

Pretesting For Financial Literacy by Gender and Income

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Abstract

This study assesses the financial knowledge of high school students prior to completing the Missouri public high school personal finance graduation requirement. The students consisted of upper division students at an unnamed public high school in Springfield. Students in this sample were preparing to take either a personal finance class or different business class. Characteristics of students in the sample appear to approximate most other students in Missouri public schools. Results indicate no statistically significant difference between genders for the overall measure of financial literacy. However, higher socioeconomic status, defined in this paper as not receiving free or reduced lunch, appears to be directly related to financial literacy.

I. Introduction

In 2005 the State of Missouri began requiring all high school graduates in public schools to complete a personal finance class prior to graduation, beginning with 2010 graduates (Missouri Department of Elementary and Secondary Education, 2007). Conventional wisdom prior to the passage of the law supposed that students needed financial literacy and so political support actually preceded the scholarly assessment to demonstrate the need for such a requirement. In fact, results presented in this paper validate that presupposition because high school students in the sample demonstrate a poor understanding of personal financial issues prior to taking the high school course to fulfill the new state requirement. Moreover, our findings also reveal that this lack of financial literacy is shared almost equally between the genders while it is more pronounced within low-income households as herein defined. Section II of the paper covers the literature review, while Section III discusses the methodology, sample selection, hypothesis testing and results. Section IV reviews the findings of this paper and suggests areas for future research.

II. Literature Review

“Financial illiteracy is widespread and particularly acute among specific groups, including those with low education, women, and minorities” (Lusardi, 2008, p.15). Several papers demonstrate important relationships between a lack of financial literacy and variables such as socioeconomic status and gender: Lucey & Giannangelo, (2006); Lusardi & Mitchell, (2008); Chang and Lyons (2008); Borden, Lee, Serido, and Collins (2008); Lusardi (2008).

After reviewing a nationally representative sample of 12-17 year olds in the United States, Lusardi, Mitchell and Curto (2009) reported differences in the financial knowledge of males and females, and concluded “there is now fairly robust evidence confirming that many women do not do well in financial calculations and do not have a firm grasp of inflation and risk diversification” (p. 12). Differences in the financial literacy between men and women have been reported by a variety of studies (Danes & Haberman, 2007; Lusardi & Mitchell, 2008; Varcoe et al., 2005). Lusardi (2008) asserted that women’s largest deficiency deals with risk diversification. Hira and Loibl (2008) support findings by Lusardi and Mitchell (2008) that

women have lower financial knowledge, especially in the areas of savings and investment. According to the biennial Jumpstart Coalition Survey of Personal Financial Literacy, Mandell (2008) found that males did marginally better than females for all high school students who were surveyed, but historically females surveyed have performed better than the males from time to time. Although males generally did better, Mandell (2008) stated that “there is no significant gender based differences in overall financial literacy” (p. 14). In fact Mandell reports that only 7% of the students taking the Jumpstart Coalition Survey of Personal Financial Literacy scored 75% or more (he labeled these students financially literate). Those who were considered financially literate were predominantly white, male children of college graduates.

In addition to gender differences, socioeconomic status appears to be an additional factor related to financial literacy. Studies have shown that the financial knowledge of underprivileged students is much less than that of their peers (Kezar, 2009; Lucey, 2002; Mandell, 2002). Cameron *et al.* (2013) agree that “students who live in an area that has higher social deprivation have significantly lower financial literacy.” (p.9). While these authors focused on low-income households, other researchers recommend broad studies of financial literacy (or lack thereof) by utilizing the educational system (Beverly & Burkhalter, 2005; Davis & Durband, 2008; Fox, Bartholomae & Lee, 2005).

III. Data, Methodology and Results

Given the preceding discussion, this study investigates two questions: Do high school students exhibit a little or no financial literacy prior to taking a required course in personal finance? Do different groups of high school students exhibit different levels of financial literacy prior to taking such a course?

Defining Financial Literacy. The Jumpstart Survey, consisting of 31 questions which measure various aspects of financial knowledge, is scaled along the lines of a typical multiple choice exam, where 75% may indicate a score in the middle of the “C” range and a score below 60% is considered failing. Our study takes a similar approach. However, we have chosen to define “financial literacy” as a score of at least 60% correct. The average score of participants in our study was slightly under 50% (49.64%), so prior to taking the required course in personal finance students in the sample exhibited a failing score in the topic. The focus of our study is to test for differences with respect to gender and socioeconomic status and the exhibited level of financial literacy. The following paragraphs cover the financial survey, the sample, the research hypotheses and the results.

Jumpstart Survey. To assess the knowledge of students prior to completing the Missouri Personal Finance course, the Jumpstart Coalition Survey of Personal Financial Literacy was employed. The Jumpstart Survey consists of 31 questions related to financial literacy and has been used nationally every two years by the Jumpstart Coalition. The Jumpstart Coalition is a non-profit coalition of organizations that has the sole purpose of advancing financial literacy among students from pre-k to college. Questions in the Jumpstart Survey require students to consider the impact of inflation, the trade-off between risk and return, the cost of sales taxes and several other financial issues typically encountered by most adults.

The Sample. Our sample consisted of students attending a public high school in Springfield, Missouri. Springfield has five public high schools, each having several hundred students. The participants in the study consisted of a convenience sample of students in six

classes at a public high school during the 2011-2012 school year. Students were asked to identify themselves as either male or female. Of the 118 students included in the study, one chose to skip this question, leaving 117 who answered which consisted of 61 male and 56 female. As an indicator of socioeconomic status, participants were asked to self-report their qualification to receive “discount” (i.e. subsidized) school lunch. This variable was employed as an indicator of household income because it was supposed that self-reporting of school lunches would be more reliable than self-reporting of household income.

Response options included full-priced lunch, reduced-price, or free. Of the 118 students, three chose not to answer the question all three were placed into the full section after a review of the income question indicated that they would not have qualified for a discount in their lunch price. Due to small sample sizes the categories of free and reduced lunches were combined to make a “lunch discount” category of 37 students and a full priced lunch segment of 81. The discount lunch accounted for 31% of the sample. According to the National Center for Education Statistics website, for 2010 just under 40% of Missouri public school students qualified for free or reduced-price lunches (see their Table 44 on the website).

Table 1 summarizes the demographics of the school, retrieved from the Missouri Department of Elementary and Secondary education and demographics of the State of Missouri, obtained by access the school report on the Missouri Department of Elementary and secondary education Website (Missouri Department of Elementary and Secondary Education, 2012) and the US Census was used to gage Missouri Demographics (US Census). When examined by ethnic group, the school student body appears to approximately reflect Missouri public school demographics, with the exception of the over-representation of white students and under-representation of black students.

Table 1.—Comparison of Sample High School to Missouri Average by Ethnic Group.
In per cent. 2011-12 data.

	<u>Asian</u>	<u>Black</u>	<u>White</u>	<u>Hispanic</u>
Sample	1.5	4.5	88.8	3.8
Missouri	1.8	11.7	83.9	3.7

The Jumpstart Coalition Survey of Personal Financial Literacy includes questions divided into several area of interest, including income, money management, as well as saving and investing. Students who take the Jumpstart Survey have not yet completed a state mandated high school personal finance class. Mandell (2008), the creator of the assessment, considers students that score 75% or greater on the Jumpstart Survey to be considered financially literate. Six surveys have been given in the United States since 1997, and the average grade has never surpassed 58% (Mandell & Schmid-Klien, 2009). The 2008 Jumpstart Survey reported a mean of about 48%. The sample size exceeded 6,500 students. The sample of 118 students taken at the Springfield, Missouri high school indicates an average score of about 50% which is similar to the Jumpstart results. It is apparent that high school students in both the national survey and the Springfield survey exhibit a lack of financial literacy. Typically, a passing score in many high school classes is 60%. So, both sets of results support the implementation of the high school personal finance requirement as an effective deployment of resources. Table 2 summarizes the results for the Springfield sample taken in 2010.

Table 2.—Results for Pretesting Financial Literacy. 2011-12. Average Overall Score. Using the Jumpstart Survey at an Unnamed High School in Springfield, Missouri

		<u>N</u>	<u>Mean</u>	<u>Standard Error</u>
Gender				
	<i>Female</i>	56	50.50%	1.80%
	<i>Male</i>	61	48.60%	2.00%
Lunch				
	<i>Discount</i>	37	42.40%	2.20%
	<i>Full Price</i>	81	52.90%	1.60%

Research Hypothesis 1 –Difference between female and male students in overall score and sub-scores. The null hypothesis states that there is no difference between the average score of financial literacy for male and female students. The general model for the null hypothesis states:

$$H_0: \mu \text{ female} = \mu \text{ male}$$

The research hypothesis is a non-directional research hypothesis that indicates that the female students' mean score will be different than the male students' mean score on the assessment. Testing for financial literacy by gender is also examined by results for questions in the Jumpstart Survey which are grouped into these categories: personal income issues (income), money management (mm), use of credit (credit) and knowledge of investments (investment). The model, H_1 , the alternative (i.e. research) hypothesis, indicates the expectation that scores will be different by gender:

$$\begin{aligned}
 H_1: \quad & \mu \text{ female-overall} \neq \mu \text{ male-overall} \\
 & \mu \text{ female-income} \neq \mu \text{ male-income} \\
 & \mu \text{ female-mm} \neq \mu \text{ male-mm} \\
 & \mu \text{ female-credit} \neq \mu \text{ male-credit} \\
 & \mu \text{ female-invest} \neq \mu \text{ male-invest}
 \end{aligned}$$

To assess whether there was a difference in knowledge level, a *t*-test was performed comparing the average score of females with the average score of males. No significant differences were observed in the overall score or any of the sub scores regarding income, money management, credit and spending or savings and investing. The *t*-statistics were very low and the *p*-values were very high, indicating no significant differences between the genders. Although changing the assumption of equality of variances (Levene's test) to inequality of variances (using Welch) adjusts the degrees of freedom, this issue had no impact on the results reported below in Table 3.

Table 3.—Means Testing by Gender. No Differences Found; t-test results.

		<i>t</i>	Degrees of Freedom	p-value
Overall Score				
	Equal variance assumed	-0.709	115	0.48
	Equal variance not assumed	-0.713	114.5	0.48
Income Score				
	Equal variance assumed	-0.928	115	0.35
	Equal variance not assumed	-0.929	114.4	0.35
Money Management Score				
	Equal variance assumed	-0.591	115	0.56
	Equal variance not assumed	-0.593	114.5	0.55
Credit and Spending Score				
	Equal variance assumed	-0.030	115	0.98
	Equal variance not assumed	-0.030	114.9	0.97
Investing and Savings Score				
	Equal variance assumed	-1.556	115	0.12
	Equal variance not assumed	-1.570	113.1	0.12

Research Hypothesis 2 – Difference between full-priced lunch and discount lunch overall score and sub-scores. Household income is expected to have at least some degree of correlation to financial literacy. In this study the proxy variable for higher income households is the status, self-reported, that the student pay full price for school lunch. The proxy for lower income households is the status, again self-reported, that the student qualifies to pay the discount price for school lunch. Three students did not respond to the lunch question; however, they were placed into the necessary group based on their response to family income level. The respondents who chose free or reduced were combined into one group called the discount lunch group. The research hypothesis is a non-directional research hypothesis that indicates that there is a difference in assessment scores between the discounted lunch and full-priced lunch groups. The null hypothesis states that there is no difference between financial literacy, as measured here, between the “discount lunch” group, representing low income households, and the “full price lunch” group representing middle and higher income households. Here is the model for the null hypothesis

$$H_0: \mu \text{ discount} = \mu \text{ full priced lunch}$$

Testing for financial literacy by socioeconomic group is also examined by results for questions in the Jumpstart Survey which are grouped into these categories: personal income issues (income), money management (mm), use of credit (credit) and knowledge of investments (investment). The model, H_2 , the alternative (i.e. research) hypothesis, indicates the expectation that average scores will differ between socioeconomic groups when financial literacy is measured overall and also within the various subtopics previously discussed. The model for this research hypothesis is:

$$H_2: \begin{aligned} &\mu \text{ full-overall} \neq \mu \text{ discount-overall} \\ &\mu \text{ full-income} \neq \mu \text{ discount-income} \\ &\mu \text{ full-mm} \neq \mu \text{ discount -mm} \\ &\mu \text{ full-credit} \neq \mu \text{ discount -credit} \\ &\mu \text{ full-invest} \neq \mu \text{ discount-invest} \end{aligned}$$

As reported earlier, in Table 2, the overall survey result for those students paying full price for lunch was almost 53%. The overall score for the group paying a discounted price for lunch was just 42%. This result does indicate that students from higher income households possess a better level of financial literacy than do students from lower income households. However, since each group scored below 60%, there is no cause for celebration.

To assess whether there was a difference in knowledge level, a *t*-test was performed comparing the average score of discount lunch buyers with the average score of full price lunch buyers. There were significant differences found between the average score of full priced and discount priced lunch in the overall score. The research rejects the null hypothesis in all situations except for money management. Table 4 summarizes these findings.

Table 4.—Means Testing by Income Group: t-test results.

		<i>t</i>	Degrees of Freedom	p-value
Overall Score				
	Equal variance assumed	-3.863	116	<.001*
	Equal variance not assumed	-3.953	78.9	<.001
Income Score				
	Equal variance assumed	-4.619	116	<.001*
	Equal variance not assumed	-4.460	64.3	<.001*
Money Management Score				
	Equal variance assumed	-0.550	116	0.58
	Equal variance not assumed	-0.548	69.5	0.59
Credit and Spending Score				
	Equal variance assumed	-2.119	116	.036*
	Equal variance not assumed	-2.110	69.1	.038*
Investing and Savings Score				
	Equal variance assumed	-3.186	116	.002*
	Equal variance not assumed	-3.275	74.7	.002*

* Statistically significant difference found, at alpha = .05.

IV. Implications and Future Research

The issue of effectiveness of financial literacy courses is questioned by a large number of researchers. Some studies support the finding that students who have completed a financial literacy course do not demonstrate better financial behaviors than those who did not complete a

financial literacy course (Mandell, 2006; Mandell & Schmid-Klein, 2009). Other researchers have argued the existing measurement of effectiveness of financial literacy coursework does not make practical sense. For example, Hathaway and Khatiwada (2008) suggested that most of the assessment tools measure knowledge that individuals have after they have completed financial literacy courses. These measures do not directly correspond to a change in financial behavior. These authors argued that being exposed to the educational process does not necessarily mean that there has been a change in financial knowledge. Similar views are expressed in Agarwal, (2007), Stango & Zinman, (2007), Willis (2008 and 2010) and Gross (2005).

The research cited above suggests that because results do not yet completely support the utility of personal finance courses at the high school level, the subject should be eliminated. If it could be demonstrated that after having taken courses in art, English, or personal hygiene, high school students exhibited little improvement or change, would these courses be dropped from the curriculum?

The research presented in the current paper assesses the knowledge of students prior to completing the Missouri Personal Finance course. That knowledge was assessed using Jumpstart coalition's survey of financial literacy. The authors utilized Statistical Package for the Social Sciences (SPSS) version 17 to perform a test of statistical significance. The average score results were compared among variables of gender and socioeconomic status (measured by full and discount lunch price).

When considering gender the overall average score was higher for females than for males, but the difference was not shown to be significant. While this result appears to contradict other studies that have shown that males have a higher financial knowledge (Danes & Haberman, 2007; Lusardi & Mitchell, 2008; Varcoe et al., 2005), the more important issue is that from the perspective of the teacher in the classroom, these results indicate that students, regardless of gender, possess a very limited form of financial literacy. Here is, perhaps, a unique opportunity to apply one teaching regime to both sexes at the same time and measure the results.

The final variable reviewed was socioeconomic status which indicated significance differences in overall score in all but the money management sub score. This seems to align with past research indicating that financial literacy is low among students from a lower socioeconomic status (Kezar, 2009; Lucey, 2002; Mandell 2002). The one sub-score that did not find a significant difference was money management. It should be noted that the subsection of money management was consistently the lowest subsection with no subgroup scoring over 40%. This could indicate that money management is poor among all students not just those from a lower socioeconomic status. Classroom teachers may wish to direct additional course materials towards the improvement of money management skills of their students.

Our results confirm that more financial education, not less, is needed at the high school level. Before enrolling in a class covering personal finance, students in our sample, regardless of gender or household income, do not pass a simple multiple choice test to measure financial literacy. The overall average was less than 60%. Without the benefit of financial knowledge, these young people are poorly equipped to make decisions about financing college, cars and household formation. Even the higher income subgroup, represented by those paying the full-price for school lunch, scored less than 53% on average. These findings indicate that the

introduction of a personal finance requirement at the high school level is a necessary and a good use of resources, at least here in Missouri.

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