
Financial Literacy: Micro and Macro Level Economic Outcomes

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ABSTRACT

This paper studies the literature review on financial literacy and its impact on various economic outcomes at the micro and macro level. Individual and institutional behaviours such as savings and investment, default probabilities and participation in financial markets are significantly impacted by the levels of financial literacy. At the macro level these translate into wider effects such as income and wealth inequalities, economic development etc. The subject needs to be dealt with caution as there are certain endogeneity issues such as omitted variable bias, reverse causality etc. Significant studies have been done at the micro level to correct for the endogeneity. However, at the macro level there are substantial literature gaps. It is also critical to model financial literacy and outcomes in a structural framework.

1. What is Financial Literacy and being financially educated mean?

Financial literacy is, “the ability to process financial information and make informed decisions on finance management”.

Lusardi and Mitchell (2008, 2011) developed questions to measure financial literacy:

- a) **Numeracy and Capacity to do calculations around interest rates:** The questions are designed to assess the numerical ability of the individuals to make calculations on returns on investment. For example:
 - i. Suppose you had \$100 in a savings account and the interest rate is 20% per year and you never withdraw money or interest payments. After 5 years, how much would you have on this account in total: more than \$ 200, exactly \$200 or less than \$200?
- b) **Understanding of Inflation:** Inflation impacts the real value of money. Hence the individuals should understand that the returns in future would be impacted by inflation. Hence, survey questions on inflation like:
 - i. Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, would you be able to buy more than, exactly same as, or less than today with money in this account?

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- c) **Understanding of Risk Diversification:** Investments in different assets are subject to different risk and returns. There exists a negative relationship between risk born and returns earned. Thus, it is important that the individuals understand the need for diversification and magnitude of risk-return relationship between assets. Example of questions asked are:
- i. When an investor spreads his money among different assets, does the risk of losing money increases, decrease or stay the same?
 - ii. Normally, which assets display the highest fluctuations over time: Savings account, Bonds and Stocks?

The major findings were that the *numerical and cognitive abilities* are most important in explaining the financial behaviours. Hence, ability to make basic calculations such as interest rates and inflation adjustments define a person to be financially literate. Mathematical abilities are thus taken as a proxy for financial literacy in most studies found in literature.

2. Importance and Growing Need of Financial Education

Before we move to the outcomes, I would like to highlight few points on, why Financial Education is more important today than it was 50 or 60 years back? And why it would be all the more important, for years to come.

- a) The credit market has expanded manifold giving easy access to individuals to finance their immediate consumption and investment needs. Thus, people are able to re-allocate their consumption across periods. However, it is important for the individuals to understand the true cost of borrowing, terms of mortgage etc.
- b) The market for financial products has diversified tremendously with global investment opportunities. Therefore, there is utter need of understanding different financial products profile and the corresponding risk factors.
- c) Earlier in countries like U.S., people relied heavily on Social Security and defined benefits. However, with narrowing down of this social support system, people are now investing more in contribution plans and Individual Retirement Accounts, thereby increasing the need of financial literacy attainment.
- d) Developing countries face structural gaps on both the demand and supply side of financial investment. Individuals are less willing to save and invest due to absence

of understanding of investment opportunities. The institutions are reluctant to offer financial products due to lack of documentation and credit worthiness information of the individuals. Hence, this gap could be bridged through financial education.

3. How investment in Financial Literacy takes place?

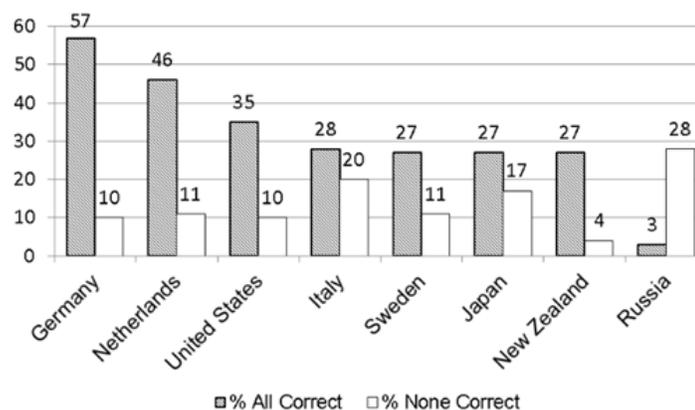
Surveys studies have found low and sub-optimal financial literacy levels across sections and age groups.

(Lusardi, Mitchell and Curto 2010), (Hung, Parker and Yoong, 2009), Huston(2010):

While the surveys vary significantly in content and sample population, they generally agree on the following:

- A large proportion of consumers are not financially literate, even among the wealthiest and most educated population segments.
- Financial literacy rates vary consistently by demographic groups, tending to be higher for those with more wealth and education.
- Financial illiteracy leads to welfare-reducing financial behavior and outcomes such as low savings and investment levels, higher probabilities of default, income inequality etc.

Financial Literacy Scores Around the World: Percent Who Correctly Answer All Three Financial Literacy Questions, or No Questions Correct
Source: Adapted from Lusardi and Mitchell



The above figure shows that financial literacy levels are low even for some of the most developed economies like Italy, Russia etc. Hence, nations that are rich in wealth also lack sufficient levels of financial literacy.

The question thus arises, that if the importance of financial literacy is known and believed then why individuals not invest in attaining financial education. The answer comes from the theoretical models where investment in human capital comes at a cost. A proclaimed and investigated model in the field is the Yoram Ben Porath Model (1967).

3.1 Yoram Ben Porath Model (1967)

The model says that the individuals will optimally elect to invest in financial knowledge so as to gain access to higher return assets. The individual maximizes his lifetime income

$$\max w_1 H_1 (1 - I) + \frac{1}{1 + r} w_2 H_2$$

w. r. t I

Subject to

$$H_2 = A(IH_1)^\alpha + (1 - \alpha)H_1$$

Where I is the investment level, time devoted to learning, w_i is the wage level in period i for each unit of human capital. H_i is the human capital in period i , and r is the interest rate. Second-period human capital, H_2 is the sum of the produced human capital, $A(IH_1)^\alpha$, and the undepreciated part of the first-period human capital $(1 - \alpha)H_1$. The parameter A represents the worker's ability to learn.

Optimal I can be solved as:

$$I = \frac{1}{H_1} \left(\alpha A \frac{1}{1 + r} \frac{w_2}{w_1} \right)^{\frac{1}{1-\alpha}}$$

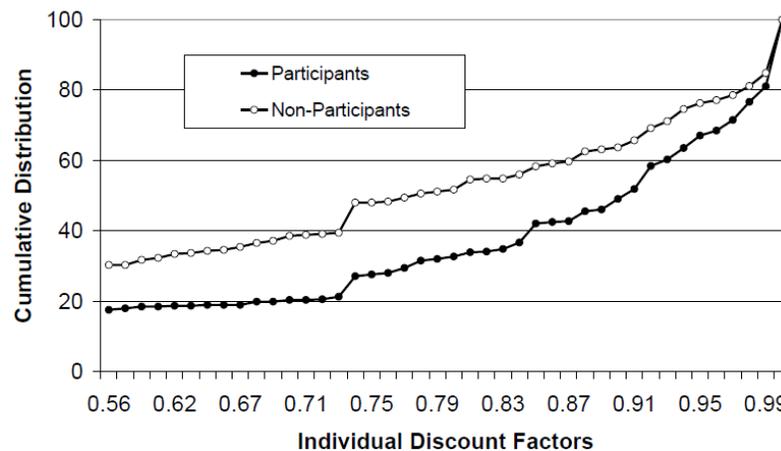
Thus, by investing in learning, the agent forgoes the opportunity of earning (and saving) in the first period.

3.2. Evidence to the Ben Porath Model

Stephan Meier and Charles Sprenger, 2008 Discounting Financial Literacy: Time Preference and participation in Financial Education Programs:

This is based on a field study that links individual decision to acquire personal financial information to their time preference characteristics. The study was carried out at Volunteer Income Tax Assistance (VITA) site near Boston, Massachusetts with 872 individuals. The individuals were offered to participate in a short credit counselling and information program that provided an overview on how to read credit reports and maintain their credit rating. Irrespective of whether they chose to participate, everyone was required to fill up a survey form that provided socio-demographic details and a set of multiple price lists for measurement of time preference. Individuals were required to make choices between smaller rewards in time t and a larger reward in period $t+\tau$, where τ is delay by 1 month, 6 months etc. Multiple price lists were provided with 22 choices and the discount factors were calculated. For example, if an individual prefers \$45 today over \$50 in one month, but prefers \$50 in one month over \$40 today, then \$45 is taken as the switching point and monthly discount factor, IDF was calculated as $45/50 = 0.9$.

The descriptive statistics suggested that there were clear differences in the time preferences between individuals who opted for the program (IDF=0.85) and those who decided to remain out (IDF=0.78).



The logit regression showed a significant relationship between willingness to participate and attain financial education and the discount factor. This shows that the individuals that discount future more heavily prefer to maximize present consumption and do not invest time, efforts and money in attaining financial education. This supports the Ben Porath model that says that higher is the interest rate, lower is the Present Discounted value of future returns and thus the individual would invest less in education.

Thus, time preference is an important determinant of financial behaviours like savings and investment. Also, as the paper suggests, time preference is correlated with decision to invest in financial education. Hence, if a model estimating the impact of financial education on

financial outcomes does not include time preference, it may lead to omitted variable bias and the financial education estimates would be biased.

4. Economic Outcomes

4.1 Individual and Institutional Behaviour and Outcomes

There has been mixed opinions about the impact of financial education on outcomes like savings and investment behaviour and default probabilities. Hathaway and Khatiwada (2008) and Willis (2008) find no conclusive evidence that financial education programs are effective. However, despite the doubts cast by certain studies on the effectiveness of financial education, there are significant evidences that financial education improve behaviour and economic outcomes. The studies that state otherwise, suffer from endogeneity issues such as:

- a) **Voluntary participation and selection bias:** The individuals characteristics if they are correlated with the other independent variables in the model, there is high probability that the individual self-selects himself into the treatment. Hence, the estimate of the treatment is biased as the ex-ante characteristics of the control and treatment group are different.
- b) **Non-inclusion of control variables** would lead to high standard errors and hence insignificant estimates which would wrongly estimate financial education programs ineffective.

As these endogeneity issues are take care through randomized controlled trials (RCT), Instrumental variables (IV) etc., there have been clear evidences of a positive relationship between financial education and affirmative financial decisions.

4.1.1. Evidence from Financial Inclusion

Leora Klapper, Annamaria Lusardi, Georgia A.Panos, JBF,2013, Financial Literacy and Its Consequences: Evidence from Russia during the financial crisis:

Russia has experienced exponentially increasing rates of household debt. The paper uses panel data to see the effects of financial literacy on financial behaviour and real income and savings effects due to financial crisis.

Panel data set of Russia's individuals interviewed in May/June 2008 and June 2009 are used. Two sets of consequences are studied with impact of financial literacy and other socio-demographic variables.

- 1) **Financial Inclusion** measured by:
 - a. Holding of Bank Account
 - b. Formal credit in form of credit and debit cards

c. Informal Credit

2) **Real Consequences** measured as:

- a. Shock to income and spending and saving capacity
- b. Availability of unspent income

Financial literacy is determined by survey questions on interest rates and compounding, inflation and sales discount.

Panel Analysis: Very few papers have attempted to do a panel study with financial literacy and measure the impacts overtime. Besides an overtime analysis, a distinguishing approach of the paper is to use dependent variable as 2009 outcomes while using 2008 values of financial literacy and other explanatory variables. This helps to deal with:

- a) **Potential simultaneity between financial literacy and financial outcomes:**
Not only would the level of financial literacy impact financial behaviour but the reverse relationship may also hold. However, taking financial literacy with a lag would estimate for 2008 literacy effect on 2009 financial behaviour and hence take care of any potential simultaneity between the two variables.
- b) **Potential endogeneity of financial literacy** measure as the error would not be correlated to financial literacy variable.

IV Estimation: Two instruments have been used, (a) number of newspapers in circulation (b) total number of universities

Financial Inclusion Results: The Probit time series results indicate that one additional correct financial literacy response raises the likelihood of using a bank account by 6.6% and formal credit by 14%. There exists a negative relationship between financial literacy and use of informal credit of about 13%. IV probit estimates are of the similar direction with even larger impacts, 12%, 14% and -23% respectively. The Random effects probit model confirms the magnitude and significance of the financial literacy effects and between 9.3% and 11.7% on bank accounts. Both the marginal effects from the random effects model and the odds ratio for the fixed effects model confirm the positive association between financial literacy and bank credit. An increase in financial literacy score within the year shows a higher likelihood of acquiring formal credit.

Real Consequences Results: Results indicate that more financially literate are less likely to report low spending capacity during financial crisis (2009). Also financially literate

individuals are significantly more likely to have unspent income in 2009. The results gave a positive significant dummy for year 2009 with effects on level of unspent income and spending capacity. This suggests that after the crisis, more literate individuals were more likely to save more than the illiterate.

Thus the results indicate that financially literate individuals are not only able to shield themselves against shocks but also contribute to market and macroeconomic stability.

4.1.2. Evidence from Savings and Investment Behaviour

Thus we see that the literature suggests that poor levels of financial literacy lead to lesser financial inclusion and hence this should impact the savings and investment behaviour.

Maarten van Rooij, Annamaria Lusardi and Rob Alessie (2011), Financial Literacy, Retirement Planning, and Household Wealth:

They find strong evidence of a positive relationship between financial literacy and net worth after controlling for determinants of wealth. Their study shows that financial literacy may boost savings and accumulation of wealth through two channels.

- a) Financial knowledge increases the likelihood of investing in the stock market, allowing individuals to benefit from the equity premium.
- b) Financial literacy is positively related to retirement planning, and the development of a savings plan.

The data was collected under a household survey for DNB (De Nederlandsche Bank) with questions on financial knowledge and retirement planning activities. An index of financial literacy levels was constructed through factor analysis. A regression analysis between wealth and financial literacy suggested that not only higher financial literacy levels led to better wealth accumulations but also wider spread across more sophisticated financial assets. Moreover, desire to increase wealth may foster investing in financial knowledge leading to simultaneity bias with some unobserved variables that also affect wealth holdings. An instrument variable (IV) estimation is therefore done with economics education as instrument. The IV estimates show that the coefficient measuring the effect of financial literacy on net worth remains significant at the 5% level and increases in magnitude with respect to the OLS estimate.

The studies suggest that investment in stocks yield higher percentage of returns than risk free assets.

Haliassos and Bertaut, Economic Journal, 1995, Why do so few hold stocks:

Economic theory dictates that it is optimal to hold a portion of household wealth in the form of stocks. Investing in the stock market provides an opportunity to take advantage of the equity premium and to benefit from risk diversification. Their regression results show that the probability of owning stocks or mutual funds increases by 8 percentage points with a one standard deviation increase in the level of advanced financial literacy (OLS estimate), and about 14 percentage points with IV estimation.

Similar results and associations have been found by other studies between financial literacy and savings, investment and retirement planning. **Lusardi and Mitchell (2009)** offer convincing evidence of financial literacy fostering thinking about retirement. In another study, **Lusardi and Mitchell (2008, 2011)** document a positive relationship between financial knowledge and retirement planning related to the calculation of saving needs after retirement. The paper also confirms that a one standard deviation increase in financial literacy increases the probability of planning for retirement by more than 20 percentage points.

Thus, financial literacy improves decision making on saving and investment via increased participation in the stock markets and enhanced financial and retirement planning.

4.1.3. Evidence from Mortgage and Counselling Programs

As the literature suggests, people save and invest to smooth consumption across periods. The expansion of credit markets has aided the individuals to re-allocate investment and consumption across periods. However, mortgage programs are unique as they treat individuals who are at a point of making critical financial decisions.

Kristopher Gerardi, Lorenz Goette and Stephan Meier, 2010, Financial Literacy and Subprime Mortgage Delinquency: Evidence from a Survey Matched to Administrative Data:

The authors have attempted to capture the impact of financial literacy on the delinquency rates of sub-prime mortgages. . Micro data on subprime mortgage terms and stream of payments has been collected from First American Loan Performance (LP) and the Warren Group. This was combined with a survey to capture borrower's financial literacy levels measured by their numerical ability, cognitive skills and basic economic understanding. Survey was done for the borrowers in 2008 who took loans between 2006 and 2007 that covered Massachusetts, Connecticut and Rhode Island.

With the survey that measured financial literacy on three parameters, Numerical ability, Cognitive skills and economic understanding, Numerical ability was seen to be most influential in driving the delinquency behaviour of the borrowers.

Three parameters were studied to measure the delinquent behaviour, Fraction of period during which a household is behind on at least one payment, Fraction of missed payments, Foreclosure. First two delinquency measures were a linear regression with percentages period and missed payments as dependent. Foreclosure was measured as probability to foreclose with respect to financial literacy and other variables.

$$D_i = \gamma NA_i + X_i' \beta + \varepsilon_i \quad (\text{For fraction of period delinquent and missed payments})$$

$$\Pr[F_i = 1 | NA_i, X_i] = \varphi(\gamma NA_i + X_i' \beta) \quad (\text{For Foreclosure Probability})$$

The baseline results revealed that Numerical ability had a significantly large negative impact on the delinquency patterns on all the three delinquency measures. The borrowers with poor numerical ability were the ones with the most delinquent payment patterns. The socio-demographic variables did not impact the magnitude or the significance of the numerical ability variable, but helped in better prediction of the model. Similar results were found when numerical ability was tested with cognitive skills, mortgage attributes and previous homeownership experience.

Loan performance and delinquency behaviours are also moulded through mortgage counselling programs.

Hartarska, Gonzalez-Vega (2005, 2006) and Quercia, Spader (2008) also find that pre-mortgage counselling is related to loan outcomes but with contrary findings. Hartarska and Gonzalez-Vega find that counselled borrowers had lower default rates but that prepayment behavior was not affected. In contrast, Quercia and Spader find more optimal prepayment behavior, but no effect on default rates. This may be reflected due to the differences in the time periods of study with high and low interest rates respectively allowing for refinancing and repayment options at the time of Quercia and Spader's study.

However, there are mixed evidences that mortgage counselling improves behavior and outcomes. There is a potential for these studies to suffer from sample selection bias. Counselling may act as a filter preventing less financially able borrowers from taking out loans, which would upwardly bias the results. It is not clear what happened to individuals who did not "graduate" from counselling, so we don't know whether counselling led to better loan outcomes by improving financial management or by weeding out the less

credit worthy. These issues have not been addressed by these papers. A paper by Agarwal et al. is able to distinguish between the effects on fall in delinquency due to enhanced financial information and drop out of poor performers.

Agarwal, Sumit et.al, 2009 Do financial counselling mandates improve mortgage choice and performance? Evidence from a legislative experiment:

The paper examines the effect of a legislative mandate of third party review in Cook County, Illinois for mortgage loan applications where either the borrower had poor credit worthiness or the mortgage products were risky. The borrowers were required to submit the loan offers for review to the counsellors, after the loan was approved by the lender. The recommendations of counsellors were not binding on the borrowers. This mandate was called HB4050.

The author carried out the analysis through construction of a “**Control group**” which is similar in socio demographic factors, loan type and default rates from within Chicago. Another group, “**Matched**” is such that every loan issued in HB 4050 region is matched to a loan issued elsewhere in Chicago bearing similar characteristics of the borrower and the loan.

A Differences-in-differences analysis is carried out to test for the impact of HB 4050 on various outcomes. The author besides controlling for the socio demographic factors and the loan type has interacted a dummy for FICO score (categorising into low, mid and high credit scores) with the treatment across time and zip codes to control for the non-random sampling bias.

$$\begin{aligned} Response_{ijt} = & \alpha + \beta_1 (Treatment_{jt} \times Low-FICO_{ijt}) + \beta_2 (Treatment_{jt} \times Mid-FICO_{ijt}) \\ & + \beta_3 (Treatment_{jt} \times High-FICO_{ijt}) + \\ & + \gamma (Time\ dummies_t) + \delta (Zip\ code\ dummies_j) + \\ & + \eta (Time\ dummies_t \times \log\ IRS\ income_{jt}) + \theta Controls_{ijt} + \varepsilon_{ijt}. \end{aligned}$$

There is a significant decline in applications for only the active lenders showing thereby, that the fall in loan applications was not only due to lenders moving out of the market but also fall in demand for loans. Hence both demand and supply are impacted by the HB 4050 mandate.

Looking at the Loan performance and Default Rates, HB4050 is seen to have a substantial negative impact on the default rates when compared to the control and the Matched group mainly with low FICO scores. Thus, financial counselling is supposed to have improved the loan performance of the low FICO borrowers. The results do not show

any significant change in the loan performance of the mid and High FICO score borrowers. Thus, the paper suggests that where sub-prime loans refer to not only the poor credible borrowers but also risky product characteristics and mortgage types, the results show that financial literacy could help to improve the performance of only the low credibility borrowers. It is not the loan type that leads to poor performance but the credit worthiness of the borrower.

4.2 Macro Level outcomes: Economic Prominence

Most of the literature on financial education concentrates on the individual outcomes like savings, investment, default behaviour etc. However, financial education has a larger impact at the economy level. There has been limited, yet pioneering work that has shown the effect of financial literacy in US Mortgage crisis that led to fall of Lehman Brothers, financial crisis and all the more welfare and income distribution effects to economic development. Below are few studies that relate financial literacy to macro level effects.

4.2.1 Financial Crisis

Maarten van Rooij, Annamaria Lusardi and Rob Alessie (2011) in their paper tested that individual with poor financial literacy levels are less likely to invest in stock market. Hence, they should be less prone to financial market fluctuations. However, Koenen et. al. in their paper have argued that individuals with lower levels of literacy and cognitive abilities are more prone to realize losses in a financial crisis situation. Therefore, though they do not necessarily incur large paper losses, they are more likely to sell the assets that face a downturn at the time of crisis and for sure realize their losses.

Tabea Bucher-Koenen and Michael Ziegelmeyer, 2011, Who Lost the Most? Financial Literacy, Cognitive Abilities, and the Financial Crisis

The author has argued that realization of losses would have long term effects as:

- a) Such individuals would not participate in the market recovery and on the contrary add to the crisis situation.

- b) The individuals who are less informed; by selling the assets during crisis realize losses, whereas better educated by investing in such assets at lower prices are able to realize profits in long term as their prices rise.

Data: The paper is based on an analysis of natural experiment from SAVE, a representative panel of German households containing information on financial and socio-economic situation along with financial literacy and cognitive abilities.

Reduced form regressions were run to see who **incurred the losses**.

$$L = \beta_0 + \beta_1 z + \beta_2 w + \beta_3 k + \beta_4 c + \epsilon.$$

Where, L is an indicator equal to 1 if a household incurred a loss. Z a vector of socio demographic variables, w is a log of gross financial wealth, k is financial literacy and c is cognitive abilities.

The results indicate that the individuals with higher financial literacy incurred greater losses in wealth by more than 11% than illiterate. However, this is due to the fact that financially literate invest more in risky assets and hence tend to lose in a crisis situation more in terms of paper losses.

Another regression to test “**Who realized the losses**” was run

$$s = \beta_0 + \beta_1 z + \beta_2 k + \beta_3 c + \beta_4 y + \lambda + \epsilon,$$

Where, s Is an indicator if the assets that lost value were sold, y is shock to income.

The results indicated that both financial literacy and cognitive abilities have negative impact stocks sold that lost value. Thus, the less educated realized their losses more. Also, the money obtained from selling was not utilized for consumption but was transferred to other assets. Hence, the falling assets were not sold due to some income shock to smooth consumption but on the expectation of long term fall in value of the asset.

The studies so far thus suggest that lower levels of financial literacy make individuals prone to financial crisis, thus landing into higher default rates, realization of losses, and loss of credibility impacting the ability to borrow. These factors thus translate into income disparity and unequal wealth distribution.

4.2.2. Wealth Inequality

Optimal Financial Knowledge and Wealth Inequality, Lusardi, Michaud, Mitchell, 2013

The inclusion of financial literacy in economic outcomes has been mainly considered as exogenous to the model. This paper has developed an augmented stochastic life cycle model that endogenizes the decisions to acquire financial knowledge. The motivation of accumulation of financial knowledge comes from higher expected returns though it is costly to acquire and depreciate over time. Thus, endogenizing the decision to acquire financial knowledge explains a sizeable share of observed differences in wealth across different groups. This results in “Wealth Inequality” and “Unequal distribution of Income” in the economy.

The paper concentrates on answering 2 vital questions:

- 1) What forces shape the knowledge accumulation over the life cycle?
- 2) How much wealth inequality can be attributable to resulting differences in financial knowledge

The paper builds and calibrates a stochastic life cycle model with uncertainty in income, capital market returns and medical expenditures. The model also incorporates an endogenous knowledge accumulation process and a sophisticated saving technology.

The paper studies 3 groups, Less than High School (>HS), High School (HS) and above College (College+) for the white males. The median net household income by education groups is constructed from the Panel Study of income Dynamics (PSID).

The data below shows that the college educated households are much more likely to use a sophisticated technology (stocks, mutual funds, bonds, Individual Retirement Plans Accounts) for saving compared to high school dropouts.

Age group	<HS	HS	College+	Total
25-35	21.8	24.8	51.5	38.6
35-45	24.6	39.8	58.3	48.7
45-55	24.1	42.3	65.5	53.4
55-65	32.1	53.3	75.6	59.5
Total	25.9	38.5	61.1	49.1

Life Cycle Participation (%) in sophisticated financial products by Educational Attainment

The model:

The utility function assumed to be strictly concave in consumption and defined as: $n_t u\left(\frac{c_t}{n_t}\right)$, where n_t is an equivalence scale capturing changes in demographics.

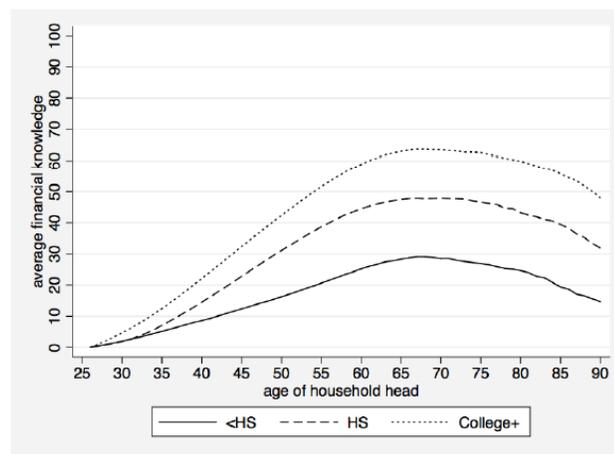
There are two kinds of investment technology, basic technology with certain low return and sophisticated technology which offers higher expected returns increasing in financial knowledge but comes at a cost.

The returns depends on the agent's level of financial knowledge at the end of t and increasing in financial knowledge

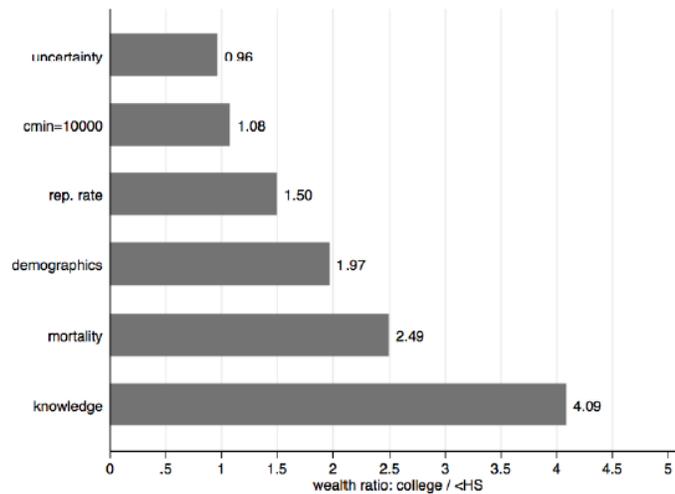
Therefore the maximization problem maximizing the value function shows that the wealth patterns around the time of retirement are quite unequal.

At retirement	<HS	HS	College+	College/<HS
Med. wealth (\$ 000)	61.5	180.3	370.2	6.05
Med. wealth-to-income ratio	1.91	4.7	7.8	4.08
% Poor ($a_t < y_t$)	0.39	0.22	0.17	0.44
% Sophis. Tech. ($\kappa_t = 1$)	0.35	0.54	0.69	1.95
% Low Knowledge ($f_t \leq 25$)	0.67	0.47	0.33	0.48

Also as seen below the lifecycle path of average financial knowledge by education groups are all hump shaped. However, in the accumulation phase, better educated consumers invest more because they have more to gain from higher returns that help them smooth lifetime marginal utilities.



Where most of the economists have argued the basis of unequal distributions on grounds of uncertainty of income, demographics etc., the author has introduced these factors in a stepwise mode to study their differential impacts with financial education introduced last. The results show that of all the explanations examined for heterogeneity in wealth outcomes, financial knowledge accounts for more than half the cross group inequality, 65%.



Hence differences in financial education play a significant role in explaining the wealth inequalities across the economy.

Wealth equity and income distribution are taken as important measures of economic development – level of happiness. Thus financial literacy should have an important bearing on economic development.

4.2.3 Economic Development

Jeanne M. Hogarth, Federal Reserve Board, U.S.A, Financial Education and Economic Development:

This is a survey paper that presents a link from financial education to community and economic development in US in 2001 and 2004. It is based on a study of Opportunities Credit Union (OCU) that provides fair and affordable financial services to underserved populations.

Economic Development was measured through survey questions that include confidence, perceived quality of life and hopefulness and involvement in the community with financial education and aid.

Major Findings:

- a) Those who said that education services of the OCU were important; they experienced increase in savings balance by approx. 100% and lower loan balance than those who said education services were not important.
- b) All the members who reported benefits, about 74% experienced an increase in economic and community development.

- c) In both 2001 and 2004, of those who believed that they realized economic development, a higher percentage belonged to the section that said that the educational services were important.

Thus, there is evidence of a positive relationship between those who value financial education and experience of economic development

5. Conclusion and Questions Remained Unanswered

Studies so far have been able to measure levels of financial literacy through mathematical abilities and basic economic understanding. Financial literacy has been recognized as an important factor in determining an individual's financial behaviours and economic outcomes. Investment in financial literacy however is a conscious attempt depending upon a person's measure of time preference and income streams. Studies have revealed that better financially educated individuals are more likely to better plan their savings and retirement, participate in investment in sophisticated assets with higher returns and manage finances better during times of crises. Less educated individuals behaving in an irrational manner during the times of crisis act as an impediment to market recovery. These factors widen income inequalities and tend to impact the economic development and people's perceptions of welfare.

Financial literacy impact measurement is impacted by various endogeneity and simultaneity issue. At the micro and institutional level there has been tremendous work to deal with such issues through RCT and diff-n-diff analysis. However, at the macro level there has been negligible work to deal with this endogeneity issue. Thus several gaps in the literature than need to be addressed are:

- a) Studies do show that financial literacy has an important influence on the economic outcomes. However, what part of financial literacy is directly attributable to improved outcomes is yet to be studied. Insufficient study has been devoted to capture the externality or the peer effect arising from a financial education program. People interact within groups and there are strong ties within communities. (Agarwal et al., Duflo and Saez 2003) have been able to show the strong peer and community effects in spread of knowledge. Thus, a financial education program not only impacts the financial behaviour of the recipients but also the peers and family members. Hence, unless the studies include the externalities or the peer effects, financial education estimates remain wrongly estimated.

- b) Most of the studies in literature have concentrated on the causal impact of financial literacy on various economic outcomes. However, there exists reverse causality between economic outcomes and financial literacy. Thus for example, someone who has significant amount of savings is more likely to invest in financial knowledge. Thus, it is important to model financial literacy in a structural framework.
- c) The studies are mainly across cross sections. However, very few attempts have been done to see that how financial knowledge along with other parameters of economic development has evolved over time. Thus, it would be interesting to study the time trends of financial education. This could possibly be done through a Vector Autoregressive Model, which is a multivariate time series analysis. The variables are regressed on their past values and the coefficients indicate the lead – lag relationship between different variables and an opportunity to forecast future trends.

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