THE IMPACT OF FINANCIAL EDUCATION ON FINANCIAL LITERACY AND SPENDING HABITS

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ABSTRACT

Most governments are concerned about improving financial literacy. Providing a course on money management to high school students should be an effective method to improve financial literacy. In this study, we examine the relationship between high school student's financial literacy, social equality and higher income. We found that financial literacy is correlated with higher per capita income and social equality. We also tested whether a course on money management in high school improves financial literacy or not.

The results of this study indicate that high school student's financial literacy has not improved after taking a money management course. Financial literacy does improve if the student is provided this information as a topic in another course. In addition, taking a money management course does not lower a student's willingness to avoid debt. However, learning money management as a topic in another course makes a student more likely to avoid debt. The evidence indicates that high school courses devoted to money management are not effectively teaching students.

Keywords: Financial education, financial literacy, GDP, social equity, money management

INTRODUCTION

Financial literacy is necessary to successfully navigate life's complicated financial decisions. Unfortunately, basic financial skills of budgeting and saving are often never taught to young adults. There have been numerous studies that find that young adults are not being provided a sufficient financial education. For example, Mandell (1997) examines financial literacy for a sample of high school students and finds that these students are not receiving a sufficient education in financial matters. Often the tendency to incur excessive debt develops at a very young age.

Mae (2005) finds that 76% of undergraduate students have credit cards and 47% have four or more cards. These students had an average credit card debt of $2,169. In today's consumer society, the importance of saving and budgeting is critical to financial success. Regardless of income, an individual will eventually go bankrupt if they spend more than they earn. We have seen countless celebrities and athletes who earn millions of dollars go bankrupt due to poor budgeting, inadequate savings, and excessive debt. Budgeting, controlling debt, and maximizing savings are the keys to financial success.

Financial education should begin at a young age so young adults can begin their careers making prudent financial decisions that will help them achieve financial success. There is very little data that examines the financial literacy of young adults and the extent that they are provided courses in money management. In this paper, we use data from a survey conducted in 2012 by the Program for International Student Assessment (PISA). This organization has been gathering information about 15-year old students' math and science abilities for years. However, the 2012 survey is the first survey that included questions about money management and

financial literacy. The countries that participated in the 2012 PISA Students and Money survey are: Australia, Belgium, Czech Republic, Estonia, France, Israel, Italy, New Zealand, Poland, Slovak Republic, Slovenia, Spain, United States of America, Shanghai-China, Colombia, Croatia, Lativa, and Russian Federation. In this study, the authors examine the following research questions:

1. Is financial literacy for each country correlated with GDP per capita?

2. Is financial literacy for each country correlated with social equality?

3. Is financial literacy correlated with the availability of money management courses?

LITERATURE REVIEW

The evidence regarding the impact that financial education has on financial literacy and savings is mixed. Bernheim, Garrett, and Maki (2001) find that high school education in personal finance leads to higher levels of saving in the future. However, there have also been studies that find financial education in high school is not effective. The Jump$tart Coalition has conducted five national surveys of high school seniors since 2000. Mandell (2009) finds that students who have taken a semester-length course in money management or personal finance are not more financially literate than those who were not given the education. However, there have been other studies that have different conclusions. For example, Nano, Dorjana, and Shkelqim (2013) examine the relationship between financial education and financial literacy in Albania. The authors find that financial education improves financial literacy.

Lusardi and Mitchell (2007a) investigate the causes and consequences of financial illiteracy to better understand why retirement planning is lacking and why so many households arrive close to retirement with little or no wealth. They find that many households are unfamiliar with even the most basic concepts needed to make saving and investment decisions.

Behrman et al., (2010) find that adult's financial literacy and schooling attainment are both positively and significantly correlated with wealth, pension contributions, and retirement planning. The findings show that financial literacy is at least as important, if not more so, than schooling in explaining variation in household wealth and pension contributions. These findings support the notion that governments can enhance household wealth and wellbeing by investing in financial literacy.

Lusardi and Mitchell (2011) find that financial illiteracy is widespread even when financial markets are well developed as in Germany, the Netherlands, Sweden, Japan, Italy, New Zealand, and the United States. Across these countries, it is shown that the older population believes itself well informed, even though it is actually less well informed than average. Other common patterns discovered are: women are less financially literate than men, ethnic and racial differences exist, and the more financially literate are also more likely to plan for retirement. The authors find notable differences across countries, such as: people are more knowledgeable about inflation if their country has experienced it recently, and people are more knowledgeable about risk diversification if the country recently experienced pension privatization.

Most studies on financial literacy and retirement planning have focused on adults. Mitchell et al., (2007) examine a group in their prime working years. The authors find that many individuals are unfamiliar with the most basic financial skills. Lusardi and Mitchell (2010)

examine respondents who are 23-28 years old and resided in the USA. The authors find that young people often find themselves carrying high amounts of student loans or credit card debt; and such early entanglements can hinder young people's ability to accumulate wealth.

Mae (2005) finds that 76% of undergraduate students have credit cards and 47% have four or more cards. The average credit card debt is $2,169. About one-fifth (21%) said they paid off their credit card balances in full each month and only 4% said their parents were responsible for the payments. Credit card debt is a special concern since it will likely be repaid at an 18% or higher interest rate while the interest rate on student loans is typically below market rates (currently less than 5%).

Several researchers have identified explanatory variables relevant to college students' use of credit cards. Armstrong and Craven (1993) find that gender impacts attitudes toward credit. Hayhoe, Leach, and Turner (1999) and Roberts and Jones (2001) find that marital status and income impact financial literacy. Palmer, Pinto, and Parente (2001) find that a college student will have lower credit card debt if their parents are involved with financial decisions. In general the literature shows that credit card balances are higher for female students, higher individual and/or family incomes, and students whose parents co-signed for the credit card. Davies and Lea (1995) suggest that students from relatively prosperous socioeconomic groups would perceive their relatively low student incomes as temporary and accept some level of debt to sustain their previous and anticipated lifestyle.

Lyons (2003) examines the credit card practices of college students using four different definitions of financial risk: $1,000 or more in credit card debt, delinquent in credit card payments by two months or more, had reached credit card limit on at least one card, and paid credit card balances in full only some of the time or never. Across the four definitions, she found that gender, ethnicity, being financially independent, owing $1,000 or more in other debt, and acquiring credit cards prior to or during the first year in college were just a few of the variables that significantly determined a student's level of financial risk.

Prior studies of high school students consistently find that they are not receiving a good education in personal finance. Chen and Volpe (1998) find that college students are not receiving a good financial education. Mandell (1997) examines financial literacy for a sample of 1,509 high school seniors from 63 schools. The author reports an average correct score of 57% in the areas of income, money management, savings and investment, and spending. His conclusion is that students are leaving schools without the ability to make critical financial decisions affecting their lives.

The Organization for Economic Co-operation and Development (OECD) conducts a global education survey of 15-year olds known as the Program for International Student Assessment (PISA). In 2012, PISA conducted one of the first extensive financial literacy surveys of 15-year old students in 18 countries. The countries which participated in the survey are: Australia, Belgium, Czech Republic, Estonia, France, Israel, Italy, New Zealand, Poland, Slovak Republic, Slovenia, Spain, United States of America (USA) Shanghai-China, Colombia, Croatia, Lativa, and Russian Federation. There were 29,000 15 Year-old students who participated in the survey.

The exam took two hours and was divided into four 30 minute segments. The students were asked 40 questions regarding financial literacy that covered four areas. The four content areas were: money and transactions, planning and managing finances, risk and reward, and financial landscape. At the end of the test booklet, students were asked questions about money matters. The findings of this survey are summarized in PISA Results: Students and Money:

Financial literacy skills for the 21st Century, Volume IV. In this document, PISA defines financial literacy for high school students as follows: "Financial literacy is knowledge and understanding of financial concepts and risks, and the skills, motivation, and confidence to apply such knowledge and understanding in order to make effective decisions across a range of financial contexts, to improve the financial well-being of individuals and society, and to enable participation in economic life."

METHODOLOGY

Secondary data

Table 1 contains a summary of the data regarding (1) financial literacy scores, (2) Gini index and (3) per capita income (measured by the GDP) for each of the eighteen countries. The data in Table 1 are ranked based on the *financial literacy scores* in each country. China has the highest financial literacy score with a mean of 603. This score is 106 above the average and 62 points above the second highest country (Belgium). The lowest score was in Colombia 379 and the United States had 492. The next column shows the Gini index and the last column shows the per capita GDP in each country.

The *Gini index* is calculated by the World Bank and measures social equality in a country. The *Gini index* measures the degree of income distribution among residents. A lower Gini index indicates the country has more social equality. A priori, we expect that financial literacy is negatively correlated with the Gini index, indicating that higher financial literacy is correlated with social equality (a lower Gini index). A priori, we expect financial literacy to be positively correlated with GDP per capita.

The correlation coefficient between financial literacy and the Gini index is negative 0.34 but not statistically significant. The correlation coefficient between financial literacy and GDP per capita is 0.13 but not statistically significant. China is an outlier since they have high financial literacy, a high amount of social inequality, and low GDP. Excluding China from the sample, the correlation coefficient between financial literacy and the Gini index is negative 0.63 and statistically significant at the 1% level. This indicates that financial literacy increases social equality. Excluding China from the sample, the correlation coefficient between financial literacy and per capita GDP is 0.45 and statistically significant at the 10% level. This indicates that financial literacy also increases per capita GDP. These two correlation coefficients support the premise that financial literacy is an important objective for governments, since financial literacy is positively correlated with social equality and GDP per capita.

Table 2 shows the availability of financial education courses in each country. In Spain, 84% of the high schools do not offer courses in financial education. The average number of high schools that do not offer a course in money management is 47%. Approximately 33% of all the countries offer 2 or more years of financial education to high school students. The highest figure is for Belgium where 73% of the high schools offer more than two years of financial education to high school students. Not surprisingly, Belgium had the second highest score on financial literacy.

Although China had the highest score in financial literacy, only 8% of the high schools offer two or more year of financial education and 50% do not offer financial education courses in high school. The correlation between financial literacy and the availability of financial courses is provided in Table 2. The correlation between financial literacy and schools not offering

financial education course is negative 0.18 but not significant. The correlation shows that the offering financial education course is positively correlated with financial literacy, but not statistically significant. Once again, China is an outlier so the tests are run after excluding China from the sample.

Table 1
Summary of Financial Literacy, Gini Index and GDP per Capita

Country	Financial Literacy	Gini Index	GDP Per Capita
Shanghai-China	603	42.16	$6,416
Flemish Community (Belgium)	541	27.59	$44,863
Estonia	529	33.15	$17,762
Australia	526	34.94	$54,718
New Zealand	520	36.60	$36,464
Czech Republic	513	26.13	$29,805
Poland	510	32.08	$14,581
Latvia	501	35.48	$14,243
United States	492	41.06	$51,486
France	486	33.10	$41,330
Russian Federation	486	41.59	$11,039
Slovenia	485	25.59	$23,896
Spain	484	35.89	$30,588
Croatia	480	32.51	$13,807
Israel	476	42.78	$32,828
Slovak Republic	470	26.12	$18,508
Italy	466	35.16	$33,704
Colombia	379	53.50	$7,448
Average	497	35	$26,860
		Full Sample	**Exclude China**
Correlation between Financial Literacy & Gini)		-0.34	-0.63
P-Value		0.16	0.01
Correlation between Financial Literacy & GDP)		0.13	0.45
P-Value		0.60	0.07

Source: PISA 2012 Results: Students and Money.

Even after excluding China, the results are not statistically significant. Overall, the data in Table 2 indicates that financial education is not being provided to many high school students around the world. It also shows the correlation between offering financial education and financial literacy is not statistically significant.

Table 2
Availability of Financial Education in High Schools
Results based on School Principals' Reports

	Financial Education Availability		
	Available ≥ 2 years	**Available < 2 years**	**Not available**
	%	%	%
Australia	61.46	10.99	27.55
Colombia	31.59	17.32	51.10
Croatia	12.88	21.28	65.84
Czech Republic	44.67	38.40	16.93
Estonia	10.57	11.19	78.24
Flemish Community (Belgium)	73.40	7.15	19.45
France	30.49	8.71	60.80
Israel	8.34	17.49	74.17
Italy	22.86	11.84	65.30
Latvia	35.52	36.14	28.34
New Zealand	58.53	11.42	30.04
Poland	31.22	15.05	53.74
Russian Federation	44.86	17.89	37.25
Shanghai-China	8.36	41.36	50.28
Slovak Republic	45.03	39.73	15.25
Slovenia	17.13	15.99	66.89
Spain	9.33	6.48	84.20
United States	57.43	9.05	33.52
Average	33.54	18.75	47.72
Correlation with Financial Literacy	0.09	0.20	-0.18
P-Value	0.11	0.43	0.46
Correlation with Financial Literacy (Excluding China)	0.35	-0.13	-0.25
P-Value	0.16	0.62	0.33

Source: PISA 2012 Results: Students and Money.

Primary Data

Table 3 provides a summary of the responses from *three critical questions* on the money management segment of the 2012 PISA: Students and Money survey. The students were asked to respond "yes" or "no" to the following questions:

Table 3
A Summary of the Responses from Three Questions on the Money Management

Question: Have you ever learned how to manage your money in a course?		
Question 1a: At school as a subject or course specifically about managing your money.		
	Frequency	**Percent**
Yes	2211	20.56
No	8543	79.44
Question 1b: At school as part of another subject.		
Yes	3489	32.44
No	7265	67.56
Question 1c: In an activity outside of school.		
Yes	3570	33.2
No	7184	66.8

Source: PISA 2012 Results: Students and Money.

1a. "Have you ever learned to manage your money in a course? At school, as a subject orcourse specifically about managing your money."
1b."Have you ever learned to manage your money in a course?" At school, as part of another course.
1c"Have you ever learned to manage your money in a course?" In an activity outside of school.

Approximately 20% of the students responded yes to question 1a. The number of yes respondents increases to 32% and 33% for questions 1b and 1c. It should be noted that the number of students that answered these three questions is 10,754. The questionnaire was given to 29,000 students. The majority (63%) of the 15-year students did not answer these questions. Recall that the financial literacy exam is a two hour exam and these questions were at the end of the exam.

The next critical question (question 2) relates to students' willingness to incur debt for a purchase. The question is "If you do not have enough money to buy something you really want, what are you likely to do?

1. Buy it with money from something else
2. Borrow from family
3. Borrow from friend
4. Save up
5. Not buy

A summary of the responses to this question is provided in Table 4. A total of 25% of the students selected 1, 2 or 3. The remaining 75% selected 4 or 5, which means that 75% of the students would not incur debt to make this purchase.

Table 4
Students Willingness to Incur Debt

Question 2: If you do not have enough money to buy something that you really want, what are you likely to do?				
	Frequency	**Percent**	**Cumulative Frequency**	**Cumulative Percent**
Buy it with money from something else	565	5.25	565	5.25
Borrow from family	1957	18.2	2522	23.45
Borrow from friend	175	1.63	2697	25.08
Save	6800	63.23	9497	88.31
Not buy	1257	11.69	10754	100

Source: PISA 2012 Results: Students and Money.

RESULTS

In this section, the results from two separate models are presented. The first model examines if taking a money management course impacts financial literacy scores. The data consists of the eighteen countries that participated in the PISA money management survey. The following model is estimated using ordinary least squares regression.

$$Financial\ literacy = \alpha + \beta_1\ MMC + \beta_2\ PMMC + \beta_3\ OS + \epsilon \qquad (1)$$

Where MMC is the percentage of students who took a money management course in school, PMMC is the percentage of students who studied money management as part of another class in school, and OS is the percentage of students who learned to manage money in an activity outside of school. The results from the ordinary least squares estimation procedure are presented in Table 5. The R squared in the model is approximately 25%.

Table 5
Ordinary Least Square Regression
Model: Financial Literacy Score = f (MMC, PMMC, OS)

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	482.685	51.16401	9.43	<.0001
MMC	1	-2.02785	1.20026	-1.69	0.1133
PMMC	1	1.64993	0.92749	1.78	0.097
OS	1	0.15374	1.03865	0.15	0.8844

R-Square	0.2494
Adj R-Sq	0.0885
Number of Observations Used	18
F Value	1.55
Pr > F	0.2456

The coefficient for the MMC variable is not significant indicating that the higher the percentage of high school students who take a course in money management does not increase financial literacy. The PMMC coefficient is significant at the 10% level. This indicates that student's financial literacy score increases when they take a course that covers money management as a topic.

The financial literacy score is only available for 18 countries thus we cannot estimate model 1 for individual students. The next model uses the full data set for individual students; recall the 2012 PISA money management survey was given to 29,000 high school students. Using this data set we test if taking a money management course impacts a student's aversion to debt. As mentioned, many students did not answer one or more of the questions, and if the student did not answer one of the four questions then the observation is deleted. There are 10,789 students who answered all four questions. The model is estimated using a cumulative probit estimation procedure.

$$Avoid\ Debt = \alpha + \beta_1\ DMMC + \beta_2\ DPMMC + \beta_3\ DOS + \epsilon \qquad (2)$$

The independent variable is the student's willingness to avoid debt. The independent variable is an ordinal variable that takes a value of 1 to 5 based on the student's response to question 2. The dependent variables are binary variables and based on questions 1a, 1b, and 1c. The DMMC takes a value of one if the student learned to manage money in a subject or course specifically about managing money and zero otherwise. The DPMMC variable takes a value of one if the student learned to manage their money as part of another course and zero otherwise, and the DOS takes a value of one if the student learned to manage money in an activity outside of school and zero otherwise.

The results from the cumulative probit estimation procedure are presented in Table 6. The likelihood ratio test, score test, and Wald test all indicate that the model has significant explanatory power. DMMC variable is not significant indicating that taking a high school class in money management does not increase the student's willingness to avoid debt.

Table 6
Cumulative Logit Model
Model: Avoid Debt = f (MMC, PMMC, OS)
Number of Observations 10789

Parameter		**DF**	**Estimate**	**Standard**	**Wald**	**Pr > ChiSq**
				Error	**Chi-Square**	
Intercept	Save	1	0.4246	0.0282	227.1614	<.0001
Intercept	Not buy	1	0.9808	0.0295	1107.0496	<.0001
Intercept	Buy	1	1.2794	0.0311	1688.8233	<.0001
Intercept	Borrow from friend	1	1.3834	0.0319	1884.6278	<.0001
DMMC		1	-0.0367	0.0502	0.5361	0.464
DPMMC		1	0.1417	0.0436	10.5512	0.0012
DOS		1	0.26	0.0425	37.4426	<.0001
Odds Ratio Estimates						
Effect	**Point Estimate**	**95% Wald**				
		Conf. Int.				
DMMC	0.964	0.874	1.064			
DPMMC	1.152	1.058	1.255			
DOS	1.297	1.193	1.41			
Odds Assumption						
Chi-Square	33.4085					
DF	9					
Pr > ChiSq	0.0001					
Testing Global Null Hypothesis: BETA=0						
Test	**Chi-Square**	**DF**	**Pr > Chi Sq**			
Likelihood Ratio	48.575	3	<.0001			
Score	48.0563	3	<.0001			
Wald	48.3091	3	<.0001			

The DPMMC and DOS variables are significant at the 1% level and positive. This indicates that students who learn to manage money as part of another course or outside of school are more likely to avoid debt when they do not have enough money to buy something they really want.

CONCLUSION

This study examines data from the 2012 PISA Students and Money survey which was given to 29,000 15-year old students in 18 countries. The authors find that the financial literacy is positively correlated with GDP per capita and social equality. This highlights the importance of financial literacy. In spite of the importance of financial literacy, a significant percentage of

countries do not offer course in financial education to high school students. On average, 47% of the high schools do not offer a financial education course. In Spain, 84% of the high schools do not offer a course in financial education.

The results from the regression model indicate that a higher percentage of students taking a money management course in school do not improve financial literacy. The authors find that the when students take money management as part of another course then financial literacy scores increase. The results suggest that the students are not benefiting from an entire course devoted to money management. Students appear to benefit more if the money management material is part of another course or learned outside of school.

The model estimated using the cumulative probit procedure provides information regarding the impact that different delivery methods for a money management course have on student's aversion to debt. The results are consistent with the conclusions from financial literacy models. Specifically, students do not improve their spending behavior if they take an entire course devoted to money management. Students improve their spending behavior if they learn money management as a subject in another course or learn the material outside of school.

The results in this study are consistent with prior studies that find that high school courses in money management are not providing students with the necessary skills to improve financial literacy. The evidence indicates that students learn more if money management is part of another course or learned outside of school.

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