

Financial Literacy Skills of Students in Urban and Rural High Schools: A Case Study

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ABSTRACT

Accumulated evidence shows that there is considerable deficiency in financial literacy among students and adults in the United States. This paper considers the influence of economic socialization on financial literacy. Based on a sample of high school students the results from regression analysis indicate that students who work between 10 and 20 hours per week, have a savings account, and are members of families with incomes between \$50,000 and \$75,000, on average, have higher levels of financial knowledge than their peers. These findings suggest that the effectiveness of financial education in improving financial literacy may be influenced by the economic socialization of those receiving such education.

I. Introduction

In the past decade, a growing number of studies have established considerable deficiencies in financial literacy among students and adults and in the United States. Results from the Jump\$Start Coalition's biennial financial literacy tests of high school seniors show that students correctly answered 58 percent, 52 percent, and 50 percent of the questions in 1997, 2000, and 2002 respectively. Adults taking the same test scored somewhat better but missed some basic insurance and credit questions. (Jump\$Start Coalition, 2002, 2000, and 1997). In a nationwide survey of 1,770 households, the Princeton Survey Research Associates (1997) found that the households only answered 42 percent of financial knowledge questions correctly. Similarly, the Institute of Certified Financial Planners, in a 1993 survey of 123 Certified Financial Planners (CFP) found that financial literacy is a major problem when it comes to making individual financial decisions. Other studies find that low-income consumers, those with less education, and African Americans and Hispanics also tend to have below-average financial literacy scores.

Recognition of the importance of financial literacy for the effective and efficient functioning of financial markets and the well-being of respondents in these markets prompted businesses, educators,

and policy makers to stress the need for more financial education at all levels of society (Greenspan, 2003). Recently, the case for financial education, defined as knowledge that helps people make sound, informed financial decisions (Hopley, 2003), has been reinforced by the findings of some studies showing that financial literacy training has had a positive impact on financial knowledge (Hilgert, Hogarth, and Beverly, 2003; Danes, Huddleston-Casas, and Boyce, 1999; Barrese, Garner, and Thrower, 1998; Langrehr, 1977; and Langrehr and Mason, 1978). Braunstein and Welch (2002) argue, however, that an increase in financial knowledge does not necessarily lead to improved financial behavior. Instead, they contend that causality may be reversed since people may gain knowledge as they save and accumulate wealth, or there may be a third influence, namely, family experiences and economic socialization, that affects both knowledge and behavior.

II. Purpose

The purpose of this paper is to further examine the relationship between the nature of economic socialization and financial literacy. Data from a survey of urban and rural high schools in Southwestern Indiana are used to establish the financial knowledge of a sample of high school students. Demographic characteristics and the students' use of financial products and services, also obtained through the survey, provide insights about their financial experience and economic socialization.

The contribution of this paper is its examination of the impact of economic socialization on financial literacy at an aggregate and disaggregated level based on the scores of high school student on a personal finance quiz and their demographic characteristics. Specifically, cross-sectional regression analysis is used to quantify the effect of their family backgrounds and participation in financial activities on their financial literacy. Regression results indicate that working between 10 and 20 hours per week, having a savings account, and plans to pursue post-secondary education have a positive impact on the overall scores of high school students. Non-parametric tests show that there are not significant

differences in the probability distributions of overall financial knowledge scores for students in urban and rural high schools. However, the same non-parametric tests indicate that there are significant differences in the probability distributions of scores associated with specific topic areas such as food purchases and car purchases.

III. Data

The data used in this paper was obtained from the responses of high school seniors in urban and rural high schools in Southwestern Indiana to personal finance questions on six specific topics – credit cards, checking and savings accounts, automobile insurance, housing rental, food purchases, and car purchases. The list of questions is based on a survey developed by the Consumer Federation of America and the American Express Travel Related Services Company, Inc. There are fourteen questions on credit which focused on definitions, obtaining credit, the cost of credit, and making payments. Of the seven checking and savings account questions, three dealt with checking accounts and four with savings accounts. The eight items on automobile mobile insurance dealt with coverage, costs, complaint resolution, and agent representation. The eight questions about housing rental concerned tenant obligations, landlord obligations, and rights, and how to negotiate a lease. The eight items about purchasing food related to cost control and quality/ingredients. The last category concerning automobile purchases, students were asked seven questions that dealt with sources of information, costs, and the protection afforded by warranties and service contracts.

Responses were also obtained on several items related to the economic socialization of the students. These included questions pertaining to the students' family background, their involvement in financial decision-making, their educational aspirations, estimated family income, the number of business classes completed, and a number of other demographic characteristics. The instrument was administered to over 300 senior students in five Southwest Indiana high schools in October 2003 who

were enrolled in economics classes; over 140 instruments were administered to students in rural schools and 173 instruments were administered to students in urban school settings.

The responses from each respondent are used to calculate the mean percentage of correct scores for each question, each section, and the entire survey. The sample is comprised of 312 respondents who completed the test and survey in October 2003.

Table 1 provides a list of variable names and their definitions. Table 2 presents summary information based on demographic characteristics and the experience students have with different financial instruments. On specific questions regarding credit, checking and savings accounts, automobile insurance, house rentals, food purchases, and car purchases, the following findings can be noted: (1) No student scored above 53% on credit card questions; (2) no student scored above a 47% on automobile insurance questions, and (3) no student scored over 54% on food purchases questions. Those students who scored above 60 percent on questions that dealt with checking and savings accounts had and used four credit cards, both mother and father were college graduates, and whose estimated family income was either between \$50 thousand and \$75 thousand or over \$150,000. Secondly, those students who scored above 60 percent on questions that dealt with car purchases had both parents with post-secondary educations, lives with their biological father and step-mother, had estimated family income of \$125,000 or more, and had either three or four other business or economics classes.

Table 1: Variable Names and Descriptions

Variable Name	Description
SCHOOL	School was either a rural (1) or an urban (0) school
SEX	Gender of respondent (0 male and 1 female)
WORK	If the respondent did not work
WORK 1	If the respondent worked between 0 and 9 hours per week
WORK 2	If the respondent worked between 10 and 20 hours per week
WORK 3	If the respondent worked over 20 hours per week
INCOME1	If the respondent estimated family income to be under \$50,000 per year
INCOME2	If the respondent estimated family income to be \$50,000 - \$75,000 per year
INCOME3	If the respondent estimated family income to be \$75,000 - \$100,000 per year

INCOME4	If the respondent estimated family income to be \$100,000 - \$125,000 per year
INCOME5	If the respondent estimated family income to be \$125,000 - \$150,000 per year
INCOME6	If the respondent estimated family income to be over \$150,000 per year
INCOME7	If the respondent had no idea of the family income
CAR	1 if the respondent has his/her own car
AUTOMOBILE_INS	1 if the respondent purchases his/her own automobile insurance
CHECKING	1 if the respondent has a checking account
SAVINGSACC	1 if the respondent has a savings account
COLLEGE	1 if the respondent had plans for post-secondary education
DEGREE	1 if the respondent indicated that a parent had a college education
CLASSES	Number of other business or economic classes taken while in high school.
CCARDS	The number of credit cards the respondent possessed
AMT	Amount respondent saves per week
SCOREPER	Percent of total correct responses
SCORECR	Percent of total correct responses on Credit questions
SCORECS	Percent of total correct responses on Checking/Saving Account questions
SCOREATO	Percent of correct responses on Automobile Insurance questions
SCOREHOU	Percent of correct responses on Housing Rental questions
SCOREFP	Percent of correct responses on Food Purchases questions
SCORECP	Percent of correct responses on Car Purchases questions

Table 2: Summary of the Dataset by Demographics and Experience with Financial Products

Variable		Percent of Sample
SCHOOL	rural school	45
GENDER	respondent is male	42
ETHNIC	white	94
	other	6
WORK	respondent does not work	29
	work 0 – 9 hours per week	15
	work 10 – 20 hours per week	30
	work 21 or more hours per week	26
CCARDS	own 0	72
	one or more owned	28
CAR	own a car	91
AUTOMOBILE_INS	respondent pays own automobile insurance	40
CHECKING	respondent has a checking account	58
SAVINGACC	respondent has a savings account	85
FAMILY MAKEUP	Father/Mother	75
	Father/Step Mother	3
	Mother/Step Father	12
	Father Only	<1
	Mother Only	7
	Guardian	2
INCOME	under \$50,000	14
	between \$50,000 and \$75,000	18
	between \$75,000 and \$100,000	13
	between \$100,000 and \$125,000	12
	between \$125,000 and \$150,000	3
	over \$150,000	5
CLASSES	respondent did not know	34
	no other business/economics classes	40
	one or more business/economics class	60

Table 3 indicates that based on mean-difference t-tests for the scores of students attending urban and rural high schools, there is no significant difference in overall financial knowledge across the two groups. However, based on performance with regard to sub-categories within the financial literacy questionnaire there are some evident differences. As the table shows these differences are in the areas of automobile insurance, housing rental, food purchases, and car purchases.

Table 3: Mean Difference t-Test of Scores of student in Urban and Rural High Schools

Variable	n	Mean	Mean Difference	Significance Level
CREDIT SCORES				
Urban	173	.487	-.021	.211
Rural	139	.508		
CHECKING/SAVINGS ACCT.				
Urban	173	.543	-.006	.775
Rural	139	.549		
AUTOMOBILE INSURANCE				
Urban	173	.412	-.038*	.056
Rural	139	.450		
HOUSING RENTAL				
Urban	173	.593	.051**	.035
Rural	139	.542		
FOOD PURCHASES				
Urban	173	.505	.062**	.003
Rural	139	.443		
CAR PURCHASES				
Urban	173	.576	.043*	.060
Rural	139	.533		
OVERALL SCORE				
Urban	173	.515	.011	.387
Rural	139	.504		

*Mean scores are significantly different at the .10 level. **Mean scores are significantly different at the .05 level.

To further analyze whether there are significant differences in financial literacy between students attending rural high schools and urban high schools, we utilize two non-parametric tests (Mann-Whitney and Kolmogorov-Smirnov) to test the equality of the probability distributions of the overall score and the scores for the topic areas covered in the questionnaire. The Mann-Whitney test is designed to detect differences in the central tendency of distributions. If the probability distributions of the rural and urban scores are related in that both have the same shape but they have unequal medians, the Mann-Whitney

test is powerful at detecting this difference. If one distribution has a smaller median, the statistic will tend to take on extreme values. The Kolmogorov-Smirnov test is designed to detect a general change in the underlying distributions. This test calculates empirical cumulative distribution functions based on the samples and detects differences in the distributions based on the deviations between these two functions.

Results shown in Table 4 indicate that the null hypothesis of no difference in the distribution of financial literacy scores between urban and rural high school students is not rejected for overall scores, credit scores, and checking and savings account scores. However there are mixed findings from the two tests for the scores pertaining to the remaining categories. While the Mann-Whitney test rejects the null hypothesis of no difference in automobile insurance scores at the 10 percent level, the Komolgorov-Smirnov test does not. In the case of food purchases and car purchases there appears to be statistically significant differences in the distribution of scores between students attending rural and urban high schools. The next section considers some possible determinants of these differences.

Table 4: Equality of Distribution Tests – Financial Literacy Scores for Students Attending Rural and Urban High Schools

	Overall Scores	Credit Scores	Checking/Saving Accounts Scores	Automobile Insurance Scores	Housing Rental Scores	Food Purchases Scores	Car Purchases Scores
Mann-Whitney Test Statistic	11,161.5 Z= -1.09	10,833 Z= -1.52	11,869 Z= - .20	10,643 Z= -1.78	10,374.5 Z= -2.11	9,840 Z= -2.80	10,438 Z= -2.00
Asymptotic Significance (2-tailed)	0.27	0.12	0.84	0.07	0.03	0.005	0.04
Komolgorov-Smirnov Absolute Extreme Statistic	0.075 Z = .0658	0.115 Z = 1.01	0.048 Z = 0.418	0.084 Z = 0.741	0.126 Z = 1.109	0.143 Z = 1.25	0.146 Z = 1.27
Asymptotic Significance	0.78	0.260	0.995	0.642	0.171	0.086	0.075

IV. Modeling the Influence of Financial Experience and Demographic Factors on Financial Knowledge

In order to test the influence of experience with financial products and demographic characteristics on financial knowledge this paper hypothesizes that the financial literacy scores (S) for individual i is a function of the following variables:

$$S_i = \alpha_0 + \alpha_1 D_{i,Rural} + \alpha_2 D_{i,College} + \alpha_3 D_{i,PostSec} + \alpha_4 D_{i,Male} + \alpha_5 D_{i,Car} + \alpha_6 D_{i,AutoIns} + \alpha_7 D_{i,CCard} + \alpha_8 D_{i,Checking} + \alpha_9 D_{i,SavingsAcc} + \alpha_{10} CLASSES + \alpha_{11} AMT_i + \sum_{g=Work1}^{Work4} \alpha_g D_{i,g} + \sum_{h=Income2}^{Income7} \alpha_h D_{i,h} + \varepsilon_i \quad (1)$$

where S_i is the financial knowledge score for individual i based on the answers to the financial literacy questionnaire and takes a value that can range from 0 to 1. D_{Rural} is a dummy variable that signifies that a respondent attends a rural high school; $D_{College}$ is a dummy variable that takes a value of 1 if the respondent's parents completed a college education; $D_{PostSec}$ is a dummy variable that has a value of 1 if the respondent plans to pursue a post-secondary education; D_{Male} is a dummy variable that signifies a respondent is male; D_{Car} is a dummy variable that takes a value of 1 if a student has a car; $D_{AutoIns}$ is a dummy variable that takes a value of 1 if the respondent pays automobile insurance; D_{CCard} is a dummy variable that has a value of 1 if the respondent had one or more credit card; $D_{Checking}$ is a dummy variable that take a value of 1 if a student has a checking account; $D_{SavingsAcc}$ is a dummy variable that takes a value of unity if the respondent has a savings account; $CLASSES$ represent the number of business/economics classes taken in high school, while AMT captures the dollar amount saved per week; D_{Work} captures the extent to which students work and includes does not work (D_{Work_0}), works up to 10 hours per week (D_{Work_1}), works between 10 and 20 hours per week (D_{Work_2}), or works more than 20 hours per week (D_{Work_3}); D_{Income} shows the annual income of the respondent's family as $< \$50,000$

($D_{Income1}$), \$50,000 - \$75,000 ($D_{Income2}$), \$75,000 - \$100,000 ($D_{Income3}$), \$100,000 - \$125,000 ($D_{Income4}$), \$125,000 - \$150,000 ($D_{Income5}$), > \$150,000 ($D_{Income6}$), or no idea about the family's income ($D_{Income7}$).

This model is estimate using cross-sectional regression analysis and results are presented in Table 5. The constant term in the model captures the omitted case which is an urban female high school student who does not work, does not plan to pursue post-secondary education, with parents who have not completed a college education, has no idea of the family's income, does not have the list of financial products (credit card, checking account, savings account), and does not have a car and as a result does not pay automobile insurance. The scores for individuals who differ from the base case can be assessed by considering the significance and sign of the estimated coefficients in the model. Planning to pursue post-secondary education is a significant determinant of the overall financial literacy score as is having a savings account. The estimated results also indicate that working up to 20 hours per week is positively related to the overall financial literacy score with work between 10 to 20 hours adding as much as 5 percentage points to the average score compared to the base case. A similar pattern is exhibited for family income between \$50,000 and \$75,000, whereby there is a 5 percentage point increment to the overall score over the omitted case of no idea about the family income. Interestingly, there was an inverse relationship between financial knowledge scores and the amount saved per week.

As the results indicate most of the demographic characteristics and experience with financial products were not found to be statistically significant influences on overall financial knowledge. Thus, having a car, responsibility for paying automobile insurance, having a checking account, being in a rural school, and gender were all found to be insignificant in determining the overall financial knowledge score of the sample.

Table 5: Regression of Financial Knowledge Scores on Financial Experience and Demographic Variables

Variable	Overall Score	Credit	Checking/Saving Accounts	Automobile Insurance	Housing Rental	Food Purchases	Car Purchases
SEX	0.007 (0.62)	0.011 (.662)	0.013 (.599)	0.0232 (1.102)	-0.025 (-1.03)	-0.011 (-.497)	0.032 (1.38)
SCHOOL	-0.0006 (-.051)	-0.028 (1.55)	-0.036 (-1.49)	-0.053** (-2.35)	0.058** (2.22)	0.049** (2.10)	0.022 (.862)
WORK1	0.036 (1.79)	0.015 (.566)	0.089** (2.45)	-0.011 (-.328)	0.069* (1.78)	0.027 (.782)	0.055 (1.47)
WORK2	0.055** (3.10)	0.069*** (2.98)	0.084*** (2.66)	0.042 (1.43)	0.067** (1.98)	0.037 (1.24)	0.186 (.568)
WORK3	0.030 (1.55)	0.055** (2.12)	0.060* (1.72)	0.021 (.066)	0.063* (1.68)	-0.0057 (-.171)	-0.0098 (-.269)
INCOME1	-0.071 (-.416)	0.004 (.170)	0.015 (.414)	0.051 (1.58)	-0.014 (-.373)	0.013 (.403)	0.006 (.182)
INCOME2	0.055** (2.54)	0.041* (1.67)	0.099 (3.04)	0.052* (1.74)	0.048 (1.37)	0.072** (2.31)	0.052 (1.55)
INCOME3	0.014 (.606)	0.016 (.623)	0.005 (.138)	0.055* (1.68)	0.016 (.411)	-0.297 (-.871)	0.038 (1.04)
INCOME4	-0.005 (-.232)	-0.026 (-.950)	0.027 (.726)	0.032 (.959)	-0.014 (-.369)	-0.016 (-.460)	-0.0016 (-.042)
INCOME5	0.037 (.940)	-0.023 (-.448)	0.042 (.609)	0.006 (.089)	0.199*** (2.78)	-0.019 (-.283)	0.087 (1.24)
INCOME6	0.038 (1.17)	0.024 (.597)	0.128** (2.35)	0.043 (.868)	0.0096 (-.167)	0.022 (.429)	0.061 (1.09)
CCARDS	0.003 (.305)	0.014 (.920)	0.037* (1.82)	-0.023 (-1.26)	0.0046 (.217)	-0.017 (-.089)	-0.011 (-.533)
CAR	-0.032 (-1.46)	-0.021 (-.715)	-0.0098 (-.248)	-0.042 (-1.15)	-0.084** (-1.99)	-0.058 (-1.53)	0.028 (.501)
AUTO_INS	0.046 (.327)	-0.003 (-.179)	-0.0313 (-1.24)	-0.002 (-.078)	0.029 (1.12)	0.027 (1.12)	0.0023 (.090)
CHECKING	0.006 (.514)	0.033* (1.88)	-0.0236 (-.997)	0.008 (.390)	-0.0027 (-.106)	-0.048** (-2.11)	0.056** (2.29)
SAVING	0.038** (2.09)	0.043* (1.74)	0.0082 (.247)	0.020 (.661)	0.063* (1.78)	0.026 (.824)	0.064* (1.87)
COLLEGE	0.0813* (2.50)	0.113*** (.681)	0.142** (2.42)	0.065 (1.22)	0.085 (1.36)	0.019 (.349)	0.047 (.785)

DEGREE	0.015 (1.13)	0.004 (.219)	0.052** (2.17)	0.085 (.385)	-0.0296 (-1.16)	0.045 (1.96)	0.026 (1.03)
CLASSES	0.002 (.393)	-0.007 (-.932)	-0.013 (-1.34)	0.002 (.188)	0.018* (1.73)	0.0045 (.472)	0.014 (1.38)
AMOUNT	-0.0002 (-1.87)	-0.0006*** (-2.74)	-0.027 (-.959)	0.00008 (.329)	0.00085*** (-2.83)	0.0005 (.198)	0.00008 (.280)
Constant	0.373 (8.68)	0.338 (6.18)	0.347 (4.69)	0.360 (5.31)	0.449 (5.71)	0.429 (6.06)	.314 (4.13)
Adjusted R ²	0.078	0.071	0.072	0.006	0.071	0.042	0.038
F-Stat	2.31	2.189	2.213	1.091	2.190	1.682	1.615
p-value	0.001	0.003	0.002	0.358	0.003	0.035	0.048

n = 312

*** Significant at the .01 level. ** Significant at the .05 level *Significant at the .10 level t-statistics in parentheses

V. Conclusion

This paper is another in a growing list of studies that provide evidence of financial literacy deficiency among high school students. A primary focus of the paper was to examine whether there were significant differences between the financial literacy skills of students attending urban and rural high schools. Based on a sample of high schools in Southwestern Indiana the results of non-parametric and parametric tests indicate that a low level of financial knowledge characterized both groups of students. The average score on a personal finance quiz was 51 percent for the entire sample of 312 students and was 51 percent for the students in the urban schools and 50 percent for the students in the rural schools.

While there were no distinctive differences in overall financial literacy there were some differences at a disaggregated level. In particular, the results of mean difference t-tests and non-parametric tests indicate that these differences were most pronounced in the areas of food purchases and car purchases. In addition, regression results indicate that working between 10 and 20 hours per week, having a savings account, and plans to pursue post-secondary education have a positive impact on the overall scores of high school students.

The regression results also provide some indication that the nature of economic socialization in terms of family income, the educational background of the students' parents, and the amount of time spent working by students are statistically significant determinants of students' performance on a financial literacy quiz. It is also evident that the educational aspiration of students is an important determinant of broad-based financial knowledge. In general, however, the relatively poor fit of the model suggests that further investigation is needed to provide more insights about the determinants of existing levels of financial literacy deficiencies among high school students.

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