Student Loans and Retirement Habits

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Executive Summary

The purpose of our research is to provide Mutual of Omaha with statistical information that can help them identify new business opportunities for providing people with investing services and finding new market bases for them to enter and provide services to. The research we conducted was on whether or not student loans affects when people begin to save for their retirement and whether the presence of loans influences the percentage of people contributing to their retirement accounts. To answer this question we used data from the National Financial Capability Study conducted by FINRA. This study allowed us to identify many variables that we thought could possibly influence when people began to invest and what caused differing rates of retirement contributions. The main variables we ended up using in our research were Age, Edu, RetireContribute, RetirementWorry, StudentLoans, and HaveAnyRetire. Secondary research we conducted used the variables SpendingIncome and BudgetTimePeriod to try and explain the results we got from our primary research.

The procedure for answering our research question consisted of us creating data visualizations with confidence intervals built in that allowed us compare those who had student loans with those who did not through different variable relationships. The confidence intervals allowed us to see if there were any statistically significant differences in the relationships and between student loan groups. To determine who had retirement accounts and the contribution rates for retirement accounts we looked at how the percentage of HaveAnyRetire changed based on the age ranges of Age, and then we looked at how the percentages for RetireContribute changed based on the age ranges of Age. From there we looked at how StudentLoans changed based on RetirementWorry to find out if there was a relationship between the percentage of people with student loans and the level of retirement worry. Age was then compared with RetirementWorry to determine what age ranges had the highest level of retirement worry. To determine the effects of student loans on retirement contribution rates we used our data visualization method to look at how the percentages for RetireContribute changed based on RetirementWorry, Edu, and Incomecat within each loan status group.

We came to conclude that the age range of 18-25 is a potential customer market for Mutual of Omaha since that age range was severely underrepresented in having people with retirement accounts, but among those who do have accounts a large percentage are investing by themselves. We also concluded that having student loans makes people statistically more likely to contribute towards retirement than those without student loans. A driving factor in this is that as the level of retirement worry increases so does the percentage of people contributing to their retirement accounts. We were also able to determine that income levels were the best predictor of personal retirement contributions in both those with student loans and those without. Contrary to existing evidence, we also found that education had very little influence.

1 Introduction

Our research is focused on looking to see if the amount of student loans affects when individuals begin to save for retirement. Our client will be interested in the aforementioned research question because they are involved with providing financial advice and retirement accounts to their customers. Some information that is already known about retirement trends is that millennials are earning 20% less than baby boomers when they were the same age ("Millennial spending and saving habits"). The same source also estimated that 43% of baby boomers won't have enough money for retirement. A past study by Joo, S., & Grable, J.E in 2005 found evidence that higher education and income levels are associated with higher percentages of people having and personally contributing to their retirement accounts. "Economic Strategies for Postsecondary Education Among Middle-Income Families" was an academic article that found that young adults are struggling to find work that does not consist of activities requiring specialized skills from a post-secondary education. What this leads to is a necessity for people to go to college in order to get a job, and in order to finance their education they have to saddle themselves with debt in the form of loans.

Our research will attempt to answer some of the questions that appear with the already existing information and provide Mutual of Omaha with data they can use in their business. Our research will provide an overview of when people generally begin to contribute to their retirement accounts in order to see if there really is a disparity between older cohorts and younger ones. Our research will also look at the relationships between the level of retirement worry and age, along with the percentage of people with student loans within each level of retirement worry. We will also provide data and analysis on if varying degrees of education, income levels, and retirement worry influence how individuals contribute to their retirement accounts. By comparing our results between different variable relationships, we plan to find unknown factors and trends that can be useful for Mutual of Omaha's business. What our client will like best about our research is that they can use it to target new markets for providing investing services to those that may have been underrepresented in their customer base in the past.

2 Data

We got our data from the National Financial Capability Study which looked into various financial variables through a 100-question survey to determine the financial behaviors and literacy of the respondents. The data was then sorted through and compiled by Professor James Murray to provide a friendly transition into a friendly R document. The National Financial Capability Study, that was administered in 2015 by the Financial Industry Regulatory Authority, surveyed a sample size of 27,564 American adults, ranging age

18 years old and older. There were about 500 respondents per state, including the District of Columbia. The survey was online, and the respondents that were drawn were representative of the entire United States population with respect to age, gender, ethnicity, education, and the Census Division. In the end, the results were weighted so that the information provided by the survey was actually representative of the United States as a whole.

The data we are looking at includes personal information on the financial behaviors and literacy of the respondents. Among all the variables looked at, our variables of interest are Age, Edu, HaveAnyRetire, RetirementWorry, RetireContribute, StudentLoans, Incomecat, SpendingIncome, and BudgetTimePeriod.

Age is an ordinal variable where a respondent places themselves into one of six age ranges. The possible ranges are 18-24, 25-34, 35-44, 45-54, 55-64, 65+.

Edu is defined as the highest level of education one has attained at the time of the survey. It is an ordinal variable that is split into 8 different groups: Did not complete high school, High school graduate-regular high school diploma, High school graduate- GED or alternative credentials, Some college no degree, Associate's Degree, Bachelor's Degree, Post Graduate Degree, and Prefer not to say.

HaveAnyRetire is a variable where the respondent either marked that they had a retirement account, either through their employer or from outside their employer, or that they did not have a retirement account. This was a binary variable where 1 signified having an account and 0 signified not having an account.

RetirementWorry is a numerical variable that had respondents rank their level of agreement with the statement, "I worry about running out of money in retirement." This variable was on a scale from 1 to 7 with 1 indicating strongly disagreeing and 7 indicating strongly agreeing.

RetireContribute is binary variable where the respondent is equal to 1 if they regularly contribute to any of their retirement accounts and is equal to 0 if the respondent does not contribute regularly to any of their retirement accounts.

StudentLoans is another binary variable where the respondent is equal to 1 if at the time of the survey they owed on their student loans and were equal to 0 if they did not owe on any student loans.

Incomecat is an ordinal variable where a respondent places themselves into one of ten categories based off their income for the last year. The categories are: Less than $15,000, At least $15,000 but less than $25,000, At least $25,000 but less than $35,000, At least $35,000 but less than $50,000, At least $50,000 but less than $75,000, At least $75,000 but less than $100,000, At least $100,000 but less than $150,000, $150,000 or more, Don't know, or Prefer not to say.

SpendingIncome is defined as comparison between the respondent's income and spending over the last year. It's a categorical variable where respondents were categorized as either Spending less than income,

Spending more than income, or Spending equal to income.

BudgetTimePeriod is defined as the upcoming length of time that a respondent considers when making a budget. It is an ordinal variable that is split into Next few months, Next year, Next few years, and Next 5-10 years.

The reason we picked these variables to analyze is because based off of existing knowledge, and our own assumptions, we felt that they would provide the best insight as to how student loans would affect retirement contribution rates. What we do with these variables in our analysis is, through the use of confidence intervals, compare the means and medians of the variables between two separate loan statuses and look at the trends seen in the relationships between variables to determine if they are good predictors of one another. Comparisons that we are really going to look at are how the percentage of people contributing to their retirement accounts changes in relation to income levels, retirement worry levels, education, and then see how these changes compare between those with student loans and those without.

3 Results

In order to answer our research questions, we created multiple data visualizations comparing our variables of interest. For each data visualization we provide confidence intervals on the bars representing different groups of data. The purpose of these confidence intervals is to provide us with the ability to compare proportions and medians within each variable group without having to run t-tests and Wilcoxon tests. This method still provides statistically reliable results that we can draw conclusions from. We will also be looking at trends among some of the data visualizations to determine whether they are adequate predictors for the percentage of people contributing to their own retirement accounts. We started our analysis with the hypothesis that those without student loans would be more likely to contribute to their retirement, with the underlying assumption that those with loans would be using their income to pay off their loans and those without student loans would be using their income to invest.

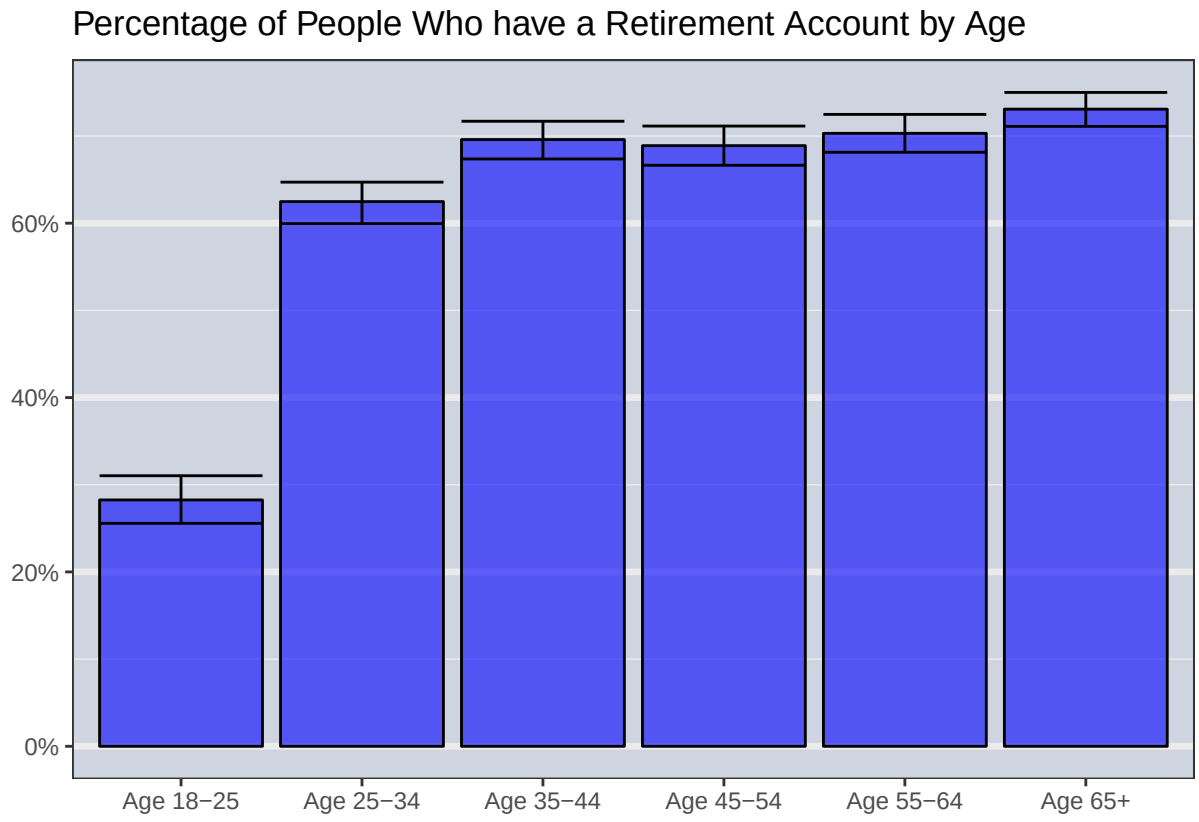

Figure 1: Percentage of People Who Have a Retirement Account by Age

Figure 1 illustrates how the percentage of people with a retirement account varies throughout different age ranges. Respondents to the survey reported whether they had any form of retirement account, either through their employer or through themselves. We can see that those between the ages of 18 to 25 have a significantly low percentage of people with retirement accounts while those 65 and above has the highest percentage of people with retirement accounts among the sample. The confidence intervals on the graph show that the 3 age ranges between 35 to 64 years old are statistically the same when it comes to the percentage of people having a retirement account. The age range of 25 to 34-year olds have a percentage of people who have a retirement account that is statistically slightly less than those 35 to 64, but they are significantly higher than those 18 to 25. The differences between age ranges may be explained by the fact that most people between the ages of 18 to 25 are either in college or just starting their careers. Because of this they may not have the money to start personally investing in retirement or aren't quite focused on it yet. As people get older they earn more money that they can invest with and become more aware of

retirement opportunities through their employers and the importance of preparing for retirement itself. Most people begin to retire around age 65 and having some form of retirement fund is common by that point in a person's life, which may explain why those age 65 and up have the highest percentage of people with a retirement account.

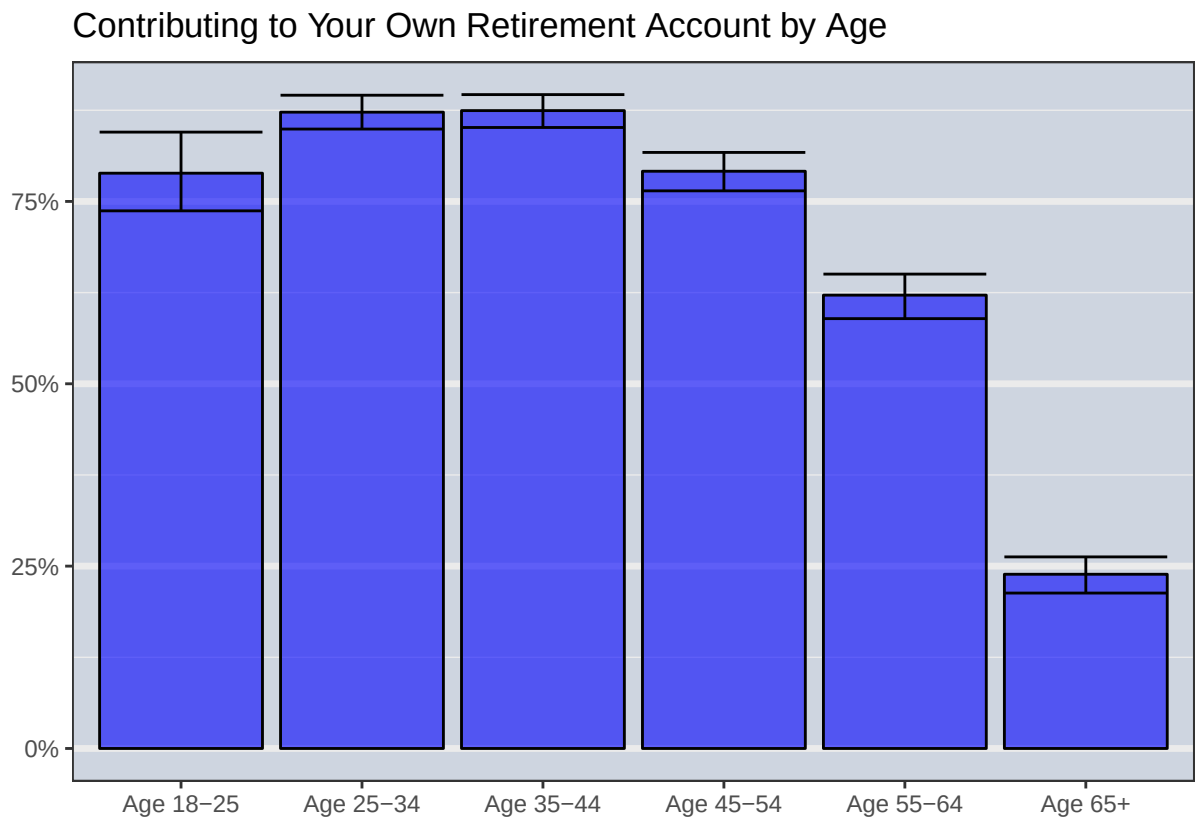

Figure 2: Percentage of People Who Contribute to Their Retirement Account by Age

Now that we have an idea of who in the population has some sort of retirement account from Figure 1 we will look at what percentages of people contribute to their own retirement. Figure 2 illustrates how the percentage of people contributing to their own retirement accounts varies throughout different age ranges. Respondents to the survey reported whether they personally invested in any form of retirement account that wasn't also invested in by their employer. Figure 2 shows that there is a jump in the percentage of people contributing to their own retirement between the 18 to 25 range and the 25 to 34 range. However, after this jump we see that as people age they begin to very slowly stop contributing to their own retirement

until we see a significant drop-off in the percentage of people investing in their retirement in the 65 and up age range. This trend may be explained by those ages 18 to 25 seeing large increases in their incomes once they enter the professional workforce, which usually occurs around age 25. As people continue working they see slight fluctuations in their income levels and priorities that can affect their retirement contribution tendencies, which may explain the slow decline in the percentage of people contributing to retirement as they age. The large drop off at age 65 and above is due to the fact that most people are retired by this time and are living off their retirement funds instead of contributing to them. Comparing Figure 1 with Figure 2 we see something interesting happening within the 18 to 25 age range. While this age range has by far the lowest percentage of people with some form retirement account, there is a significant percentage of people who contribute personally to their own retirement.

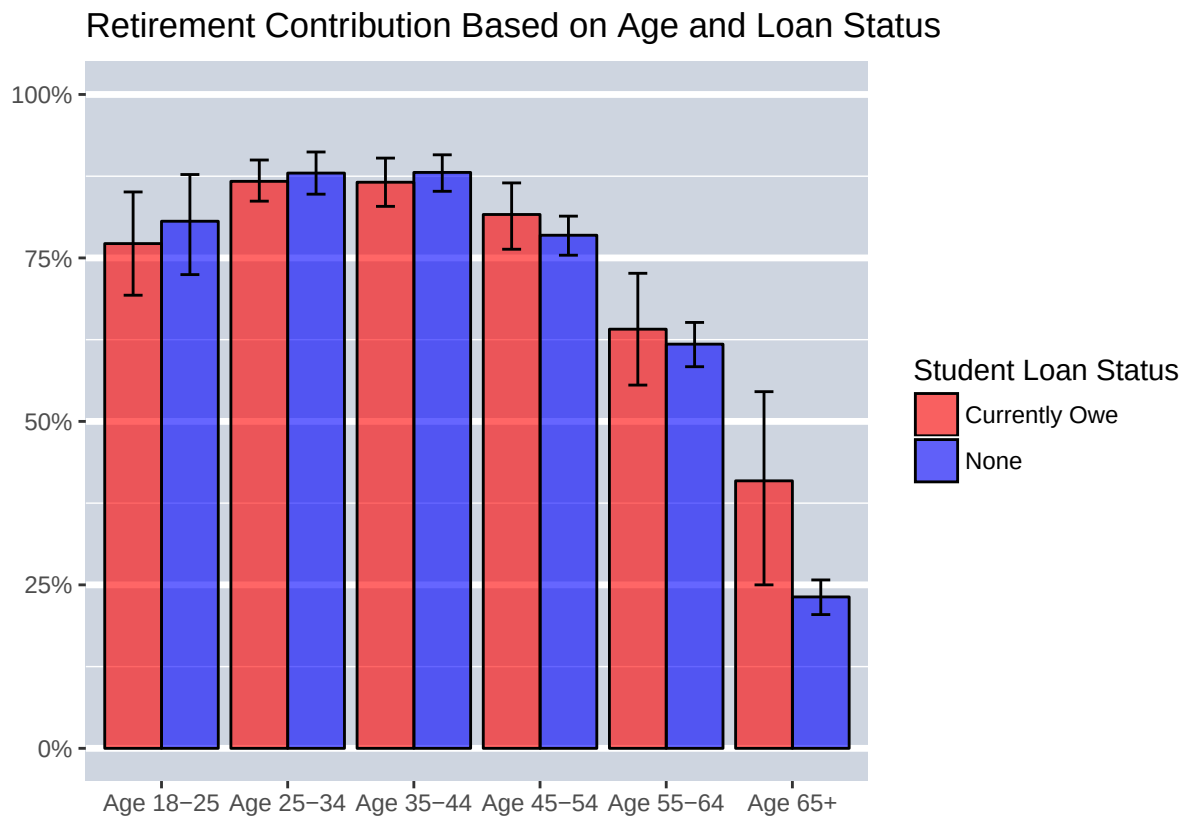

Figure 3: Percentage of People Who Contribute to Their Retirement Account by Age and Loan status

Since our goal is to determine how student loans affect the percentage of people contributing to their own

retirement, Figure 3 is the same graph as Figure 2. The difference is that now the percentages of people contributing to their own retirement are being compared across age ranges and between whether people have student loans or not. Individuals reported whether they owed money on student loans or not at the time of the survey, in which they answered either yes or no. Figure 3 is our first attempt to get a general idea of how the presence of student loans affects the retirement contribution rates of people. What the graph and confidence intervals illustrate is that within each age range, the percentage of people contributing to their retirement is statistically the same between those with student loans and those without. At this point, Figure 3 is suggesting that the presence of student loans does not affect personal retirement contribution rates.

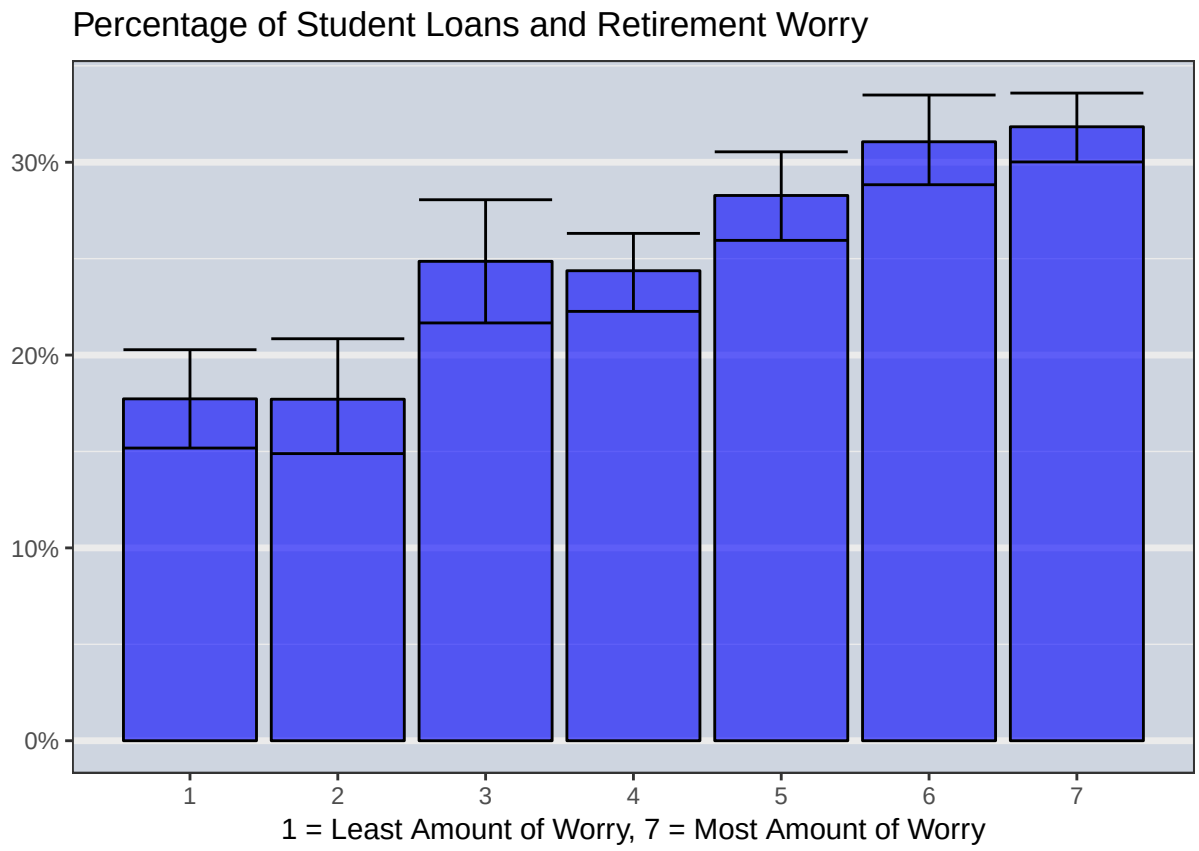

Figure 4: Percentage of People With Student Loans Based on Retirement Worry Level

What is illustrated in Figure 4 is how the percentage of people with student loans varies among different levels of retirement worry. Respondents from the survey indicated whether they had student loans at

the time and also gave an estimate of worried they were for retirement on a scale of 1(low worry) to 7(high worry). What can be seen is that on average, the more worried people are about retirement the more likely they are to have student loans. The confidence intervals show that the first three retirement worry levels statistically have the same percentage of people with student loans. After level 3, we see that every two increases retirement worry level results in a statistically significant increase in the percentage of people with student loans. One possible explanation for the overall trend is that some sort of post-secondary education usually requires a person to take out a loan to pay for it. These people who are more highly educated are, on average, more conscious about financial matters like retirement. Still, the highest percentage of people with student loans tops off at around 30%. This could mean that most people are paying of their student loans or not taking any out in the first place.

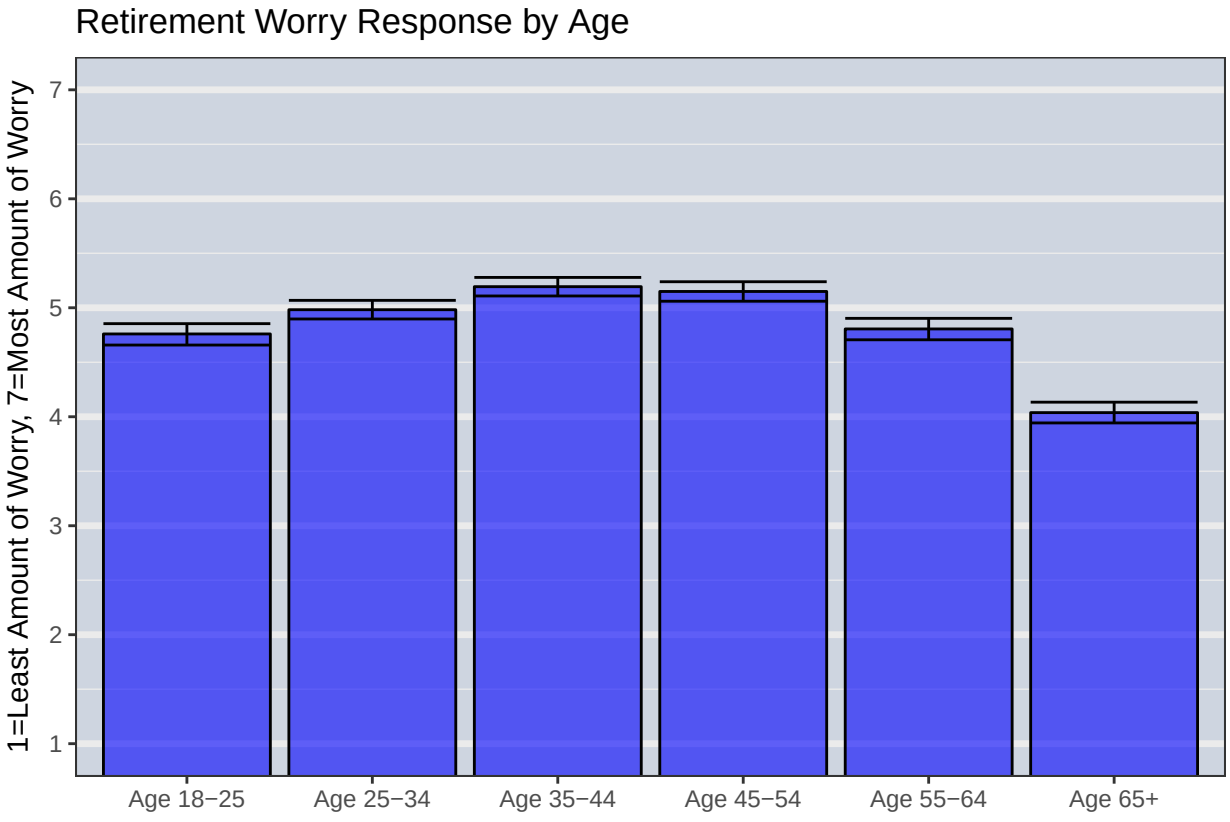

Figure 5: Level of Retirement Worry Based on Age

Based on what was seen in Figure 4, we used Figure 5 to look at how the interpolated median for the level

of retirement worry varied across age. What Figure 5 shows is that between the ages of 18 to 44 there is a statistically significant increase in the interpolated median level of retirement worry as people grow older. However, once people become older than 44 we see that the interpolated median level of worry decreases with age. This may be explained by the younger age range not making as much money on average as the older generation does and the younger age range has had less time to build up a retirement account. While most of the age ranges are statistically different from one another as evidenced by the confidence intervals, those differences are very small except for those 65 and up. This means that other than those very close to retirement or are retired, most age ranges are at least moderately worried about their retirement situation.

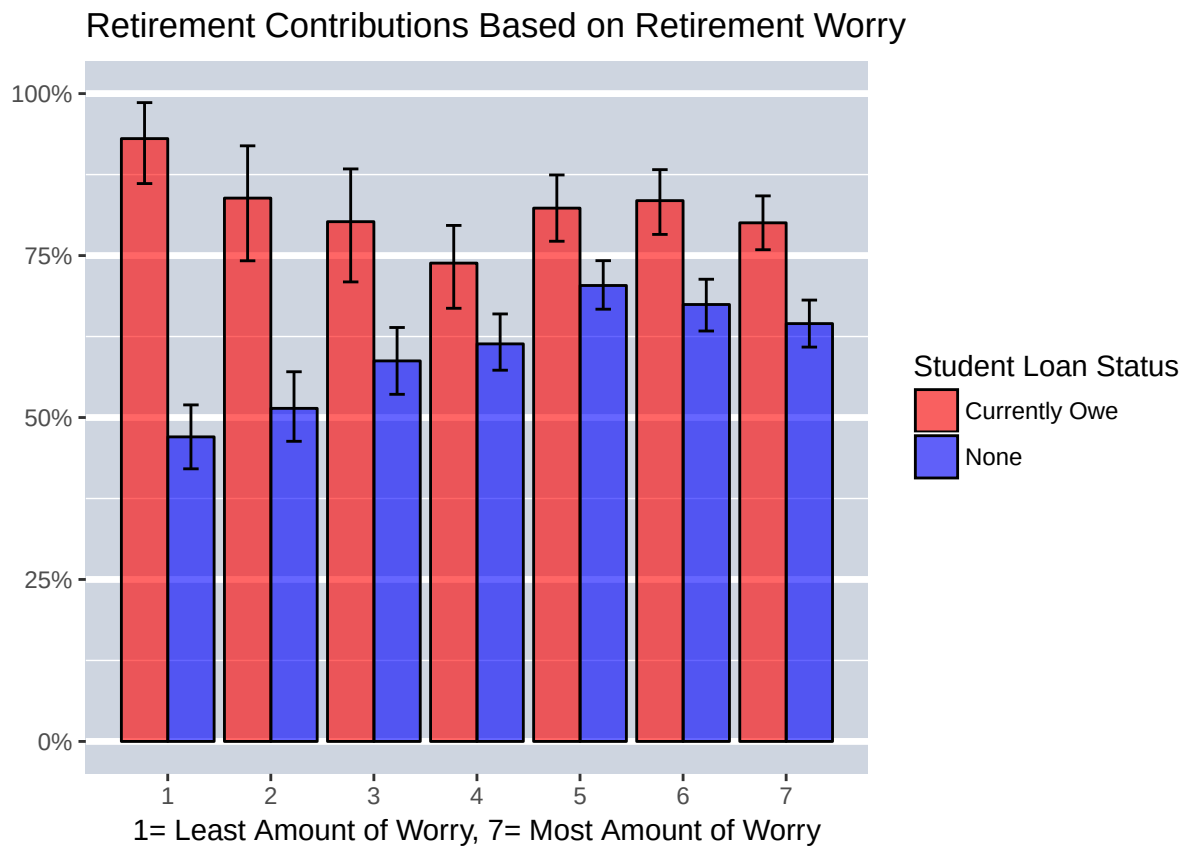

Figure 6: Percentage of People Contributing to Their Retirement Based on Retirement Worry

Figure 6 is being used to tie what we analyzed from the levels of retirement worry into our analysis of student loan status and its relationship with the percentage of people contributing to their own retirement. It illustrates how the percentage of people contributing to their own retirement within the two different

loan statuses varies across different levels of retirement worry. What the confidence levels show us is that at every level of retirement worry, those with student loans are statistically more likely to contribute to their own retirement than those without student loans. Looking at the trends within Figure 6 we see that among those without student loans, as retirement worry levels increase so does the percentage of people who contribute to their own retirement. For those with student loans there is actually a slight downward trend when you compare the confidence interval for level 1 with the confidence interval for level 7. The overall trend that is seen when you average the two loans statuses together is a general increase in the percentage of people contributing to their own retirement accounts as the level of retirement worry increases. An explanation for this overall trend can be seen by looking at Figures 5 and 3. What we saw within these two figures is that the age range of 25-54-year olds statistically have the highest levels of retirement worry and they also have among the highest percentages of people contributing to their own retirement accounts.

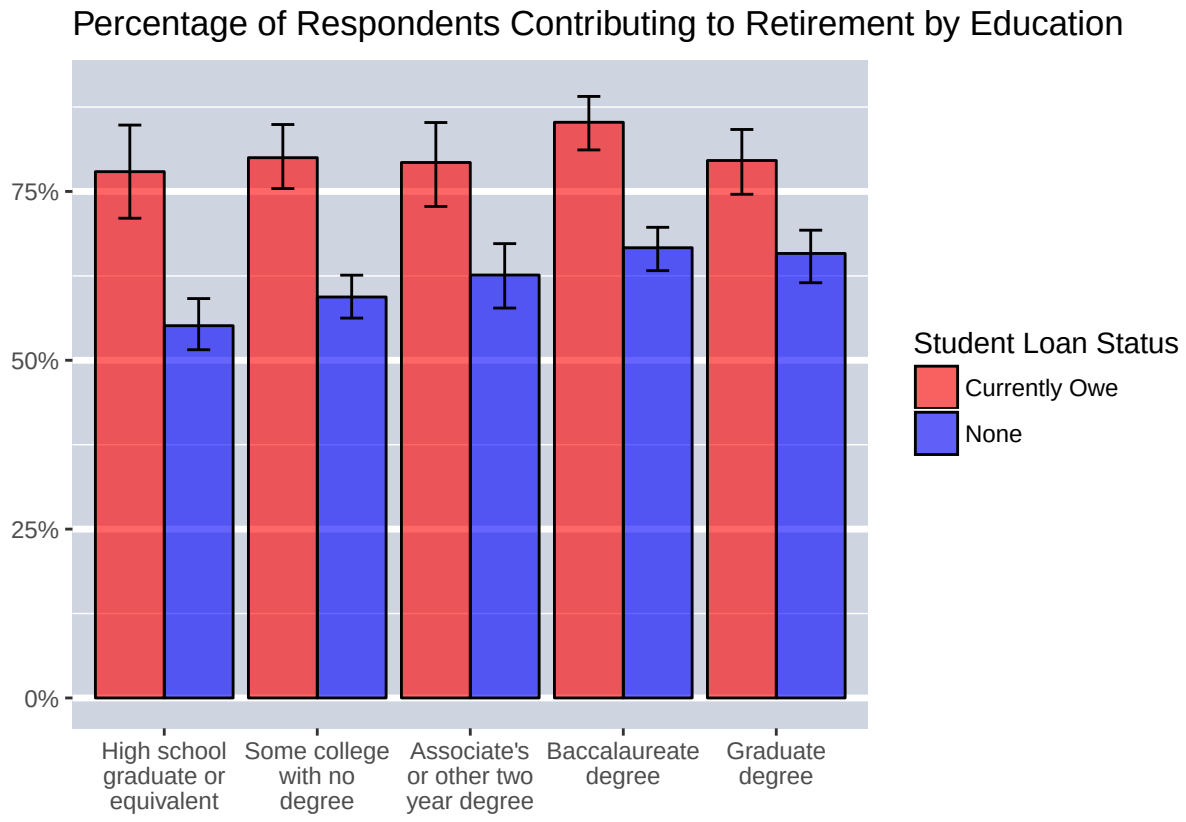

Figure 7: Percentage of People Contributing to Their Retirement Based on Education Level

To determine whether the results seen in Figure 6 were actually representative of the relationship between student loans and the percentage of people contributing to their own retirement accounts we looked at another variable. Figure 7 illustrates how the percentage of people contributing to their own retirement accounts varies by educational attainment levels. Individuals reported what the highest level of education they completed was at the time of the survey. Similar to what we found in Figure 6, we can see from the confidence intervals that people with student loans are statistically more likely to contribute to their own retirement than those without student loans for each education level. These results are suggesting that those with student loans are overall more likely to contribute to their own retirement accounts than those without student loans. Looking at the trends within Figure 7, by comparing each student loan group separately among education levels we see that the education level doesn't have a statistically significant effect on the percentage of people contributing to their own retirement accounts for those with student loans. Those without student loans only see a very small increase as education level increases. What this suggests is that educational attainment level may not be as good of a predictor for retirement contributions as previously found by Joo and Grable in 2005.

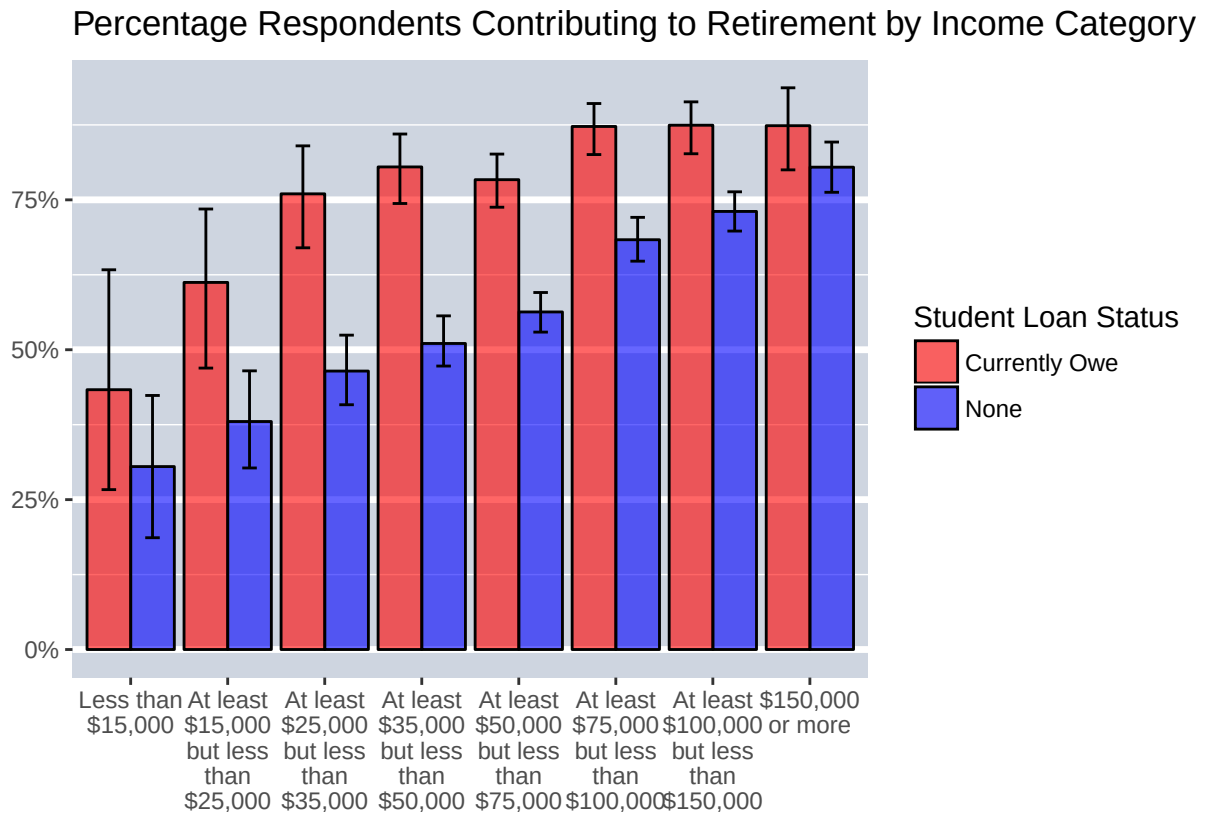

Figure 8: Percentage of People Contributing to Their Retirement Based on Income Level

At this point our initial hypothesis was proven wrong. We still wanted to see how the percentage of people contributing to their retirement accounts within each loan group was affected by income levels. This would provide evidence to see if our underlying assumption for our hypothesis was flawed. Figure 8 illustrates how the percentage of people contributing to their retirement accounts varies based on income levels within the two student loan groups. What we see from the confidence intervals is that other than those with less than $15,000 and those with more than $150,000 every other income level show that people with student loans are statistically more likely to contribute to their retirement accounts than people without student loans. This proved our underlying assumption to be flawed. We can also see by the individual and overall trends of Figure 8 that as income level increases, so does the percentage of people who contribute to their retirement accounts. This falls in line with what Joo and Grable found in 2005 and can be explained by the idea that as people make more money, they will have more money available to contribute with after paying their expenses.

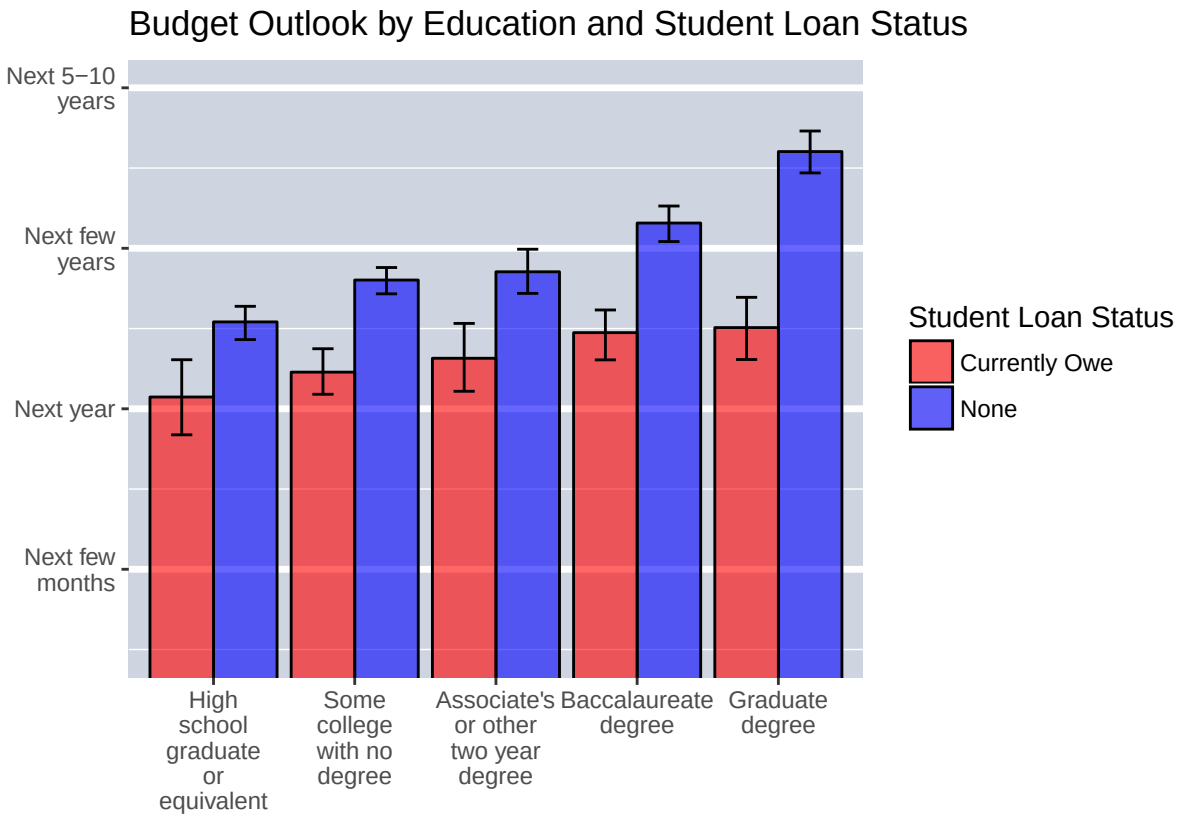

Figure 9: Budget Outlook Based on Education Level

Since our analysis has shown different results than what we expected, we looked at a possible underlying factor in the relationship between student loans and retirement contribution rates. Figure 9 illustrates how budget outlooks changed based on the education level. Since people with student loans had been consistently more likely to be contributing to their retirement accounts than people without student loans, we expected to see that people with student loans would also have better budget outlooks. What we see instead is that at every education level, people without student loans statistically have better budget outlooks than people with student loans which would suggest that they should have more income available to them to invest with. It has already been proven untrue that people without student loans have a higher percentage of people contributing to their retirement accounts than people with student loans. This suggests that we need to look at a different underlying variable to try and explain the data.

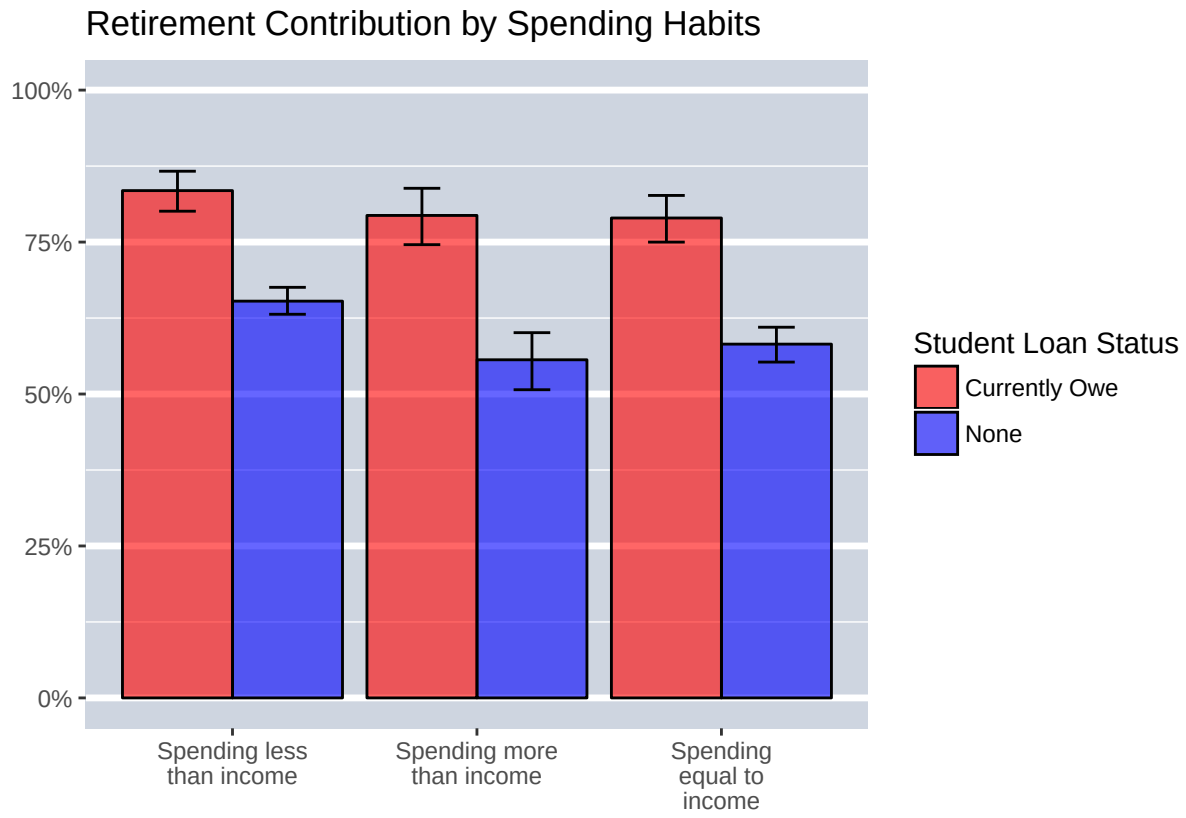

Figure 10: Percentage of People Contributing to Their Retirement Based on Spending Habits

Since Figure 9 gave us contradictory supporting evidence we looked at spending habits to try see if it was an underlying driver for the trend that people with student loans are more likely to contribute to their retirement accounts than people without student loans. Figure 10 illustrates how the percentage of people contributing to their retirement accounts varies based on what their spending type has been over the past year. What we see from the confidence intervals is that people with student loans are statistically more likely to contribute to their retirement accounts than people without student loans. This supports what we saw in Figure 8 because within each income level there are some of each one of these spending type categories, and Figure 10 is showing that having student loans makes a person more likely to contribute to their retirement account which is what is seen in Figure 8. One oddity that is seen in the trends of this graph is that there hardly any statistical difference between those spending less than what they earned and those who are spending more or the same as what they earned. We would expect to see a large difference between those who are spending less than what they earn and those who spend more than they earn.

What this means is that spending habits aren't a good predictor for overall retirement contribution rates.

4 Discussion

What we've learned from our research is that the 18-25 age group had the lowest percentages of people who had a retirement account, but of those who had a retirement account a high percentage of them were regularly contributing to their accounts. From this we can conclude that this age group is an untouched market of willing retirement investors who are underrepresented in the population of those who have retirement accounts. We also found that people with the highest levels of retirement worry also had the highest percentage of people who had student loans. Tying in with this is that the age ranges from 25 to 54 statistically had the highest levels of retirement worry and were also among those who had the highest percentages of people contributing to their retirement accounts. Another thing that was found from our analysis was that people with student loans were consistently more likely to be contributing to their retirement account than people without student loans, and that educational attainment levels didn't actually provide evidence of affecting contribution rates while income and retirement worry levels did. From these findings we can draw the conclusion that having student loans makes a person more likely to be contributing to their retirement account, with the underlying drivers of this trend being that as retirement worry and income levels increase so does the likelihood of contributing.

The conclusions that we have drawn from our analysis of the data from the National Financial Capability Study have identified that the younger population is a potentially large market for firms like Mutual of Omaha to market their services towards. The findings that those with student loans are more likely to contribute to their retirement fund can also be used to find new clients that may not currently have a retirement account but are likely to contribute regularly if they get one. One final decision that our conclusions can help Mutual of Omaha make is start to offer loan payment plan services to more people due to it being closely tied with retirement worry levels. One weakness of our research was that it was kind of narrow focused since we were looking at the relationship between student loans and retirement contribution rates and there are many other factors that could influence the relationship we've seen. Although we are confident with the results that we found, there are other factors that could affect our findings, for instance, level of financial literacy itself could severely alter the amount of worry an individual could have. Variables such as how many kids live in the household, past checking and saving account overdrawn charges, and whether they live alone or with a spouse can also have their own relationship with the percentage of people contributing to retirement accounts. Also, evaluating which individuals are receiving help from family/relatives is important to take into account. Some could be put at an automatic

advantage based off of their background. Extensive research would be necessary to evaluate the impact of these variables on our findings.

As stated above, there are more variables that could be examined to really understand the relationships between students' loans and how they affect when individuals begin to save for retirement. Examining the socioeconomic background of individuals trying to pay off loans and if family or relatives are aiding in the payment of these loans would be an important aspect to look into due to the fact that not everyone has assistance of that nature available to them. It would also prove to be worthwhile to examine if the prestigiousness of post-secondary school affects the amount of student loans and/or the ease with which an individual is able to pay off the loans. These variables could very well play a role in determining how student loans affect retirement savings and would be important to examine in further research.

5 Appendix

Questions used in our research that were asked in the National Financial Capability Study:

Age: What is the age of the respondent

HaveAnyRetire: Do you [or your spouse/partner] have any retirement plans through a current or previous employer, like a pension plan, [a Thrift Savings Plan (TSP),] or a 401(k)?

RetirementWorry: How strongly do you agree or disagree with the following statements - I worry about running out of money in retirement

StudentLoans: Do you currently have any student loans? If so, for whose education was this/were these loan(s) taken out? - Yourself

RetireContribute: Do you [or your spouse/partner] regularly contribute to a retirement account like a [Thrift Savings Plan (TSP),] 401(k) or IRA?

Edu: What was the highest level of education that you completed?

Incomecat: What is your [household's] approximate annual income, including wages, tips, investment income, public assistance, income from retirement plans, etc.?

SpendingIncome: Over the past year, would you say your [household's] spending was less than, more than, or about equal to your [household's] income?

BudgetTimePeriod: In planning or budgeting your [household's] saving and spending, which of the following time periods is most important to you [and your household]?