey respondents of which 56.1% were female. The average GPA for these students is 3.558, with a slightly higher median GPA of 3.60. Out of all the participants, 12.1% are immigrants and 16.2% first generation students with 17.3% of them having attended a private high school prior to college.

EMPIRICAL RESULTS

High Debt

Debt is first proxied using the indicator variable high debt in Model 1 of Table 2:

$$GPA = \alpha_0 + \alpha_1 \, HighDebt$$

The variable debt serves as an indicator variable to determine if the person had any debt at all at the time of graduation. Because of the wide range of debt intervals used in this study, an indicator variable is created to evaluate whether the participant had "high" debt or not. For this study, high debt is characterized as having higher than the median debt. The median debt for this sample is $25,000-$29,999. Therefore, high debt is anyone with debt greater than or equal to $30,000. The results in Model 1 indicated a negative significance between high debt and GPA.

In Model 2 of Table 2, other variables are controlled for to see if this changes the impact of high debt on academic performance.

$$GPA = \alpha_0 + \alpha_1\, HighDebt + \alpha_2 \text{CollegeSib} + \alpha_3 Dependent + \alpha_4 Female + \alpha_5 GenFirst + \alpha_6 Immigrant + \alpha_7 PrivateHS + \alpha_8 HouseInc$$

Despite adding control variables, high debt still proves to be statistically significant with a negative impact on GPA at a correlation of -.14.

In models 3 to 6, two other variables are used as proxy for student debt: debt and loans. Debt is an indicator variable equal to one if the participant indicated they had debt at the time of graduation. Loans is an indicator variable equal to one if the participant selected loans (public or private) as a form of financing their education. All four models show no significant between debt or loans and GPA.

To conclude, Table 2 shows that the amount of student debt has an influence on academic performance, with a negative correlation as student debt rises. This finding is similar to the findings of Zhan, Xiang, & Elliott (2018) where they find that debt beyond a certain point begins to impact student performance.

Debt & College Siblings

In these models the financial burden and, in turn, effect on academic performance of having a sibling in college at the same time as the participant is examined. For each model, the indicator variable collegesib was created to determine if the participant had any siblings in college at the same time as them.

Table 3 reports these results. In Model 1 the dependent variable is a variable created that combines both high debt and sibling(s) in college:

$$GPA = \alpha_0 + \alpha_1\, HighDebt\_collegesib$$

Having high debt and a sibling in college at the same time did not prove statistically significant by itself or when controlled for the remaining variables in Model 2.

$$GPA = \alpha_0 + \alpha_1\, HighDebt_{CollegeSib} + \alpha_2 \text{HighDebt} + \alpha_3 CollegeSib + \alpha_4 Dependent + \alpha_5 Female + \alpha_6 GenFirst + \alpha_7 Immigrant + \alpha_8 PrivateHS + \alpha_9 HouseInc$$

In Model 3 the interaction between any debt and a sibling in college is tested. If a student has debt and at least one sibling in college it is significantly negatively correlated with their GPA. After controlling for other variables, the interaction becomes more significant, further driving GPA down with negative correlations of -.245 and -.224 for debt and loans, respectively. Similarly, Models 5 and 6 use the variable "loans" which is created as an indicator variable to determine if the student financed their education with loans at all, private or public. In Model 5 the interaction between loans and having a sibling in college is tested. Having loans and at least one sibling in college at the same time as the participant is statistically significant as well and negatively impacts GPA. Just as with debt, when controlled for other variables, the results have a negative impact.

While it is statistically significant for a student to have debt and/or loans and at least one sibling in college at the same time as them, the shift from regular debt to high debt does not prove significant meaning that the burden does not increase if debt is higher, but merely the presence of debt/loans and a sibling is enough to impact academic performance.

Debt & Dependent Siblings

In these models, the relationship between debt and financially dependent siblings and its impact on GPA is being evaluated. Dependent is an indicator variable that denotes if the

student had at least one financially dependent sibling while they attended college. Table 4 reports the results.

Like the previous tests, Model 1 evaluates the relationship between high debt and a financially dependent sibling:

$$GPA = \alpha_0 + \alpha_1 highdebt\_dependent$$

Having both high debt and at least one dependent sibling in college does not appear to be significant and therefore does not have an added impact on academic performance. The results are still insignificant when controlling for the remaining variables in Model 2:

$$GPA = \alpha_0 + \alpha_1\, highdebt_{dependent} + \alpha_2 \text{highdebt} + \alpha_3 CollegeSib + \alpha_4 Dependent\ + \alpha_5 Female$$
$$+ \alpha_6 FirstGenerationh, + \alpha_7 Immigrant + \ \alpha_8 PrivateHS + \ \alpha_9 HouseInc$$

In Model 3, the variable debt_dependent is used to evaluate the interaction between a participant with any level of debt (>$1 of debt at the time of graduation) and having at least one dependent sibling while they attended college. On its own, the interaction between debt and dependent has a significant negative correlation with academic performance. In Model 4, additional variables are controlled for and the interaction still proves to have a significant negative correlation with GPA. While it decreases slightly from Model 3, it still shows a significant impact.

Models 5 and 6 explore the interaction between loans and a financially dependent sibling. As with the previous tests, loans and debt produce very similar results, as someone who stated they had loans to finance college in the survey would presumably also state that they had at least $1 of debt at the time of graduation. Model 5 shows that the interaction between a participant having both loans and a financially dependent sibling is significant. As seen with

the interaction between debt and financially dependent siblings, there is a strong impact on GPA, with a negative correlation of -.222. Model 6 controls for the remaining variables. After controlling for these variables, the interaction is almost the same, producing significant results and a negative impact on academic performance.

Financial Stress

In this section, the role financial stress plays on academic performance is examined. Financial stress is an indicator variable for if the student reported higher than the median (on a scale of 1-5) on three questions pertaining to regular finances, monthly expenses, and affording education. The first question asked the student to rate their worry on a scale about finances on a regular basis, while the next question focused on worry regarding monthly expenses, and finally their worry about affording their education. If the participant reported having higher than the median in any of the three stress categories, they were categorized as having financial stress.

Using the control variables from previous regressions, this model was used:

$$GPA = \alpha_0 + \alpha_1\, finstress + \alpha_2 CollegeSib + \alpha_3 Dependent\ + \alpha_4 Female\ +$$

$$\alpha_5 FirstGeneration + \alpha_6 Immigrant + \alpha_7 PrivateHS\ + \alpha_8 Low\ Household\ Income$$

The results in Table 5 show that financial stress negatively impacts academic performance with statistical significance at the 5% level and a negative correlation of -.234.

Low household income was added into this model as financial standing and background seems to be a significant indicator of a student's financial stress. Zhan, Xiang, & Elliott (2018) controlled for socioeconomic status in their study to control for other predictors and factors that may influence college graduation rates and academic performance.

In this model, low income is defined as lower than the median household income for the study and used to control for prior financial burden . The interaction between low household income and financial stress is tested, proving a negative impact on academic performance. The interaction is significant at the 5% level, with a negative correlation of -.300.
The correlations in these two models prove much higher than seen in previous models, indication the importance of testing financial stress and socioeconomic status.

Undergraduates & Debt

While there was not sufficient data to prove the same conclusions regarding the undergraduate survey data, a few models were still tested. Debt and High Debt did not prove to be statistically significant using this smaller sample. Although this does not mean it is not, it just means there is not sufficient observations to prove it. However, the undergraduate data set still found a negative impact on academic performance at the highest significance level.
It is possible that debt and high debt did not prove significant because juniors and seniors (those surveyed as part of the undergraduate model) are not fully aware of the implications of debt on their academic performance and other aspects of life.
Similar to previous data models, Table 6 shows the undergraduate models that evaluate the role that siblings and debt/loans plays in impacting academic performance. From these it becomes clear that the amount of debt does not matter, but just the presence of debt, as loans is negatively correlated with academic performance at the highest significance level. The correlation for this interaction is the highest seen among all models, at -.386. Whereas in the first set of models, high debt proved to be detrimental to academic performance. Financial stress also plays a huge role in academic performance, with students who feel more stressed

performing poorly compared to those with none. Presumably, those with high stress might be because of high amounts of debt/loans.

LIMITATIONS

One major limitation of this study is that it is based entirely on self-reported data. Because it deals with private loan information, the only way to obtain this was through asking participants. This study also serves as a case study on Bryant University, as all data obtained came from current or previous students. This can be limiting because many students here have similar characteristics and socioeconomic backgrounds that could make their financial situations quite similar. Bryant University is also a private institution which would generally attract wealthier individuals to attend as opposed to a public university.

The variables “loans” and “debt” can be constraining as they only assess if the person said they had loans or debt. They could have anywhere from $1 of debt to $100,000+. While debt numbers were reported in increments of $5,000, debt was only assessed as “high” or the presence of debt. More could be done with the varying levels of debt. The question of using loans to finance college can also be considered vague. For instance, a student's parents could be taking out loans to pay for their education, but the student is not expected to pay them back. This presumably does not hold the same financial burden for a student and in turn, might not impact academic performance the same way.

Working during the school year might have a very significant impact on an individual's academic performance, as time spent working takes away from the time one could study and focus on academics, in turn affecting their academic performance. Future studies would certainly benefit from studying this relationship.

Sampling alumni from the last 10 years (2009-2020) assumes similar college prices, but as we know the cost of tuition at universities over the last decade or more has risen much faster than previous decades. There have also been economic downturns that could've impacted students differently (for instance, those attending/graduating from college during the recession or immediately after).

CONCLUSION

This study finds that high debt (>$30,000), the presence of financially dependent siblings, and/or siblings in college at the same time as them in addition to loans/debt impacts academic performance. This can be explained by the fact that debt up to a certain point is manageable. Students might feel they will have no problem paying it off post-graduation, but there is a threshold at which debt becomes crippling and therefore can impact students in other ways. When taking into consideration siblings, regular loan debt at any interval impacts academic performance. This can be explained by the fact that additional children either in college at the same time, or just financially dependent create an increased financial burden on families. This financial burden might, in turn, be reflected by the student, thus impacting their academic performance. Financial stress plays a large role in impacting academic performance. Students who worry about finances regularly, whether that be just in general, their monthly expenses, or affording their education, see a negative effect on their academic performance as a result.

TABLES

Table 1: Descriptive Statistics

This table reports descriptive statistics of sample Alumni who graduated from Bryant University between 2009 to 2020, respectively. All variables are defined in the appendix.

Alumni (N = 336)			
Variables	Mean	Median	Std. Dev.
GPA	3.427	3.475	0.344
High Debt	0.467	0.000	0.499
Debt	0.767	1.000	0.422
Loans	0.758	1.000	0.428
College Sibling	0.568	1.000	0.496
Dependent	0.693	1.000	0.461
Female	0.574	1.000	0.495
First Generation	0.244	0.000	0.430
Immigrant	0.151	0.000	0.359
Private HS	0.181	0.000	0.386

Indicator Variable Breakdowns (N = 336)			
Variables	Mean	Median	Std. Dev.
# of Dependent Sibling(s)	1.982	2.000	0.846
# of College Sibling(s)	1.669	2.000	0.651
Amount of Debt	9.443	7.000	7.445

Table 2: Debt vs. High Debt

This table reports the results from regressions on the relation between GPA and the level of debt a participant had. All control variables are defined in the appendix. *t*-statistics are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Alumni Model

	GPA					
	1	2	3	4	5	6
High Debt	-0.095**	-0.082**				
	(-2.54)	(-2.12)				
Debt			-0.061	-0.057		
			(-1.37)	(-1.24)		
Loans					-0.036	-0.033
					(-0.82)	(-0.73)
College Sib		0.038		0.051		0.050
		(0.89)		(1.21)		(1.19)
Dependent		0.021		0.015		0.012
		(0.45)		(0.32)		(0.26)
Female		0.124***		0.124***		0.123***
		(3.30)		(3.28)		(3.24)
First Gen		-0.009		-0.013		-0.015
		(-0.19		(-0.26)		(-0.31)
Immigrant		0.016		0.021		0.021
		(0.29)		(0.37)		(0.37)
Private HS		0.119**		0.127**		0.131***
		(2.47)		(2.63)		(2.70)
Low Household Income		-0.025		-0.029		-0.033
		(-0.60)		(-0.70)		(-0.78)
Constant	3.472***	3.347***	3.475***	3.349***	3.455***	3.335***
	(135.88)	(67.91)	(89.15)	(61.54)	(90.18)	(61.47)
Observations	336	336	336	336	336	336
Adjusted R^2	0.016	0.050	0.003	0.042	-0.001	0.039

Table 3: Debt and College Sibling(s)

This table reports the results from regressions on the relation between the debt and at least one sibling in college at the same time as the participant. *t*-statistics are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Alumni Model						
	GPA					
	1	2	3	4	5	6
Highdebt_collegesib	0.014	-0.012				
	(0.18)	(0.16)				
High Debt	-0.097*	-0.089				
	(-1.71)	(-1.54)				
Debt_collegesib			-0.215**	-0.229**		
			(-2.43)	(-2.60)		
Debt			0.055	0.071		
			(0.83)	(1.07)		
Loans_collegesib					-0.174**	-0.206**
					(-1.98)	(-2.37)
loans					0.058	0.082
					(0.89)	(1.24)
College Sibling	0.037	0.032	0.222***	0.231***	0.188**	0.209***
	(0.71)	(0.55)	(2.86)	(2.86)	(2.46)	(2.65)
Dependent		0.021		0.000		0.005
		(0.46)		(0.01)		(0.12)
female		0.124***		0.128***		0.129***
		(3.29)		(3.40)		(3.41)
First Gen		-0.009		-0.020		-0.023
		(-0.19)		(-0.40)		(-0.46)
Immigrant		0.015		0.028		0.033
		(0.27)		(0.51)		(0.59)
Private HS		0.119**		0.128***		0.136***
		(2.46)		(2.68)		(2.83)
Low Household		-0.025		-0.034		-0.034
Income		(-0.59)		(-0.80)		(-0.80)
Constant	3.449***	3.350***	3.355***	3.260***	3.353***	3.248***
	(82.49)	(61.41)	(59.03)	(50.95)	(59.52)	(49.76)
Observations	336	336	336	336	336	336
Adjusted R^2	0.014	0.047	0.021	0.058	0.011	0.052

Table 4: Debt and Financially Dependent Sibling(s)

This table reports the results from regressions on the relation between debt and at least one financially dependent sibling while in college. *t*-statistics are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Alumni Model

	GPA					
	1	2	3	4	5	6
Highdebt_dependent	-0.112	-0.098				
	(-1.38)	(-1.23)				
Highdebt	-0.019	-0.014				
	(-0.27)	(-0.21)				
Debt_dependent			-0.231**	-0.209**		
			(-2.48)	(-2.26)		
debt			0.087	0.082		
			(1.16)	(1.08)		
Loans_dependent					-0.160*	-0.166*
					(-1.71)	(-1.79)
loans					0.070	0.080
					(0.91)	(1.03)
dependent	0.105*	0.067	0.228***	0.175**	0.172**	0.136*
	(1.92)	(1.13)	(2.83)	(2.08)	(2.13)	(1.64)
Collegesib		0.036		0.043		0.048
		(0.86)		(1.02)		(1.14)
female		0.123***		0.122***		0.126***
		(3.25)		(3.23)		(3.32)
genfirst		-0.007		-0.015		-0.015
		(-0.13)		(-0.30)		(-0.31)
immig		0.016		0.031		0.029
		(0.29)		(0.56)		(0.51)
privhs		0.120**		0.123**		0.128***
		(2.48)		(2.55)		(2.66)
Low Household		-0.022		-0.033		-0.038
Income		(-0.52)		(-0.78)		(-0.89)
Constant	3.401***	3.316***	3.329***	3.253***	3.340***	3.252***
	(75.28)	(59.86)	(51.63)	(47.23)	(50.53)	(45.75)
Observations	336	336	336	336	336	336
Adjusted R^2	0.021	0.052	0.020	0.053	0.007	0.045

Table 5: Debt and Financial Stress

This table reports the results from regressions on the relation between debt and financial stress. *t*-statistics are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Alumni Model

	GPA			
	1	2	3	4
Financial Stress	-0.104**	-0.100**		
	(-2.36)	(-2.25)		
Finstress_lowhouseinc			-0.245**	-0.238**
			(-2.43)	(-2.37)
Low Household Income		-0.026	-0.173*	-0.165*
		(-0.62)	(1.90)	(1.82)
College Sibling		0.052		0.047
		(1.24)		(1.13)
Dependent		0.013		0.015
		(0.30)		(0.34)
Female		0.126***		0.122***
		(3.34)		(3.26)
First Generation		-0.011		0.007
		(-0.23)		(0.13)
Immigrant		0.029		0.030
		(0.53)		(0.54)
Private HS		0.125***		0.130***
		(2.60)		(2.71)
Constant	3.508***	3.379***	3.468***	3.335***
	(90.50)	(61.58)	(51.63)	(57.94)
Observations	336	336	336	336
Adjusted R^2	0.013	0.052	0.026	0.065

Table 6: Undergraduates

This table reports the results from regressions on the relation between different proxies of debt and academic performance. *t*-statistics are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Undergraduate Model						
			GPA			
	1	2	3	4	5	6
Highdebt	-0.031	-0.038				
	(-0.71)	(-0.86)				
debt			-0.063	-0.047		
			(-1.36)	(-1.02)		
loans					-0.138***	-0.134***
					(-3.20)	(-3.13)
College Sibling		0.024		0.023		0.014
		(0.46)		(0.45)		(0.28)
Dependent		-0.021		-0.023		-0.043
		(-0.42)		(-0.45)		(-0.85)
female		0.145***		0.142***		0.137***
		(3.37)		(3.29)		(3.27)
First Generation		-0.078		-0.077		-0.064
		(-1.14)		(-1.14)		(-0.97)
Immigrant		-0.079		-0.077		-0.081
		(-1.03)		(-0.93)		(-1.08)
Private HS		-0.042		-0.042		-0.062
		(-0.74)		(-0.74)		(-1.10)
Low Household		0.046		0.043		0.025
Income		(0.84)		(0.79)		(0.47)
Constant	3.573***	3.514***	3.602***	3.531***	3.640***	3.606***
	(119.27)	(61.47)	(94.16)	(56.54)	(109.71)	(56.88)
Observations	173	173	173	173	173	173
Adjusted R^2	-0.003	0.060	0.005	0.061	0.051	0.108

APPENDICES

Appendix A: Survey Questions

Demographics:

1. How old are you?
2. What is your gender?
3. What is your race/ethnicity?
4. What year did you graduate from Bryant? (Undergrad)
5. At what age did you start college?

Student Information

6. Were you enrolled full time or part time?
7. Are you a first-generation college student?
8. What was your major/concentration?
9. What was your cumulative grade point average (GPA) upon graduation?
10. What type of high school did you attend?

Financial Information

11. How did you finance college? *(Check all that apply)*
12. Did you work while attending school?
13. About how much debt did you graduate college with?
14. How much debt do you still owe TODAY?
15. What was your annual household income while attending college?
16. How many financially dependent siblings do you have?
17. Were any of your siblings in college at the same time as you?
18. What is your current salary?

Financial Stress

*For the following questions please rate your level of agreement with the following statements from 1 (strongly disagree) to 5 (strongly agree) as you identified with them **DURING** your time as an undergraduate student*

19. I worry about finances on a regular basis.

1 2 3 4 5

20. I am worried about being able to cover my monthly expenses.

1 2 3 4 5

21. I am worried about being able to afford my education.

1 2 3 4 5

For the next section, please answer the same three statements as they pertain to you TODAY (at the time of the survey).

22. I worry about finances on a regular basis.

1 2 3 4 5

23. I am worried about being able to cover my monthly expenses.

1 2 3 4 5

24. I am worried about being able to afford my education.

1 2 3 4 5

Further Education

25. Has the presence of debt affected your decision to attend further education?
26. Did you pursue additional schooling? (MBA, MS, Doctorate, etc.)
27. What additional degrees do you hold? *(Check all that apply)*

Appendix B: Data Measures

Grade Point Average (GPA) (Stoddard, 2018; Baker and Montalto, 2019)	Self-reported by the participants as the cumulative GPA they held at the time of graduation
Student Loan Debt (Stoddard, 2018; Baker and Montalto, 2019; Klepfer, et al., 2018)	The amount of debt held *at the time of graduation* and *today* (at the time of the study) categorized in $5,000 increments
Financial Background (Zhan, Xiang, & Elliott, 2018)	Parent's annual household income (at the time they were in college) categorized in bins Number of siblings Current Annual Salary (at the time of the study)
Financial Stress (Baker and Montalto, 2019; Norvilitis and Batt, 2016; Solis & Ferguson, 2017; Klepfer, et al., 2018)	Statements dealing with general financial stress, stress over monthly expenses, and stress for paying for school (rated on a scale of 1-5 pertaining to overall agreement while in college and today)
Further Education	Impact of debt on decision to pursue higher education Higher education pursued
Demographics (Zhan, Xiang, & Elliott, 2018; Houle & Warner, 2017; Fasules, Huie, and Troutman, 2017)	the following variables self-reported: Age Gender Race/ethnicity the year they graduated from Bryant First-generation college student Age they were when they began college Major Type of High School Attended, Employment Student status

Appendix C: Variable Descriptions

Variable	Description
GPA	Participants cumulative grade point average at the time of undergraduate graduation
High Debt	Indicator variable equal to one if the participant had ≥$30,000 in student loan debt at time of undergraduate graduation
Debt	Indicator variable equal to one if the participant has ≥$1 of debt at the time of graduation
Loans	Indicator variable equal to one if the participant stated that they financed their education with loans (private or public)
College Sibling	Indicator variable equal to one if the participant had at least one sibling in college at the same time as them
Dependent Sibling	Indicator variable equal to one if the participant had at least one financially dependent sibling while they attended college
Female	Indicator variable equal to one if the participant is female
First Generation	Indicator variable equal to one if the participant is a first-generation student
Immigrant	Indicator variable equal to one if it is the participant is a first-generation immigrant
Private HS	Indicator variable equal to one if it is the participant attended a private high school prior to Bryant University

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