2017

Assessing the Financial Knowledge, Behaviours, and Attitudes of Undergraduates

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Abstract

In this study the relationship between undergraduates' financial knowledge, behaviours, and attitudes are explored. These three dimensions of financial capability are considered in order to identify ways in which they influence one another. Data are collected via a survey administered at a small, private university in the United States. Financial knowledge is evaluated with five questions related to basic financial concepts. The financial behaviours considered are following a formal budget and paying off one's credit card balance every month. Individual's attitudes towards risk and self-reported financial stress are the financial attitudes queried. The results suggest that a higher level of knowledge, in and of itself, does not lead to prudent financial behaviour. Additionally, knowledge does not influence self-reported financial stress but believing one has strong mathematical abilities lowers stress levels. Overconfidence, in the form of an inaccurate appraisal of one's knowledge, lowers the probability an individual pays off their credit card each month. Significant group differences (gender, race, and college major) in financial behaviours and attitudes are found. Group differences, and the idiosyncratic relationship between knowledge, behaviour, and attitudes suggests that financial educational initiatives will be more effective if they target specific financial behaviours in a way that recognizes the uniqueness of those enrolled in the program rather than through one-size-fits-all approaches.

Keywords: Financial knowledge; financial behaviour; financial attitudes; financial capability.

Introduction

Jobst (2012) makes the case that the college years are likely one of the last times for individuals to gain the financial knowledge necessary for the decisions they must make in the future. During this time young adults are on the cusp of laying the financial foundation for the rest of their lives. Unfortunately, young adults in the United States have low levels of financial literacy (Lusardi, 2011). Most are not equipped to make prudent financial decisions as they enter the labor market.

The *2013 Survey of Consumer Finances* (SCF) provides extensive data on the ways young adults in the United States are participating in financial markets. In their analysis of the 2013 SCF, Dettling and Hsu (2014) focus on the balance sheets of 18 to 31 year olds. They conclude that young adults today are doing a better job at managing certain aspects of their financial lives than their predecessors, but there is room for improvement. Use of credit cards is one example of this phenomenon. The percent of young adult's holding credit card debt has declined (36% in 2013); but 25% hold revolving credit card debt and 21% have been late on payments in the last year (Dettling & Hsu, p. 318). Simultaneously, the encouraging decline in the percent holding credit card debt has been offset by an increase in student loan deby. Merry and Thomas (2014) analyze the 2013 SCF's data on young adult's (18 – 41 years old) asset holdings. Among this demographic there is declining ownership of stocks, bonds, and retirement accounts. Lusardi and Bassa Scheresberg (2013) find that 34% of adults aged 18 – 34 have used high-cost methods of borrowing (e.g. payday loans, pawn shops). Considering these studies together, young adults are holding significant levels of debt while simultaneously making less use of formal financial instruments than their predecessors. Given the low levels of financial literacy among young adults in the United States it comes as no surprise than that studies such as Sánchez and Zhu (2015) find the delinquency rate on student loans to be quite high.

In this study the financial knowledge, behaviour, and attitudes of undergraduate students are analyzed. By including a diverse set of questions a robust picture of the financial capability of undergraduates is obtained. Data are collected via a survey administered to undergraduate students at a private university in the northwest of the United States. The survey was designed to extend the literature on the financial capability of young adults. Often surveys in this literature contain questions that are not immediately applicable to the typical young adult (e.g. the difference between 15 and 30 year mortgages). Questioning students on decisions they are not likely to make in the near term allows for the possibility that rational ignorance is influencing the results. Because information and knowledge are costly to acquire an individual may choose to delay learning about a matter until a decision must be made. In response to rational ignorance, the survey is structured to gauge knowledge of concepts, behaviours, and attitudes that are immediately applicable to most undergraduates. A second unique feature of the data set is the appraisal of self-awareness. Respondent's self-awareness is evaluated in order to determine if an accurate conception of one's knowledge influences financial behaviours and attitudes.

Literature Review

Financial education is often proposed as a means to improve financial literacy and empower individuals to make appropriate financial decisions. Numerous studies have found that education improves financial knowledge and promotes prudent financial behaviour (Bernheim, Garrett, & Maki, 2001; Harter & Harter, 2010; Jobst, 2014, Xiao & O'Neill, 2016). Young adults in the United States have low levels of financial literacy making them a prime group for this type of intervention (Mandell & Institute, 2008; Lusardi, 2011). The implications of this literature are straightforward and intuitive; raising an individual's knowledge equips them to make better decisions. For the reader

interested in a more thorough discussion of this literature surveys by Fox, Bartholomae, and Lee (2005), and the more recent Lusardi and Mitchell (2014) are highly recommended.

In spite of this robust literature the conclusion that financial education leads to prudent financial behaviour is increasingly being called into question. Many studies have not found a relationship between education and behaviour (Hogarth, 2002; Mandell & Klein, 2009; Cole, Paulson, & Shastry, 2014). To educators and researchers alike, these results are perplexing. Surely knowledge empowers individuals to make prudent decisions but perhaps in the case of financial decisions there are complicating factors at work.

A number of different tactics have been applied to unpack the paradoxical relationship between finanical knowledge and behaviour. A promising line of inquiry explores the ways in which attitudes, subjective evaluation of circumstances, and social factors influence the relationship between knowledge and behaviour. Knowing something to be true and acting upon that knowledge are not the same thing. Roberts and Jones (2001) find that financial attitudes impact the use of credit cards and compulsive buying behaviour; Dowling, Tim, and Hoiles (2009) that individuals with higher levels of evaluation (envy) and anxiety over financial concerns are more likely to have financial problems. While anxiety contributes to financial problems it also serves as an impetus to seek out financial help. Kim, Heckman, Letkiewicz, and Montalto (2014) find such a relationship at work among college students.

The survey applied in this study seeks to leverage the insights of this latter strand of the literature on financial knowledge and behaviour. Data on behaviour, attitudes, and knowledge are analyzed through numerous specifications in order to control for the myriad factors which may influence undergraduates' financial behaviours and attitudes. This approach is congruent with Alsemgeest's (2015) recommendation that financial educators must be aware of the influence of non-cognitive factors on financial behaviours.

Method

Undergraduate students at a small, private university in the northwest of the United States were surveyed during the fall of 2014. Prior to administering the survey it was approved by the university's internal review board. Surveys were randomly administered in person and on-line. Questions on the survey were related to demographics, knowledge of financial concepts, financial behaviours, and financial attitudes. Respondents also provided a subjective ranking of their mathematical ability and predicted how many of the financial concept questions they answered correctly. Due to significant differences in cultural and educational backgrounds non-U.S. citizens have been excluded from the final data set. A total of 449 completed surveys are analyzed in the study.

The demographic categories considered are gender, race, major, and year in school. (Percentages in the following discussion do not necessarily sum to 100% due to rounding). Fifty-five percent of respondents were male and 45% female. The U.S. Census Bureau's racial categories are applied. The three largest categories within the sample are White, Hispanic, and Other; 83%, 8%, and 6% of respondents, respectively. Majors are differentiated according to the college they are housed in; 29% business, 27% engineering, 37% art and science, and 9% other. Finally, 39% of respondents reported being first-year students by credits, 26% sophomores, 14% juniors, and 20% seniors.

Five questions were used to measure financial knowledge. Questions 1 and 5 (below) are original to this study. Questions 2 and 3 are from Chen and Volpe (1998); question 4, Mandell (2008). The questions and percentages of correct responses are:

1. *If you, or your spouse, doesn't consolidate your student loan and use the standard payback method how many years do you have to pay off the loan? 5, 10, 15 or 30 years? 45% correct*
2. *The most liquid asset is: money in a certificate of deposit account, money in a checking account, a car, a computer, or a house? 71% correct*
3. *The main reason to purchase insurance is to: protect you from a loss recently incurred, provide you with excellent investment returns, protect you from sustaining a catastrophic loss, protect you from small incidental losses, or improve your standard of living by filing fraudulent claims? 72% correct*
4. *Sara and Joshua just had a baby. They received money as baby gifts and want to put it away for the baby's education. Which of the following tends to have the highest growth over periods of time as long as 18 years: a checking account, stocks, a U.S. Govt. savings bond, or a savings account? 28% correct*
5. *The purpose of a debit card is to: obtain a discount on consumer purchases, make credit card purchases, quickly obtain a cash loan, make investments with an investment company, or pay for an item or service from your checking account? 96% correct*

The mean score was 3.13 correct out of five. Only 8% of respondents answered every question correct, while 36% answered at least four correctly. Seventy-five percent answered at least three correct.

Following the questions on financial concepts, participants were asked to predict how many questions they answered correctly. These predictions provide a measure of whether respondents are able to accurately appraise their level of knowledge. Peach, Van der Werff, and Halley (2013 - 14) as well as Xiao, Ahn, Serido, and Shim, S. (2014) find that subjective assessments of knowledge can be a predictor of behaviour. The average prediction was three correct out of five. After the data were collected predictions were subtracted from the actual number the respondent answered correctly. The mean difference was -0.1 suggesting respondents, on average, slightly underestimated their financial knowledge. Respondents also rated their ability to understand math concepts (on a Likert-scale with 5 being the highest and 1 being the lowest); the mean is 3.7 out of five.

Two financial behaviours were included on the survey; following a formal budget and credit card management. Thirty-five percent of respondents reported following a written, or electronic budget on a monthly basis. In regards to credit cards, respondents were asked if, at any time in the last year, they had not paid off their monthly balance in full. Eighteen percent of the sample had not paid off their credit card(s) each month.

The last group of questions addressed financial attitudes. The first attitude considered was self-reported financial stress. The average being 3.30 out of 5 (on a Likert-scale with 5 being none and 1 being overwhelming). Risk-tolerance was measured with a question from the 2013 SCF. Respondents were asked how much risk they would be willing to take in light of expected returns. The average score was 2.2 out of 4 (on a Likert-scale with 4 being unwilling to take any risk and 1 being willing to take substantial risk to earn substantial returns). Risk aversion becomes problematic when considered in light of the low percentage of respondents (28%) that knew which financial instrument earns the highest returns over long periods of time.

Prior to discussing the findings, the reader should be mindful of two of the dataset's limitations. First, the university where the survey was administered is a small, private university. Any systematic differences between its student population and the national

undergraduate population mitigates the external validity of the results. Second, though the survey was administered randomly, males are over-sampled. While these limitations merit attention they do not negate the methodology nor invalidate the conclusions drawn from it.

Results

Multivariate regression models are used to analyze the data. A logit regression model is applied to budgeting and credit card management. The dependent variable in these models is a binary variable. Estimated coefficients represent changes in the probability of practicing the relevant behaviour. Levels of financial stress and attitudes towards risk are ranked via ordered responses and evaluated via multinomial logit. Estimated coefficients in these models are the ordered log-odds of moving between the categories due to a marginal change in the relevant explanatory variable.

Two groups of explanatory variables are applied in the analysis. The first category is demographics: gender, race, year of schooling (first-year, sophomore, etc.), and major. *Gender* is treated as a binary indicator variable (=1 if female, = 0 if male). *Race* is considered in the same manner (= 1 if Caucasian, = 0 if non-Caucasian). There was not sufficient variation in the data to allow for considering each of the U.S. Census Bureau's racial categories separately. *Year* is a count variable (higher values indicate having been in college longer). *Major* sorts respondents according to their primary area of study (= 1 if business major, = 0 if non-business major). This variable controls for the impact of taking courses which expose students to the financial concepts found on the survey.

The second group of explanatory variables includes the number of financial knowledge questions answered correctly, self-reported mathematical ability, and measures of personal discernment. *Correct* is the number of financial questions the respondent answered correctly; 5 being the maximum. *Math* is self-reported ability in mathematics (on a Likert-scale with 5 being the highest and 1 being the lowest). Discernment is represented with two variables. The first is the individual's prediction of the number of questions they answered correctly; *Predict*. The second is a measure of whether the individual has an accurate prediction; *Overconfidence*. *Overconfidence* is equal to *Predict* minus *Correct*; its range {−5, 5}. A value of -5 represents an individual that answered all of the knowledge questions correctly but believes they answered each incorrectly. A value of 5, believing that each question is answered correctly when none are. The inclusion of *Overconfidence* in estimations creates a channel by which an inaccurate appraisal of one's financial knowledge impacts financial behaviours and attitudes. To avoid issues of multicollinearity *Predict*, *Correct*, and *Overconfidence* are not simultaneously included in estimations.

Self-Reported Budgeting

To evaluate budgeting behaviour respondents were asked whether they follow a formal, written budget each month. The McFadden *R*-squared is low (0.020) and the null hypothesis that the slope coefficients are simultaneously equal to zero cannot be rejected at the 10% level. Because of the low explanatory power of the estimations the results are not presented. Knowledge of basic financial concepts and the demographics controlled for in the analysis do not influence the probability an individual will follow a budget; other factors are at work.

Credit Card Repayment

The management of credit cards was assessed by asking whether the individual had paid off their credit card(s) each month within the last year. Table 1 presents these results. A positive (negative) coefficient indicates that an increase in the variable of

interest (or setting a categorical variable equal to 1) makes it more (less) likely an individual will pay off their credit card each month. The McFadden *R*-squared and LR statistic indicate the estimations have satisfactory explanatory power. In both specifications *Race* and *Year* are significant at the 1% level and *Major* at the 10% level. *Gender* is significant at the 10% level in column 1 and the 5% level in column 2. *Overconfidence* is significant when included.

Table 1:
Regression Analysis of Credit Card Repayment

Dependent Variable: Credit Card Repayment		
Independent Variable	**(1)**	**(2)**
Constant	4.392***	4.719***
	(1.263)	(1.087)
Major (Non-Business Omitted Category)	-0.738*	-0.743*
	(0.445)	(0.410)
Race (Non-Caucasian Omitted Category)	1.477***	1.475***
	(0.471)	(0.490)
Gender (Male Omitted Category)	-0.835*	-0.831**
	(0.443)	(0.435)
Year	-1.079***	-1.080***
	(0.206)	(0.178)
Correct	0.342	-
	(0.226)	
Math	0.193	0.193
	(0.197)	(0.184)
Predict	-0.351	-
	(0.217)	
Overconfidence	-	-0.347**
		(0.158)
McFadden *R*-squared	0.242	0.242
LR Statistic	57.110	57.109
p-value (LR statistic)	0.000	0.000

Note: A binary logit model is applied. An increase in the dependent variable corresponds to an increase in the probability that one's credit card is paid off each month. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Standard errors are reported in parentheses. LR statistic is the likelihood ratio that acts as an *F*-test of the estimated coefficients.

Financial Stress

Three specifications are applied to the analysis of financial stress. An increase in *Financial Stress* corresponds to higher levels of reported stress. See Table 2 for the results. The baseline specification can be found in column 1. Specifications 2 and 3

(columns 2 and 3, respectively) include *Overconfidence* and *Credit Card* as explanatory variables. Across the estimations *Gender* and *Math* are consistently significant.

Table 2:
Regression Analysis of Reported Financial Stress

Dependent Variable: Financial Stress			
Independent Variable	**(1)**	**(2)**	**(3)**
Major (Non-Business Omitted Category)	-0.018	-0.085	-0.060
	(0.209)	(0.204)	(0.210)
Race (Non-Caucasian Omitted Category)	-0.345	-0.383	-0.266
	(0.246)	(0.245)	(0.249)
Gender (Male Omitted Category)	0.387**	0.431**	0.355*
	(0.194)	(0.192)	(0.195)
Year	0.152*	0.125	0.106
	(0.083)	(0.081)	(0.086)
Correct	-0.091	-	-0.076
	(0.092)		(0.097)
Math	-0.336***	-0.346***	-0.326***
	(0.092)	(0.092)	(0.093)
Predict	-0.096	-	-0.116
	(0.091)		(0.091)
Overconfidence	-	-0.010	-
		(0.071)	
Credit Card	-	-	0.778**
			(0.383)
Pseudo *R*-squared	0.030	0.028	0.034
LR Statistic	31.048	28.687	35.195
p-value (LR statistic)	(0.000)	(0.000)	(0.000)

Note: A multinomial logit is applied. An increase in the dependent variable indicates higher levels of reported stress. Estimated threshold parameters are not reported. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$. Standard errors are reported in parentheses. LR statistic is the likelihood ratio that acts as an *F*-test of the estimated coefficients.

Attitudes towards financial risk

Self-reported attitudes towards financial risk are reported in Table 3. An increase in the dependent variable corresponds to being more risk averse. Column 1 is the baseline specification, column 2 includes *Overconfidence*, and column 3 specific financial knowledge questions. Across the estimations *Gender* and *Major* are statistically significant. Females are more risk averse than males, a finding consistent with other studies (Jianakoplos & Bernasek, 1998; Borghans, Heckman, Golsteyn, & Meijers, 2009). Students majoring in business-related disciplines (*Major*) are predicted to be less risk averse than their peers. When included, knowing the repayment period for student

loans and that stocks earn higher returns than U.S. government bonds, checking accounts, and savings accounts over long periods of time (more than a decade) impacts an individual's attitudes towards risk.

Table 3:

Regression Analysis of Attitudes Towards Financial Risk

Dependent Variable: Risk Aversion			
Independent Variable	**(1)**	**(2)**	**(3)**
Major (Non-Business Omitted Category)	-0.468***	-0.568***	-0.398**
	(0.209)	(0.204)	(0.212)
Race (Non-Caucasian Omitted Category)	0.287	0.241	0.370
	(0.254)	(0.253)	(0.257)
Gender (Male Omitted Category)	0.999***	1.07***	1.039***
	(0.200)	(0.198)	(0.202)
Year	-0.076	-0.115	-0.047
	(0.082)	(0.080)	(0.083)
Correct	-0.138	-	-
	(0.096)		
Math	0.072	0.049	0.091
	(0.091)	(0.090)	(0.093)
Predict	-0.140	-	-0.132
	(0.093)		(0.093)
Overconfidence	-	-0.001	-
		(0.072)	
Student Loan (Incorrect Omitted Category)	-	-	0.313*
			(0.186)
Investment Return (Incorrect Omitted Category)	-	-	-0.669***
			(0.212)
Pseudo *R*-squared	0.050	0.045	0.064
LR Statistic	50.104	44.913	64.092
p-value (LR statistic)	(0.000)	(0.000)	(0.000)

Note: A multinomial logit is applied. An increase in the dependent variable indicates being more risk averse. Estimated threshold parameters are not reported. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Standard errors are reported in parentheses. LR statistic is the likelihood ratio that acts as an *F*-test of the estimated coefficients. Statistically insignificant financial knowledge explanatory variables are omitted.

Discussion

One useful way to interpret the results related to credit card management presented in Table 1 is to consider a 'representative individual.' For example, the predicted probability that a female, non-Caucasian, senior business major with mean values of *Math* and *Predict* will not pay off their credit card each month is 79%. For a Caucasian, identical in every other way to the previous individual, the probability is 25%; a

difference of 54 percentage points. *Race* and *Year* are the variables with the largest (in absolute value) estimated coefficients. In order to interpret the impact of a marginal change in each of these variables in isolation, the remainder of the right hand side variables are set equal to their mean values. In specification 1, a non-Caucasian is 7.5 percentage points less likely than a Caucasian to pay off their credit cards each month. A marginal change in *Year* corresponds to a 3.3 percentage point decline in the probability one pays off their credit card each month. This finding is troubling to the extent that the use and access to credit cards tends to increase as an individual gets older.

Knowledge has a multi-faceted relationship with credit cards. Those majoring in business-related disciplines are less likely than other students to pay off their credit cards. Thus, it would be erroneous to conclude that exposure to financial concepts through course work will lead to advisable financial behaviours. Additionally, *Correct* is not significant in either specification. The individual's level of knowledge does not influence their behaviour. This finding is consistent with Xiao et al.'s (2014) study of the influence of financial knowledge on risky financial behaviours. *Overconfidence*'s negative coefficient indicates that individuals with an inaccurate understanding of their level of financial knowledge are less likely to pay off their credit card each month. The estimated coefficient is not particularly large but a marginal change in this variable is not trivial. For the aforementioned representative individual with a mean value of *Overconfidence*, a one-unit increase in *Overconfidence* results in a 10 percentage point increase in the probability of not paying off a credit card. The implication of this set of results is that ignorance is a deterrent to the prudent management of credit cards while knowledge does not necessarily lead to advisable behaviour. Financial education which seeks to equip students to manage debt ought to seek to expose students' areas of ignorance if it is to be effective.

Neither financial knowledge nor ignorance impact an individual's level of financial stress; both *Correct* and *Overconfidence* are statistically insignificant. Interestingly, believing one is better at math leads to lower levels of financial stress. Given the importance of numeracy in making many financial decisions this result is not unexpected. It stands to reason that individuals that believe they have the mathematical ability to manage their finances are less likely to feel anxious about them. Financial education should not be divorced from mathematical education, they are complimentary. Female undergraduates, holding other factors constant, are more likely to report higher levels of financial stress than their male counterparts. As expected, the act of not paying off one's credit card is predicted to lead to higher levels of financial stress.

Across the various specifications appraising attitudes towards financial risk *Major* and *Gender* are consistently statistically significant. Non-business majors are more risk averse than business majors and females are more risk averse than males. In order to better understand the relationship between financial knowledge and risk aversion the financial knowledge variable was disaggregated into its individual questions. (During preliminary analysis risk aversion was the only dependent variable in which considering responses to the financial knowledge questions individually yielded noteworthy results.) See column 3 of Table 3 for results; only statistically significant coefficients are reported. Knowing where to invest sums of money over a long time period results in the individual being willing to take greater financial risk. Knowing the payback period on student loans is predicted to cause higher risk aversion. It is worth noting that the coefficient is significant at the 10% level. It is possible that individuals that know the payback period on loans have disproportionately higher levels of student debt leading to more risk aversion. Unfortunately, this is conjecture and cannot be tested with the data set. As with credit card management, these results suggest that targeted financial education can lead to empowering attitudes towards financial risk. Financial risk ought not be avoided, but managed in a way appropriate for one's goals and stage of life.

Conclusion

Prior to summarizing the results of the study it is worth reiterating two limitations of the analysis. First, the survey utilized was administered at a single university potentially diminishing the external validity of the results. Second, there are many other aspects of the financial lives of undergraduates that could have been considered. Despite these caveats, the rigorous methodology applied and the consistency of the results across the models suggests that many of the key findings are likely true of undergraduates at other institutions.

Raising the financial capability of young adults is a significant social challenge that involves a wide group of stakeholders; from parents to government agencies. While financial knowledge is a necessary condition for financial capability, results from this study suggest that the relationship between knowledge, behaviour, and attitudes is nuanced. For undergraduates, higher levels of general financial knowledge are not predicted to contribute to prudent financial behaviours such as paying off one's credit card on a monthly basis or following a formal budget. Ignorance, on the other hand, negatively influences the probability of paying off a credit card each month. It does not impact the probability an individual follows a formal budget.

In many of the estimations significant differences across groups (gender, race, year in school, and area of study) were found suggesting that social factors, or peer effects, influence individual's financial capability. This findings are congruent with Alsemgeest's (2015) arguement that 'one-size-fits-all' approaches to financial eduaciton are likely to be ineffective. In light of these group differences, educational measures may be more successful when they are explicitly tailored and directed towards individuals, or groups, that have unhelpful attitudes towards finance, low levels of knowledge, or higher levels of ignorance.

Understanding and formalizing the ways in which attitudes and knowledge influence behaviours remains an important line of inquiry. More work is needed to determine when and how financial education can raise the financial well-being of those it attempts to empower. It is to this important work that this study contributes.

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