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Trends in Financial Literacy

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Trends in Financial Literacy

It is one thing to measure the financial literacy rate of a country, but it is a whole other story to take action and make improvements. Often times, efforts are put forth to try to increase the financial literacy of children in individual schools, but a lot of other children and people do not get reached. This made me wonder if there is something that can be done to an economy as a whole to increase the financial literacy rate of a country's population. From here I developed my specific research question: "What is the correlation between the financial literacy rate of a country and the well-being of its economy and population?"

Background

Financial literacy is important because it can help both individuals and countries manage their purchases and budgets. This is especially true as time goes on and new financial instruments are introduced. Many times, these new instruments can be confusing, misleading, and even provide negative results, leaving people wondering where they went wrong. In addition, it generally seems that the higher the financial literacy rate is in a country, the more well-off it and its' citizens are. This can lead to more happiness, less crime, and eventually a higher productivity level. The more knowledgeable people are, the more they can make a meaningful difference in their country. Furthermore, most people, including myself, start life on their own without fully being prepared to manage their own finances. Even as an accounting and finance major with an economics minor, I do not know how to go about buying a house and getting a mortgage, or how to start saving money for retirement, let alone all the other aspects of being financially literate. For these reasons, I think it is important to improve the financial literacy rate across the world.

My research is mainly geared toward the law-makers and government officials of a country that actually have the ability to enact new legislation and possibly improve the financial literacy of their people. It is also important for the economists and statisticians that study similar trends and are advising the law-makers and government officials mentioned above. Finally, it may be beneficial for individuals to learn more about financial literacy and how they grow in their knowledge, as well as why it important for both themselves and entire countries.

Existing Research

Most of the research that has been done on the topic of financial literacy revolves around how to actually measure the financial literacy rate of a country, including what type of questions to use, which people to ask, and how to distribute the survey. However, there are two significant studies that have researched the different trends in financial literacy like I aim to do.

The first was done in Brazil and looked at the influence of socioeconomic and demographic variables on financial literacy. It found positive correlations with a person's gender (9.56%), family income (3.73%), and education level (2.54%). So for example, this means that as family income rises by one percent, an individual's financial literacy rate will rise by 3.73%. This study also discovered a negative correlation with having dependents (-7.51%), meaning that as a person has more dependents, the lower their financial literacy will be.¹⁶

The second study was done by a man named Tullio Japelli in Italy and was titled, *Financial Literacy: An International Comparison*. He found similar results as the first study in regard to the impact of education. His research displayed a positive correlation with both college attendance and PISA test scores. The PISA test is a standardized test across multiple subjects that is given to 15 year old students internationally. Additionally, he found a negative correlation with social security systems. This results because as a social security system becomes more

generous, people have less incentive to learn on their own because almost everything they need is given to them.¹⁹ My goal is to expand upon this research, and look at how economic indicators of a country as a whole can affect the financial literacy rate, rather than individual factors like gender that were used in these studies.

Research Methods

My research process started with determining which countries to include in my analysis. I wanted to make sure they were all well-developed, first-world countries, while still being from a variety of different regions of the world to provide a more diverse comparison. The next step was to collect data about each country's economic well-being as well as the quality of life of its population. The most important part was to then analyze the data using a regression analysis to find which economic measures have the largest impact on the financial literacy rate. Then using the top three indicators found in the regression analysis, I did a trend analysis to see the individual effects that financial literacy had on them. By looking at the correlation between the individual measures and the financial literacy rate, I was able to lessen the chance of finding a correlation that was not due to causation.

Data Collection

To commence my research, I decided on using 45 well-developed or developing countries from seven different regions around the world, including North America, South America, the Middle East, Southern Africa, various areas in Asia and Europe, as well as Oceania. The financial literacy rate I used was gathered in a study that asked people over the age of 18 simple questions about financial instruments like loans and mortgages, along with techniques for saving and interest calculations.

I then collected data for 15 different variables that measure the economic well-being of a country. I separated these variables into three different categories: economic measures, measures of an individual's quality of life, and indicators of the total population's quality of life. The economic measures category includes a tax score that I derived from the personal income tax rate, the payroll or social security tax, and the sales tax. This category also includes the unemployment rate, poverty rate, GDP per capita, and the Gini coefficient. The Gini coefficient is a measure of income inequality that calculates the ratio of the average income of the bottom ten percent of the population to the average income of the top ten percent of the population. The smaller the percentage, the more inequality there is.

The individuals quality of life variables include a cost of living index, an index that measures property price as a percentage of income, both a corruption and a safety index, as well as a happiness score. The happiness score was found by asking respondents in a survey to rank their overall happiness in life on a scale of one to ten, with ten being the most happy.

The indicators of the total population's quality of life include a country's marriage rate, overall literacy rate, migration rate, household savings rate, and urbanization rate. The migration rate is "net" and factors in both people coming in and out of the country. The savings rate is the proportion of an economy's income that is saved or invested, rather than used for consumption. The urbanization rate is another measure of development in a country. It analyzes the number of cities the country has, the amount of the population living in the cities, as well as items like infrastructure and overall well-being.

After I gathered all of this data I standardized it on a scale from one to ten. Whichever country had the ideal measure in each category was given a ten and all the other countries were given a relative value based on that. My reasoning for doing this was to get a more accurate

comparison amongst the variables. With factors like GDP per capita that has values in the thousands, a happiness score with values between one and ten, and all the other percentages, it is hard to get meaningful results unless they are measured on the same scale.

Regression Analysis

For the first regression analysis, I used all 15 of the variables as the inputs and the financial literacy rate as the output. Looking at Table 1, I discovered that the coefficient of determination was .684. The coefficient of determination, or r-squared value, is a measure that

tells how much of the y-variable can be explained by the x-variables. It can range anywhere from zero to one with one being a perfect correlation and zero

representing no correlation whatsoever. So in this

analysis that means that 68% of the financial literacy rate can be explained by the 15 economic variables that

I selected. This is not a perfect correlation, but it is

fairly strong. The top three indicators (in green) were

the happiness score, literacy rate, and corruption index.

On the other hand, there were also quite a few measures

that were lower than the rest and had very little impact

(in yellow), including the poverty rate, GDP per capita,

marriage rate, net migration rate, property price/income index, and household savings rate. Due

to their subpar impact, I decided to exclude them from my next regression analysis.

<i>Table 1: Regression Statistics</i>	
Correlation Coefficient	0.890
Coefficient of Determination	0.684
# of Observations	45
<i>Regression Coefficients</i>	
Tax Rate	-0.0360
Unemployment Rate	0.0103
Poverty Rate	-0.0095
Gini Coefficient	0.0173
GDP per Capita	0.0037
Marriage Rate	0.0054
Urbanization Rate	0.0113
Literacy Rate	0.0401
Net Migration Rate	0.0049
Happiness Score	0.0424
Cost of living Index	-0.0196
Property Price/Income Index	0.0058
Corruption Index	0.0370
Household savings Rate	-0.0056
Safety Index	-0.0158

In the second regression analysis shown in Table 2 below, I again used the financial literacy rate as the y-variable and the nine remaining economic measures as the x-variables. This time the coefficient rose a couple percent to .709 meaning that almost 71% of the financial literacy rate can be explained by the chosen variables. The top three regression coefficients were the same as in the first regression and included the literacy rate, the corruption index, and the happiness score (in green). The unemployment rate, urbanization rate, and cost of living index had minimal impacts with regression coefficients of less than .015, so I decided to remove them from my analysis (in

Correlation Coefficient	0.877	
Coefficient of Determination	0.709	
# of Observations	45	
Regression Coefficients		P-value
Tax Rate	-0.022	0.485
Unemployment Rate	0.007	0.302
Gini Coefficient	0.019	0.112
Urbanization Rate	0.012	0.284
Literacy Rate	0.046	0.127
Happiness Score	0.038	0.140
Cost of living Index	-0.014	0.249
Corruption Index	0.041	0.001
Safety Index	-0.020	0.036

yellow). In addition, the tax rate had a high p-value in comparison to the rest of the variables (in pink). When doing a regression analysis, the p-value is a measure of how reliable or statistically significant the data it is. The higher it is, the less meaningful it becomes. In other words, it is a measure regarding the idea that “correlation does not always mean causation.” As a result, I decided to remove this factor as well.

For the third and final regression analysis, I used the five remaining factors as the inputs and the financial literacy rate as the output. This resulted in a coefficient of determination of .721 as seen in Table 3, which is higher than the previous correlation and can be considered a strong correlation. The top three factors were still the

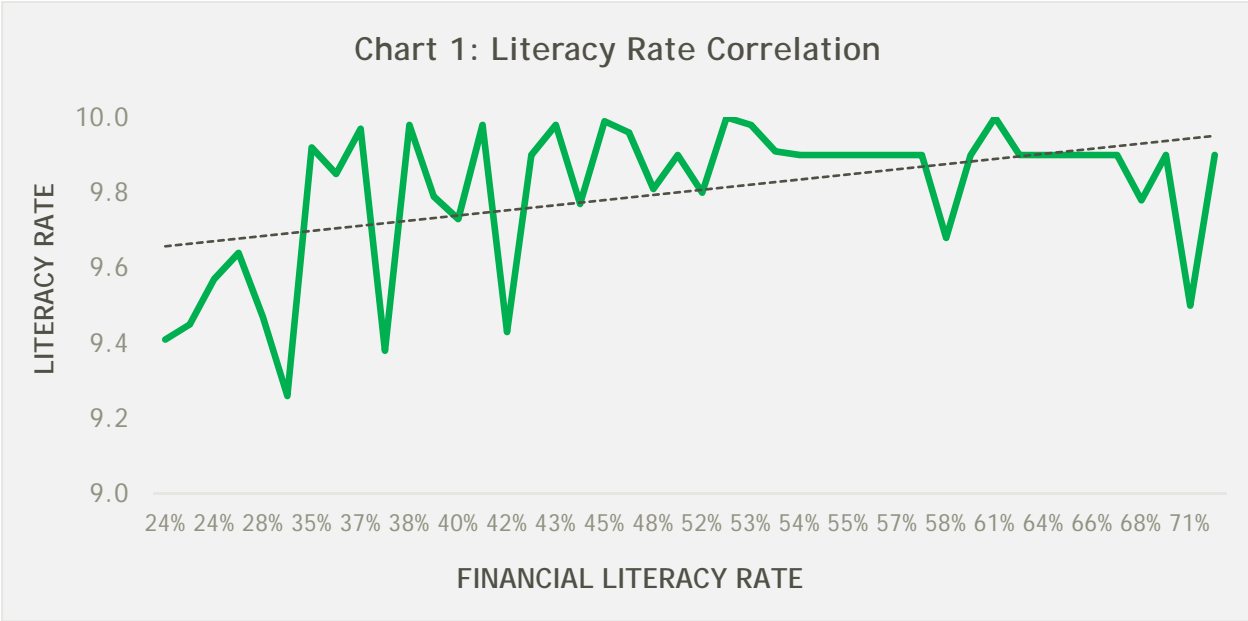
Correlation Coefficient	0.867
Coefficient of Determination	0.721
# of Observations	45
Regression Coefficients	
Gini Coefficient	0.016
Literacy Rate	0.048
Happiness Score	0.038
Corruption Index	0.039
Safety Index	-0.017

literacy rate, corruption index, and happiness score (in green). The next best was the safety index, but I did not include this in the following trend analysis because its p-value was slightly higher than the rest to be accurate and I did not understand why it had a negative correlation. The last factor, the Gini coefficient, then had too small of a correlation to be impactful, relative to the top three, so I did not include this variable in the trend analysis either.

Trend Analysis

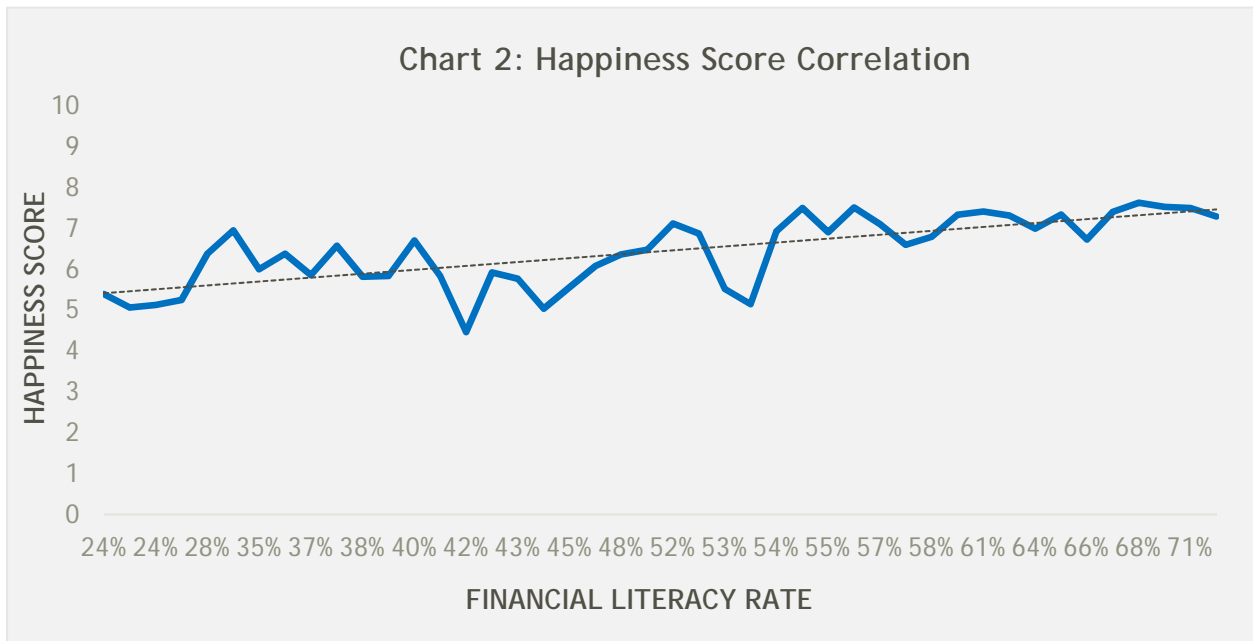
The next step was to look at the correlation between the top three indicators derived above and the financial literacy rate in the opposite direction. Instead of looking at how the economic variables impact the financial literacy rate, I then looked at how the financial literacy rate impacted the literacy rate, corruption index, and happiness score individually.

Using the financial literacy rate as the input and the overall literacy rate as the output, I found a coefficient of determination of .188, which represents a low correlation. As seen in Chart 1 below, the data appears to be very volatile and rarely falls on the line of best fit (the dotted line). This volatility is a representation of the lack of correlation between the two variables. Another measure of correlation, the correlation coefficient, is also ranked as low-moderate at



.454. This is a measure of the dependence of the variables on one another and can be anywhere between negative one and one. The overall coefficient for the literacy rate is 1.458 which means that as the financial literacy rate goes up by one percent the literacy rate is going to go up by one and a half percent or about .15 on the one to ten scale. This overall, or regression, coefficient measures the response of the y-variable to changes in the x-variable.

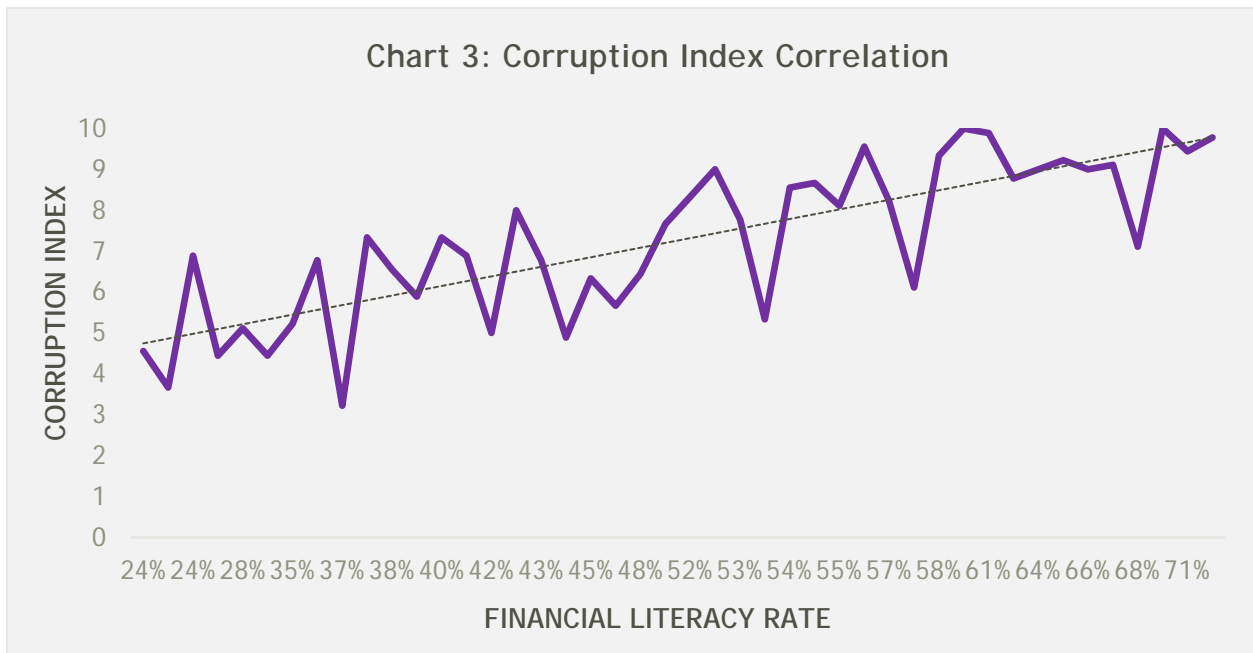
Using the happiness score as the output, I found there to be a higher coefficient of determination of .558, this represents a moderate correlation. The correlation coefficient was even higher at .754 meaning that the two variables, financial literacy and the happiness score, are 75% dependent on each other. The regression coefficient was at 4.872, or as the financial literacy rate rises by one percent the happiness score is rising by almost five percent or .5 on the scale from one to ten. This stronger correlation is represented in Chart 2 below where the data lies



more closely to the line of best fit and is not as volatile. The reason why it does not receive an even higher correlation is because it does not trend upward very much. For the most part it stays

at a very slight incline throughout with a few outliers. This means that although there is a correlation, one variable increasing slightly is not going to have a very large effect on the other.

The corruption index had the highest correlation with the financial literacy rate out of all three that I tested with a coefficient of determination of .645. This is almost the same level of correlation as there was with the top five factors pitted against the financial literacy rate. The correlation coefficient was also very high at 81%. Additionally, the regression coefficient was almost three times higher than that of the happiness score and ten times higher than the literacy rate at 11.1. This means that as the financial literacy rate goes up by one percent, the corruption index goes up by eleven percent. Since the corruption index is being measured on a scale from one to ten, this is over one point of that index. Looking at the data in Chart 3 below, you can see



that even though it appears more volatile than in the previous chart, that there is a definite upward trend. This confirms that the greater the financial literacy rate, the higher the corruption index, or the lesser the amount of corruption. Another thing to note is that there are not any extreme outliers, most of the data follows the general trend.

Conclusion

Through the regression analysis, I discovered that a country's literacy rate, happiness score, and corruption index can accurately explain 72% of its financial literacy rate. This means they have the largest impact in the determination of how that rate grows and becomes stronger. Using a regression analysis to look at trends with financial literacy and the top three variables, I found that the financial literacy rate of a county is an accurate predictor of both the happiness score and the corruption index. Its correlation coefficient or dependence with the other variable is 81% and 75%, respectively. Because there is such a high correlation with these two indicators, we can infer that in this case correlation does mean causation and they really do have an impact on each other. This information is important because it can help both law-makers and individuals improve the factors of a country's economic well-being to stimulate growth, reduce corruption, improve overall happiness, and therefore increase financial literacy.

Limitations

As with all research, there are going to be limitations altering the results. The largest one being that correlation does not always equal causation. Although I did my best to reduce this risk in my analysis, there is still a chance that not all of the correlations are statistically significant. There are also more factors that can affect the financial literacy rate than the 15 that I chose to analyze. Variables like race, religion, or gender can affect the individual, and factors can also affect the economy as a whole, like the type of government that is used. In addition, not all of my countries were the same level of development. For example, I had very well-developed countries like the U.S. or the United Kingdom, but I also had developing countries like Russia and Brazil. Differences like these can cause inaccuracy. Finally, my sample size was 45 countries. In order to get more accurate results, I would have had to collect data on a larger number of countries.

Further Research

If I had more time to continue my research I would try to reverse many of the limitations described above. I would try to have a larger sample size with more variables that could affect the financial literacy rate involved in the analysis. I would also try to hold constant both individual factors and other economic factors that could skew my results. As I mentioned above, race, religion, and gender all play a role in the financial literacy rate, as well as circumstances like a person's home life when they were growing up or the career path they chose to embark on. Other factors that could alter the results are things like what region of the world a country is located in, what type of government the country is ran by, and what level of schooling is provided to their citizens. Overall, I would try to take a more in depth look at each of the variables independently, how they affect the financial literacy rate, and how they affect each other to determine an overall correlation.

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