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The Influences of Locus of Control, Debt Overhang, and Framing on Saving for Retirement

Patrick Ilcin
Butler University

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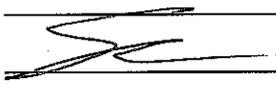Applicant   Patrick Ilcin
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**The Influences of Locus of Control, Debt Overhang,
and Framing on Saving for Retirement**

A Thesis

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Patrick Ilcin

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**The Influences of Locus of Control, Debt Overhang,
and Framing on Saving for Retirement**

Abstract

This study evaluates locus of control, debt overhang, and framing effects as potential drivers of retirement savings decisions. We use a hypothetical scenario administered through an online survey to analyze how much an individual will save for retirement. The study finds that individuals who measure as having an external locus of control (based off the Rotter I-E scale), contribute significantly less to their retirement savings than individuals with an internal locus of control. Interestingly, this study finds no significant relationship between debt overhang and initial contributions. To measure framing effects, participants were given the choice to change their initial contribution rate after learning the increased amount of their account balance based on how much of their salary they saved. The increased amount of the account was given based off either a percentage of salary (frame 1) or a dollar amount of salary (frame 2). The survey results show that individuals that were given the percentage frame increase their initial contribution to their retirement account significantly more than the group receiving the dollar frame.

The Influences of Locus of Control, Debt Overhang, and Framing on Saving for

Retirement.

1. Introduction

Retirement has often been built up to be one of the greatest stages of life, where individuals trade in daily work for cruises and vacations. In order to finance retirement, careful planning is needed to make use of employer sponsored benefits and other retirement vehicles, such as IRAs. However, when looking at statistics, one of the things that people often neglect to do is save for retirement. According to US News, the median 401(k) balance at the end of 2014 was a mere $18,127 (Brandon, 2016). Forty percent of the participants who took part in the study had less than $10,000 in their account. With the concurrent shift in the United States from defined benefit plans to defined contributions, it appears that many Americans are woefully ill-prepared for their retirement stage of life.

Extensive research has been conducted in order to determine the factors influencing retirement savings decisions. One such factor in this area that has been studied widely is financial literacy. Financial literacy is defined by the National Financial Educators Council as "Possessing the skills and knowledge on financial matters to confidently take effective action that best fulfills an individual's personal, family and global community goals." (2013).

The causes and effects of financial literacy have been studied quite extensively. However, most notably to this study, Mayer, Zick, and Glaittli (2011) found a lack of knowledge about retirement planning among the public. The study looked specifically at four different rules of thumb: the income replacement ratio rule, the 20 times income rule, the 110 minus age rule, and the 4% withdrawal rate rule (Mayer, Zick, and Glaittli, 2011).

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The study found that only 3.5% of the people studied had knowledge of all 4 rules. In addition, the study found that a higher level of education resulted in the increased likelihood of being aware of 3 out of the 4 rules (Mayer, Zick, and Glaittli, 2011). Lack of knowledge in these areas could prove to be detrimental to an individual's retirement saving. Additionally, Koposko, Hershey, Bojórquez, and Pérez (2016) found that an individual's financial knowledge has a significant positive effect on his/her expectations for their retirement plans.

While financial literacy has long been thought of as playing a significant role in the financial decisions made by individual's, recent studies are beginning to indicate otherwise. Fernandes, Lynch, & Netemeyer (2014) examined over 200 other studies on Financial Literacy, and found that increased financial literacy had very little impact on future financial decisions. The researchers broke the studies they examined into two groups, manipulated financial literacy, which involved interventions for an individual, and measured financial literacy, which just measured the participants' financial literacy through a questionnaire. The study found that interventions only explained .1% of variance in future financial decisions, and measured financial literacy only explained 2% of the variance in future financial decisions (Fernandes, Lynch, & Netemeyer, 2014). Thus, we believe that it is important to investigate other potential drivers that significantly influence the retirement savings decision.

Other studies have looked at various characteristics that affect the perceived importance of saving for retirement. Power and Hobbs (2015) looked at demographic factors that affected the importance of saving for retirement and found that when making employment decisions, females, younger people, and married couples all placed a higher

level of importance on having options to save for retirement (Power and Hobbs, 2015). Research by Grace, Weaven, and Mitchell (2010) supported this finding.

This study looks to further research already done and determine other drivers that would affect how much individuals save for retirement. By doing so, companies and other organizations can use the findings to better design their retirement plan education, in order to help participants save more. This study proposes the following variables that we believe to be drivers of retirement savings:

a. Locus of control: the extent of control an individual feels that he/she has over his/her life and the events that occur in his/her life.

b. Debt overhang. This paper seeks to analyze how much debt (namely, student loans and credit card debt) affects an individual's initial retirement decision.

c. Framing effects. After an individual provided their initial retirement contribution amount, the survey posted an estimate of how much additional future money would be generated if the contribution was increased by either 1% (percentage frame) or $500 (dollar frame).

For this paper, we generated a survey to gather information on participants' demographic data, locus of control, and debt overhang. Results of a hypothetical scenario asking individuals how much they would save for retirement indicated that both locus of control and framing effects had a significant impact on the amount that an individual would save for retirement. More specifically, this study finds that individuals with an external locus of control would save less for retirement than individuals with an internal locus of control. Additionally, we find that individuals that received a percentage frame would increase their retirement contribution significantly more than individuals who received a

dollar frame. This results of this study show no significant relationship between debt overhang and the amount saved for retirement.

2. Literature Review

2.1 Locus of Control

Locus of control refers to the extent of control an individual feels over his/her life, as well as the events that occur in his/her life. An individual with an internal locus (internals) of control believes he/she has control over their life, while an individual with an external locus of control (externals) believes that external forces have complete control over his/her life (Fournier, 2016).

Recently studies have looked at the levels of locus of control by generation and gender. Twenge and Campbell (2008) found that external locus of control, amongst other psychological traits, is higher in Generation Y (millennials) than previous. Shaw and Waite (2015) conducted a similar generational study looking at only men, which supported these results. This study found that young men felt like they did not have much control over their lives, and as a result, were less likely to auto-enroll in a retirement plan (Shaw and Waite, 2015). Clearly this has a negative effect on an individual's retirement planning and ability to retire at a desired age.

Another area of retirement planning that an individual's locus of control affects is his/her retirement planning anxiety. A 1995 survey found a negative relationship between retirement planning anxiety and internal locus of control, meaning that people with increased internal levels of locus of control have lower retirement anxiety (MacEwan, Barling, Kelloway, and Higginbottom, 1995).

2.2 Locus of Control and Savings Behavior

In addition to looking at levels of locus of control in different generations, other studies have been done looking at how locus of control affects saving behavior. Research by Cobb-Clark, Kassenboehmer, and Sinning, (2016) shows that households who had an internal reference person (head of household), saved substantially more than households with an external reference person. Perry and Morris (2005) found that externals were less likely to participate in responsible financial behavior, which includes saving money. Furthermore, a 2010 study conducted by Kasilingam and Sudha looking at Indian investors proposes that individuals have varying levels of both internal and external locus of control, each of which can be measured. However, this study found contradicting results showing that savings behavior depended solely on the level of external locus of control. Specifically, the study found that individuals with a higher external level of control were more likely to save a portion of their income, and individuals with higher levels of internal locus of control were only likely to save money when they received extra income (Kasilingam and Sudha, 2010).

This study looks to expand upon the research previously done, and seeks to provide additional evidence in this area of literature. While much research has been done on how locus of control affects savings behavior, there is a lack of evidence on how locus of control affects retirement savings. This study looks to provide new research on that topic. In addition to analyzing locus of control, we also investigate whether an individual's locus of control influences his/her debt overhang as well as the retirement savings decision.

2.3 Debt Overhang

Debt overhang refers to a large amount of debt, whether a mortgage, credit card debt, or student loan debt, that begins to play an increasing role in the financial decisions of individuals. One of the largest sources of debt is student loan debt. This factor has been shown by several studies to significantly influence individuals financial decisions (Zhang, 2013; Rothstein and Rouse, 2011; Minicozzi, 2005).

The student loan problem has been consistently growing in the United States. The article "The Millennial Debt Dilemma", published February 2017, states that student loan debt and mortgages are the top two sources of all debt for Americans. This can be a huge problem for recent college graduates, who may not have as much financial experience, and ability to pay off their student loans. A recent study done by Forbes found that 59% of those surveyed did not know how long it would take them to pay off their loans (Henderson, 2016). Another statistic, which is arguably worse, is that a third of respondents said they would not have gone to college if they realized the actual cost of their education (Henderson, 2016). In addition to this regret, student loans have been shown to affect many financial decisions, especially right out of college.

2.4 Debt Overhangs Effect on Post-Grad Decisions

Debt overhang, especially that which is caused by student loans, has been shown to have large impacts on the decisions of recent graduates when it comes to the decisions of going to graduate school, as well as job acceptance. When determining whether to go to graduate school, Zhang (2013) found that larger levels of debt decreased attendance. This study found that public school graduates who reached the average level of student debt were 11% less likely to go to graduate school than those students who did not reach this level of debt (Zhang, 2013).

Researchers have also found that debt overhang also plays a role in job selection post-graduation. Rothstein and Rouse (2011) found that graduates with higher levels of debt overhang were much less likely to take a job in a "low-income" sector, such as education, non-profits, and governmental jobs. Minicozzi (2005) found that for each thousand dollars of debt a student has, their beginning salary increases by 1%. These studies show that not only does debt overhang have an impact on job decision, it may be forcing recent graduates out of careers they enjoy and into higher paying careers, just so they can pay off their debts. One area that current studies have not focused on is how debt overhang impacts savings decisions, such as retirement savings. This study looks to provide answers to this gap in the current literature.

2.5 Debt Overhang and Locus of Control

Other studies have been done that focus on the relationship between debt overhang and locus of control. Research by Wang, Chen, and Wang (2008) found that individuals with an external locus of control were significantly less likely to use loans when buying a house than individuals with an internal locus of control. Other studies have linked locus of control with levels of credit card debt. Limerick and Peltier (2014) found that individuals with an external locus of control were more likely to have high levels of credit card debt. These findings are concurrent with previous studies (Caputo, 2012; Peltier, Pomirleanu, Endres, & Markos, 2013)

One of the key differences between mortgages and credit card debts are that mortgages are planned ahead of time, and credit card debt is more of a reactive, "in the moment" debt. Other studies have shown that individuals with an external locus of control lack self-confidence (Gürol, & Atsan, 2006), are less optimistic (Popper, Amit, Gal,

Mishkal-Sinai, & Lisak, 2004) and have lower risk tolerance (Wong & Carducci, 2016). As a result, externals avoid large risky debts that require confidence that they will have the ability to pay off, such as home mortgages.

When comparing student loan debt with mortgage and credit card debt, one can see more similarities with mortgages. Mortgage loans are backed by an underlying asset that generally appreciates over time. Student loans are often intended to be an investment that yields larger career earnings. Carnevale, Cheah, and Hanson (2015) found that college graduates earn on average $1 million more than non-graduates over the course of their working life. Both mortgages and student loans are large, pre-meditated loans that require extended time to pay off. As a result, this study expects higher levels of student debt to be representative of a population with higher levels of internal locus of control.

To the best of our knowledge, the relationship between debt overhang and retirement savings has not been previously analyzed. Furthermore, we seek to extend the strand of literature by evaluating whether individuals with higher student loan debt provide significantly less initial retirement contributions than those who will not graduate with student loans. In addition to examining alternative potential drivers influencing retirement savings decisions, this paper seeks to identify potential ways to improve the retirement savings decision-making process. One way we address this issue is through the framing of potential increased future retirement savings as it pertains to the incremental increases in individual contribution rates.

2.6 Framing Effects

Framing refers to how a situation or problem is presented to an individual or group. Framing and its effects can have huge implications on any decision that is made, but can

be especially impactful for financial decisions. Some studies have looked at framing effects and their impact on financial decisions. One of the first examples of framing effects were found in 1981, by Tversky and Kahneman. The study had respondents answer gain or loss questions, asking to decide between a guaranteed gain/loss and the probability of a larger gain/loss. The study found that when the question was framed as a loss, participants were much more likely to take on risk, even though both outcomes had the same expected value (Tversky & Kahneman, 1981)

Jain, Jain, and Jain (2015) looked at the effects of framing when investors are faced with the problem of figuring out what companies to invest in. They found that investors are much more likely to choose stocks that they are familiar with, even if they are worse stocks (Jain, Jain, & Jain, 2015). Payne, Segara, Shu, Appelt, and Johnson (2013) looked to see how framing would affect an individual's expectations for how long he/she would live. Their study asked individuals when they thought they would die. They asked the question using either a "live-to" "die-by" frame. The individuals who were asked the question in a "live-to" frame had an average response that was over 9 years longer than the "die-by" framed question (Payne, Segara, Shu, Appelt, & Johnson, 2013).

Reimers (2009) looked at progressive tax systems and how they were favored by individuals when framed in an amount paid vs. amount left over scenario. The study found that individuals favored a much more progressive tax system when the question was framed in an amount left over scenario, and that framing effects had a significant impact on this decision (Reimers, 2009).

Other studies have focused on framing effects and planning for retirement. Card and Ransom (2011) found that additional savings behavior beyond a pension depended on

how the contributions were named. The study looked at college professors, and the likelihood they would save additional money beyond just the pension contributions they were already making out of their paycheck. The study found that additional savings were reduced by 10-30% more when framed as per dollar of employee contributions, rather than when labeled as employer contributions (Card, & Ransom, 2011). Another study by Brown, Kapteyn, and Mitchell (2011) looking at social security found that throughout ten scenarios, framing effects played a significant role in when an individual would claim social security benefits.

These studies show that framing effects clearly play a role in financial decisions. This study looks to expand upon that research by looking at how framing effects will affect the amount an individual saves for retirement. This is a topic that has not been studied extensively. The research process has uncovered only one study looking at this topic. The Common Cents Lab (2016) found that intended contributions increased 5% when salary was framed as an annual salary rather than an hourly wage. The salaries of the individuals in this study were the same, the only difference was how they were presented to the individuals in the study. Our study looks to expand upon this study's findings and differentiates itself by using a different set of frames.

3. Methodology

3.1 Experimental Design and Variable Measures

Data was collected through a Qualtrics online survey. This survey was designed to measure an individual's locus of control, debt overhang, and retirement contributions before and after the framing intervention. In the first section of the survey, we gathered demographic and educational data on the participants, including major, education level,

internship experience, and financial education experience. A copy of the survey can be found in supplement A of the paper.

The second section of the survey measured locus of control by using the Rotter I-E scale (Rotter, 1966). This scale was developed by Julian B. Rotter, and it involves 29 sets of statements. An individual being tested must choose the statement that they most agree with. While the Rotter Scale involves 29 sets of statements, only 23 sets are used to calculate an individual's locus of control. For each of these 23 questions, one answer indicates an external locus of control. For each answer indicating an external locus of control selected, participants are given a point. In this study, total points were divided by 23 to take an average score. As a result, scores range from 0-1, with a 0.0 indicating a more internal locus of control and a score of 1.0 indicating a more external locus of control.

The third section of the survey inquired about the participants' level of debt overhang. As the individuals in this survey are currently college students, they were asked what their approximate expected level of student loans will be upon graduation. In addition to measuring student loan debt, the survey also measures the levels of all other debts that an individual may have (credit card, mortgage, auto loan, etc.).

The fourth part of the survey sought to measure how much a participant will save for retirement. Participants was given a scenario where they had recently accepted a job that would pay them $50,000 upon graduation. The decision to use $50,000 was based upon a recent survey by the National Association of Colleges and Employers (NACE). The survey found that the average expected salary for 2016 graduates was $50,566 (Poppick, 2015). They were also given information about what a 401(k) is and the company's 401(k) match program, including a chart that detailed how much would be deposited into the

account at various savings levels, up to the maximum contribution allowed. Survey participants were asked to determine how much they would save for retirement in this situation. Participants were asked to specify their initial contributions as a percent of the salary, but were also given a table indicating the equivalent dollar amount of their salary.

The final section of the survey included one of four follow up scenarios. To measure framing effects, participants were given information on how much the account value of their 401(k), based on historical returns, would increase with every additional 1% or $500 saved. These values were based on one of two mock portfolios, either a 60/40 stock to bond split, or an 80/20 split. As a result, the 80/20 split portfolio shows increased returns for every $500 or 1% saved compared to the 60/40 split. This allowed us to determine if in addition to framing, if the promise of increased returns would have any significant effect on an individual's choice to change his/her initial contribution. In addition, participants were either given that this increase was based on a 1% or a $500 increase in their deduction. However, only one number was given, not both. Survey participants were then asked if they would like to change their contribution from what they had originally stated, and if so, what their new contribution would be. As a result, the participants of the survey were split into four groups, which are represented on the chart below:

Group	Framing	Portfolio
Group 1	Percentage	60/40
Group 2	Percentage	80/20
Group 3	Dollar	60/40
Group 4	Dollar	80/20

3.2 Participants

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The primary participants in this study are college students, who attend a small, private liberal arts university in the Midwest United States. Survey participants were gathered in a variety of ways. This included posts on social media, as well as using various organizations on the school's campus. These organizations include the honors program, Information Commons program, and various other organizations that either of the researchers are a part of on campus. As a result, the survey participants have varied majors and are representative of the university as a whole.

In total, the survey was taken 177 times. However, only complete responses were used in the data analysis. In addition, any response from an individual older than 30 years was not used. This was so the survey participants and the results were in line with the target audience of the survey: current or recently graduated college students. As a result of these criteria, only 114 of the 177 survey responses were used in the data analysis. In addition, only 104 of the 114 respondents gave an initial contribution in the scenario analysis of the survey.

Of the 114 responses, 69 responses were from females (60%), and 45 were from males (40%). This accurately depicts the student body of the small, Midwest University. In terms of ethnicity, the vast majority of respondents were white. The amount of participants that identified as white was 108, or 95% of the participants. Again, this represents the student body of this University. One hundred and two (89%) of the participants fell in the age range of 18-22. Of the 36 survey participants that have taken a finance course, 26 of them took the class as an undergraduate college student. While we refrain from using financial literacy as a variable in this analysis, we include a variable that includes previous experience taking a finance course. In a similar experimental setting,

Arling, Foltice, Kirby and Saajasto (2018) found that students who had previously taken a finance course provided higher initial retirement contribution rates by 1.7%.

One of the variables tested in this study is student loan debt. Out of the 114 respondents, 60 had taken out student loans (52%). The average amount of student loans that the participants had was $25,000. There was a large variation in the amount of student loans taken out when analyzed by gender. Females on average had taken out almost $12,000 more than males to finance their education. Student loans were not analyzed on an average basis by ethnicity, as there was not a large enough variation in ethnicity.

From the scenario analysis, the average amount that an individual saved for retirement was approximately 11.57% of their salary, or approximately $5,250 annually. Again, due to the predominantly white participants, analysis based on averages could not be done for ethnicity. However, based on gender, there was a fairly significant difference in saving behavior. Female respondents saved approximately 2% more than males, a difference of around $1,000 in the scenario. A summary and description of the variables used in this analysis are provided below:

Variable:	Description:
Dummy Variables:	
Gender	The gender of the participant (male=0 or female=1)
Finance Course	Whether or not the participant had taken a financial class
Tested Variables	
Locus of Control	Internal or external, on a scale of 0-1
Student Debt	Expected level of student debt expected at graduation, in thousands
Other Loan	Other individual debt, excluding mortgage and student debts, in thousands
Initial Contribution 401(k)	The amount the participant initially contributed to his/her
Percentage Framing	Participants that received the final scenario as a percentage of salary.

| Dollar Framing | Participants that received the final scenario as a dollar amount of salary. |

4. Hypothesis and Results

4.1 Hypothesis 1

Our first hypothesis focuses on the effect of locus of control on retirement saving decisions. Previous literature is contradictory on this topic: most studies find that internals save more (Perry, V.G., & Morris, M.D. 2005; Cobb-Clark, D. A., Kassenboehmer, S. C., & Sinning, M. G., 2016) while Kasilinghma and Sudha (2010) find that externals save more. This paper agrees with the majority of studies that internals save more than externals. We believe that individuals who think that they have more control over their own lives will take more of an initiative in their financial future. As a result, the first hypothesis (H1) is that:

> *H1: Individuals with an internal locus of control will save more for retirement than individuals with an external locus of control.*

This study uses two linear regression models to analyze hypothesis one. Regression 1 includes gender as a dummy variable. Regression 2 factors in financial education (previous experience taking a finance course).

In both regression models, shown in Table 1, we find support for hypothesis one as we cannot reject the null hypothesis. These models find that locus of control was the only significant driver of the savings decision. Here, we show that an individual who ranked as

completely external (average of 1), would have an initial contribution, on average, approximately 10% less than an internal (with a p-value of .03). Taking a finance class had the least significance of any of the variables tested, supporting the findings of Fernandes, Lynch, & Netemeyer (2014) and are in conflict with the findings of Arling, Foltice, Kirby, and Saajasto (2018).

Table 1. Regression Model Results – Impact on Initial Retirement Savings Allocation

Variable	Regression 1	Regression 2
N	104	104
Adjusted R Squared	0.029	0.019
Constant	16.277	16.312
Gender	0.918	0.908
Locus of Control	-10.09*	-10.115*
Finance Course		-0.051

Note: This table displays the results of a regression analysis on the key variables listed to determine the various drivers of the initial equity allocation.
* significant at $p < 0.05$; ** significant at $p < 0.01$; *** significant at $p < 0.001$

4.2 Hypothesis 2

As already discussed in the previous literature, debt overhang has large influences on post graduate decisions for many college students. For the most part, individuals with a larger debt overhang tend to forego additional expenses, such as graduate school, to take high paying jobs, and start paying off debt. Many will even be forced out of careers they enjoy in order to take higher paying jobs. This study predicts that individuals with a higher debt overhang will forego retirement saving to pay off debt. As a result, Hypothesis 2, part one (H2a) is:

H2a: Individuals with more debt will save less for retirement than individuals with little to no debt.

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Again, multiple linear regression are used to analyze the data, which can be seen in Table 2. The first regression analyzes the effect that the two types of loans (student and other) would have on initial contributions. The second regression tests this again, but also includes the variable of financial education. In both models, we find no evidence to support this hypothesis. The regressions tests multiple variables, no significant drivers are found to determine how much an individual's contribution would be. One possible explanation of this finding is that this survey was completed by current students who, most likely, haven't yet made a payment on their student loan and do not realize the impact it will have on their saving habits.

Table 2. Regression Model Results – Impact of Debt on Initial Contributions

Variable	Regression 1	Regression 2
N	104	104
Adjusted R Squared	0.014	0.015
Constant	10.563	10.347
Gender	1.003	1.089
Student Loans (in thousands)	0.032	0.033
Other Loans	-0.037	-0.033
Finance Course		0.473

Note: This table displays the results of a regression analysis on the key variables listed to determine the various drivers of the initial equity allocation.
* significant at $p < 0.05$; ** significant at $p < 0.01$; *** significant at $p < 0.001$

The second part of Hypothesis 2, (H2b) looks to further the knowledge of the relationship between locus of control and debt. Studies have shown that externals tend to take on more credit card debt, while internals are more likely to take on pre-planned, long-term debt, such as mortgages. Since student debt is more of a pre-planned, long-term debt, H2b is that:

H2b: Individuals with an internal locus of control will have a higher student debt

overhang than individuals with an external locus of control.

Hypothesis 2B predicts that individuals with an internal locus of control would have higher levels of student loans than individuals with an external locus of control. A linear regression finds that this relationship did exist; however, it was not significant to a 95% confidence interval (p value of .129). Because of this, Hypothesis 2B was not supported by this study. This can be seen in Table 3.

Table 3. Regression Model Results – Locus of Control and Student Debt

Variable	*Regression 1*
N	114
Adjusted R-Squared	0.004
Constant	20.279
Locus of Control	-18.727
Gender	4.415
Other Loan	0.056
Finance Course	-2.061

Note: This table displays the results of a regression analysis on the key variables listed to determine the various drivers of the initial equity allocation.
* significant at p < 0.05; ** significant at p < 0.01; *** significant at p < 0.001

4.3 H1 and H2 Together

In order to determine the ultimate driver of initial contributions, we run a regression that combines both H1 and H2. Overall, it tests student loans, other loans, finance course, gender, and locus of control. Here, the only significant driver is locus of control, further adding support for Hypothesis 1. This can be seen in Table 4. Locus of control has clearly been determined to be a main driver of retirement savings by this study.

Table 4. Regression Model Results – Impact of Debt and Locus of Control on Initial Allocation

Variable	Regression 1
N	104
Adjusted R-Squared	0.051
Constant	15.938
Student Loans	0.019
Gender	0.787
Finance Course	-0.054
Locus of Control	-9.664*
Other Loan	-0.037

Note: This table displays the results of a regression analysis on the key variables listed to determine the various drivers of the initial equity allocation.
* significant at $p < 0.05$; ** significant at $p < 0.01$; *** significant at $p < 0.001$

4.4 Hypothesis 3

The third and final question that this paper seeks to answer is how framing effects will impact an individual's decision on how much to save for retirement. Some studies have already looked at this: however, we propose a different set of frames. The frames that will be used will be in an absolute dollar and percentage frame of an annual salary. In this scenario, an absolute dollar frame will appear to be a larger portion of the annual salary than the percentage frame. As a result, H3 is:

> *H3: Individuals who are given a percentage frame will be more likely to increase*
>
> *their retirement savings than those given an absolute dollar frame.*

For each survey participant, one of four scenarios were given. The groups were either given a percentage frame or a dollar frame, in addition, the increased account value was either based on a 60/40 stock to bond split, or an 80/20 stock to bond split. A breakdown of the groups can be seen in the chart below:

Group	Framing	Portfolio

Group 1	Percentage	60/40
Group 2	Percentage	80/20
Group 3	Dollar	60/40
Group 4	Dollar	80/20

Approximately half the people in each group elected to change their contribution rate, indicating that neither of the factors had any influence on whether an individual would change their initial contribution rate or not. However, one of the factors had a significant impact on how much the participant would change their initial contribution by. The average change and standard deviation for each group (including the percentage frame and stock splits groupings) can be seen in Table 5.

Table 5 Average Change and T-Test Results

Group	N	Δ	Average Δ	95% Confidence
Group 1	26	12	3.833	
Group 2	26	13	3.769	
Group 3	28	12	-1.917	
Group 4	26	12	-0.925	
60/40 (Groups 1& 3)	54	24	0.958	-1.29 - 3.21
80/20 (Groups 2 & 4)	52	25	1.516	-0.27 – 3.31
Percentage Frame (Groups 1 & 2)	52	25	3.800*	2.64 - 4.96
Dollar Frame (Groups 3 & 4)	54	24	-1.421*	-3.55 - 0.71
H3. Difference between Groups 1&2 / 3&4			**5.221***	

Note: This table displays the results of a T-Test analysis on the key variables listed to determine the various drivers of the initial equity allocation.
* significant at $p < 0.05$; ** significant at $p < 0.01$; *** significant at $p < 0.001$

For the participants in each group that elected to change their initial contribution, Group 1 increased their contribution by 3.83% on average. Group 2 increased their contribution by 3.76% on average. Group 3 decreased their contribution by about 1.91% on average, and Group 4 decreased their contribution by 0.93% on average. When we

combine the groupings based on their framing (percentage versus dollar framing), a significant difference was found, with the group given the percentage frame increasing their initial contributions by 3.8% on average, and the group given the dollar frame decreased their portfolio by 1.42% on average. For H3, we test the difference between percent and dollar frames, and find that the percentage frame increased contributions by 5.27% compared to the dollar frame (significant at $p<.001$). The implications of this finding is that one small intervention can significantly increase the amount of an individual's contribution.

When ignoring the percentage and dollar framing, and looking at groups based on either a 60/40 split or an 80/20 split, there is no significant difference found in the change in contributions.

Finally, we run three regressions to determine the potential drivers of the change in contribution rates, our dependent variable. Potential drivers included in the model (our independent variables) were: gender, locus of control, financial education, the percentage vs. dollar framing, and the 60/40 vs. 80/20 split. Results can be seen in Table 6.

Table 6. Regression Model Results – Impact of Percentage Framing

Variable	Regression 1	Regression 2	Regression 3
N	49	49	49
Adjusted R-Squared	0.309	0.290	0.276
Constant	-0.658	0.553	0.492
Gender	-0.874	-1.224	-1.215
Locus of Control	-0.501	-1.426	-1.800
Percentage Framing	5.182***	5.342***	5.346***
Finance Course		-2.155	-2.162
Portfolio Framing			0.492

Note: This table displays the results of a regression analysis on the key variables listed to determine the various drivers of the initial equity allocation.
* significant at $p < 0.05$; ** significant at $p < 0.01$; *** significant at $p < 0.001$

Here, we find that the only driver that was found to be statistically significant was the percentage framing (P < 0.001). As a result, this paper concludes that Hypothesis 3 is supported, and that individuals given the percentage framing were more likely to increase their contributions than individuals given a dollar framing.

While hypothesis three has been found to be supported, there is a potential limitation to the findings, and that is with the sample size. Only 49 survey participants elected to change their contribution, and each subgroup (groups 1-4) had either 12 or 13 individuals per group. As a result, when combining groups into frame type and portfolio split, each group had either 24 or 25 in its sample size. However, although the sample sizes are small, the relationship was found to be extremely significant (p<0.001), indicating that the relationship can still be considered significant.

5. Limitations and Discussion

This study faced multiple limitations that could have influenced the results of the survey. The first was that the initial contributions were based on a hypothetical situation, rather than real life. As such, it is possible that participants may not have taken into account their student loans when making their decision on how much to save for retirement, since to them, this was not a realistic depiction of their post-graduate life.

Another limitation may be the lack of diversity of the participants. As previously mentioned, the survey participants were predominantly white. In addition, there may also have been a lack of diversity in socioeconomic status. The participants were mainly gathered from a private school in the Midwest. While no socioeconomic data was gathered, the majority of students that go to this institution are from middle or upper class families.

While we don't believe these factors to have a significant impact on our findings, we are cognizant that that survey sample is not consistent with a representative sample of individuals in the United States.

6. Conclusion

The most notable trend in retirement has been the switch from defined benefit plans to defined contribution plans, such as a 401(k). As a result, understanding the drivers on how much individuals save for retirement will help companies and other organizations create retirement plans that will encourage people to save more for retirement. This study finds that individuals with an external locus of control save significantly less for retirement than those with an internal locus of control. While it is unrealistic for companies to determine a new hire's locus of control, this information can be used to design a better new hire system that will target externals with more information on why they should save for retirement.

In addition, this survey shows that when framed as a percentage of salary, individuals save significantly more for retirement than when framed as a dollar amount. As a result, it is important for companies to realize that when asking for initial contributions to a company sponsored 401k plan, a company can easily help to better prepare their employees for retirement by asking it as a percent of salary, as opposed to a dollar figure.

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Supplement A – Copy of Survey

Q2 How old are you?

	18 28 38 48 58 68 78 88 98 100
Age in years (1)	

Q22 What gender do you identify with?

○ Male (1)

○ Female (2)

○ Neither/choose not to disclose (3)

Q23 What ethnicity best describes you?

○ White (1)

○ Black or African American (2)

○ American Indian or Alaska Native (3)

○ Asian (4)

○ Native Hawaiian or Pacific Islander (5)

○ Other (6)

Q24 What is the highest level of education you have completed?

○ Less than high school (1)

○ High school graduate (2)

○ Some college (3)

○ 2 year degree (4)

○ 4 year degree (5)

○ Professional degree (6)

○ Doctorate (7)

Q25 What was your primary major that you completed or are currently pursuing as an undergraduate?

_____

Q58 Have you taken a course(s) on financial education?

☐ Yes (1)

☐ No (2)

Q26 When did you take this/these course(s)?

◯ High School (2)

◯ Undergraduate College (4)

◯ Graduate School (5)

◯ Other (6)

Q59 You indicated other, when did you take this course?

_____

Q60 Please describe the financial education course(s) you have taken.

_____

Q28 Have you had an internship before?

◯ Yes (1)

◯ No (2)

Q29 Was the internship paid?

○ Yes (1)

○ No (2)

Q30 Have you ever worked a full-time job that has offered retirement plans, such as a 401k?

○ Yes (1)

○ No (2)

Q31 Select the statement you agree with the most.

○ Children get into trouble because their parents punish them too much. (1)

○ The trouble with most children nowadays is that their parents are too easy with them. (2)

Q32 Select the statement that you agree with the most.

○ Many of the unhappy things in people's lives are partly due to bad luck. (1)

○ People's misfortunes result from the mistakes they make. (2)

Q33 Select the statement you agree with the most.

○ One of the major reasons why we have wars is because people don't take enough interest in politics. (1)

○ There will always be wars, no matter how hard people try to prevent them. (2)

Q34 Select the statement you agree with the most.

○ In the long run people get the respect they deserve in this world. (1)

○ Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries. (2)

Q35 Select the statement you agree with the most.

○ The idea that teachers are unfair to students is nonsense. (1)

○ Most students don't realize the extent to which their grades are influenced by accidental happenings. (2)

Q36 Select the statement you agree with the most.

○ Without the right breaks one cannot be an effective leader. (1)

○ Capable people who fail to become leaders have not taken advantage of their opportunities. (2)

Q37 Select the statement you agree with the most.

○ No matter how hard you try some people just don't like you. (1)

○ People who can't get others to like them don't understand how to get along with others. (2)

Q38 Select the statement you agree with the most.

○ Heredity plays a major role in determining one's personality. (1)

○ It is one's experiences in life which determine what they're like. (2)

Q39 Select the statement you agree with the most.

○ I have often found that what is going to happen will happen. (1)

○ Trusting to fate has never turned out as well for me as making a decision to take a definite course of action. (2)

Q40 Select the statement you agree with the most.

○ In the case of the well prepared student, there is rarely if ever, such a thing as an unfair test. (1)

○ Many times exam questions tend to be so unrelated to course work that studying is really useless. (2)

Q41 Select the statement you agree with the most.

○ Becoming a success is a matter of hard work, luck has little or nothing to do with it. (1)

○ Getting a good job depends mainly on being in the right place at the right time. (2)

Q42 Select the statement you agree with the most.

○ The average citizen can have an influence in government decisions. (1)

○ This world is run by a few people in power, and there is not much the little guy can do about it. (2)

Q43 Select the statement you agree with the most.

    ⚪ When I make plans, I am almost certain that I can make them work. (1)

    ⚪ It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow. (2)

Q44 Select the statement you agree with the most.

    ⚪ There are certain people who are just no good. (1)

    ⚪ There is some good in everybody. (2)

Q45 Select the statement you agree with the most.

    ⚪ In my case getting what I want has little or nothing to do with luck. (1)

    ⚪ Many times we might just as well decide what to do by flipping a coin. (2)

Q46 Select the statement you agree with the most.

    ⚪ Who gets to be the boss often depends on who was lucky enough to be in the right place first. (1)

    ⚪ Getting people to do the right thing depends upon ability. Luck has little or nothing to do with it. (2)

Q47 Select the statement you agree with the most.

○ As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control. (1)

○ By taking an active part in political and social affairs the people can control world events. (2)

Q48 Select the statement you agree with the most.

○ Most people don't realize the extent to which their lives are controlled by accidental happenings. (1)

○ There really is no such thing as "luck". (2)

Q49 Select the statement you agree with the most.

○ One should always be willing to admit mistakes. (1)

○ It is usually best to cover up one's mistakes. (2)

Q50 Select the statement you agree with the most.

○ It is hard to know whether or not a person really likes you. (1)

○ How many friends you have depends upon how nice a person you are. (2)

Q51 Select the statement you agree with the most.

○ In the long run, the bad things that happen to us are balanced by the good ones. (1)

○ Most misfortunes are the result of lack of ability, ignorance, laziness, or all three. (2)

Q52 Select the statement you agree with the most.

○ With enough effort we can wipe out political corruption. (1)

○ It is difficult for people to have much control over the things politicians do in office. (2)

Q53 Select the statement you agree with the most.

○ Sometimes I can't understand how teachers arrive at the grades they give. (1)

○ There is a direct connection between how hard I study and the grades I get. (2)

Q54 Select the statement you agree with the most.

○ A good leader expects people to decide for themselves what they should do. (1)

○ A good leader makes it clear to everybody what their jobs are. (2)

Q55 Select the statement you agree with the most.

○ Many times I feel that I have little influence over the things that happen to me. (1)

○ It is impossible for me to believe that chance or luck plays an important role in my life. (2)

Q56 Select the statement you agree with the most.

○ People are lonely because they dont try to be friendly. (1)

○ There's not much use in trying too hard to please people, if they like you, they like you. (2)

Q57 Select the statement you agree with the most.

○ There is too much emphasis on athletics in high school. (1)

○ Team sports are an excellent way to build character. (2)

Q58 Select the statement you agree with the most.

○ What happens to me is my own doing. (1)

○ Sometimes I feel that I don't have enough control over the direction my life is taking. (2)

Q59 Select the statement you agree with the most.

○ Most of the time I can't understand why politicians behave the way they do. (1)

○ In the long run the people are responsible for bad government on a national as well as on a local level. (2)

End of Block: Locus Of Control

Start of Block: Debt Overhang

Q3 As of today, have you had to take out any student loans to finance your education?

○ Yes (1)

○ No (2)

Display This Question:

If As of today, have you had to take out any student loans to finance your education? = Yes

Q4 Approximately how much in student loans do you have? Round to the nearest 1,000.

0   10   20   30   40   50   60   70   80   90   100

Amount of Loans (in 000s) (1)	

Q5 Do you currently have any other forms of debt? Indicate to the nearest 1,000 next to each option. If you do not have any other debt, simply enter 0.

0 10 20 30 40 50 60 70 80 90 100

Mortgage (1)	
Auto Loan (2)	
Credit Card Debt (3)	
Alternative Financing (Pawn Shop, Payday Loans, etc.) (4)	
Other (5)	

Q6 You indicated you had "other" forms of debt, please provide a brief explanation of that debt.

_____

Q7 Do you currently have any money saved in a savings account, trading account, or retirement account?

○ Yes (1)

○ No (2)

Q8 What type of account?

○ Savings/Money Market (1)

○ Trading/Brokerage Account (2)

○ Retirement Account (IRA, 401k, etc.) (3)

○ Other (4)

Q9 Please provide a brief description of the account you have savings in.

_____

Q10 Do you feel as if you have held back on saving money or purchasing any product because of your student debt?

○ Yes (1)

○ No (2)

Q11 Please explain what you've held back on because of your student loan debt.

_____

End of Block: Debt Overhang

Start of Block: Saving For Retirement

Q12 A 401k plan is a company sponsored retirement plan that allows participants to set aside a percentage of each paycheck to invest towards retirement. You will be able to allocate your savings among various investment choices, such as mutual funds, bonds, and money market funds.
Your investment will grow tax-free and you will only be taxed when the funds are withdrawn at

retirement. The tax benefits of a 401K can make a significant difference in the amount of income you have at retirement when compared to investing the same amount of money on your own without a 401K.

In order to encourage employees to save for retirement, companies often match a portion of what an employee contributes towards the 401k account. A common employer match would be matching 50% of employee contributions, up to 6% of the employee's salary. If an employee contributed 6% to their 401k, their employer would contribute an additional 3% on the employee's behalf. A table below illustrates this match. The dollar figures in the table are based on a $50,000 annual salary.

Employee Contribution		Employer Match		Total Contribution		1%
($500)	0.5% ($250)	1.5% ($750)	2% ($1,000)	1% ($500)		3%
($1,500)	3% ($1,500)	1.5% ($750)	4.5% ($2,250)	4% ($2,000)		
2% ($1,000)	6% ($3,000)	5% ($2,500)	2.5% ($1,250)	7.5% ($3,750)		
6% ($3,000)	3% ($1,500)	9% ($4,500)	7% ($3,500)	3% ($1,500)		
10% ($5,000)	8% ($4,000)	3% ($1,500)	11% ($5,500)	9% ($4,500)		
3% ($1,500)	12% ($6,000)	10% ($5,000)	3% ($1,500)	13% ($6,500)		
11% ($5,500)	3% ($1,500)	14% ($7,000)	12% ($6,000)	3% ($1,500)		
15% ($7,500)	13% ($6,500)	3% ($1,500)	16% ($8,000)	14%		
($7,000)	3% ($1,500)	17% ($8,500)	15% ($7,500)	3% ($1,500)		
18% ($9,000)	16% ($8,000)	3% ($1,500)	19% ($9,500)	17%		
($8,500)	3% ($1,500)	20% ($10,000)	18% ($9,000)	3% ($1,500)		
21% ($10,500)	19% ($9,500)	3% ($1,500)	22% ($11,000)	20%		
($10,000)	3% ($1,500)	23% ($11,500)	Max – 36% ($18,000)	3%		
($1,500)	39% ($19,500					

Assume that upon graduation from your undergraduate education, you chose to accept a job from a company that will pay you an annual salary of $50,000 ($4,167.77 per month) before tax. The employer also provides a 401k plan, and will match 50% of your contributions up to 6% of your salary. Based on this information, how much would you like to contribute to your 401k annually?

0   4   7   11   14   18   22   25   29   32   36

What percentage of your salary would you like to save? (1)	▬▬▬▬▬▮▬▬▬▬

Q13 A commonly recommended strategy for investing within a 401k is to maintain a portfolio consisting of both stocks and bonds. Based upon historical returns, a portfolio consisting of a mixture of stocks and bonds has an average annual return of 8.27%.

Based on this return, and assuming that you were going to retire in 40 years, increasing the contribution rate by 1% would result in having an additional $208,643.00 ($139,073.00) in your

401k account at retirement if you are contributing less (more) than 6%.
For example, increasing your annual contribution by 6%, from 0% to 6% would increase your 401k account by $1,251,858.00 at retirement. Increasing your contribution from 6% to 12% would increase your future portfolio value by $834,438.00 (from $1,251,858 to $2,086,296.00). Based on this information, would you like to change the amount you are contributing to your 401k?

○ Yes (1)

○ No (2)

Q14 What is your new contribution rate? (As a percent of your salary?)

	0 4 7 11 14 18 22 25 29 32 36
Percent of Salary (1)	[slider]

End of Block: Framing Effect 1a

Start of Block: Framing Effect 1b

Q18 A commonly recommended strategy for investing within a 401k is to maintain a portfolio consisting of both stocks and bonds. Based upon historical returns, a portfolio consisting of a mixture of stocks and bonds has an average annual return of 9.01%.
Based on this return, and assuming that you were going to retire in 40 years, increasing the contribution rate by 1% would result in having an additional $338,895.00 ($169,447.00) in your 401k account at retirement if you are contributing less (more) than 6%.
For example, increasing your annual contribution by 6%, from 0% to 6% would increase your 401k account by $1,863,922.00 at retirement. Increasing your contribution from 6% to 12% would increase your future portfolio value by $1,016,685.00 (from $1,863,922 to $2,880,607.00). Based on this information, would you like to change the amount you are contributing to your 401k?

○ Yes (1)

○ No (2)

Q19 What is your new contribution rate? As a percent of your salary.

                                           0   4   7   11   14   18   22   25   29   32   36

Percent of Salary (1)	▬▬▬▬▬▬▬▮▬▬▬▬▬▬

End of Block: Framing Effect 1b

Start of Block: Framing Effect 2a

Q15 A commonly recommended strategy for investing within a 401k is to maintain a portfolio consisting of both stocks and bonds. Based upon historical returns, a portfolio consisting of a mixture of stocks and bonds has an average annual return of 8.27%.

  Based on this return, and assuming that you were going to retire in 40 years, increasing the contribution rate by $500.00 annually would result in having an additional $208,643.00 ($139,073.00) in your 401k account at retirement if you are contributing less (more) than $3,000.

Based on this information, would you like to change the amount you are contributing to your 401k?

◯ Yes (1)

◯ No (2)

- -

Q16 What is your new contribution rate?

                                           0   2   4   5   7   9   11   13   14   16   18

Contribution (in 000s) (1)	▬▬▬▬▬▬▬▮▬▬▬▬▬▬

Q20 A commonly recommended strategy for investing within a 401k is to maintain a portfolio consisting of both stocks and bonds. Based upon historical returns, a portfolio consisting of a mixture of stocks and bonds has an average annual return of 9.01%.

Based on this return, and assuming that you were going to retire in 40 years, increasing the contribution rate by $500 would result in having an additional $338,895.00 ($169,447.00) in your 401k account at retirement if you are contributing less (more) than 6%.

For example, increasing your annual contribution by $3,000, from $0 to $3,000 would increase your 401k account by $1,863,922.00 at retirement. Increasing your contribution from $3,000 to $6,000 would increase your future portfolio value by $1,016,685.00 (from $1,863,922 to $2,880,607.00).

Based on this information, would you like to change the amount you are contributing to your 401k?

○ Yes (1)

○ No (2)

Q21 What is your new contribution rate?

	0	2	4	5	7	9	11	13	14	16	18
Contribution Rate (in 000s) (1)											