

Miserable Millennials: The Current State of the Student Loan Bubble Using 2016 Data

Victoria Walter

Wage and Employment Determination in the U.S. Labor Market

Professor Sohani Fatehin

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## Introduction

Dickinson College's, my alma mater and a private liberal arts college, total cost of attendance for the 2019-2020 school year is \$73,854. Pennsylvania State University, a public state university, at Main Campus's total cost of attendance for a PA Resident is between \$31,864-35,086 and for non-PA residents is \$48,268-51,490. This is, obviously, *a lot of money*. Americans have witnessed two major trends in higher education in the last three decades. The first, the continuously increasing need for a college degree in order to pursue a career and sustain the American middle class. Governments and institutions have made great strides to recruit students from lower socioeconomic backgrounds and achieve greater classroom diversity. For decades, higher education was the key for so many to lift themselves out of systemic poverty and grow the middle class.

The second trend, unfortunately, is skyrocketing costs for tuition, board, and fees from community colleges to public universities to private liberal arts colleges and everything in between. These two trends produce an ugly byproduct: debt. Student loan debt. Millions of students and their families cannot bare these increasing costs and are forced to turn to education loans. This has led student debt in America to increase exponentially, especially in the wake of the Great Recession. During the same time period, there were three factors in the economy that contributed to the increase: (1) low federal funds rate making it cheaper to borrow, (2) recent undergraduates choosing to go to graduate school because they were unable to find jobs during the Great Recession, (3) more students than ever choosing for-profit universities, and (4) substantial federal budget cuts to higher education spending.

The Great Recession created two of the economic factors additionally contributing to our current student debt bubble. During the Great Recession, the Federal Reserve responded by cutting the federal funds rate to 0%, a very typical method of expansionary monetary policy. Making it cheaper to borrow, the Federal Reserve hoped that this would spur consumption and pull the United States out of recession. This incentive to borrow coincided with the high unemployment of the Great Recession. Many recent undergraduates were unable to find a job and instead chose to attend graduate school, most of whom had to take on more student loan debt in order to attend. After finishing graduate school, many of these individuals were overqualified for the jobs they originally had wanted—but only for a short time. Employers began to raise their expectations, preferring or even requiring graduate education for jobs that previously didn't ask for it. The third effect is the increase in attendance of for-profit universities. In 2014, eight of the top ten colleges where students owe the most were for-profit universities contrasting with just one in 2000. Additionally, students at for-profit universities have the highest drop-out rate on average compared to other types of higher education. These findings are illustrated in Figures 1 and 2.

Figure 1: Where Student Loans Are Going

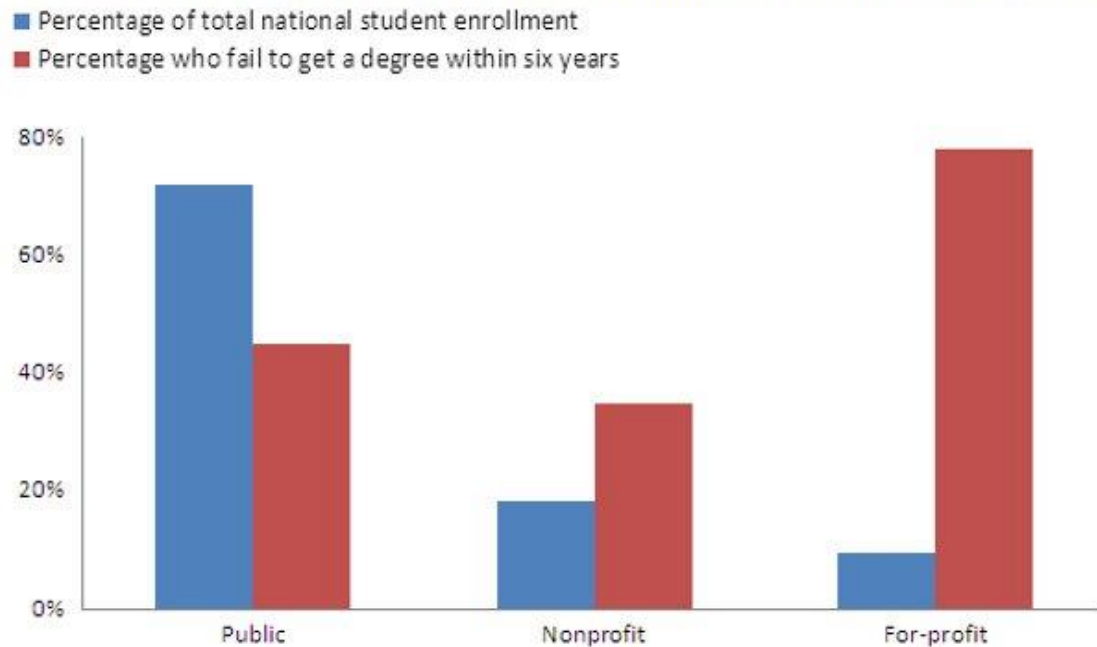
### Where Student Loans are Going:

Colleges whose students owe the most, 2000 vs. 2014

For-Profit		Non-Profit or Public	
2000		2014	
Institution	Total Debt (Billions)	Institution	Total Debt (Billions)
1 New York University	\$2.2	1 University of Phoenix-Phoenix Campus	\$35.5
2 University of Phoenix-Phoenix Campus	\$2.1	2 Walden University	\$9.8
3 Nova Southeastern University	\$1.7	3 Nova Southeastern University	\$8.7
4 Pennsylvania State University	\$1.7	4 DeVry University-Illinois	\$8.2
5 University of Southern California	\$1.6	5 Capella University	\$8.0
6 Ohio State University-Main Campus	\$1.5	6 Strayer University-Global Region	\$6.7
7 Temple University	\$1.5	7 Kaplan University-Davenport Campus	\$6.7
8 Arizona State University	\$1.4	8 New York University	\$6.3
9 Michigan State University	\$1.3	9 Argosy University-Chicago	\$6.2
10 University of Minnesota-Twin Cities	\$1.3	10 Ashford University	\$5.9

Figure 2: College Enrollment and Drop-Out Rates Among

**College enrollment and drop-out rates at different four-year institutions**



Source: NCES, Harvard Graduate School of Education

Figure 3 from Bloomberg shows this massive increase in student debt relative to other forms of student debt following 2008.<sup>1</sup>

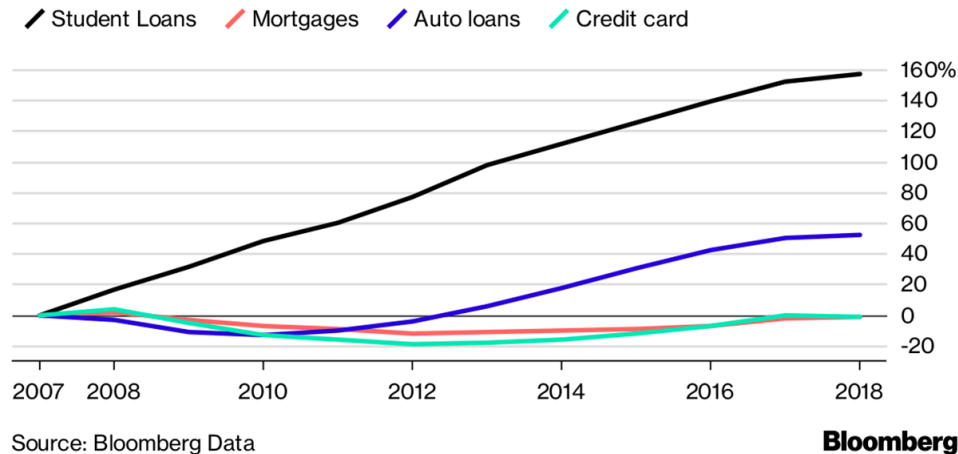
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<sup>1</sup> <https://www.bloomberg.com/news/articles/2018-10-17/the-student-loan-debt-crisis-is-about-to-get-worse>

Figure 3: Student Debt Just Keeps Growing

### Student Debt Just Keeps Growing

Student loans are the fastest growing segment of U.S. household debt, seeing almost 157 percent growth since the Great Recession.



The growing student debt bubble could be very detrimental to the U.S. economy. If more young workers are suffocated by student loan debt, they are unable to buy homes, buy new cars, or spend disposable income back into the economy. Therefore, consumption, the economy, and GDP growth can slow, especially once the expansionary effects of Trump's tax cuts wear off. Additionally, the student loan bubble is dangerous not only to the U.S. economy but also the U.S. government. Most of the outstanding student debt was issued by the federal government, so when borrowers default on their loans, the federal government loses money. As the federal government loses more money, the federal deficit and debt grow, exacerbating an existing problem. Federal governments cannot simply go bankrupt and receive bailouts like private banks. As more borrowers default on their loans, interest rates rise for those that are still paying, which could then incite another round of defaults. Because of drastic implications on individual borrowers in the U.S. and the U.S. government and economy as well, there needs to be more research conducted on this topic and better policy solutions put in place.

## **Review of Existing Literature**

There is a limited but growing amount of literature and research on the current student debt crisis in America, but there is an abundance of existing literature and research surrounding the topic of household debt. The Federal Reserve Bank of Dallas recently released a report about the current state of household debt in the U.S. using data from the New York Consumer Credit Panel with Equifax from up until the second quarter of 2017 (Ash, Ford, and Siems 2017). Their findings focus on the drivers of household debt in the U.S. following the financial crisis. Since 2013, total household debt has rebounded, indicating a recovery from the Great Recession, but auto and student loans have been exploded (Ash, Ford, and Siems 2017). Student debt in the U.S. has doubled to over \$1.3 trillion since 2008 to the second quarter of 2017 (Ash, Ford, and Siems 2017). Auto loans are up over 50% since 2008, especially subprime auto loans, with delinquencies over 15% (Ash, Ford, and Siems 2017). Rising auto and student loans aside, the total household debt relative to GDP is significantly lower in 2017 than in 2009, decreasing from 87% to 67%, indicating a relatively stronger and wealthier economy (Ash, Ford, and Siems 2017).

The Dallas Fed's article offers a concise high-level view of the current state of household debt in the U.S. and gives me a few jumping off points for emphasis when researching other literature on the subject—auto loans, student loans, and household debt to GDP ratios. It also provides helpful graphs showing breakdowns of household debt by quarter from 2003 to 2017. The article doesn't go too in-depth about any particular subject, though, so the topics it emphasizes—auto loans, subprime auto loans, and student loans—will be further investigated and focused on individually in the rest of my research of the existing literature on household debt in the U.S.

Student loans have also exploded along with auto loans since the Great Recession. The Brown Center on Education Policy at Brookings published an article in 2014 detailing the risks of a student loan bubble—“Is There a Student Loan Crisis on the Horizon?” by Beth Akers and Matthew M. Chingos. They use the Survey of Consumer Finance data from 1989 to 2010 and the Federal Reserve Bank of New York’s Consumer Credit Panel to compare education debt levels with incomes for young households by using multivariate decomposition approach (Akers and Chingos 2014). Student debt has increased substantially: the mean per-person student debt burden has tripled from 1989 to 2010 from about \$5,800 to \$17,900 (Akers and Chingos 2014). In the 1989 and 1992 Surveys of Consumer Finances, only a very small amount of people had more than \$20,000 in debt per person, but according to the 2010 survey, about a quarter of people have that amount of more in student loan debt.

There are a number of trends regarding the student loan crisis they find. The first is that a substantial increase in student debt—about a quarter—can be attributed to an increase in graduate degrees in the U.S. (Akers and Chingos 2014). The average debt level for an individual with a graduate degree has gone from \$10,000 to over \$40,000, whereas the average debt level for an individual with only a bachelor’s degree has gone from \$6,000 to \$16,000 (Akers and Chingos 2014). The second trend is that increases in incomes have kept in pace with the increases in student debt (Akers and Chingos 2014). This finding is at odds with that of the St. Louis Fed’s Household Debt Research Symposium, but this could make sense since Akers and Chingos article is from 2014 and Boshara’s Symposium was in 2017. Therefore, using Survey of Consumer Finance data from 2010 does not paint an as accurate picture of the current state of student debt because it has increased so much since then. The final trend in Akers and Chingos



findings about student debt is that the monthly debt payment for student debt has stayed the same or even lessened for some in the last two decades (Akers and Chingos 2014).

## **Methodology**

### *Research Question and Analysis Objectives*

The research question of this study is: Do Americans with additional sources of income other than wages pay off their student debt at higher rates and have lower student debt to income ratios? Given that additional sources of income—specifically, investment or passive income—are typically what separates the middle class from the upper class in America, I am interested to see if wealthy or upper-class Americans with student debt have a statistically and substantively significant advantage when it comes paying off student loan debt. In the last thirty-years, wages for the middle class have stagnated and the income/wealth gap has widened substantially. Meanwhile, the cost of higher education has increased exponentially, and student loans are easier to borrow than ever. Though all Americans should be able to have access to the resources they may need to obtain higher education and improve their socioeconomic status, this combination of macroeconomic factors and political ignorance from government could spell disaster with the “burst” of the student loan bubble.

This study also seeks to analyze the relationship between education level, types of income, amount of student debt, and student debt-to-income ratios at the household level. To understand the context of the growing student loan bubble, this analysis also takes into account a number of factors regarding the student loan (is it a federal loan, etc). Additionally, this analysis includes a number of demographic variables control for and also study their association and impact on amount of outstanding student debt, percentages of outstanding student debt, and

student debt-to-income ratios. The demographics include sex, race, gender, marital status, and number of dependents. Finally, this analysis seeks to aim to better understand the current student debt crisis and what policy objectives are necessary to prevent a student debt bubble burst.

### *Data*

The dataset chosen for this analysis is the Survey of Consumer Finances (SCF) from 2016. The SCF is conducted by the Federal Reserve Bank of New York and has been surveying Americans since 1989. The SCF is a voluntary cross-sectional survey of U.S. households that collects data on families' balance sheets, income, and demographic characteristics conducted over the phone. The survey construction is very detailed and asks a variety of questions regarding debt, incomes, consumption, investments, as well as changes in demographics. In its entirety, the 2016 SCF has over 30,000 variables for over 6,500 households surveyed. Since this dataset comes from a reputable source, has a large sample size, and is very detailed, it makes it a great dataset for this analysis.

I was able to access the 2016 SCF already in Stata format from the New York Federal Reserve Bank of New York website. However, since there are so many variables, the version of Stata I have on my computer could not process all of them so I had to enter manually the variable codes I wanted to use. Table 1 shows the variables I chose from the survey, their codes, and the survey question that was asked for that specific answer or value. The variables I chose make up four categories: categorical demographic data, categorical loan data, continuous income data, and continuous loan amount data. For categorical demographic variables, I chose sex, race, age, education level, marital status, and number of dependents—basic demographic information to gauge the respondents' background and family situation.

For categorical loan information, I chose to four variables: (1) Student Loans, (2) Federal Student Loans, (3) Whose Education, and (4) Drop Out. The descriptions of these variables are included in Table 1. For student loans, I decided to only include data from respondents that have student loan debt, which reduced the number of observations to about 6,080. This is still a large sample size and the summary statistics and regressions are more accurate considering only about 20% of respondents in the original dataset have student loans. I chose to include Federal Loans because student loans issued from the federal government typically have much lower interest rates than private student loans. Additionally, this study is concerned with the implications of the growing student debt bubble on the U.S. federal government, so it is necessary to measure any effect that specifically having a federal student loan has on my dependent variables. The Whose Education variable is important in this analysis considering the rise of parent plus loans and their contribution to the student loan variable. Finally, in the last decade, the top ten institutions with the most student loan debt are for-profit universities. Unfortunately, there is no variable for regarding for-profit universities. However, students attending for-profit universities face much higher drop-out rates than students in any other university or institution, thus why I chose the Drop Out variable.

The continuous income information is necessary in order to measure the impact that investment or passive income (Total Income – Wage Income) has. There were some small changes I made to the data in order for my results to make more sense. Using Stata, I replaced any total income values that were negative with 0. Based on the SCF's methodology for the total income question, it does not make sense to me why it would be negative. Finally, I selected continuous variables relating to a respondent's amount of outstanding student loans and the

original amount borrowed for those student loans. The SCF gives respondents the options to report information for up to six student loans.

Table 1: Survey Variables

Survey Variables for Demographics, Student Loan Information, and Incomes		
Variable	Code	Description
Sex	X8021	I am required to ask your sex.
Age	X8022	How old are you?
Race	X6809	Which of these categories do you feel best describe you: white, black or African-American, Hispanic or Latino, Asian, American Indian or Alaska Native, Hawaiian Native or other Pacific Islander, or another race?
Education	X5931	What is the highest level of school completed or the highest degree you have received?
Marital status	X8023	(Are you/Is your [RELATIONSHIP] currently married or living with a partner, separated, divorced, widowed, or (have you/has [he/she]) never been married?
Number of Dependents	X101	The number of people in the household according to the HHL. Excludes people included in the household listing who do not usually live there and who are financially independent.
Student Loans	X7801	Do you (and your family living here) owe any money or have any student loans for educational expenses?
Federal Student Loans	X7879	Is this loan a federal student loan such as Stafford, Direct, PLUS, or Perkins?
Whose Education	X7978	For whose education was (this/the largest/the next largest) loan taken out?
Drop Out	X7881	Did (you/he/she/he or she) complete the educational program this loan was used to pay for?
Total Income	X5729	How much was the total income you (and your family living here) received in 2015 from all sources, before taxes and other deductions were made?
Wage Income	X5702	In total, what was your (family's) annual income from wages and salaries in 2015, before deductions for taxes and anything else?

Survey Variables for Loan and Borrowing Amounts (in U.S. Dollars)		
Variable	Code	Description
Education Loan #1 Amount Still Owed	X7824	How much is still owed on this loan?
Education Loan #2 Amount Still Owed	X7847	How much is still owed on this loan?
Education Loan #3 Amount Still Owed	X7870	How much is still owed on this loan?
Education Loan #4 Amount Still Owed	X7924	How much is still owed on this loan?
Education Loan #5 Amount Still Owed	X7947	How much is still owed on this loan?
Education Loan #6 Amount Still Owed	X7970	How much is still owed on this loan?
Education Loan #1 Amount Borrowed	X7805	How much was borrowed or financed (for this loan), not counting the finance charges?
Education Loan #2 Amount Borrowed	X7828	How much was borrowed or financed (for this loan), not counting the finance charges?
Education Loan #3 Amount Borrowed	X7851	How much was borrowed or financed (for this loan), not counting the finance charges?
Education Loan #4 Amount Borrowed	X7905	How much was borrowed or financed (for this loan), not counting the finance charges?
Education Loan #5 Amount Borrowed	X7928	How much was borrowed or financed (for this loan), not counting the finance charges?
Education Loan #6 Amount Borrowed	X7951	How much was borrowed or financed (for this loan), not counting the finance charges?

In order to meet my analysis objectives, I needed to construct my dependent variables because they were not provided by the SCF. Table 2 shows these variables and how they were constructed: total outstanding student debt, total amount of student loans borrowed, total student debt paid off, percentage student debt outstanding, percent student debt paid, student debt to wage income ratio, and student debt to total income ratio and total amounts in dollars of outstanding debt, paid off debt, and originally borrowed amount. The reason I chose three dependent variables to investigate my research question instead of one is because each of these variables tells a different part of the story regarding the state of student debt in America. For

example, \$75,000 in outstanding debt has a different financial and economic impact on a respondent earning \$600,000 annually and a respondent earning \$60,000 annually, which is why I am analyzing the student debt-to-income ratios and total amounts. Additionally, responds that owe \$10,000 in student debt, for example, could be in drastically different financial situations depending on how much was originally borrowed. Respondent 1 could have originally borrowed \$100,000 in student loans, and therefore \$10,000 outstanding indicates they have paid off 90% of their student debt so far. Respondent two could have originally borrowed \$12,000 in student loans, and therefore \$10,000 indicates they have paid off only 16.67% of their student debt so far. Factoring in incomes and ages further deepens this analysis.

Finally, I dropped most of the continuous loan information variables from the survey, specifically the Education Loan Amount Outstanding #1-6 and Education Loan Borrowed #1-6. The variables used in the OLS regression analysis are in the descriptive and summary statistics in Tables 3 and 4.

Table 2: Constructed Variables

Constructed Variables	
Variable	Formula
Total Remaining Student Debt	Education Loan #1 + Education Loan #2 + Education Loan #3 + Education Loan #4 + Education Loan #5 + Education Loan #6
Total Student Loan Amount Borrowed	Education Loan #1 Amount Borrowed + Education Loan #2 Amount Borrowed + Education Loan #3 Amount Borrowed + Education Loan #4 Amount Borrowed + Education Loan #5 Amount Borrowed + Education Loan #6 Amount Borrowed
Total Student Debt Paid Off	Total Borrowed - Total Remaining Debt <i>**dropped any negative values</i>
Percentage Student Debt Remaining	Total Remaining Student Debt / Total Student Loan Amount Borrowed * 100%
Percentage Student Debt Paid	Total Student Debt Paid Off / Total Student Loan Amount Borrowed * 100% <i>**dropped any negative values</i>
Student Debt to Wage Income Ratio	Total Remaining Student Debt / Wage Income
Student Debt to Total Income Ratio	Total Remaining Student Debt / Total Income

There are a few other data construction changes I made. I recoded the race and marital status variables so that they became dummy variables, 0 for whites/1 for nonwhites and 0 for not married/1 for married. Additionally, I recoded Drop Out as 5 for dropping out and 1 for not dropping out so that my regressions make more sense, because previously it was coded as the opposite. Finally, I recoded Whose Education to a dummy variable, where 0 is that the loan is for the respondent and that 1 is the loan for someone other than the respondent. The descriptive statistics are available for each of these variables in dummy form and before dummy form in Table 3.

### *Descriptive and Summary Statistics*

There are several notable trends in the descriptive and summary statistics of my variables. The SCF is a voluntary survey conducted over the phone and that has a substantial impact on the descriptive statistics for demographics. Most of the respondents are male and white. This trend was the same in the data before dropping respondents without student loans. Age and marital status changed drastically after dropping respondents without student loans. Originally, most of the respondents were married and between the ages of 50-70, which makes sense because that age demographic is most likely to be retired or at least have more time on their hands to answer a voluntary survey. After the change, most respondents are single or never married, and fall between the ages of 29 and 45, though the distribution is still somewhat even among ages. The most frequent levels of education are bachelor's degree, high school diploma, and master's degree. I hypothesize that for many of the individuals above about 40, and for many of the individuals that have only a high school diploma, the student loans borrowed are most likely for someone other than themselves, most likely their partner or their children. Almost half of the

loans borrowed by respondents in this data are for someone other than the respondent.

Additionally, almost all of the loans are federal loans.

The summary statistics for incomes and student debt paid, and percentage paid indicate that many of the respondents are still students and not earning an income or have recently graduated and have not yet started paying off their student loans. For wage income in particular, the bottom 10<sup>th</sup> percentile are all \$0. For percentage of student loans paid, the bottom 25<sup>th</sup> percentile are all 0% paid. Even by the 50<sup>th</sup> percentile, only about 8.33% of student loans are paid. Additionally, it appears that there is a wide income disparity between both types of income. For wage income, the standard deviation is almost \$98,000. The disparity is even greater for total income, where the standard deviation is over \$250,000. There are a few outliers or abnormalities in the data, especially for percentages and ratios. I don't quite understand why there are outstanding student debt percentages above 100% like it is at the 90<sup>th</sup> percentile, but this probably is an error that arose because it is a variable that I constructed. There are some very high student debt to income ratios, as high as 172:1. I assume these outliers arise from very low but not yet 0 incomes of respondents still in school and high student debt. Finally, there also seems to be a disparity in percentage of student loans outstanding, where the standard deviation is over 49%.



Table 3: Demographics Descriptive Statistics

Demographics Descriptive Statistics for Sex, Race, Marital Status, Number of Dependents					
Variable	Response		Code	Frequency	Percentage
<b>Sex</b>	Male		1	4360	71.71
	Female		2	1720	28.29
<b>Race</b>	White		0	3871	63.67
	Nonwhite		1	2209	36.33
		Black		1338	22.01
		Latino		545	8.96
		Other		326	5.36
<b>Marital Status</b>	Married		1	2885	47.45
	Not Married		0	3195	52.55
		Inappropriate		825	13.57
		Separated		190	3.13
		Divorced		690	11.35
		Widowed		120	1.97
		Never Married		1370	22.53
<b>Number of Dependents</b>					
		1		980	16.12
		2		1665	27.38
		3		1370	22.53
		4		1200	19.74
		5		595	9.79
		6		180	2.96
		7		30	0.49
		8		35	0.58
		9		15	0.25
		10		5	0.08
		11		5	0.08

Demographics Descriptive Statistics for Age						
Response	Frequency	Percentage		Response	Frequency	Percentage
19	15	0.25		51	145	2.38
20	50	0.82		52	140	2.3
21	60	0.99		53	100	1.64
22	85	1.4		54	95	1.56
23	95	1.56		55	115	1.89
24	110	1.81		56	95	1.56
25	130	2.14		57	75	1.23
26	140	2.3		58	95	1.56
27	225	3.7		59	60	0.99
28	170	2.8		60	110	1.81
29	220	3.62		61	70	1.15
30	160	2.63		62	55	0.9
31	205	3.37		63	20	0.33
32	240	3.95		64	40	0.66
33	175	2.88		65	25	0.41
34	155	2.55		66	20	0.33
35	225	3.7		67	25	0.41
36	190	3.13		68	10	0.16
37	185	3.04		69	15	0.25
38	165	2.71		70	20	0.33
39	155	2.55		71	15	0.25
40	155	2.55		72	5	0.08
41	160	2.63		73	0	0
42	180	2.96		74	10	0.16
43	135	2.22		75	10	0.16
44	135	2.22		76	0	0
45	150	2.47		77	5	0.08
46	165	2.71		78	0	0
47	95	1.56		79	0	0
48	140	2.3		80	0	0
49	105	1.73		81	5	0.08
50	120	1.97		82	5	0.08

Demographics Descriptive Statistics for Education Level			
Response	Code	Frequency	Percentage
Less than 1st grade	-1	5	0.08
1st-4th grade	1	5	0.08
5th-6th grade	2	10	0.16
7th-8th grade	3	10	0.16
9th grade	4	20	0.33
10th grade	5	60	0.99
11th grade	6	20	0.33
12th grade, no diploma	7	75	1.23
High school graduate	8	1015	16.69
Some college but no degree	9	1082	17.8
Associate degree in college - occupation/vocation	10	505	8.31
Associate degree in college - academic program	11	530	8.72
Bachelor's degree	12	1633	26.86
Master's degree	13	775	12.75
Professional school degree / Doctorate Degree	14	335	5.51

Table 4: Student Loan Information Descriptive Statistics

Student Loan Information Descriptive Statistics				
Does the respondent have student loans?				
		Code	Frequency	Percent
		1	6080	100
		0	0	0
Is the loan a federal loan?				
		Code	Frequency	Percent
		1	5,257	86.46
		5	823	13.54
Did you/he/she drop out of the educational program for which this				
		Code	Frequency	Percent
		5	980	16.12
		1	3686	60.63
		0	1414	23.26
For whose education was this loan taken out?				
		Code	Frequency	Percentage
		0	3175	52.22
		1	2905	47.78
	Spouse / Partner		1905	31.33
	Child		1000	16.45
	Grandchild		0	0
	Other		0	0

Table 5: Income Summary Statistics

Wage Income (in U.S. Dollars)					Total Income (in U.S. Dollars)				
	Percentiles	Smallest				Percentiles	Smallest		
1%	0	0			1%	1100	0		
5%	0	0			5%	10000	0		
10%	0	0	Observations	6080	10%	15000	0	Observations	6080
25%	24000	0	Sum of Wgt.	6080	25%	33000	0	Sum of Wgt.	6080
50%	49000		Mean	70711.53	50%	60000		Mean	99277.37
		Largest	Standard Deviation	97741.96			Largest	Standard Deviation	250970.9
75%	90000	2.00E+06			75%	105000	6.00E+06		
90%	145000	2.00E+06	Variance	9.55E+09	90%	175000	6.00E+06	Variance	6.30E+10
95%	200000	2.00E+06	Skewness	8.733966	95%	251500	6.00E+06	Skewness	16.05828
99%	400000	2.00E+06	Kurtosis	142.5767	99%	6.14E+05	6.00E+06	Kurtosis	326.8785

Table 6: Student Loan Summary Statistics

Student Debt Outstanding (in U.S. Dollars)				
	Percentiles	Smallest		
1%	510	100		
5%	2000	100		
10%	3400	100	Observations	6080
25%	8350	100	Sum of Wgt.	6080
50%	20000		Mean	35549.12
		Largest	Standard Deviation	46816.68
75%	44650	465000		
90%	84000	465000	Variance	2.19E+09
95%	120000	466000	Skewness	3.396973
99%	224000	466000	Kurtosis	20.1091
Student Debt Paid (in U.S. Dollars)				
	Percentiles	Smallest		
1%	0	0		
5%	0	0		
10%	0	0	Observations	6080
25%	0	0	Sum of Wgt.	6080
50%	1650		Mean	8055.467
		Largest	Standard Deviation	16661.78
75%	10000	212000		
90%	22000	232000	Variance	2.78E+08
95%	35000	246000	Skewness	5.069302
99%	80000	257000	Kurtosis	44.96549

Student Debt Originally Borrowed (in U.S. Dollars)				
	Percentiles	Smallest		
1%	1500	400		
5%	3500	400		
10%	5800	400	Observations	6080
25%	11000	400	Sum of Wgt.	6080
50%	25000		Mean	42319.74
			Standard	
		Largest	Deviation	51247.82
75%	50000	436000		
90%	100000	437000	Variance	2.63E+09
95%	140000	470000	Skewness	3.216483
99%	260000	470000	Kurtosis	17.60636

Percentage of Student Loans Outstanding					Percentage of Student Loans Paid				
	Percentiles	Smallest				Percentiles	Smallest		
1%	7.058824%	0.66667%				1%	0%	0%	
5%	23.52941%	0.66667%				5%	0%	0%	
10%	35.64155%	0.66667%	Observations	6080		10%	0%	0%	Observations 6080
25%	62.50%	0.66667%	Sum of Wgt.	6080		25%	0%	0%	Sum of Wgt. 6080
50%	91.66667%		Mean	84.49303%		50%	8.33333%		Mean 21.25042%
			Standard						Standard
		Largest	Deviation	49.31419%				Largest	Deviation 26.37951%
75%	100%	1000%				75%	37.5%	99.33334%	
90%	105%	1000%	Variance	2431.889%		90%	64.35845%	99.33334%	Variance 695.878%
95%	125%	1000%	Skewness	8.569511		95%	76.47059%	99.33334%	Skewness 1.093853
99%	221.2121%	1000%	Kurtosis	148.0049		99%	92.94118%	99.33334%	Kurtosis 3.059364

Table 7: Student Debt-to-Income Ratio Summary Statistics

Student Debt to Wage Income Ratio					Student Debt to Total Income Ratio				
	Percentiles	Smallest				Percentiles	Smallest		
1%	0.009234828	0.0010101				1%	0.0071575	3.08E-04	
5%	0.03043478	0.0010101				5%	0.0246305	3.12E-04	
10%	0.05333333	0.0010101	Observations	5455		10%	0.0465116	3.34E-04	Observations 6025
25%	0.1428571	0.0010309	Sum of Wgt.	5455		25%	0.1243243	3.61E-04	Sum of Wgt. 6025
50%	0.3548387		Mean	1.217555		50%	0.3142857		Mean 0.9704231
			Standard						Standard
		Largest	Deviation	5.983609				Largest	Deviation 4.740638
75%	0.952381	163.9524				75%	0.8571429	149.913	
90%	2.181818	164.1905	Variance	3.58E+01		90%	1.811765	149.913	Variance 2.25E+01
95%	3.6	165.1429	Skewness	21.03272		95%	2.92963	150.3913	Skewness 26.01227
99%	13.75	172.4	Kurtosis	535.8518		99%	8.627451	150.7826	Kurtosis 793.0271

### OLS Regression Parameters

For this analysis, I am using robust OLS regressions. I chose to make my OLS regressions robust so that bias is minimized. My plan to reach the research objectives of this

study is to do two regression tables for each individual dependent variable. The first regression table for each dependent variable will analyze each independent variable individually, so without controlling for the other variables. My second regression table for each dependent variable will analyze each independent variable controlling for the others. The purpose of the two tables is to see if there is a statistically significant and/or substantively significant difference between the association or impact of an independent variable controlling for the other variables or not controlling. Some sample regressions include:

$$\begin{aligned} \text{DebtWageIncRatio} = & \beta_1 * \text{Sex} + \beta_2 * \text{Race} + \beta_3 * \text{Age} + \beta_4 * \text{Marital} + \\ & \beta_5 * \text{Dependents} + \beta_6 * \text{Education} + \beta_7 * \text{DropOut} + \\ & \beta_8 * \text{WhoseEducation} + \beta_9 * \text{FedStudentLoans} \end{aligned}$$

$$\begin{aligned} \text{DebtTotalIncRatio} = & \beta_1 * \text{Sex} + \beta_2 * \text{Race} + \beta_3 * \text{Age} + \beta_4 * \text{Education} \\ & + \beta_5 * \text{DropOut} + \beta_6 * \text{WhoseEducation} \end{aligned}$$

## Results

My results progress in the following order: amount of student debt outstanding for wage and total incomes, percentage of student debt outstanding for wage and total incomes, and finally student debt-to-income ratios for wage and total incomes. For each analysis there are two tables: one table of each dependent variable analyzed in isolation and one table analyzed using the other dependent variables as controls.

Table 8: Wage Income and Amount of Outstanding Student Debt

OLS Estimates of the Effect of Wage Income, Demographic Variables, and Loan Information on the Amount of Outstanding Student Debt of a Respondent <i>**Without Controlling for Other Variables</i>										
Dependent Variable: Amount in U.S. Dollars of Outstanding Student Debt of a Respondent from the Survey of Consumer Finances 2016										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Wage Income	0.0523*** (0.00584)	0.0566*** (0.00629)	0.0533*** (0.00595)	0.0519*** (0.00595)	0.0213*** (0.00654)	0.0431*** (0.00575)	0.0504*** (0.00614)	0.0524*** (0.00587)	0.0487*** (0.00613)	0.0574*** (0.00590)
Sex		4,094*** (1,415)								
Race			2,318* (1,285)							
Age				26.80 (48.23)						
Education					6,337*** (321.4)					
Has the Student Dropped Out?						-4,248*** (229.9)				
Is the Loan for Someone Other than the Respondent?							1,838 (1,267)			
Is the Loan a Federal Loan?								-1,491*** (352.5)		
Marital Status									2,420* (1,272)	
Number of Dependents										-2,044*** (368.2)
Constant	31,848*** (692.5)	26,294*** (2,046)	30,936*** (838.4)	30,797*** (1,977)	-32,837*** (3,031)	40,017*** (970.8)	31,107*** (776.4)	34,141*** (938.6)	30,960*** (821.9)	37,548*** (1,401)
Observations	6,080	6,080	6,080	6,080	6,080	6,080	6,080	6,080	6,080	6,080
R-squared	0.012	0.013	0.013	0.012	0.092	0.039	0.012	0.014	0.013	0.016
Robust standard errors in parentheses										
*** p<0.01, ** p<0.05, * p<0.1										



OLS Estimates of the Effect of Wage Income, Demographic Variables, and Loan Information on the Amount of Outstanding Student Debt of a Respondent <i>**Controlling for Other Variables</i>								
Dependent Variable: Amount in U.S. Dollars of Outstanding Student Debt of a Respondent from the Survey of Consumer Finances 2016								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Wage Income	0.0570*** (0.00635)	0.0566*** (0.00648)	0.0232*** (0.00694)	0.0205*** (0.00709)	0.0117 (0.00798)	0.0111 (0.00798)	0.00887 (0.00823)	0.0111 (0.00808)
Sex	3,773*** (1,385)	3,771*** (1,386)	429.7 (1,297)	550.3 (1,295)	5,479*** (1,304)	5,247*** (1,303)	7,091*** (1,391)	7,417*** (1,400)
Race	1,731 (1,256)	1,729 (1,257)	4,741*** (1,228)	4,856*** (1,222)	5,178*** (1,216)	4,937*** (1,212)	4,987*** (1,213)	5,438*** (1,228)
Age		26.15 (48.37)	7.741 (47.53)	-6.623 (47.06)	-170.6*** (53.00)	-170.8*** (52.94)	-195.0*** (51.85)	-213.2*** (52.90)
Education							3,617** (1,432)	5,516*** (1,486)
Has the Student Dropped Out?								-1,841*** (391.1)
Is the Loan for Someone Other than the Respondent?			6,424*** (323.6)	5,880*** (319.6)	6,707*** (360.3)	6,755*** (361.9)	6,723*** (362.9)	6,581*** (353.3)
Is the Loan a Federal Loan?				-2,678*** (216.6)	-2,360*** (218.1)	-2,296*** (218.0)	-2,277*** (217.9)	-2,274*** (218.3)
Marital Status					12,887*** (1,486)	13,077*** (1,493)	12,397*** (1,556)	13,315*** (1,624)
Number of Dependents						-1,587*** (344.5)	-1,572*** (343.5)	-1,585*** (343.3)
Constant	26,049*** (2,085)	25,027*** (2,652)	-36,483*** (3,779)	-25,429*** (3,847)	-40,061*** (4,228)	-37,890*** (4,169)	-40,247*** (4,268)	-34,627*** (4,084)
Observations	6,080	6,080	6,080	6,080	6,080	6,080	6,080	6,080
R-squared	0.014	0.014	0.095	0.105	0.117	0.119	0.120	0.123
Robust standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1								

Wage income is statistically significant in every column of the regressions without controls, though not really substantively significant. Wage income loses its statistical significance in column 5 when marital status is added.

In Table 8, I think it is particularly interesting that race and marital status are not statistically significant when not controlling for other variables (Stata marks it with a star, but a p-value  $> 0.05$  is usually not accepted as statistically significant in econometric research) but when controlling for the other variables, it becomes consistently and substantively significant. Married people have more debt, which makes sense because married people may have a child that requires student loans. Race did not become statistically significant until controlling for whose education, therefore implying that the outstanding student debt nonwhites have is for someone else, again, probably their children. Additionally, federal loans are statistically and substantively significant, and negative. Surprisingly, every demographic and loan variable is statistically significant in the final column (8) but wage income is not.



OLS Estimates of the Effect of Total Income, Demographic Variables, and Loan Information on the Amount of Outstanding Student Debt of a Respondent <i>**Controlling for Other Variables</i>							
Dependent Variable: Amount in U.S. Dollars of Outstanding Student Debt of a Respondent from the Survey of Consumer Finances 2016							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Total Income	0.0156*** (0.00444)	0.0153*** (0.00446)	0.00560* (0.00328)	0.00550* (0.00327)	0.00329 (0.00307)	0.00492 (0.00319)	0.00374 (0.00310)
Sex	2,246* (1,358)	2,255* (1,357)	-276.4 (1,248)	-23.70 (1,244)	5,247*** (1,285)	3,706*** (1,422)	7,325*** (1,392)
Race	1,375 (1,261)	1,376 (1,261)	4,653*** (1,229)	4,782*** (1,223)	5,141*** (1,216)	4,689*** (1,220)	5,391*** (1,229)
Age		41.96 (48.71)	15.19 (47.49)	-1.955 (47.04)	-171.0*** (53.29)	-62.89 (47.29)	-216.0*** (53.19)
Education						6,546*** (1,350)	5,686*** (1,473)
Has the Student Dropped Out?							-1,812*** (394.5)
Is the Loan for Someone Other than the Respondent?			6,549*** (315.2)	5,968*** (311.9)	6,765*** (344.6)	5,984*** (311.9)	6,622*** (338.2)
Is the Loan a Federal Loan?				-2,732*** (214.9)	-2,385*** (217.4)	-2,596*** (215.4)	-2,295*** (217.6)
Marital Status					13,087*** (1,430)		13,417*** (1,589)
Number of Dependents						-1,495*** (337.2)	-1,632*** (344.1)
Constant	30,618*** (1,979)	28,938*** (2,617)	-36,079*** (3,774)	-24,784*** (3,840)	-39,902*** (4,203)	-28,223*** (4,059)	-34,509*** (4,024)
Observations	6,080	6,080	6,080	6,080	6,080	6,080	6,080
R-squared	0.007	0.007	0.093	0.104	0.117	0.109	0.123
Robust standard errors in parentheses							
*** p<0.01, ** p<0.05, * p<0.1							

Table 9 has some similar trends to Table 8 regarding wage income, but there are a few striking differences. Sex only becomes statistically significant when marital status is controlled for. Additionally, the impact or association of sex increases as more variables are controlled for.



OLS Estimates of the Effect of Wage Income, Demographics, and Loan Information on the Percentage of Outstanding Student Debt of a Respondent <i>**Controlling for Other Variables</i>								
Dependent Variable: Percentage of Outstanding Student Debt of a Respondent from the Survey of Consumer Finances 2016								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Wage Income	-4.93e-05*** (9.29e-06)	-5.20e-05*** (9.66e-06)	-4.23e-05*** (8.75e-06)	-4.21e-05*** (8.73e-06)	-4.19e-05*** (8.77e-06)	-4.17e-05*** (8.77e-06)	-4.02e-05*** (8.71e-06)	-4.11e-05*** (8.77e-06)
Sex	13.02*** (1.725)	13.01*** (1.722)	13.98*** (1.778)	13.97*** (1.775)	13.87*** (1.529)	13.95*** (1.528)	12.70*** (1.587)	12.57*** (1.579)
Race	7.726*** (1.325)	7.717*** (1.324)	6.843*** (1.286)	6.831*** (1.284)	6.825*** (1.271)	6.907*** (1.264)	6.873*** (1.263)	6.697*** (1.246)
Age		0.154*** (0.0596)	0.160*** (0.0598)	0.161*** (0.0602)	0.164** (0.0731)	0.164** (0.0731)	0.181** (0.0742)	0.188** (0.0761)
Education							-2.463** (1.201)	-3.207** (1.315)
Has the Student Dropped Out?								0.721 (0.512)
Is the Loan for Someone Other than the Respondent?			-1.866*** (0.250)	-1.811*** (0.250)	-1.827*** (0.299)	-1.844*** (0.300)	-1.822*** (0.298)	-1.766*** (0.297)
Is the Loan a Federal Student Loan?				0.269 (0.377)	0.263 (0.376)	0.241 (0.374)	0.228 (0.374)	0.227 (0.373)
Marital Status					-0.252 (1.526)	-0.317 (1.526)	0.145 (1.531)	-0.214 (1.610)
Number of Dependents						0.545 (0.413)	0.534 (0.413)	0.539 (0.412)
Constant	68.47*** (2.290)	62.43*** (3.879)	80.30*** (3.295)	79.19*** (3.743)	79.48*** (3.397)	78.73*** (3.387)	80.34*** (3.408)	78.13*** (4.174)
Observations	6,080	6,080	6,080	6,080	6,080	6,080	6,080	6,080
R-squared	0.039	0.041	0.047	0.047	0.047	0.047	0.047	0.048
Robust standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1								

Wage Income is consistently statistically significant and negative whether controlling for other variables or not but, again, is not very substantively significant so the impact is very little. Consistently statistically significant when controlling for other variables are sex, race, age, education, and if the loan is for someone other than the respondent. Interestingly, if the respondent has a higher education level and if the loan is for someone other than the respondent,

the percent of outstanding loans is negative and somewhat substantively significant at an impact of about a 2-3% reduction each. Whether controlling for other variables or not, sex and race are statistically significant and substantively significant in every single column they are analyzed. The coefficient is positive, indicating that women and nonwhites respectfully have about 14% and 9% more outstanding student loan debt.

Table 11: Total Income and Percentage of Outstanding Debt

OLS Estimates of the Effect of Total Income, Demographic Variables, and Loan Information on the Percentage of Outstanding Student Debt of a Respondent ***Not Controlling for Other Variables										
Dependent Variable: Percentage of Outstanding Student Debt of a Respondent from the Survey of Consumer Finances 2016										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Total Income	-1.58e-05*** (3.17e-06)	-1.18e-05*** (2.49e-06)	-1.48e-05*** (2.79e-06)	-1.67e-05*** (3.44e-06)	-1.28e-05*** (2.80e-06)	-1.54e-05*** (3.11e-06)	-1.48e-05*** (3.03e-06)	-1.59e-05*** (3.19e-06)	-1.20e-05*** (2.60e-06)	-1.57e-05*** (3.17e-06)
Sex		16.06*** (1.866)								
Race			10.48*** (1.501)							
Age				0.129** (0.0598)						
Education					-2.055*** (0.241)					
Has the Student Dropped Out?						1.042*** (0.377)				
Is the Loan for Someone Other than the Respondent?							-3.426*** (1.221)			
Is the Loan a Federal Loan?								0.206 (0.440)		
Marital Status									-10.01*** (1.228)	
Number of Dependents										-0.199 (0.425)
Constant	86.06*** (0.733)	65.06*** (2.083)	82.16*** (0.672)	80.92*** (2.046)	107.4*** (2.879)	84.18*** (0.879)	87.60*** (1.123)	85.75*** (0.992)	90.44*** (1.067)	86.64*** (1.436)
Observations	6,080	6,080	6,080	6,080	6,080	6,080	6,080	6,080	6,080	6,080
R-squared	0.006	0.028	0.017	0.007	0.014	0.008	0.008	0.006	0.016	0.006

Robust standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

OLS Estimates of the Effect of Total Income, Demographic Variables, and Loan Information on the Percentage of Outstanding Student Debt of a Respondent <i>**Controlling for Other Variables</i>								
Dependent Variable: Percentage of Outstanding Student Debt of a Respondent from the Survey of Consumer Finances 2016								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total Income	-1.15e-05*** (2.27e-06)	-1.24e-05*** (2.50e-06)	-9.28e-06*** (2.15e-06)	-9.26e-06*** (2.15e-06)	-9.07e-06*** (2.12e-06)	-9.25e-06*** (2.17e-06)	-8.84e-06*** (2.12e-06)	-8.99e-06*** (2.12e-06)
Sex	14.50*** (1.733)	14.53*** (1.739)	15.35*** (1.784)	15.31*** (1.780)	14.85*** (1.523)	14.94*** (1.521)	13.14*** (1.594)	13.05*** (1.587)
Race	8.058*** (1.340)	8.062*** (1.341)	7.005*** (1.295)	6.987*** (1.293)	6.956*** (1.278)	7.059*** (1.271)	7.004*** (1.270)	6.866*** (1.254)
Age		0.135** (0.0590)	0.143** (0.0594)	0.146** (0.0598)	0.160** (0.0731)	0.161** (0.0731)	0.184** (0.0743)	0.190** (0.0762)
Is the Loan for Someone Other than the Respondent?			-2.112*** (0.245)	-2.031*** (0.245)	-2.100*** (0.292)	-2.114*** (0.292)	-2.069*** (0.292)	-2.029*** (0.291)
Is the Loan a Federal Loan?				0.380 (0.377)	0.350 (0.375)	0.323 (0.374)	0.300 (0.374)	0.300 (0.373)
Marital Status					-1.132 (1.527)	-1.195 (1.527)	-0.505 (1.535)	-0.802 (1.617)
Number of Dependents						0.688* (0.413)	0.666 (0.413)	0.672 (0.413)
Education							-3.420*** (1.177)	-4.027*** (1.300)
Has the Student Dropped Out?								0.572 (0.512)
Constant	64.10*** (2.150)	58.71*** (3.918)	79.68*** (3.319)	78.11*** (3.773)	79.41*** (3.413)	78.43*** (3.411)	80.66*** (3.426)	78.92*** (4.189)
Observations	6,080	6,080	6,080	6,080	6,080	6,080	6,080	6,080
R-squared	0.034	0.035	0.043	0.043	0.043	0.043	0.044	0.044
Robust standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1								

Total income is consistently statistically significant in every column it is analyzed but is not substantively impactful. Without controls, almost every single variable except for number of dependents, federal loans, and drop out are statistically and substantively significant. Sex has the greatest association or impact, where women have on average 13-15% greater outstanding student debt. Race has the second greatest impact, where men have on average 7-8% greater



outstanding student debt. What I find particularly interesting is that individuals with higher education tend to have lower outstanding student debt—about 3-4% and is statistically significant. I also think it is interesting that Drop Out (without controlling for other factors) is actually positive, indicating that those that have dropped out have a higher percentage of debt they haven't paid.

Table 12: Student Debt to Wage Income Ratio

OLS Estimates of the Effect of Demographic Variables and Loan Information on the Student Debt to Wage Income Ratio of a Respondent **Not Controlling for Other Variables										
Dependent Variable: Student Debt to Wage Ratio of a Respondent from the Survey of Consumer Finances 2016										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Sex		1.258*** (0.277)								
Race			0.514** (0.204)							
Age				-0.0229*** (0.00802)						
Education					0.241*** (0.0444)					
Has the Student Dropped Out?						-0.248*** (0.0403)				
Is the Loan for Someone Other than the Respondent?							-0.842*** (0.159)			
Is the Loan a Federal Loan?								-0.103*** (0.0303)		
Marital									-0.960*** (0.161)	
Dependents										-0.275*** (0.0686)
Constant	1.218*** (0.0810)	-0.368 (0.291)	1.030*** (0.0617)	2.124*** (0.356)	-1.329*** (0.395)	1.643*** (0.148)	1.630*** (0.145)	1.375*** (0.117)	1.694*** (0.147)	2.042*** (0.277)
Observations	5,455	5,455	5,455	5,455	5,455	5,455	5,455	5,455	5,455	5,455
R-squared	0.000	0.009	0.002	0.002	0.007	0.005	0.005	0.001	0.006	0.005
Robust standard errors in parentheses										
*** p<0.01. ** p<0.05. * p<0.1										

OLS Estimates of the Effect of Demographic Variables and Loan Information on the Student Debt to Wage Income								
Dependent Variable: Student Debt to Wage Ratio of a Respondent from the Survey of Consumer Finances 2016								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sex	1.195*** (0.247)	1.170*** (0.241)	1.040*** (0.222)	1.032*** (0.221)	0.976*** (0.229)	0.970*** (0.228)	0.744*** (0.251)	0.760*** (0.256)
Race	0.316* (0.165)	0.321* (0.166)	0.446** (0.181)	0.462** (0.183)	0.458** (0.184)	0.452** (0.183)	0.441** (0.184)	0.480** (0.197)
Age		-0.0210*** (0.00778)	-0.0243*** (0.00789)	-0.0263*** (0.00813)	-0.0244*** (0.00787)	-0.0246*** (0.00788)	-0.0211*** (0.00795)	-0.0221*** (0.00811)
Education			0.241*** (0.0451)	0.200*** (0.0399)	0.192*** (0.0425)	0.193*** (0.0427)	0.199*** (0.0425)	0.191*** (0.0394)
Has the Student Dropped Out?				-0.203*** (0.0346)	-0.207*** (0.0345)	-0.204*** (0.0340)	-0.206*** (0.0340)	-0.206*** (0.0339)
Is the Loan for Someone Other than the Respondent?					-0.138* (0.0783)	-0.130* (0.0789)	-0.0507 (0.0737)	0.0198 (0.0938)
Is the Loan a Federal Loan?						-0.0660*** (0.0256)	-0.0688*** (0.0256)	-0.0684*** (0.0255)
Marital							-0.411*** (0.0782)	-0.259** (0.122)
Dependents								-0.144** (0.0659)
Constant	-0.404 (0.309)	0.457* (0.246)	-1.842*** (0.590)	-0.980* (0.514)	-0.824 (0.579)	-0.723 (0.561)	-0.467 (0.583)	-0.0522 (0.453)
Observations	5,455	5,455	5,455	5,455	5,455	5,455	5,455	5,455
R-squared	0.009	0.011	0.018	0.021	0.021	0.022	0.022	0.023
Robust standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1								

In Table 12, many of the variables have statistical significance. Sex, race, and education are all statistically significant and have a positive impact on student debt to wage income ratio. Sex, however, makes the biggest difference. Even controlling for all of the other variables, women face a 0.76 greater ratio, which is 76% more. Nonwhites also face between a 30-50% higher student debt to wage income ratio, though these results are not as statistically significant as they

are for sex—p-values for race are either  $p < 0.1$  or  $p < 0.05$ . If the respondent is married or has multiple dependents, their student debt to wage ratio is likely to be lower.



OLS Estimates of the Effect of Demographic Variables and Loan Information on the Student Debt to Total Income Ratio of a Respondent <i>**Not Controlling for Other Variables</i>								
Dependent Variable: Student Debt to Total Ratio of a Respondent from the Survey of Consumer Finances 2016								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sex	1.050*** (0.183)	1.031*** (0.180)	0.984*** (0.171)	1.001*** (0.173)	0.900*** (0.184)	0.895*** (0.183)	0.697*** (0.200)	0.724*** (0.207)
Race	0.182 (0.130)	0.182 (0.130)	0.264* (0.144)	0.270* (0.145)	0.263* (0.146)	0.257* (0.145)	0.251* (0.145)	0.289* (0.155)
Age		-0.0281*** (0.00470)	-0.0295*** (0.00492)	-0.0305*** (0.00506)	-0.0272*** (0.00520)	-0.0272*** (0.00520)	-0.0246*** (0.00515)	-0.0261*** (0.00549)
Education			0.161*** (0.0335)	0.127*** (0.0281)	0.113*** (0.0294)	0.114*** (0.0296)	0.120*** (0.0294)	0.109*** (0.0266)
Has the Student Dropped Out?				-0.159*** (0.0278)	-0.165*** (0.0276)	-0.164*** (0.0272)	-0.166*** (0.0272)	-0.166*** (0.0273)
Is the Loan for Someone Other than the Respondent?					-0.245*** (0.0551)	-0.241*** (0.0551)	-0.164*** (0.0510)	-0.0809 (0.0662)
Is the Loan a Federal Loan?						-0.0412*** (0.0159)	-0.0427*** (0.0159)	-0.0442*** (0.0162)
Marital							-0.371*** (0.0705)	-0.200* (0.103)
Dependents								-0.159*** (0.0493)
Constant	-0.442** (0.224)	0.718*** (0.177)	-0.895** (0.412)	-0.239 (0.333)	0.0415 (0.369)	0.0993 (0.362)	0.331 (0.389)	0.809*** (0.279)
Observations	6,025	6,025	6,025	6,025	6,025	6,025	6,025	6,025
R-squared	0.011	0.016	0.021	0.025	0.025	0.025	0.026	0.028
Robust standard errors in parentheses								
*** p<0.01, ** p<0.05, * p<0.1								

In Table 13, every single variable was statistically significant without controls. With controls, these findings are consistent except for the race variable, which has a p-value>0.05 and therefore isn't statistically significant following best practices in econometric research. Marital status and number of dependents have the biggest magnitude for a negative impact on student debt to income ratio.

## Discussion

### Trends

#### *The Impact of Investment Income*

According to this analysis, my thesis/hypothesis was correct that people with extra income (total income – wage income) have a higher percentage of student loans paid. This finding is statistically significant and substantively significant as well. Individuals with investment income have, on average, 86% of their student debt paid off. However, individuals without investment income (just wage income), have about 82% of their student debt paid off in this data set. In Table 14, respondents with investment income (total income group) are in blue and labeled “True” and those without investment income (wage income group) are orange and labeled “False.” Nonwhite people also pay a higher percentage of their loans compared to white people. This result was also statistically significant. These results are shown in Table 15.

Table 14: Investment Income Leads to Higher Percentage of Student Debt Paid Off



Table 15: Nonwhites are Associated with Higher Percentage of Student Debt Paid



## *Married People Have More Student Debt in Dollars, But Pay off Debt Quicker and Their Debt is More Manageable*

According to my findings in each regression table, marital status has a statistically significant impact on almost every regression it is analyzed in. Marital status is particularly interesting because it has a positive/increasing effect on the amount of outstanding student debt in dollars but have a negative/decreasing effect on their percentage of student debt outstanding and student debt-to-income ratios for both types of incomes. I think this trend exists because of loan consolidation programs. Loan consolidation programs are when an individual and their spouse's student debt is merged together. These programs used to be provided by the federal government by the Department of Education's joint consolidation loans but following 2005 this program was taken away. Student loan consolidation programs are still possible, just through a private refinancing company like a bank or credit union.<sup>2</sup> There are several ways that loan consolidation programs help couple pay off a greater percentage of their student debt. These include scoring a lower interest rate, reducing your monthly payment by lengthening the loan repayment term, and simplifying the student loan payback process much simpler.<sup>3</sup>

## *Women Face the Greatest Up-Hill Battle with Student Debt*

In almost every single regression, with or without controls, women face the most statistically significant and substantively significant impact of all of the demographics and loan information variables. According to this analysis, women typically have higher dollar amounts of student debt, higher percentages of student debt outstanding, and higher debt-to-income ratios for

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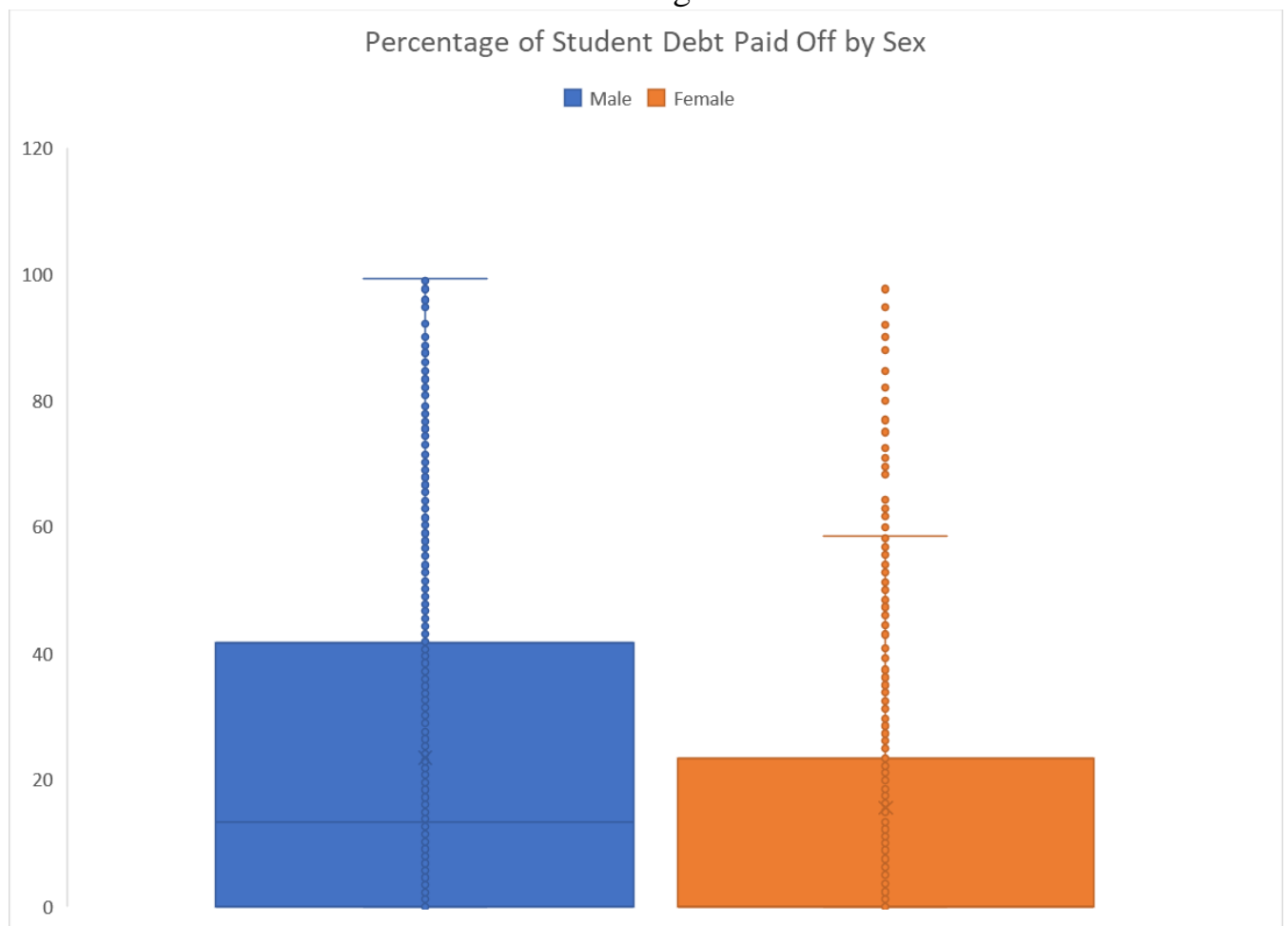
<sup>2</sup> <https://studentloanhero.com/featured/how-to-combine-your-student-loan-debt-with-your-spouses/>

<sup>3</sup> <https://studentloanhero.com/featured/how-to-combine-your-student-loan-debt-with-your-spouses/>



both wage income and total income. For each dependent variable, the presence of investment income (total income – wage income) has very little impact on the OLS estimates for the sex variable. In this analysis, it is extremely statistically significant that women have lower percentages of their student debt paid off. Table 16 shows that, on average, women only have about 23% of their student debt paid back and men have about 42% of their student debt paid back in this dataset.

**Table 16: Women Have Much Lower Percentages of Student Debt Paid Than Men**



As disheartening as this may be, it does make sense considering trends of women in the American labor market. Women have higher dollar amounts of student debt most likely not because they severely lack the same resources as men to pay for higher education, but that they

are pursuing levels of higher education much more frequently than men. The Atlantic notes, “Across socioeconomic classes, women are increasingly enrolling and completing postsecondary education, while, even as opportunities for people without a college education shrink, men’s rates of graduation remain relatively stagnant.”<sup>4</sup> The Washington Post also notes,

“Women today get the majority of college degrees in America. It doesn’t matter what kind — associate’s, bachelor’s, master’s, or doctoral — women beat men in all the categories. In the 2009-2010 academic year, women earned 57.4 percent of all bachelor’s degrees.”<sup>5</sup>

The gender education gap described by both of these authors began to shift in the 1970s when women began to pursue higher education instead of being a staying at home. By the 1990s the gap had switched completely—now women graduating at higher rates than men. This disparity has continued to increase since then.

More women graduating from higher education is economically beneficial, but why are the results of this analysis so unfavorable to women? The answer: the gender pay gap in America. According to the Institute for Women’s Policy Research, female full-time, year-round workers made only 80.5 cents for every dollar earned by male workers. This is due to a multitude of economic and cultural factors in America, but the IWPR note that there has been very little progress in the gender integration of work. They argue, “This persistent occupational segregation is a primary contributor to the lack of significant progress in closing the wage gap.”<sup>6</sup>

The combination of higher graduate rates of higher education, rapidly increasing education costs, and the persistent gender wage gap in America make it increasingly difficult for female borrowers to pay back their loans. According to the AAUW, women hold about two-

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<sup>4</sup> <https://www.theatlantic.com/business/archive/2017/11/gender-education-gap/546677/>

<sup>5</sup> [https://www.washingtonpost.com/news/storyline/wp/2014/12/11/women-are-dominating-men-at-college-blame-sexism/?utm\\_term=.11ea5b3bb688](https://www.washingtonpost.com/news/storyline/wp/2014/12/11/women-are-dominating-men-at-college-blame-sexism/?utm_term=.11ea5b3bb688)

<sup>6</sup> <https://iwpr.org/issue/employment-education-economic-change/pay-equity-discrimination/>

thirds of the student debt in America as of mid-2018.<sup>7</sup> Additionally, they pay back their student loans more slowly than men. This “gender student debt gap” has serious ethical and economic implications. The AAUW note, “

“Perhaps unsurprisingly, graduates still repaying loans four years after college are less likely than graduates without loan payments to be able to meet essential expenses, such as rent or mortgage payments, within the past year. Women — especially women of color — are most likely to experience difficulties: 34 percent of all women and 57 percent of black women who were repaying student loans reported that they had been unable to meet essential expenses within the past year.”<sup>8</sup>

Not only is this effecting American women with student debt individually, but also the U.S. economy as a whole. If these women do not have the disposable income to make payments on their student debt, it is highly unlikely they will be able to spend money on items that are not absolutely necessary. This decrease in spending can slow consumption and eventually slow GDP growth.

### *Higher Levels of Education Are Associated with Lower Percentages of Outstanding Student Debt*

One finding I was particularly fascinated by is that individuals with higher levels of education are associated with lower percentages of outstanding student debt, regardless if the analysis used wage income or total income (Tables 10 and 11). This is interesting because in Tables 8 and 9, my analysis shows that respondents with higher levels of education have about \$5,000 more outstanding student debt. Though, individuals with higher levels of education have about 3-4% less outstanding student debt comparatively. I hypothesize respondents with higher levels of education have a greater amount in dollars of student debt because with more education usually requires more money/loans. However, given that many jobs with higher levels of

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<sup>7</sup> <https://www.aauw.org/research/deeper-in-debt/>

<sup>8</sup> <https://www.aauw.org/research/deeper-in-debt/>

education have higher salaries—for example, lawyers have to pay a substantial amount for law school, but once they graduate and begin working they are paid handsomely. With the extra disposable income, they are able to pay off their student debt quicker.

### *Policy Implications*

Policy reaction is necessary to decrease the financial burden of student loans on millions of Americans and to prevent the burst of a student loan bubble that could severely damage the federal government's deficit and debt. The Obama Administration made some strides, such as unveiling and expanding income-based repayment plans.<sup>9</sup> The goal of these plans is to greatly reduce the monthly payment borrowers are responsible so that it is more financially manageable for them. However, this is nowhere near a perfect solution. If an individual uses an income-based repayment program for too long, “any benefit will be wiped out over the long term as students pay down less of their debt and incur higher interest costs,” Melinda Lewis, a University of Kansas professor explains. These types of programs appear to be a band-aid for a wound that requires surgery and stitches.

Though I am no policymaker, I think that more aggressive student debt forgiveness programs could help get at the root of this issue, especially for women struggling to repay their student debt. In reality, this would probably not be very politically feasible given the current administration and Congress's historical apathy to the gender pay gap in America. I still have some faith, however, because this escalating crisis needs a solution fast.

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<sup>9</sup> <https://www.goodcall.com/news/obama-reaffirms-call-for-nationwide-free-community-college-in-state-of-the-union-04013>

### *Limitations / Research Moving Forward*

There are a few limitations to consider in this study. The Survey of Consumer Finances is not the perfect dataset. It is a very valuable dataset in that it comes from a very reputable source (The Federal Reserve Bank of New York), has a large sample size (over 6,500 households surveyed), and that it is extremely detailed (originally over 30,000 variables). However, the construction can lead to some skewed results. For example, the survey is voluntary, so individuals can easily choose not to take the survey. These individuals may not have time to take a survey. Therefore, more results come from those that have more time, most likely older or wealthier. Also, some of the student debt to income ratios have outliers due to students or unemployed people that have very low to no income and student loans.

Additionally, since the SCF is a survey, it requires the respondents to self-report their demographic and financial information. This runs the risk that some respondents gave inaccurate data when it comes to that information. Finally, the SCF doesn't have variable or question to consider the tier of the institution an individual went to, i.e. private liberal arts college, public university, community college, for-profit university, etc. This has an impact on the analysis of the relationship between income and outstanding student loans.

### **Conclusion**

The growing student loan bubble is becoming increasingly concerning and dangerous to both individual borrowers and the U.S. economy and federal government. Due to the combination of increasing education costs, stagnant wages for the middle class, and the growing necessity for more and more higher education to obtain a desirable career. This study used the Survey of Consumer Finances to analyze if respondents with investment income were better able to pay down their student debt in dollar amount, percentages, and student debt-to-wage ratios.

This was done by using total income and wage income, along with several other demographics and loan information variables as independent variables. My thesis is correct, that individuals with investment income have, on average, 4% more student loans paid back, and this finding is statistically significant. Additionally, the first major trend I identified is that nonwhites have greater amounts in dollars of student debt but lower percentages of outstanding student debt. The second trend is that women have the most outstanding student debt in dollars and by percentage and this debt is more difficult for them to manage based on their incomes due to more women graduating from higher education while the gender pay gap in America persists. The second trend is that married individuals have more student debt but lower percentages of debt and lower debt-to-income ratios, most likely due to student debt consolidation programs. Finally, respondents with more education have higher amounts of outstanding student debt in dollars, but lower percentages, indicating that these individuals have higher incomes to manage their debt. Congress has been inefficient in policymaking to reduce the student debt bubble, but there needs to be a policy solution quickly or the entire U.S. government and economy will suffer.

## Bibliography

- Akers, Beth and Matthew M. Chingos. "Is a Student Loan Crisis on the Horizon?" *Brown Center on Education Policy at Brookings*. (2014). <https://www.brookings.edu/wp-content/uploads/2016/06/Is-a-Student-Loan-Crisis-on-the-Horizon.pdf>
- Ash, Preston, Lexie Ford, and Thomas F. Siems. "What's 'Driving' Changes in Household Debt?" *Financial Insights* 6, no. 3 (2017).  
<https://www.dallasfed.org/~media/documents/outreach/fi/2017/fi1703.pdf>
- Boshara, Ray. "'Tipping Points' II Household Debt Research Symposium." *Center for Household Financial Stability Federal Reserve Bank of St. Louis* (2017).  
[https://www.stlouisfed.org/~media/files/pdfs/hfs/assets/2017/tpii\\_executive\\_summary.pdf?la=en](https://www.stlouisfed.org/~media/files/pdfs/hfs/assets/2017/tpii_executive_summary.pdf?la=en)
- Goodcall.com. (2019). *Obama Reaffirms Call for Nationwide Free Community College in State of the Union* / *GoodCall News*. [online] Available at:  
<https://www.goodcall.com/news/obama-reaffirms-call-for-nationwide-free-community-college-in-state-of-the-union-04013> [Accessed 14 May 2019].
- Guo, J. (2019). *Women are dominating men at college. Blame sexism*. [online] Washington Post. Available at:  
<https://www.washingtonpost.com/news/storyline/wp/2014/12/11/women-are-dominating-men-at-college-blame-sexism> [Accessed 14 May 2019].

Institute for Women's Policy Research. (2019). *Pay Equity & Discrimination* / *Institute for Women's Policy Research*. [online] Available at: <https://iwpr.org/issue/employment-education-economic-change/pay-equity-discrimination/> [Accessed 14 May 2019].

Morgan, Kyle. "Car Loan Statistics." Finder.com. <https://www.finder.com/car-loan-statistics>. (Accessed February 22, 2019).

National, A. (2019). *Women's Student Debt Crisis in the United States*. [online] AAUW: Empowering Women Since 1881. Available at: <https://www.aauw.org/research/deeper-in-debt/> [Accessed 14 May 2019].

Samuels, A. (2019). *Poor Girls Are Leaving Their Brothers Behind*. [online] The Atlantic. Available at: <https://www.theatlantic.com/business/archive/2017/11/gender-education-gap/546677/> [Accessed 14 May 2019].