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Impacts of Financial Literacy and College Graduation on the Real Per Capita Gross Domestic Product and the Real Per Capita Income of the U.S. States

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FINACIAL LITERACY V. COLLEGE GRADUTES ON STATE GDP

Abstract

The impacts of personal financial literacy on the real per capita Gross State Product and income of the 50 U.S. states are examined, utilizing the 2009, 2012 and 2015 Financial Capability Studies by the U.S. Treasury Department. An increase in financial literacy by a third is associated with an increase in per capita GSP by over a third. This is equivalent to increasing the number of college graduates by 75% for the same increase in GSP. State income per capita shows similar results. Increasing financial literacy in the U.S. by 33% may be more realistic than increasing the number of college graduates by 75% in an industrialized country like Germany score 72% more in financial literacy.

Impacts of Financial Literacy and College Graduation on the Real Per Capita Gross Domestic Product and the Real Per Capita Income of the U.S. States

Financial literacy is a topic that has been of great interest since the Great Recession of 2008. This in part is attributed to the financial illiteracy of consumers (Geradi, Goette & Meirer, 2013). The movement of retirement plans away from defined-benefit plans to defined-contribution plans (which require individual attention by consumers) was yet another factor leading to calls for financial education (Lusardi & Mitchell, 2011). Studies to examine the effectiveness of Early Financial Literacy (EFL) were commissioned to Mandell (2008) by Jumpstart, a private organization dedicated to promoting financial literacy (Jumpstart, 1995). This study does not find EFL to be beneficial. On the other hand, Walstad, Rebeck and MacDonald (2010) and Lusardi and Mitchell (2014) separately concluded that there were positive effects of early financial literacy. U.S. financial literacy is far behind that of European countries as reported by Lusardi and Mitchell (2014). Their three-question survey, used by other studies on the topic, found that the U.S. had a score of 19.2% while Germany had a score of 51.6% after secondary school. Beyond secondary school, for those without a college degree, these figures were 31.3% and about 53.7%, respectively. A 2012 study of the financial literacy scores of 15-year-olds in 18 international educational systems placed the U.S. in the middle of the distribution (Figure 1).

(Suggested Space for Figure 1)

Setting testable financial knowledge aside, there is the question of how impactful financial education is in the lives of consumers and their households. The challenge of measuring the impact of early education (K-12) could perhaps be asked of any subject taught in schools unless we accept early education as preparation for something bigger. About 74% of the U.S.

population falls short of graduating from college (NFCS, 2016). Thus, it falls on policymakers to decide how to make financial education before college impactful. This requires support from academic researchers with creative research and solutions. Researchers also may be mindful of the pedagogical challenge of retaining the knowledge gained to settings beyond the classroom (Ball, Lubienski & Mewborn, 2001).

The relationship between financial literacy and financial capability (useful financial behavior) as studied by Wagner (2015) reported positive associations using the 2012 Financial Capability Study by Financial Industry Regulatory Authority (FINRA). These data allow for examining how well financial literacy and financial capability are applied to personal financial matters.

The study presented in this paper looks at the broader impact of financial literacy on the economies of the states in the U.S. Specifically, this paper uses 2009, 2012, and 2015 FINRA data to examine the associations of financial literacy and college graduation with real Gross State Product per capita (GSP) (NFCS, 2016; BEA, 2016). An empirical model is estimated in which GSP is regressed on personal financial literacy (PFL) and college degree completion, as well as controls for the percent of the adult population that is of working-age and the percent of the adult population who form single households. The results show that an increase in GSP by about 40% is associated with about a 33 percentage point increase in financial literacy, which is equivalent to increasing the number of college graduates by about 75%. While an increase of about 75% in the level of college graduates could arguably be an unattainable goal, increasing financial literacy by 33% would be short of matching the financial literacy of Germany which is about 72% more than that of the U.S. A supplemental analysis shows an increase in PFL by about a third is associated with an increase in real state income per capita (INC) by over a third. This, in

turn, is equivalent to increasing the number of college graduates by 130% to increase INC by about 33%. (GSP and INC, although related, are separate macroeconomic measures used from published BEA data in this paper. The latter is provided as supplemental analysis. Emphasis may be given to GSP as INC is not as universally defined as is GSP. The two may not be directly compared to each other in this paper.) The general interest here is mostly the direction and very approximate magnitude of the associations.

Literature

Remund (2010) explains personal financial literacy as the ability to comprehend the needed financial concepts and the confidence to help make effective financial decisions in life. Walstad et al. (2010) report that financial planning education, in some form, is already part of the high-school curriculum in 44 of the states in the U.S. In Texas schools, personal financial education was initially delivered as part of the 12th-grade economics curriculum. Financial planning examples are now employed in the K-8 mathematics curricula in Texas schools (TEA, 2015). In addition, financial planning education is included in social studies in grades 8-12. The effectiveness of this initiative is discussed in Joseph, Kalenkoski and Lacombe (2019). It is worth noting that formal specialization is not a requirement to teach personal finance topics. However, personal finance is offered to teachers as part of their continuing education credits.

There are challenges in measuring financial literacy. Huston (2010) points out how inconsistently financial literacy is measured in the literature. Lusardi and Mitchell (2014) use just three questions to measure knowledge of personal finance, while Mandell (2008) uses 30 to 50 questions. Houston (2010) has called for more uniformity in the way financial literacy is measured.

The depreciation of financial knowledge is another concern. Finke, Howe and Huston (2016) report that the depreciation of financial literacy in old age is approximately one percentage point per year past age 60. A decline in cognition explains this decline in financial literacy. During these golden years, there also is a lack of awareness of what they do not know. There is overconfidence in their financial knowledge at a time in life when such overconfidence can be unhealthy financially. Finke et al. (2016) point out how the financial planning profession may step in to compensate for this decline in cognition as well as the pitfalls of overconfidence. This suggests the idea that refresher education in personal finance later in life might help prevent this decline.

The existing literature on the effectiveness of early financial literacy education is conflicting. Mandell (2008), who conducted periodic surveys (1997- 2008) for JumpStart, does not find support for any impact of early financial education. However, Walstad et al. (2010) and Lusardi and Mitchell (2014) find strong empirical effects of the value of financial literacy education on practical financial decisions such as planning for retirement and creating wealth. Wagner (2015) also finds positive associations between financial literacy and financial capability using the 2012 National Financial Capability Survey.

There is theoretical support also for the benefits of literacy in general. More literacy means greater human capital (Becker, 1993). A simple linear production function forms the basis for the model estimated in this study, associating GSP (an output) with PFL and college graduates as the inputs (Bowles, 1970; Hanushek, 2008).

This paper utilizes data from the 2009, 2012 and 2015 by FINRA (NFCS, 2016), which cover the 50 U.S. states, to estimate a continuous Least Squares Regression model of GSP on PFL and the percentage of college graduates, controlling for socioeconomic factors that may

reflect productivity differences. They also control for clustering at the state-level. The results show that PFL and college graduation are statistically, substantively and positively associated with GSP. A supplementary analysis shows that PFL and college graduation are statistically, substantively and positively associated with INC.

Data

There are two sources of data used for the analysis in this paper. The data for the dependent variables, which are state-level real per capita GDP and state-level real per capita income, come from the U.S. Bureau of Economic Analysis of the U.S. Department of Commerce (BEA, 2016).

Concerning the key explanatory variables, financial literacy and the percent of the adult population with a college degree, as well as the socioeconomic control variables, data came from the Financial Industry Regulatory Authority (NFCS, 2016). FINRA periodically conducts a study on financial literacy in the U.S. titled the National Financial Capability Study (NFCS), with the first report issued in 2009. Elements were repeated or added in 2012 and 2015. The NFCS survey has about 500 paid respondents of the age of at least 18, randomly selected from each state, for a total of about 25,000 respondents. (The U.S. population under 18-years in age is about 24%.) Sample selections are set within each state to approximate census distributions for demographics based on data from the American Community Survey of the U.S. Bureau of Census. The data for the dependent variables, GSP and INC are average measures of each of the U.S. states, which is the unit of measure, and thus the independent variables are also average measures. Appendix A illustrates conversion of 2009, 2012 and 2015 INC to base year of 2005 to be consistent with the base year for GSP.

Figure 2 shows that the GSP of D.C. is an outlier at \$147K, \$145K and \$181K respectively for 2009, 2012 and 2015 while other states range from \$62K, \$61K and \$70K in Delaware to \$28K, \$29K and \$36K in Mississippi. The GSP of Washington D.C. is 4.3 standard deviations from the mean GSP and hence is excluded from the analysis. The INC of Washington D.C. is 5.5 standard deviations from the mean INC.

(Suggested Space for Figure 2.)

The key explanatory variables in this analysis are PFL and the percent of the adult population with a college degree. Other control variables are the percent of the adult population that is of working age and the percent of the adult population that are single households. All these independent variables come from FINRA.

There are about 115 questions dealing with financial literacy and financial capability, along with demographics in the full NFCS report. FINRA also publishes a summary report of responses to approximately 50 questions, covering the questions of interest in this study. This paper utilizes these continuous measures of summary data for the independent variables. There are five questions which quantify financial literacy (Appendix B). The average number of correct answers from each of the 50 states is used as a continuous measure of financial literacy. The average correct answers for all states over the three years out of the total five questions is 3.06.

The descriptive statistics of the variables in this study are shown in Table 1. The average GSP of the 50 states is about \$45K with a standard deviation of about \$10.5K, and the average INC is about \$41K with a standard deviation of about \$7.5K using 150 samples over the three years. The average PFL score is 3.06 out of five questions answered correctly with

(Suggested Space for Table 1)

a standard deviation of 0.215. The average percent of the adult population that are college graduates is about 25.5%, with a standard deviation of 4.6%. The working age (18-64 years old) portion is about 83% with a standard deviation of 2.6%. The single households average about 22.2% with a standard deviation of 3.1%. The variability of the independent variables is relatively small as represented by the coefficient of variance as a percent of standard deviation over mean as included in Table 1.

Model

Given two separate measures of macroeconomic well-being, two separate models are estimated. The empirical models in this paper are given by:

$$\text{Model 1: } GSP_i = \beta_0 + \beta_1 FLS_i + \beta_2 ColEdn_i + \beta_3 WorkingAge_i + \beta_4 SingleHH_i + E_i \quad (1)$$

$$\text{Model 2: } INC_i = \gamma_0 + \gamma_1 FLS_i + \gamma_2 ColEdn_i + \gamma_3 WorkingAge_i + \gamma_4 SingleHH_i + E_i \quad (2)$$

where i refers to the U.S. states from Alabama to Wyoming, GSP and INC stand for the dependent variables: state-level real GSP per capita and state-level real income per capita, respectively. β_{1-4} and γ_{1-4} are the coefficients of the independent variables to be estimated, including the constant terms β_0 and γ_0 for equations (1) and (2) respectively. For the independent variables, FLS stands for personal financial literacy score (or PFL) ranging 0-5; ColEdn stands for the percent of the adult population who are college graduates; WorkingAge stands for the percentage of the adult population that is of working age from 18-64 years-old and SingleHH stands for the percent of the adult population who are living in single households. The populations above exclude those under 18 years in age. The respondents are paid. The terms E_i and E_i stand for unexplained factors in each of the models respectively and are assumed to follow a normal distribution.

The coefficients for PFL, β_1 and γ_1 , measure the effect of PFL on GSP and INC respectively and are expected to be associated positively with GSP and INC on theoretical and empirical bases as discussed in the literature section. The benefit of wealth from financial education is supported by Wagner (2015). Financial education can be divided into business finance and personal finance. These subdivisions support different entities or customers, but the principles are about the same. For instance, the balance sheet or net-worth statement, the income or cash-flow statement, and planning and budgeting are all common tools to achieve economic efficiency, whether they are corporations or households. Education as a key component of human capital and its effect on financial well-being like GDP or INC is well represented in the literature (Becker, 1993; Schultz, 1995). Thus, the coefficients β_2 and γ_2 for percent college graduates on GSP and INC respectively also are expected to be positive. With respect to the estimated coefficients on the control variables, the working-age population is expected to be positive as more people of working age contribute to the economy. However, per capita GDP and income are influenced by population distribution and demographics. For instance, Becker and Barro (1988) find that the effect of fertility on per capita income is negative. Choudhry and Elhort (2010) find that the population of working-age positively impacts the growth rate of the GDP per capita. However, such growth is impeded by dependent children and old age, influencing the effect of working-age population on per capita GDP or income. The control variable of single-person households is expected to be positive as GSP is geared more towards market production relative to household production and GSP measures market production but not household production. This applies to INC, also being a major component of the GSP measured using the income approach.

The GSP and INC (both real per capita) of the U.S. 50 states are separately regressed on the states' personal financial literacy and percent college graduates, also controlling for the percent of the adult population of working age and the percent of the adult population who lives in single person households. All variables are continuous.

Results

The Least Squares Regression estimates of equations (1 & 2) with robust standard errors, allowing for clustering at the state-level are presented in Tables 2 & 3. Financial literacy is statistically significant at the 1% level. For an increase in the Financial Literacy Score (FLS or PFL) by one unit, GSP is estimated to increase by about \$19K, holding constant the other independent variables. This is an economically significant effect as it is more than one-third of the mean GSP of \$45K. At the current average PFL score of 3.06, a one-point increase works out to $(4.06/3.06 = 1.33 \text{ times})$ a 32.6% increase in PFL score for an increase in GSP of about \$19K, with all other conditions remaining the same.

(Suggested Space for Table 2)

(Suggested Space for Table 3)

The percent of the adult population with a college degree is significant at the 1% level. A 1% increase in college graduates increases the average GSP by about \$1000, holding constant the other independent variables. The average percent of college graduates is about 25.5%. Thus, the level of college graduates must increase by about $(18,756/984=19)$ 19 percentage points to 44.6% to match the contribution of a 1-point increase in the PFL score. A 33% increase in PFL is equivalent to nearly doubling $(44.6/25.5=1.75 \text{ times})$ the number of college graduates. While such an increase in the level of college graduates could arguably be an unattainable goal, increasing PFL by 33% (1.33 times) would still be short of matching the financial literacy of

Germany for those without college degrees, which is about 1.72 times ($53.7\%/31.3\% = 1.72$ times) that of the U.S., or 72% more. This is based on the financial literacy of those without college degrees in Germany (53.7%) vs. the U.S. (31.3%), according to Lusardi and Mitchell (2014). The workouts of the above calculations are in Appendices C and D.

The directional effect on GSP of the percent of the adult population that is of working age, a control variable in the model, is positive as expected and significant at 10% level, as more people of working age should mean more productive output. The effect of working age population on INC, significant at 5% level, is negative. This possibility is raised earlier due to the influence of population distribution and demographics. Becker and Barro (1988) find that the effect of fertility on per capita income to be negative. Choudhry and Elhort (2010) find that the working-age population impacts the GDP per capita growth rate positively. However, such growth is hindered by dependent children and old age, influencing the effect of working-age population on GSP or INC. The effect of the percent of the adult population that are living in single households on GSP and INC are also positive. This is expected due to single-person households' greater relative focus on market production rather than household production.

Conclusions

The existing literature on the effectiveness of financial literacy and early financial education in particular, is mixed. This paper examines the impact of personal financial literacy (PFL) at the macroeconomic level of state-level real per capita GDP (GSP) and state-level real per capita income (INC). The percentage of the adult population made up of college graduates within a state also is included as a key explanatory variable, along with the percent of the adult population that is of working-age and the percent of the adult population that resides in a single-person household as control variables. The data for the dependent variables, GSP and INC in

years 2009, 2012 and 2015, come from the U.S. Department of Commerce. The data for the independent variables come from NFCS (2009, 2012 and 2015), which are averages of data for each state in each of the years.

The relationships between the dependent variables GSP and INC and the independent variables are based on a simple linear production model estimated via Least Squares Regression with robust standard errors, allowing for clustering at the state-level. Both PFL and the percent of a state's adult population that is comprised of college graduates are significantly associated with GSP. A one-point increase in the average financial literacy score from 3.06 to 4.06 (an increase of about 33%) increases GSP by about \$19,000; this is more than a third of the average GSP which is \$45,000. For the same effect on the GSP, the average percentage of the population that is comprised of college graduates needs to increase by about 19 percentage points from the state-level average of 25.5% to 44.6%, an increase of 75%.

A 75% increase in the percent of a state's population of age at least 18 years that is comprised of college graduates may be considered as an unattainable task when the payback of college education at an individual level is being challenged given the rise in college costs and mounting student debt. Increasing financial literacy by about 33% may be more realistic, given that the financial literacy scores of those without a college degree in an industrialized country like Germany (53.7%) vs. the U.S. (31.3%) is 72% higher than the U.S.

The policy implications of these results are that there may not be an appreciable increase in the infrastructure and the resources needed to rearrange educational priorities to bring about financial education, where a significant increase in infrastructure and human resources may be required to nearly double the percent of college graduates.

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Appendix A

Illustration: Conversion of Real Per Capita Income to Base Year 2005

***Example of Converting Real Per Capita Income (Chained \$)
from Base Year 2012 to Base Year 2005[#]***

State		RpcGSP "2005"	RpcGSP "2012"	2005/2012 Factor	RpcINC "2012"	RpcINC "2005"
		A	B	A/B	C	C*A/B
California	2009	45105	54827	0.823	39716	32674
California	2012	46029	56406	0.816	43262	35303
California	2015	61924	62132	0.997	47613	47454

[#] This converts published Real Per Capita Income from the published base year of 2012 to base year 2005 using factors calculated from published Real Chained \$ per capita GSP for base year 2012 and 2015.

Source: BEA.gov

Appendix B

Financial Literacy Quiz

Financial Literacy Quiz in NFCS (2012)

Source: NFCS (2012)

*Prefer-not-to-say averages 1%, ranging 0-2%.

Suppose you had \$100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?

- A. More than \$102
- B. Exactly \$102
- C. Less than \$102
- D. Don't know
- E. Prefer not to say*

Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?

- A. More than today
- B. Exactly the same
- C. Less than today
- D. Don't know
- E. Prefer not to say*

If interest rates rise, what will typically happen to bond prices?

- A. They will rise
- B. They will fall
- C. They will stay the same
- D. There is no relationship between bond prices and the interest rate
- E. Don't know
- F. Prefer not to say*

A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage, but the total interest paid over the life of the loan will be less.

- A. True
- B. False
- C. Don't know
- D. Prefer not to say*

Buying a single company's stock usually provides a safer return than a stock mutual fund.

- A. True
- B. False
- C. Don't know
- D. Prefer not to say*

Appendix C

Illustration: Equivalency of Financial Literacy to Percent College Graduates in Units of State-Level GDP

State-Level, Real GSP Per Capita :: Financial Literacy : % College Graduates

GSP = State level, Real GSP per capita **FL**= State-Level Fin. Literacy Score **CG** = % College Graduates

Sources: Bea.gov (2009, 2012 & 2015); NFCS (2009, 2012 & 2015; Lusardi & Mitchell (2013)

Equivalancy of Avg. FL vs. Avg. % CG in Units of Avg. State-Level GSP, Centris Paribus -
(Cluster Robust Least Squares Model in the Results Section)

To Increase GSP by an Avg. about \$19,000, FL needs to Increase by about 33%

	Calculation	FL	GSP
Current Avg. States' Financial Literacy Score (Scale: 0-5)		3.06	
1 point increase in FL	$3.06 + 1$	4.06	
Associated increase in GSP Per-Capita			\$18,756
Percent of Avg. GSP per capita	$18576/45215 = >33\%$		41%
Increased FL factor	$4.06 / 3.06$	1.3263	
Increased percent-point in FL	$(1.3263 - 1) * 100$	33%	

To Increase Avg. GSP by about \$19,000, CG needs to increase by about 75%

1% increase in CG increases Per-Capita GDP by			\$984
Increase in % CG to match 1 unit increase in FL	$18756/984$	19	
Current Avg. College Graduates		25.52%	
Avg. CG needed to match FL effect	$25.52\% + (19/100)$	44.59%	
Associated increase in Avg. Per-Capita GSP	$984 * 19$		\$18,756
Increased CG factor	$44.59 / 25.52$	1.747	
Increased percent CG	$(1.747 - 1) * 100$	75%	

How Realistic is to Increase Avg. FL by 33%?

Germany is at about 74% over the U.S. in FL

	Calculation	U.S.	Germany
FLS without CG: US vs. Germany		31%	54%
FLS Factor of GDR vs. US	$54 / 31$		1.7419
Increased percent FL: GDR over US	$(1.7419 - 1) * 100$		74.19%

Appendix D

Illustration: Equivalency of Financial Literacy to Percent College Graduates in Units of State-Level Income

State-Level, Real Income Per Capita :: Financial Literacy : % College Graduates

GSP = State level, Real GSP Per Capita **FL**= State-Level Fin. Literacy Score **CG** = % College Graduates

Sources: Bea.gov (2009, 2012 & 2015); NFCS (2009, 2012 & 2015; Lusardi & Mitchell (2013)

Equivalancy of Avg. FL vs. Avg. % CG in Units of Avg. State-Level Income, Centris Paribus -
(Cluster Robust Least Squares Model in the Results Section)

An Increase in Income by about \$16,000, is Associated with an Increase in FL by about 33%

	Calculation	FL	INC
Current Avg. States' Financial Literacy (Scale: 0-5)		3.06	
1 point increase in FL	$3.06 + 1$	4.06	
Associated increase in Per-Capita Income			\$15,806
Percent of Avg. income per capita	$18576/40632 = >33\%$		39%
Increased FL factor	$4.06 / 3.06$	1.326	
Increased percent-point in FL	$(1.326 - 1) * 100$	33%	

To Increase Income by about \$16,000, CG needs to increase by about 130%

1% increase in CG increases Per-Capita Income by			\$473
Increase in % CG to match 1 unit increase in FL	$15806/473$	33	
Current Avg. College Graduates		25.52%	
Avg. CG needed to match FL effect	$25.52\% + (33/100)$	58.91%	
Associated increase in Per-Capita Income	$984 * 33$		\$15,806
Increased CG factor	$44.59 / 25.52$	2.31	
Increased percent CG	$(2.308 - 1) * 100$	131%	

How Realistic is to Increase Avg. FL by 33%?

Germany is at about 74% over the U.S. in FL

	Calculation	U.S.	Germany
FL without CG: U.S. vs. Germany		31%	54%
FL Factor of GDR vs. U.S.	$54 / 31$		1.74
Increased percent FL: GDR over U.S.	$(1.7419 - 1) * 100$		74.19%

Tables

Table 1

Summary Statistics: GSP - Income - Financial Literacy–Percent College Grads

***Cross-Sectional & Time: U.S. State-Level GSP and Income Per Capita
vs. States' Financial Literacy & Percent College Graduates***

Variable		Mean	Std. Dev.	CV = (sd/ mean)	Min	Max	Observations
State ID	Overall				1	50	N = 150
Year	Overall				2009	2015	N = 150
Real Per Capita Income [#]	Overall	40632.02	7444.63	18.3%	29431.8	65736.3	N = 150
	Between		4099.12	10.1%	32606.9	53213.8	n = 50
	Within		6232.60	15.3%	31103.7	54827.7	T = 3
Real Per Capita GSP [#]	Overall	45214.85	10524.66	23.3%	28078.0	81801.0	N = 150
	Between		8678.39	19.2%	30983.3	68740.3	n = 50
	Within		6038.63	13.4%	32728.9	59351.9	T = 3
Financial Literacy (FLS) [0-5]	Overall	3.06	0.22	7.0%	2.5	3.8	N = 150
	Between		0.15	4.8%	2.8	3.3	n = 50
	Within		0.16	5.1%	2.8	3.5	T = 3
College Graduates, %	Overall	25.52	4.58	17.9%	16.1	38.0	N = 150
	Between		4.50	17.6%	17.0	36.3	n = 50
	Within		0.96	3.8%	23.1	27.2	T = 3
Working Age18-64, %	Overall	83.44	2.57	3.1%	76.1	92.2	N = 150
	Between		2.05	2.5%	77.5	90.7	n = 50
	Within		1.56	1.9%	79.1	88.1	T = 3
Single House Holds, %	Overall	22.16	3.13	14.1%	10.8	31.0	N = 150
	Between		2.44	11.0%	12.6	27.0	n = 50
	Within		1.99	9.0%	16.9	29.5	T = 3

Number of States x Years: N: 50 x 3 50 clusters #Chained (2005) Dollars

Sources: NFCS (2009, 2012 & 2015) and
and BEA, U.S. Dept. of Commerce (2009, 2012 & 2015)

Table 2

Regression Estimates: GSP on Financial Literacy, Percent College Graduates

Least Squares Regression Estimates, Cluster-Robust,

U.S. State-Level Real GSP Per Capita on Fin. Literacy and Percent

College Grads on States' Financial Literacy & Percent College Graduates

Dependent Variable: Real Per Capita GSP[#]

Real Per Capita GSP [#]	Robust		t	95% Conf. Interval	
	Coef.	Std. Err.			
Financial Literacy (FLS)	18756	3989.4 ***	4.70	10739	26773
College Graduates ^{##}	984	180.6 ***	5.45	621	1346
Working Age18-64 ^{##}	834	419.5 *	1.99	-9	1677
Single House Holds ^{##}	1245	220.1 ***	5.66	803	1688
Constant	-134558	44699.8 ***	-3.01	-224385	-44730

Statistical Significance Levels: ***1%, **5%, *10%

Number of Observations, 50 x 3 50 clusters

Goodness of Fit: Prob > F ***, R-squared = 0.53

Sources: NFCS (2009, 2012 & 2015) and BEA, #Chained (2005) Dollars

U.S. Dept. of Commerce (2009, 2012 & 2015) ## % Adult Population

Table 3

Regression Estimates: Income on Financial Literacy, Percent College Graduates

***Least Squares Regression Estimates, Cluster-Robust,
U.S. State-Level Real Income Per Capita on Fin. Literacy and Percent
College Grads on States' Financial Literacy & Percent College Graduates***
Dependent Variable: Real Per Capita GSP[#]

Real Per Capita GSP [#]	Robust		t	95% Conf. Interval	
	Coef.	Std. Err.			
Financial Literacy (FLS)	15806	2374.5 ***	6.66	11034	20577
College Graduates ^{##}	473	119.8 ***	3.95	233	714
Working Age18-64 ^{##}	-496	195.3 **	-2.54	-888	-103
Single House Holds ^{##}	897	119.6 ***	7.5	657	1138
Constant	1578	21769	0.07	-42168	45323

Statistical Significance Levels: ***1%, **5%, *10%

Number of Observations, 50 x 3 50 clusters

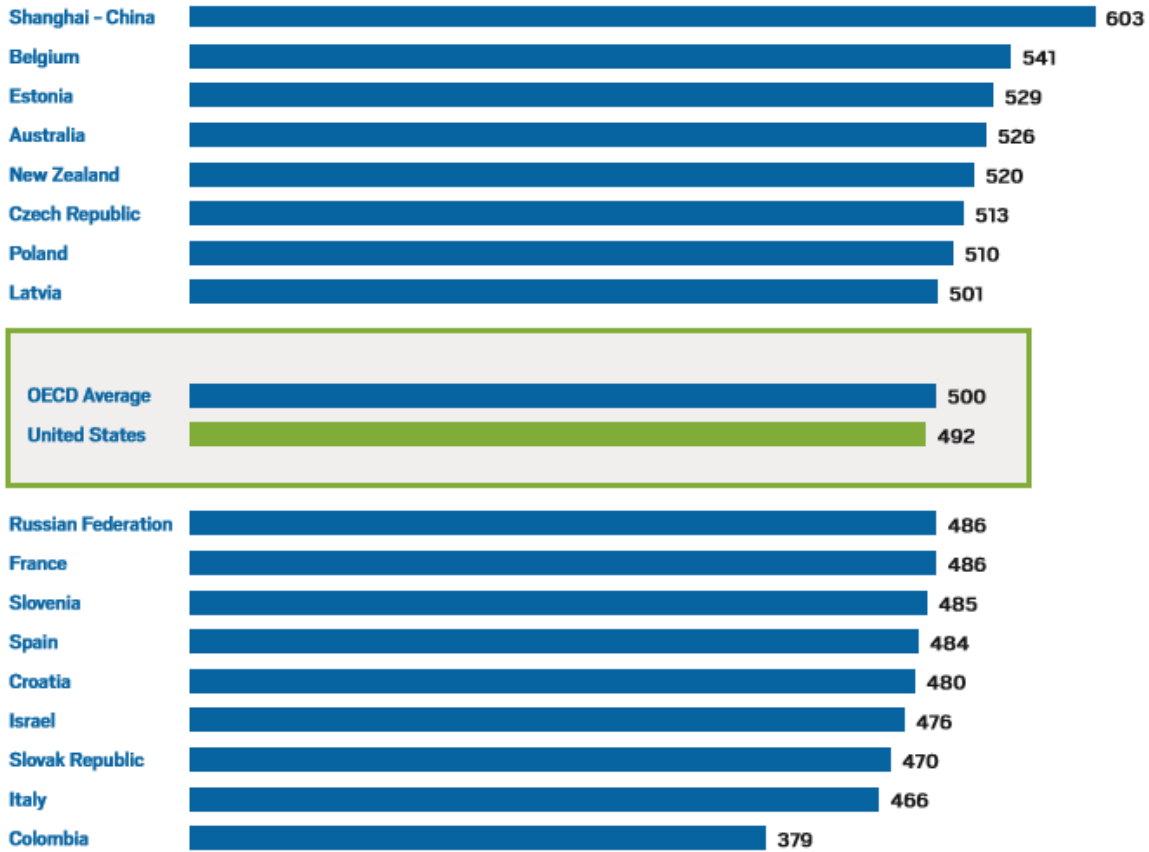
Goodness of Fit: Prob > F ***, R-squared = 0.58

Sources: NFCS (2009, 2012 & 2015) and BEA, #Chained (2005) Dollars
U.S. Dept. of Commerce (2009, 2012 & 2015) ## % Adult Population

Figures

Programme for International Student Assessment (PISA) Results

Mean Financial Literacy Score of 15-year-olds



Source: OECD (2014). *PISA 2012 Results: Students and Money: Financial Literacy Skills for the 21st Century (Volume VI)*. PISA, OECD Publishing.

Figure 1. Financial Literacy Scores by International Educational Systems

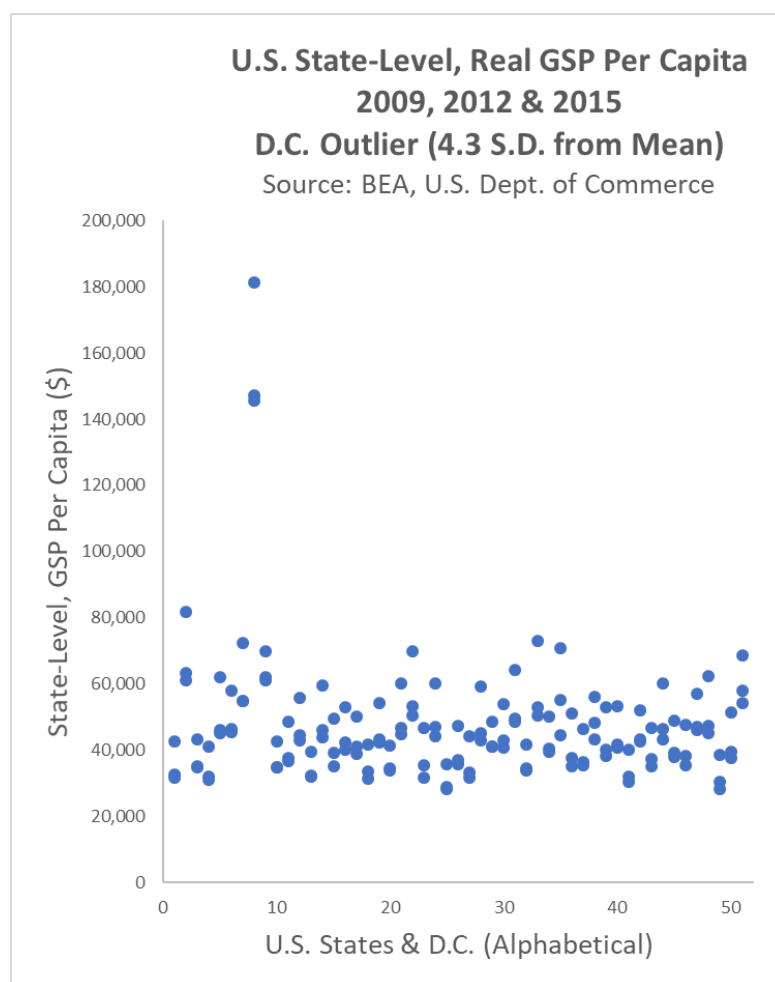


Figure 2. U.S. State-Level, Real GSP Per Capita