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Financial Literacy and Its Consequences in the Emerging MiddleClass

by

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Abstract

This paper analyzes the state and impact of financial literacy in a so far largely neglected group: the middle class in emerging economies. This group is of increasing importance for implementing structural change, including the proper use of sophisticated financial products. We survey middle class people living in Bangkok and find that higher financial literacy leads to an increased probability of individuals demanding the sophisticated financial products that are available, and more informed use of credit cards. Overall, improving the financial literacy of the emerging middle class provides a double dividend: it increases the welfare of this group and also contributes to financial development, which is a driver of growth.

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Financial Literacy and Its Consequences in the Emerging Middle Class

1   Introduction

Individuals have to make many financial decisions during their life time; they have to borrow, to invest or to fund current consumption and at the same time, they have to save for retirement. Whereas this is true for almost all people, these decisions are of particular importance for the middle classes in emerging economies. These economies are characterized by rapid growth, heavy structural changes and the emergence of a larger middle class (e.g. Landes, 1998, Ravallion, 2009). Increasing incomes allow higher savings, new risks require diversification, longevity in combination with social individualization asks for retirement precautions and sophisticated financial products become newly available in these markets. In order to address challenges adequately and use sophisticated products rationally, individuals need to have a certain financial understanding (Campbell, 2006). Financial literacy is therefore of particular importance for the middle classes in emerging economies.

Somewhat surprisingly, this case has been almost neglected in the extant literature. Studies have focused either on advanced economies (see Lusardi and Mitchell, 2014), population-wide studies in developing countries (Behrman et al., 2010), or poorer areas in developing countries (Xu and Zia, 2012). Studies by Klapper and Panos (2011) in Russia and Beckman (2013) in Romania show that financial literacy is consistently higher in urban areas than in rural areas. While several studies cover financial literacy in poorer rural areas, research focusing on the middle class in emerging economies is lacking. Our study contributes to filling this gap in the literature.

There is another motivation to study financial literacy of the middle class in emerging economies: going beyond the individual perspective, we argue that financial literacy can usefully contribute to financial development and thus to economic growth. This aspect is mostly neglected in the literature because financial development is hardly important for growth in advanced economies, and the gap between financial development and growth seems too wide in poor rural areas. At the stage of emerging economies, however, financial development occurs most rapidly and can be important for macro development. A driving force in this process of structural change is the emerging middle class whose potential contribution can be linked to channels from financial development to growth (Levine, 2005).

Levine (2005) recognizes five different channels through which financial sector development leads to better use of resources and so to growth. Two of these channels, capital

allocation and investment monitoring, refer mainly to corporate finance and are thus beyond the scope of our study. The other three channels, however, are relevant for middle class people. Indeed, the financial sector (i) mobilizes and pools savings, (ii) facilitates trading, diversification, and management of risk, and (iii) eases the exchange of goods and services. A developed financial system hence gives individuals the possibility to make better decisions. However, what happens if these individuals are unable to use this improvement in information and investment opportunities effectively? We argue here that not only the supply of sophisticated financial products is important for financial development, but that demand of these products also plays a crucial role. Financial illiteracy may act as an obstacle to the demand for more sophisticated financial products and thus to the channels through which financial development leads to growth.

The middle class in Bangkok provides the ideal platform to study the impact of financial literacy on financial behavior of middle class people and its implications for financial development for a number of reasons. Firstly, Thailand belongs to the group of emerging economies where a sizable middle class with significant financial needs and wealth has developed. This group is largely concentrated in the larger Bangkok area, where 23% of the Thai population lives, but which produces 44% of total GDP. Secondly, the financial sector grew quickly and the economy expanded significantly, meaning that the middle class had to adjust quickly to new financial products. Thirdly, as the financial sector is well developed and access to sophisticated financial products should not be a problem for members of the middle class in Bangkok, low take up of these products has non-supply side reasons.

We design a survey, specifically to answer these questions, during which we collect information for over 500 middle class people in Bangkok. Our sample is relatively homogenous with respect to age, income and education, making it ideal for studying non-socio demographic factors such as financial literacy and their effects on financial behavior. To test the degree of financial literacy, we use standard items and find that basic financial knowledge for middle class people in Bangkok is at the same level as that found in representative studies in developed countries. However, the results also indicate that our respondents struggle with more advanced financial knowledge, as only 24% can answer the standard stock market diversification question correctly. At the same time, use of sophisticated financial products such as stocks and bonds is low (9% and 11% respectively), whereas bank accounts and deposits are the most common financial assets.

We further show that financial literacy explains a wide range of savings as well as borrowing decisions, all of which show that more financially literate individuals make better

use of advanced financial products. However, the relationship between financial literacy and financial behavior suffers from potential endogeneity caused by potential measurement error or unobserved variable bias. Furthermore, reverse causality is also a potential problem; it is conceivable that holding advanced financial products such as stocks may provide some kind of financial literacy training. In order to address these problems, we use an instrumental variable approach. We collect several variables that refer to respondent's childhood. These are particularly suited to be used as instruments as they are likely to be correlated with financial literacy, but uncorrelated with financial decisions in adulthood. The analyses with instrumental variables confirm our earlier findings.

Hence we are confident to argue that financial literacy of the middle class in an emerging economy may pay a double dividend: Firstly, financial literacy helps to increase individual welfare by supporting better financial behavior. Secondly, financial literacy may help to mobilize savings, to diversify risks and to ease the proper use of credit cards, which altogether supports financial development and thus indirectly growth.

Our main contribution to the literature is showing the beneficial causal impact of financial literacy for a sample representing the emerging middle class. As additional aspects we argue that (i) the typically highlighted benefits of financial literacy for the individual person may be accompanied in the case of emerging economies by further benefits for financial development. In order to demonstrate potential effects at the macroeconomic level, we (ii) consider a broader set of savings and borrowings decisions. Finally, we (iii) show the robust role of instruments derived from the childhood of our sample participants in explaining their behavior as adults. In all of our analyses we control for numeracy, risk tolerance, education, income, financial assets and standard socio-economic variables.

The literature of financial literacy first developed trying to study the link between financial literacy and retirement planning. The argument is that planning for retirement is a complex decision problem, requiring knowledge of discount rates, survival probabilities, expected investment returns and pensions benefits (amongst others), and that this planning therefore requires high financial literacy. In this sense financial literacy provides the necessary skills to make more rational financial decisions which lead to higher welfare in the end. This line of argument has been well documented for the U.S., where private savings decisions for retirement are particularly important, and has been extended to further countries since (Ameriks et al., 2003, Lusardi and Mitchell, 2007, Bucher-Koenen and Lusardi, 2011, van Rooij et al., 2011b).

With regards to savings, the decision to participate in pensions plans can be seen as an example of sophisticated savings. Similarly, financially literate individuals are more likely to invest in stocks (van Rooij et al., 2011a) and have more diverse portfolios (Guiso and Jappelli, 2008). Regarding borrowing decisions, financially literate people have lower cost debt and are more likely to report that they know their optimal level of debt (Lusardi and Tufano, 2009, Stango and Zinman, 2009). They have less high cost consumer credit (Disney and Gathergood, 2013) and fewer problems with repaying credit card debt (Gathergood, 2012). All these factors mean that financial literacy contributes to individual welfare.

Financial literacy is also an important topic for developing countries: we refer to Xu and Zia (2013) for a recent review of the literature. Levels of financial literacy in developing countries are lower than in developed countries (Hastings and Tejada-Ashton, 2008, Cole et al., 2011, Klapper and Panos, 2011, Beckman, 2013), especially in rural areas. Further, studies in developing countries confirm that better financial literacy is positively related to retirement planning (Klapper and Panos, 2011), to greater participation in financial markets, to greater use of formal sources of borrowing (Klapper, Lusardi and Panos, 2013), to higher savings and better diversification (Beckmann, 2013).

This paper is structured as follows: Section 2 describes the data and its collection, Section 3 shows results including IV regressions, Section 4 looks at robustness and Section 5 concludes.

2   Data description

The section starts by providing background information on Thailand and Bangkok (Section 2.1). It goes on to describe the conduct of the survey implemented in Bangkok in December 2012 (Section 2.2), provides definitions and descriptive statistics about socio-demographic variables used (Section 2.3), our measure of financial literacy (Section 2.4), numeracy and risk attitude (Section 2.5) and correlates of financial literacy (Section 2.6).

2.1 The financial-economic background of Thailand and Bangkok

With our financial literacy survey we specifically target the middle class in Bangkok, Thailand. Over the last 50 years, Thailand has rapidly developed from a relatively poor agricultural society with GDP per capita of 101 USD in 1965, to an "upper-middle income" economy with GDP per capita of 5,480 USD in 2012 (in current USD, source: World Bank).[1] Hiding behind this remarkable success story of economic transformation and development,

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[1] Real GDP per capita grew from 437 USD in 1965 to 3,353 in 2012 (in constant 2005 USD, World Bank).

there is also regional disparity. Thailand has a population of 66 million people as of 2012, of which 15 million (23%) live in the capital city Bangkok and its direct vicinity.[2] Bangkok is the administrative, economic and financial center of the country, producing 44% of Thailand's GDP. As a result, GDP per capita in Bangkok is twice the national average, similar to Greece and the Czech Republic (corrected for purchasing power).[3]

Consumer finance services in Bangkok are modern and well developed, including a dense network of banks and ATM's, providing access to savings accounts, time deposits, investment funds (stock, bonds), credit cards, consumer loans and home mortgages. Insurance products are available at bank branches and also sold through a large direct sales network. In addition, offices of brokers are widespread, providing direct access to the local stock and bond markets.[4] A special feature in Bangkok are gold shops, present in most neighborhoods, where gold bars and jewelry are traded.

A worrisome recent trend is that in 2013 the ratio of household debt to GDP reached 82.3%, steeply rising from only 55.1% in 2008 (source: Bank of Thailand). This raises the question to what extent households fully understand the consequences of increasing debt service for their financial situation.

Similar to most developed countries, Thailand's has a rapidly ageing population, predicted to shrink from 2023 onwards. The number of retirees as a proportion of the population was 14% in 2012 and is expected to increase to 32% by 2050 (source: UN), above the global average. Although Thailand has a pension system with public and private pillars, both the coverage and the benefits are limited, due to a cap of public pensions and high levels of self or informally employed people. To counter the expected pension shortfall, the Thai government actively encourages individual retirement savings through tax-exempt equity funds and retirement funds, but this clearly requires some financial literacy.

In our study we focus on the middle class in Bangkok, which we define in Section 2.2 as having regular employment and earning at least 15,000 Baht (460 USD) per month. Our survey will assess to what extent the Bangkok middle class uses these old and modern channels of savings, investment and borrowing.

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[2] Source for regional GDP and population figures: National Economic and Social Development Board (NESDB).
[3] When considering GDP per capita in nominal USD, without correcting for purchasing power effects, Bangkok's GDP per capita in 2012 is similar to Turkey, Malaysia and Brazil.
[4] Like in developed countries, online banking and brokerage services are easily available.

2.2 Data collection by survey

The data necessary for this research is not available and thus had to be collected. Data collection took place in Bangkok over a ten day period in December 2012 in order to get useful responses from more than 500 persons. Interviews were conducted face to face by a Bangkok based market research company. This company has a long-standing relationship and cooperation with various researchers from one of the participating universities. The research team designed the questionnaire and the market research company gave advice regarding its implementation. As next step we conducted a test run with individuals who have the same characteristics as the target group and the final version of the questionnaire was the basis for training the interviewers.

Survey participants were intercepted in public places throughout Bangkok and were chosen at random. The areas in which each team operated were decided on before the start of the survey; they consisted of six different main areas in Bangkok and 28 specific locations. Locations were chosen so that a balanced sample with respect to income, education and wealth would be collected. Hence data collection took place in business as well as residential areas of Bangkok. Interviewer teams consisted of three to four people, with one person acting as team leader. Each interviewer had previous experience conducting interviews and was trained on this specific questionnaire. On a given day each team was responsible for a certain area of Bangkok. Despite working in teams, respondents were approached and interviews were conducted by one person only. Rates of participation were fairly high with 85% of those approached willing to be part of the survey. Participants were made aware that the information would be used for academic research purposes only. Interviews took 20 to 30 minutes and participants were given a small present as a thank you for taking part.

Due to the potential difficulty caused by surveying using street intercepts, great care was taken to stratify the sample. Thus four pre-selection criteria were used (and respective questions asked) in order to determine suitability of each potential respondent. These four criteria are: age, income, financial responsibility and gender. (1) The individual's age was required to be between 18 and 60 years, with 60 being the mandatory retirement age, in order to target financially active respondents. (2) As the aim of this paper is to study financial literacy among the urban middle class, participants had to earn at least 15,000 Baht per month (460 USD). The amount is equivalent to the starting salary for a recent graduate with a bachelor degree in Bangkok. According to the Thai National Statistics Office (2011), 29% of the regularly employed in Bangkok earn 15,000 Baht or more. Thus our understanding of a middle class follows Ravallion (2009) and others who refer to an absolute income level in

order to define the group; more specifically, our definition is selective and comes close to a "narrower definition" (Ravallion, 2009, p.452). (3) Interview subjects also had to be responsible for their own, or their household's, financial decisions. (4) Finally, regarding gender we aimed for a balanced group, considering the fact that women as well as men often have financial responsibility in the country. If individuals approached did not fulfill these requirements, interviews were discontinued after preliminary questions. Roughly 31% of those approached failed initial screening, mostly due to incomes being too low.

2.3 Description of socio-demographic variables

As this paper focuses solely on the urban middle class, both average individual and household income are higher than the Bangkok average. Mean individual income in our survey (see Table 1, Panel A) is 26,800 Baht per month (840 USD) which is considerably higher than average income of an employee in Bangkok of 16,961 Baht per month (530 USD) in 2011 according to the Thai National Statistics Office. It is worth mentioning that the standard deviation for our income variable is high at 20,500, so there is substantial heterogeneity. Indeed, 21.1% of our sample earn just 15,000 Baht a month. Household income, as was estimated by the respondent, is also higher for our sample than the Bangkok average: the mean in our sample is 64,400 Baht per month (2,010 USD), whereas the Bangkok average as published by National Statistics is 41,600 Baht per month (1,300 USD).

Our sample is not only richer than the Bangkok average; it is also young and highly educated, as 47% are 30 years of age or younger and most respondents have a higher educational degree. The highest educational attainment of 64% of our respondents is a bachelor degree, compared to 36% in the Bangkok labor force (National Statistics, 2011). As an explanation for the high education level in our sample (see Table 1, Panel B), we note that bachelor degrees have become a minimum requirement for white collar jobs in Thailand. As part of a push by the government to raise education levels, bachelor degree programs have grown rapidly.

The proportion of women in our sample is 48%, close to the 49.6% population proportion among the labor force in Bangkok (National Statistics, 2011). Information on household composition is also collected, the average number of children is 0.8 and the number of adults per household is 3.0. The average number of full-time income earners in the household is 2.5. These results indicate that many households include grown up offspring living with their parents, despite being part of the work force, which can be explained both by the family-centered Asian culture and the high costs of living.

2.4 Description of financial literacy

Financial literacy is usually measured by a score and there are various ways to do this. We motivate our choice and show the resulting level and distribution of financial literacy in our sample.

Financial literacy measure. In our analysis we choose to use the basic Lusardi and Mitchell score, which is based on three items, and extend it with our own item about financial institutional knowledge.

The Lusardi-Mitchell score is the most prominent measure of financial literacy. We include three question first used by Lusardi and Mitchell in the 2004 US Health and Retirement survey (Lusardi and Mitchell, 2011), which have become standard in the literature. Regarding the first question we follow the slight adaption to a developing country as proposed by Cole et al. (2011). These questions test understanding of three key financial concepts: interest rates, inflation, and risk diversification. In line with the literature, we simply award one point for each question that is answered correctly. Hence these questions award a score between 0 and 3.

In addition to these standard items, we also ask respondents to name foreign banks that operate in Thailand. By doing this, we try to expand the measure of financial literacy to include institutional knowledge, which has been shown to be of importance for financial outcomes (Gustman et al. 2012, Carpena et al. 2011). There are about ten foreign banks operating in the retail market in Bangkok. Being able to name these foreign retail banks, beyond more familiar local banks, is a proxy for knowledge of financial institutions. The question is open-ended and there is no time limit on how long respondents can take to answer. Respondents are able to name up to four foreign banks. To construct our overall financial literacy measure, on top of the Lusardi and Mitchell literacy score, we award 0.25 points per foreign bank. This way we are giving the same weight to being able to name four foreign banks as we are giving to one of the other three questions. Thus, the overall financial literacy final score is in the range between zero and four. There are also other ways to measure financial literacy, but our results do not depend on the specific measure, as we demonstrate in the robustness section.

Financial literacy results. Regarding the Lusardi-Mitchell measure, the number of correct answers is fairly high for the first and second question. Knowledge of interest rates seems good, with 79% answering the first question correctly (Table 2, Panel A). Slightly fewer people seem to have a good grasp of inflation. Only 62% answered this question

correctly, with 12% claiming that they don't know or refuse to answer. Most striking are the answers to the third question, which requires knowledge of the concept of portfolio diversification in the stock market context. Only 24% of respondents can answer this question correctly, with a high 52% answering I don't know/refuse to answer. It is not clear whether these poor results are due to a lack of knowledge on the working of the stock market, or alternatively, because individuals do not grasp risk diversification. It is thus unsurprising that only 17.6% of the respondents answer all three questions correctly. Most respondents, 41.1% of the sample, give two correct answers, while a small minority of 11%, do not give any correct answers.

As the benchmark questions have been used in many other countries, we can compare results across countries. It is most noticeable that the number of correct answers in Bangkok is not hugely different from those in developed countries for first two questions; however results are considerably worse on the risk diversification question (Xu and Zia, 2012). This indicates that while basic financial knowledge of interest rates and inflation in Bangkok is good, the resident middle class here lacks more advanced financial knowledge, despite wide availability of advanced financial products. At the same time, our Bangkok middle class residents do considerably better on all questions compared to general population surveys in developing countries (Xu and Zia, 2012; Lusardi and Mitchell, 2014).[5]

When it comes to naming foreign banks, respondents name between zero and four foreign banks, with only one person being able to name six foreign banks. To avoid an outlier in the financial literacy measure, this single observation was set back to four. The mean number of foreign banks mentioned is 2.24 (Table 2, Panel B), with 20.1% being able to name four and 6.5% being able to name none at all. Figure 1 shows the distribution of our new financial literacy measure that includes the name foreign banks score (scale: 0 to 4) in Panel B, and the standard Lusardi-Mitchell score (scale: 0 to 3) in Panel A. The new financial literacy measure is more evenly distributed, with a mean of 2.2 and mode of 2.5, while only 1.1% get a score of zero.

Correlations (Table 2, Panel C) show that each question measures a different element of financial literacy, as none of the correlations exceeds 0.3. Relatively, the highest correlation is between the inflation question and the portfolio diversification question. The name foreign bank score is correlated with the inflation and diversification questions, although not strongly.

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[5] Interestingly, the low 24% proportion of correct answers on the stock market diversification question is comparable to *urban* sub-groups in Russia and Romania (Panos and Klapper, 2011, Beckmann, 2013).

2.5 Description of numeracy and risk attitude

Financial literacy clearly involves a certain level of numeracy (mathematical ability), but pure knowledge of financial concepts is also necessary. In order to differentiate between financial literacy and numeracy, we ask four math-based questions, which correspond to four of the eight maths questions used by Cole et al. (2011). Respondents perform much better on these questions than on financial literacy, with the average number of correct answers being 3.6 (Table 3, Panels A and B), as opposed to 2.2 for the financial literacy items. These results indicate that the respondents are able to perform simple calculation tasks and poor performance on the financial literacy questions is mostly due to lack of financial knowledge.

In addition to this, a question on risk attitudes is included. The item is a qualitative measure of risk attitude, where respondents are required to place themselves on a scale from 0 to 10, with 0 meaning "unwilling to take risk" and 10 meaning "fully prepared to take risk". This item has been applied before; see, for example, Dohmen et al. (2011) for Germany and Hardeweg et al. (2013) for Thailand.[6] We turn this measure of risk tolerance into a measure for risk aversion by reversing the scale to a score between zero and one.

2.6 Financial literacy by demographic group and correlates

Correlations between our measure of financial literacy, numeracy and risk attitude are shown in Table 1, Panel C. Further, Table 4 shows financial literacy by gender, age, education, as well as by income groups and financial assets. We find that our data mainly show the expected patterns, both for our new measure of financial literacy as well as the Lusardi and Mitchell measure of financial literacy. Financial literacy is higher for respondents with higher education, higher income and higher financial assets.

Remarkable is the steep rise in the percentage of correct answers to the stock market diversification question as a function of income and financial assets, ranging from less than 20% correct in the lowest income and asset groups to more than 40% correct in the highest groups. The evidence supports the model of Jappelli and Padula (2013) where financial literacy and wealth are endogenous variables, jointly determined over the life-cycle.

We find one surprising result in Table 4, namely that the women in our sample do not have lower financial literacy than the men. In additional OLS regressions explaining financial literacy with respondent characteristics in the Appendix (Table A1), we find that demographic variables do not have the strongest relation with financial literacy, but rather numeracy, risk

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[6] The average response is 5.5, implying that the distribution of answers is somewhat shifted towards willingness to take risk, which is unusual for earlier applications of this measure (Table 3, Panel B). Nevertheless, as we are interested in risk attitude relative to others, the mean of this distribution does not require further attention.

aversion and income, which is in line with recent findings by Fernandes et al. (2014) and Meier and Sprenger (2013).

3 Results

In this section we present results in four steps: first, we describe the necessary financial assets and borrowings data in our sample (Section 3.1). The determinants of these financial decisions are then analyzed, separately for savings (Section 3.2) and borrowings decisions (Section 3.3). Lastly, we look at the causality of financial literacy for financial decisions (Section 3.4).

3.1 Description of financial assets and debt

In order to assess the link between financial literacy and financial behavior, variables on the respondent's financial situation have to be collected. This includes detailed information on financial assets and liabilities. Hence we ask for information on the amount of financial assets that respondents hold, along with what form financial assets are being held in. Results are shown in Table 5, Panel A. Penetration of basic financial services is wide among the urban middle class; every respondent has a bank savings account.

However, ownership of other financial assets is not as widely spread, as only 41% have a fixed deposit account and 8% of people hold gold to store wealth. More sophisticated financial assets are even less common than fixed deposits: only 11% of respondents own bonds or bond mutual funds, 9% hold stocks or an equity mutual fund, and 16% have a life insurance policy. In total only 52% of our respondents have other assets apart from a savings account, with the average number of other asset types held equal to 0.75. Furthermore, 62% of the sample holds the largest proportion of their wealth in a savings account.

Due to reservations about passing on financial information, the survey only asks respondents to indicate their total amount of financial assets in five pre-defined categories, instead of asking for the exact amount. The level of assets in our sample is relatively low, with 53% claiming to hold less than 100,000 Baht (3,100 USD), 22% have assets worth between 100,000 and 500,000 Baht (15,600 USD), and the remaining 9% hold assets in excess of 500,000 Baht. A further 19% refuse to answer the question. The low amount of financial assets reported may be partially explained by a preference for investing in real estate and the relatively young age of our sample, apart from reservations about sharing this information.

Our findings for investments in financial assets are similar to results reported in Guiso and Sodini (2013) for the lowest wealth deciles in the U.S.: the majority of financial assets is held in cash, while participation in stock and bonds markets is below 20%. As wealth increases, financial asset holdings become more diversified and the weight of cash decreases. In our sample we find exactly the same pattern: Figure 2 shows stock and bond market participation as a function of the reported amount of financial assets. In the group with more than 500,000 Baht (15,600 USD) of financial assets stock market participation is 57%, while 34% own bonds or bond funds. Hence, limited participation in financial markets among the emerging middle class may partially be explained by low wealth levels.

On the debt side, we ask for information on the total amount of debt and we collect information on the use of credit cards (see Panel B of Table 4), as credit cards can improve financial transactions considerably, but can also lead to problems if used irrationally. Therefore we also gather information on the number of credit cards, as well as information about credit card debt repayment and awareness of interest rates.

Levels of debt are fairly high, with 47% responding that they have an outstanding loan, are borrowing cash or paying for goods by installment. Respondents are reasonably open about their debts, with 79% reporting an exact amount of debt, and 21% not reporting the amount. Among respondents providing a positive debt amount, the average loan value is 272,400 Baht (8,570 USD), with a large standard deviation of 586,700. For 20% of those reporting a positive debt amount, the loan amount is larger than their annual income.

Only 33% of respondents have a credit card, showing that credit card use is not yet widely spread among the Bangkok middle class, potentially due to having insufficient monthly income.[7] Out of those with a credit card, 15% claim that they find it difficult to pay off their credit card debt every month. Further, 57% do not know the interest rate charged by the credit card company, which is worrisome as credit card debt is one the most expensive sources of consumer finance.

3.2 Financial literacy and saving decisions

We analyze two types of savings and investment decisions, namely the use of financial products beyond basic savings accounts and diversification. Both of these are indicators that

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[7] We expect that some respondents fail to meet bank requirements for issuing a credit card, such as having sufficient regular income or liquid assets. A poll among 1,205 people aged 25 to 60-years in Greater Bangkok by Assumption University found that only 23.3% of the respondents used credit cards (source: *The Nation*, 25 Sep 2013). In our sample, 43% of those in the group with self-reported financial assets between 100,000 and 500,000 Baht have a credit card, and 72% of those with high assets (more than 500,000 Baht).

individuals are using the advanced financial system that is available to them. In detail, we rely on the following definitions of informed savings decisions:

(i) Virtually everyone in Bangkok's middle class holds a savings account. However, apart from convenience and safety, it is not a financial asset with attractive return features; in recent years the effective real rate of return (after inflation) on savings accounts has been negative. Thus holding *assets other than a savings account* serves as a most simple characteristic of informed savings behavior. The dependent variable is a dummy that is unity if the respondent holds an asset other than a savings account.

(ii) For the middle class in Thailand, *fixed savings deposits* are an advantageous product due to tax advantages and offering higher interest rates than savings accounts. Thus we analyze whether financial literacy is related to owning this product. In our analysis we use a dummy that is one if the respondent holds such a fixed deposit account, and zero otherwise.

(iii) Following the literature, another financial asset that offers positive expected long-term real returns but may require financial literacy, we analyze the ownership of *stocks* and *stock mutual funds*.

(iv) We finally analyze the holding of a product which we expect to be less attractive for the financially literate in the Thai context, that is, having *life insurance*. The life insurance products offered in the retail market combine long-term savings contracts (e.g., for 5 or 10 years) with a life insurance policy. The interest rate offered is typically low, below government bond yields, but determining the effective rate of return requires high numeracy and financial skills. Still, regardless of its poor investment return, life insurance products may attract risk averse people.

(v) Finally, the decision to diversify, which follows from basic understanding of risk, is measured in the simplest way in that we count the *number of different asset types* that an individual owns. We here use a regression model for count data.

In explaining these savings decisions, we find that financial literacy contributes to better use of available information and products, and thus appears to be beneficial (Table 6). The relationship between financial literacy and better savings behavior − as proxied by the variables in specification (i) to (v) − is mostly statistically significant and economically meaningful. Those that can score an additional point on the financial literacy measure are about 7% more likely to hold an asset other than a savings account at the mean. Similarly, scoring an extra point increases the probability of having a fixed deposit account by about 6% at the mean. Moreover, an extra financial literacy point reduces the likelihood of having life

insurance by about 3%. At the same time, an extra financial literacy point increases the number of assets held by 0.11, an increase of 14% relative to the mean (0.75).

Financial literacy explains all dependent variables except for stock market participation, which seems to be driven mainly by asset and income levels. It is remarkable that the effect of financial literacy is significant alongside the many control variables which cover the main aspects discussed in the literature, such as numeracy, education and income. Most notable is that education and financial literacy are significant in (almost) all columns of Table 5, in addition to controls for income and having low assets. This indicates to us that financial literacy is not synonymous with education. One does not guarantee the other, and specific knowledge of finance is needed in order to make good financial decisions. Numeracy is significant for three out of five savings variables, with the expected sign. Thus, financial literacy contributes to more informed financial decisions, even after controlling for the effect of simple numeracy skills and general education.

In the previous section we showed that the take-up of sophisticated savings products amongst our sample is low, similar to people in the lower wealth deciles in developed countries. We demonstrate in this section that those who are more financially literate are more likely to use sophisticated savings products, and to use more of these products. This effect clearly reaches beyond the individual welfare level. It also means that financial literacy is important for the pooling and mobilization of savings, as well as for risk diversification and management, which are two of the channels indentified by Levine (2005) through which financial development leads to growth.

3.3 Financial literacy and borrowing decisions

Less researched than savings decisions is borrowing behavior. A problematic policy issue in many emerging economies, such as in Thailand, is uninformed and excessive consumer credit. We analyze two dimensions: the use of credit cards and the total loan amount.

Credit cards can have advantages for certain transactions and promise easy access to credit, but also involve concerns of uninformed and excessive use of credit, for which we use two indicators:

(i) Consumers who do *not know the (high) interest rate* to be paid on credit card debt may underestimate the effective debt burden.

(ii) A full monthly repayment is rational as credit card debt is expensive, but is timely repayment a potential problem for consumers? Thus we ask people whether they regard *monthly repayment as difficult*.

Results for these two items are shown in columns 1 and 2 of Table 7. Financial literacy is negatively linked to both of these indicators. In particular, one extra point on the financial literacy scale (0 to 4) increases the chance of not knowing the interest rate on credit card debt by 12%, while it reduces the probability of finding it difficult to pay off credit card debt by 6%. Moreover, our results show that financial literacy is the only variable that has significant explanatory power for these indicators, apart from gender and an asset dummy; remarkably, numeracy, education and income are insignificant.

Credit cards are part of a developed financial system, but can also cause problems for this system if used unwisely. We have shown here that financial literacy is important for a rational use of credit cards and so impacts on the wider financial system. Indeed, more financially literate people are more able to benefit from the ease of transaction provided by a credit card. We show here that financial literacy is important for this channel through which financial sector development leads to growth.

Another concern of policy makers refers to the level of debt for consumption purposes. Our data are arguably not perfect in this respect as some respondents do not give answers, or possibly do not always refer to consumption credit only. Nevertheless, with these qualifications, we examine three indicators of, possibly uninformed, borrowing decisions:

(iii) A large *number of credit cards* may signal a lack of spending control and excessive credit. We examine whether there is a link between the number of credit cards someone has and their level of financial literacy.

(iv) We also see if there is a link between *having debt at all* and financial literacy, as this will help us make the distinction between debt in itself and excessive debt.

(v) Another measure of uninformed or excessive borrowing is a high *debt to income ratio*, which is also a first indicator of credit bearing capacity.

Results for our indicators of borrowing do not show a direct relation with the degree of financial literacy. Rather, other variables better explain these borrowing indicators, such as age, income and having high assets. The non-linear relation between debt and age in columns (3), (4) and (5) is a sign of income smoothing, as predicted by standard life-cycle models. For example, the estimates in column (4) imply that the probability of having debt is increasing from age 18 to 39 years and decreasing after the age of 40. In line with theory, younger people tend to borrow against future income, while older people pay off debt and draw down

savings. Further, the importance of collateral and liquidity constraints for borrowing is apparent in column (3) and (5): respondents with high levels of assets tend to have more credit cards and are more likely to borrow in excess of their annual income. Finally, respondents with higher risk aversion and better numeracy skills are less likely to borrow more than their annual income, which is plausible.

In sum, our results suggest that income smoothing, liquidity constraints and collateral are the main drivers of having debt, in line with economic theory. Moreover, having lower risk aversion and worse numeracy skills are related to having relatively high debt compared to income, but financial literacy is an insignificant determinant.

However, there is also slight evidence that there may be a link between excessive debt and financial literacy. Recall that about one in five respondents refused to report their amount of debt. When regressing a dummy for not answering this question against financial literacy, we see a clear negative relationship whilst controlling for the usual socio-demographic variables (results not reported in Table 7). There are two possible reasons for this relation. Either respondents with low financial literacy simply do not know how much debt they have, and so they cannot answer the question. Or, alternatively, respondents with low financial literacy and high debt are embarrassed about this, and refuse to answer the question. Either way, this finding helps us better understand the lack of a relationship between borrowing and financial literacy, as respondents engaged in uninformed or excessive borrowing may prefer not to report their debt amount.

Overall, and considering savings and borrowings decisions together, we find that financial literacy has a clear effect on financial decisions in the expected way: higher financial literacy relates to choosing more advanced financial products and better diversification, and it relates to a more informed use of credit cards. Hence in Sections 3.2 and 3.3 we are able to show that financial literacy is beneficial for middle class people.

Moreover, it is also supportive for three channels through which financial sector development affects growth. This mainly works by financial literacy enabling individuals to use more attractive savings products stimulating savings, to better diversify risks and to ease transactions by a more informed use of credit cards.

3.4 Causal relationships

Logic may suggest that causality runs from financial literacy to good financial decisions making, but the reverse is also conceivable (Jappelli, 2010, Jappelli and Padula, 2013). It is possible that investing in advanced financial products, such as stocks or a fixed deposit

accounts provides some kind of financial literacy training and so enables respondents to answer more questions correctly. At the same time, it is possible that OLS regression suffers from endogeneity, caused either by unobserved variable bias or by measurement error. The standard approach for dealing with these endogeneity problems in the literature is to analyze the impact of financial literacy with instrumental variables (IV) methods.

The main conclusion arising from other studies employing IV-methods is that financial literacy has a direct causal effect on wealth accumulation (Behrman et al., 2010, 2012, van Rooij et al., 2012), retirement planning (Lusardi and Mitchell, 2009, van Rooij et al., 2011b), stock market participation (Christiansen et al., 2008, van Rooij et al., 2011a) and having unspent income (Klapper et al., 2013). In many cases the effect of financial literacy on the outcome variable becomes stronger after changing the methodology from ordinary least squares to a specification where financial literacy is instrumented.[8]

To verify the causality of the associations reported so far, we have estimated instrumental variable regressions where we use childhood experiences as instruments for financial literacy in the first stage. We search for instruments that do not directly predict the outcome variable (passing an over-identifying restrictions test), while being highly correlated with financial literacy (passing a weak instruments test). Hence childhood experiences with money are particularly suited for this, as they are highly correlated with financial literacy (see, e.g., Lusardi et al., 2010), but uncorrelated with financial behavior in adulthood.

As the survey for this paper was designed especially for the purpose of studying financial literacy, we included a large number of potential instruments, all of which refer to the respondents' childhood. Our survey includes questions about the education level of the parents, a rating of the parent's financial understanding, whether the parents taught budgeting and encouraged savings during the respondent's childhood, whether the respondent had economics as a subject in school, and whether they had a bank account before the age of 18.

Table 8 reports results of two-stage instrumental variable regressions. All childhood variables collected were used as potential instruments for financial literacy in the first-stage regression. For each dependent variable separately, instruments were eliminated if the over-identification test rejected the null hypothesis of no direct relation between the instrument and the dependent variable. Further, instruments were deleted if they had low significance in the first-stage regression for explaining financial literacy, to avoid having weak instruments. The

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[8] Other papers have tried to solve the potential reverse causality problem by looking at the difference in financial outcomes between those that have had some kind of financial training and those that did not (Bernheim et al., 2001, Bernheim and Garret, 2003, Cole and Shastry, 2009, Carlin and Robinson, 2012). However, effects on real financial outcomes are often negative, which may be due to ineffective training.

final set of instruments is shown in the third row, and usually consists of only one or two variables. Parents encouraged savings and having a bank account before the age of 18 are most often selected as instruments, followed by the financial understanding of the parents. The first row in Table 8 shows the original marginal effect estimate from a probit model, repeated from Table 6 and Table 7, respectively. The second row of Table 8 shows the marginal effect of financial literacy in a two-stage probit regression, with financial literacy instrumented. All regressions include a full set of socio-economic controls, but to save space the coefficient estimates are not shown. The results in Table 8 show that the impact of financial literacy on financial decisions is causal. Further, in line with the literature, the impact of financial literacy becomes stronger when using an instrumental variables approach. For the dependent variables that are discrete count variables, namely the number of asset types owned and the number of credit cards owned, instrumental variable techniques are not readily available, and therefore no results are shown.

Table 8 also provides detailed information on instrument validity. The fourth row of Table 8 shows the result of the Stock-Yogo F-test for weak instruments. Higher F-values indicate stronger instruments. The fifth row shows the Hansen J-statistic for overidentifying restrictions, testing the null hypothesis that the instruments do not directly predict the dependent variable. None of the J-statistics are significant by default, as we have eliminated instruments not passing this test beforehand. Finally, the sixth row shows a chi-square statistic testing exogeneity of financial literacy. Significance, indicated with stars, implies that financial literacy is endogenous and the use of instrumental variable techniques is necessary. However, if exogeneity cannot be rejected, instrumental variable techniques are not required and can lead to inefficient standard errors. We find that financial literacy is endogenous in several of the equations explaining asset ownership, as one would logically expect, because exposure to savings products can give rise to higher financial knowledge. But, financial literacy is mostly exogenous when explaining borrowing behavior, which is also plausible, as exposure to debt or credit cards in itself does not necessarily improve financial knowledge.

4   Robustness

We perform a number of robustness exercises in order to demonstrate that our findings hold when using other measures of financial literacy, and when using other regression methods. Tables with the results of these tests are shown in the Appendix and also shortly described below.

Other measures of financial literacy. Table A2 in the Appendix shows results of regressions which reproduce the main specifications of Table 6 and 7 with alternative measures of financial literacy: i) the number of correct answers on the three standard Lusardi-Mitchell financial literacy questions (from 0 to 3), ii) a dummy for answering all three standard Lusardi-Mitchell financial literacy questions correctly (0 or 1), and iii) the number of correct answers on the three standard Lusardi-Mitchell questions, plus an additional borrowing question from Cole et al. (2011) (from 0 to 4). The table shows the estimated marginal effects of the various financial literacy measures, plus the R^2s. In general, the results for most dependent variables are robust to changing the financial literacy measure.

Other regression approaches. We repeat the main regressions with a simple OLS approach in order to see whether results are robust to using alternative, but less appropriate, techniques. Results are given in Table A3 in the Appendix. The sign and significance of the coefficients remain almost unchanged compared to the original results, as documented in Table 6 and 7.

Focus on lower income households. We have repeated all analyses with respondents who report aggregate household income below, or exactly at, the median value of 50,000 Baht per month. Results are shown in Table A4 in the Appendix. Our findings in this sub-group do not deviate hugely from our findings for the full group.

5   Conclusion

To our knowledge this is the first study that examines the impact of financial literacy among the middle class of an emerging economy, a group that is very important for various reasons. First, emerging economies undergo dramatic institutional changes, in particular if growth rates are high. Second, the middle class emerges as an important group in these countries due to progress in education, income and aspirations. The middle class is crucial if an emerging country aims for broad-based economic development. Both of these developments – institutional change and the emergence of the middle class – have important impacts on the financial sector.

In this paper we were able to show that financial literacy has two main benefits. First, it improves individual welfare by improving financial decision making for both savings and borrowing decisions. Financially literate individuals are more likely to hold sophisticated financial products, hold a larger number of different products, and use credit cards more rationally. Further, this link is causal, as demonstrated through IV regressions. Second, higher demand for sophisticated financial products has additional benefits beyond improving

individual welfare, namely by aiding financial development. Financial development is clearly important in supporting economic growth. The financial development process involves more than just building financial institutions, but also involves improving the demand side. Here, the middle class plays an important role, and their financial literacy can therefore either dampen or stimulate financial development.

Thus we learn from analyzing the level of financial literacy of the emerging middle class not only about their ability to make financial decisions, but also about the demand side of financial development. This complements the usually taken micro perspective by an equally important macro perspective. More precisely, we argue that financial literacy is an important component in three out of five channels though which financial literacy leads to growth (Levine, 2005). We find that higher financial literacy leads to individuals making better use of sophisticated financial products provided by an advanced financial system. This means that there is a more efficient mobilization of savings. Further, more financially literate people better use opportunities that aid management of risk. Lastly, an advanced financial system can ease financial transactions and indeed, as we show, financial literacy supports the rational use of credits cards.

Overall, financial literacy of an emerging middle class provides a double dividend: it increases the welfare of this group and also contributes to financial development of the economy as a potential driver of growth.

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Table 1: Summary Statistics

Panel A: Demographics

	mean	stdev	min	max	N
Female	0.48	0.50	0	1	530
Age in years	34.58	9.49	18	60	530
Married	0.46	0.50	0	1	530
Personal income[*]	26,794	20,499	15,000	200,000	530
Household income[*]	64,353	99,166	15,000	2,000,000	530
Number of children in HH	0.83	1.03	0	6	529
Number of adults in HH	2.97	1.59	1	12	529
Number of incomes HH	2.49	1.26	1	10	529

[*] Monthly amount in Thai Baht

Panel B: Education

	Percent	N
No education	0.4	2
Primary school	4.2	22
Secondary school	14.0	74
Vocational	14.5	77
Bachelor degree	64.0	339
Masters degree	2.8	15
PhD	0.2	1
Total	**100.0**	**530**

Table 2: Financial Literacy

The financial literacy questions are repeated below. The first three questions are multiple choice and responses "I don't know" and "I refuse to answer" are available in addition to the listed options.

1. **Interest rate:**
   If you borrow 10 000 Baht, at an interest rate of 2% a month, after 3 months how much do you owe? **a)** Less than 10 200 Baht   **b)** More than 10 200 Baht   **c)** Exactly 10 200 Baht

2. **Inflation:**
   If you have 10 000 Baht in an account, the interest rate on the account is 1% per year, and the price of goods and services rises by 2% per year, after one year can you buy:
   a) Less than today   **b)** More than today   **c)** Exactly the same as today

3. **Diversification:**
   Buying a single company's stock is safer than buying a stock mutual fund.
   a) True   **b**) False

4. **Institutional knowledge:**
   Name foreign banks. Open answers

Panel A: Responses to Financial Literacy Questions

	Correct (%)	Wrong	Don't Know	Refuse to Answer
Interest rate	79.2	15.3	5.3	0.2
Inflation	62.5	25.8	10.9	0.8
Diversification	23.6	24.3	50.6	1.5

Panel B: Financial Literacy Measures

	mean	stdev	min	max
Sum correct 3 basic questions (*Lusardi-Mitchell*)	1.65	0.89	0	3
Total number of foreign banks named	2.24	1.19	0	6
Score between 0 and 1 for naming foreign banks	0.56	0.30	0	1
Sum correct 3 basic questions and name banks score out of 4 (*Lusardi-Mitchell + banks)*	2.21	1.00	0	4

Panel C: Correlations

	Interest Rate	Inflation	Diversification	Name Foreign Banks
Interest rate	1.00			
Inflation	0.21***	1.00		
Diversification	0.07	0.27***	1.00	
Naming foreign banks	0.08*	0.17**	0.24***	1.00

***, ** and * denote significance at the 1%, 5% and 10% levels, respectively

Table 3: Numeracy and Risk Aversion

Panel A: Numeracy Question

	Correct (%)	Wrong	Don't know	Refuse to Answer
35+82	0.834	0.113	0.025	0.028
4 friends, 4 sweets [a]	0.838	0.125	0.006	0.032
10% of 400	0.942	0.015	0.015	0.028
1000-370 [b]	0.947	0.017	0.004	0.032

[a] The question asks, if you have four friends and you want to give each friend four sweets, how many sweets do you need? [b] If you buy a bag of rice for 370 Baht and you pay with 1000 Baht note, how much change do you get?

Panel B: Statistics of Numeracy and Risk Aversion

	mean	stdev	min	max
Numeracy score out of 4	3.56	0.88	0	4
Scale of risk taker	5.45	2.28	0	10
Risk aversion scale 1 (0-1)	0.46	0.23	0	1

Panel C: Correlations

	Numeracy	Risk aversion scale 1	Financial Literacy (3+banks)
Numeracy	1		
Risk aversion scale 1	-0.26***	1	
Financial literacy (*3+banks*)	0.25***	-0.38***	1

***, ** and * denote significance at the 1%, 5% and 10% levels, respectively

Table 4: Distribution of Financial Literacy across Demographic and Income Groups

	Obs.	Percent. in group	Interest correct %	Inflation correct %	Stock risk correct %	All three correct %	Foreign banks (0-4) mean	Financial literacy (0-4) mean	Risk aversion (0-1) mean	Numeracy (0-4) mean
Gender										
Male	275	52%	0.80	0.62	0.23	0.16	2.20	2.19	0.43	3.57
Female	255	48%	0.78	0.63	0.25	0.19	2.28	2.23	0.48	3.55
Age										
< 35 years	295	56%	0.81	0.66	0.25	0.18	2.26	2.29	0.44	3.66
35 - 50 years	191	36%	0.78	0.56	0.19	0.15	2.17	2.07	0.46	3.48
> 50 years	44	8%	0.70	0.64	0.36	0.23	2.34	2.29	0.50	3.25
Education										
Secondary or lower	98	18%	0.63	0.48	0.10	0.03	1.78	1.66	0.53	3.08
Vocational	77	15%	0.82	0.60	0.34	0.25	2.09	2.27	0.50	3.68
Bachelor or higher	355	67%	0.83	0.67	0.25	0.20	2.39	2.35	0.42	3.67
Income										
< 17,500	189	36%	0.75	0.56	0.16	0.08	2.09	2.00	0.50	3.41
17,500 - 22,500	156	29%	0.76	0.58	0.19	0.14	2.20	2.09	0.46	3.56
22,500 - 37,500	104	20%	0.86	0.73	0.30	0.26	2.38	2.48	0.39	3.72
> 37,500	81	15%	0.86	0.72	0.41	0.35	2.46	2.60	0.41	3.72
Financial assets										
Refuse/ don't know	102	19%	0.81	0.49	0.18	0.12	1.92	1.96	0.45	3.67
< 100,000	267	50%	0.78	0.64	0.21	0.14	2.32	2.20	0.46	3.58
100,000 - 500,000	114	22%	0.83	0.68	0.25	0.23	2.39	2.36	0.44	3.41
> 500,000	47	9%	0.72	0.72	0.49	0.34	2.09	2.46	0.44	3.60

Note: Columns "Interest correct %", "Inflation correct %", "Stock risk correct %", and "All three correct %" fall under the header "Financial literacy questions (Lusardi-Mitchell)".

Table 5: Savings and Borrowings Summary Statistics

Panel A: Assets

	mean	stdev	min	max	count
Has a savings account	1.00	0.00	1	1	530
Owns fixed deposit accounts	0.41	0.49	0	1	530
Owns a government savings bank deposit	0.02	0.15	0	1	520
Owns bonds or bond mutual funds	0.11	0.32	0	1	529
Owns stocks or equity mutual funds	0.09	0.28	0	1	528
Owns gold	0.08	0.27	0	1	527
Owns life insurance	0.16	0.37	0	1	530
Financial Assets < 100,000	0.53	0.50	0	1	530
100,000 < Financial Assets < 500,000 Baht	0.22	0.41	0	1	530
Financial Assets > 500,000 Baht	0.09	0.28	0	1	530
Did not provide financial assets amount	0.19	0.39	0	1	530
Owns >= 2 types of assets[a]	0.52	0.50	0	1	526
Number of asset types owned, apart from a savings account[a]	0.75	0.92	0	5	526

[a] Includes fixed deposit accounts, government savings bank deposits, bonds or bond funds, stocks or stock funds, and gold. It excludes life insurance.

Panel B: Debt

	mean	stdev	min	max	count
Has any debt	0.47	0.50	0	1	512
Amount of debt in Baht	103,316	384,080	0	4,000,000	414
Amount of debt in Baht *(conditional on having debt)*	272,439	586,662	0	4,000,000	157
Debt larger than annual income	0.08	0.27	0	1	414
Debt larger than annual income *(conditional on having debt)*	0.20	0.40	0	1	157
Number of credit cards	0.61	1.09	0	7	530
Has at least one credit card	0.33	0.47	0	1	530
Finds it difficult to pay off credit card *(conditional on having a credit card)*	0.15	0.35	0	1	171
Does NOT know interest on credit card *(conditional on having credit card)*	0.57	0.50	0	1	173

Table 6: Savings, Assets and Financial Literacy

	(1) Assets other than savings account	(2) Fixed deposit	(3) Stocks	(4) Insurance	(5) Number of asset types owned
Financial literacy	0.072***	0.059***	0.008	-0.034**	0.105***
	[0.020]	[0.021]	[0.008]	[0.015]	[0.032]
Numeracy	0.056**	0.040	-0.010	-0.051***	0.097**
	[0.025]	[0.026]	[0.009]	[0.014]	[0.046]
Risk aversion	-0.103	-0.171*	0.044	0.175***	-0.124
	[0.095]	[0.095]	[0.044]	[0.060]	[0.153]
Higher education	0.157***	0.119***	0.067***	0.091***	0.349***
	[0.038]	[0.041]	[0.024]	[0.031]	[0.078]
Female	0.080**	0.090**	-0.020	0.025	0.159***
	[0.035]	[0.037]	[0.019]	[0.026]	[0.058]
Age	0.034**	0.022	0.002	0.008	0.102***
	[0.017]	[0.016]	[0.009]	[0.011]	[0.025]
Age squared / 100	-0.039	-0.021	-0.001	-0.010	-0.114***
	[0.024]	[0.022]	[0.011]	[0.014]	[0.031]
No of children in HH	-0.021	-0.035*	-0.016	-0.039**	-0.043
	[0.019]	[0.019]	[0.010]	[0.015]	[0.029]
No of adults in HH	0.009	-0.009	0.012**	0.011	0.029*
	[0.012]	[0.013]	[0.005]	[0.009]	[0.017]
Log of income	0.292***	0.230***	0.046**	0.018	0.418***
	[0.067]	[0.054]	[0.023]	[0.037]	[0.080]
Assets low dummy	-0.159***	-0.156***	-0.039*	-0.197***	-0.434***
	[0.048]	[0.049]	[0.023]	[0.034]	[0.087]
Assets high dummy	0.123	-0.117	0.110***	0.155***	0.169*
	[0.096]	[0.084]	[0.025]	[0.043]	[0.092]
Assets amount missing dummy	-0.099*	-0.067	-0.029	-0.075**	-0.160*
	[0.057]	[0.059]	[0.031]	[0.038]	[0.091]
Pseudo-R²	0.29	0.20	0.39	0.33	0.21
Observations	525	529	527	529	525

Notes: The table reports regression marginal effects, with robust standard errors in brackets. The dependent variable in the regression models is: (1) a dummy for owning assets other than a savings account, (2) a dummy for owning fixed deposit accounts, (3) a dummy for owning stocks or equity mutual funds, (4) a dummy for owning life insurance, and (5) the number of asset types owned (excluding savings accounts). Results in Column (1) to (4) use probit regression models, and Column (5) is based on a Poisson count data regression model.
***, ** and * denote significance at the 1%, 5% and 10% levels, respectively

Table 7: Borrowing Behavior and Financial Literacy

	(1) Does not know interest rate on credit card	(2) Has difficulty paying off credit card	(3) Number of credit cards	(4) Has Debt	(5) Has debt larger than annual income
Financial literacy	-0.120***	-0.063**	0.033	0.013	0.002
	[0.039]	[0.029]	[0.052]	[0.025]	[0.013]
Numeracy	-0.036	-0.055	0.114*	-0.008	-0.029**
	[0.069]	[0.043]	[0.067]	[0.027]	[0.013]
Risk aversion	0.048	0.012	-0.447*	-0.005	-0.138**
	[0.185]	[0.127]	[0.258]	[0.105]	[0.054]
Higher education	-0.138	-0.067	0.338**	0.076	0.019
	[0.089]	[0.057]	[0.132]	[0.049]	[0.030]
Female	0.098	-0.114**	0.054	-0.007	-0.031
	[0.073]	[0.055]	[0.098]	[0.044]	[0.024]
Age	-0.005	-0.036	0.111***	0.091***	0.033***
	[0.033]	[0.025]	[0.041]	[0.018]	[0.013]
Age squared / 100	0.002	0.042	-0.134***	-0.116***	-0.040**
	[0.041]	[0.032]	[0.051]	[0.024]	[0.016]
No of children in HH	0.004	0.021	0.070	0.006	0.014
	[0.037]	[0.026]	[0.058]	[0.023]	[0.012]
No of adults in HH	0.038	-0.011	0.016	-0.003	-0.007
	[0.024]	[0.015]	[0.033]	[0.014]	[0.009]
Log of income	-0.112	0.081	0.369**	-0.175***	-0.037
	[0.096]	[0.061]	[0.150]	[0.066]	[0.033]
Assets low dummy	-0.041	-0.016	-0.076	-0.027	-0.057*
	[0.101]	[0.076]	[0.143]	[0.063]	[0.032]
Assets high dummy	0.211*	-0.059	0.321**	0.112	0.107***
	[0.118]	[0.088]	[0.162]	[0.097]	[0.037]
Assets amount missing dummy	0.035	0.009	-0.033	0.007	-0.029
	[0.119]	[0.093]	[0.146]	[0.071]	[0.041]
Pseudo-R²	0.11	0.12	0.08	0.05	0.21
Observations	172	170	529	511	413

Notes: The table reports marginal effects, with robust standard errors in brackets. The dependent variable of the regression models is: (1) a dummy for not knowing the interest rate on credit card debt, (2) a dummy for respondents that indicate having difficulty paying off their credit card debt on time, (3) the number of credit cards the respondent has, (4) a dummy for having debt, and (5) a dummy equal to one if the amount of debt is larger than annual income. Results in Column (1), (2), (4) and (4) use probit regression models, and Column (3) is based on a negative binomial count data regression model. In Column (1) and (2) the sample is limited to respondents with credit cards only. The sample in Column (5) excludes respondents who did not provide the amount of debt (missing). ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Table 8. Instrumental Variable Regressions

Panel A: Savings and Assets

|	(1) Assets other than savings account	(2) Fixed Deposits	(3) Stocks	(4) Insurance	(5) Number of asset types owned
Financial literacy: original	0.072*** [0.08]	0.059*** [0.07]	0.008 [0.01]	-0.034** [0.02]	0.105*** [0.04]
Financial literacy: instrumented	0.181*** [0.06]	0.215*** [0.05]	-0.034 [0.05]	-0.230*** [0.04]	--- ---
Instrument set	encourage saving bank before 18	encourage saving bank before 18	encourage saving bank before 18	encourage saving bank before 18	--- ---
F-test for weak instruments	12.69[a]	12.55[a]	12.59[a]	12.55[a]	---
Overidentification test (Hansen J)	1.17	0.021	0.145	0.211	---
Wald exogeneity test (chi-square)	1.93	4.50**	1.02	16.54***	---
N	501	505	503	505	525

Panel B: Borrowing

	(1) Does not now interest rate on credit card	(2) Has difficulty paying off credit card	(3) Number of credit cards	(4) Has debt	(5) Has debt more than one annual income
Financial literacy: original	-0.12*** [0.04]	-0.063** [0.03]	0.032 [0.05]	0.013 [0.025]	0.002 [0.013]
Financial literacy: instrumented	-0.22** [0.09]	-0.20*** [0.07]	--- ---	0.089 [0.13]	0.006 [0.08]
Instrument set	fin.und. parents bank before 18	fin.und. parents bank before 18	--- ---	encourage saving	encourage saving
F-test for weak instruments	7.92[b]	8.18[b]	---	12.72[a]	10.16[a]
Overidentification test (Hansen J)	0.14	0.14	---	---	---
Wald exogeneity test (chi-square)	0.75	3.41*	---	0.24	0.00
N	162	160	529	496	402

Notes: The table reports instrumental variable (IV) probit estimation results with robust standard errors in brackets. The financial literacy measure is instrumented. The table reports the coefficient estimate of financial literacy in the 2nd stage regression. A full set of control variables is included, but coefficients not shown to save space. Superscript [a], [b] denotes passing the Stock-Yogo test for weak instruments at 15% and 25% maximal IV size, respectively. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively

Figure 1: Distribution of Financial Literacy

Panel A: Score on Lusardi-Mitchell Questions (0 – 3)
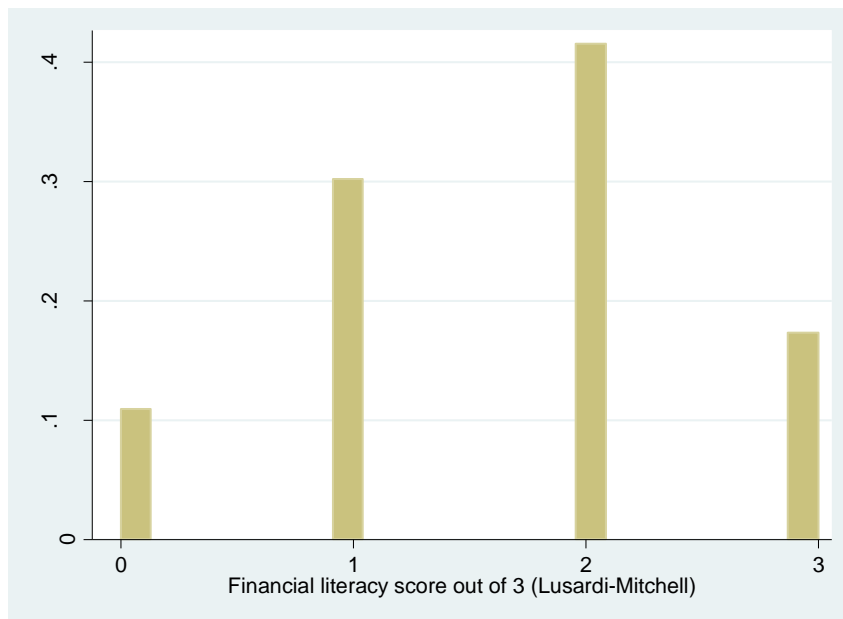
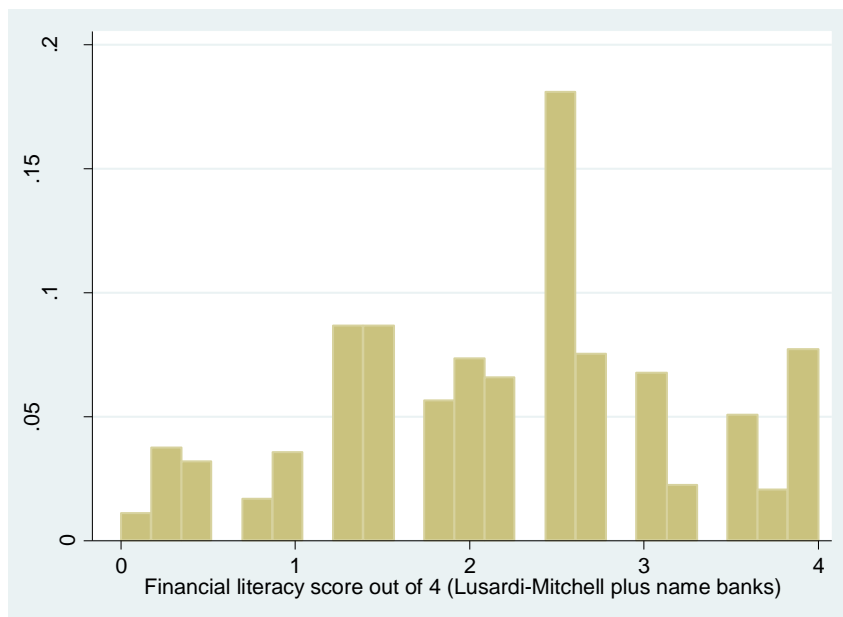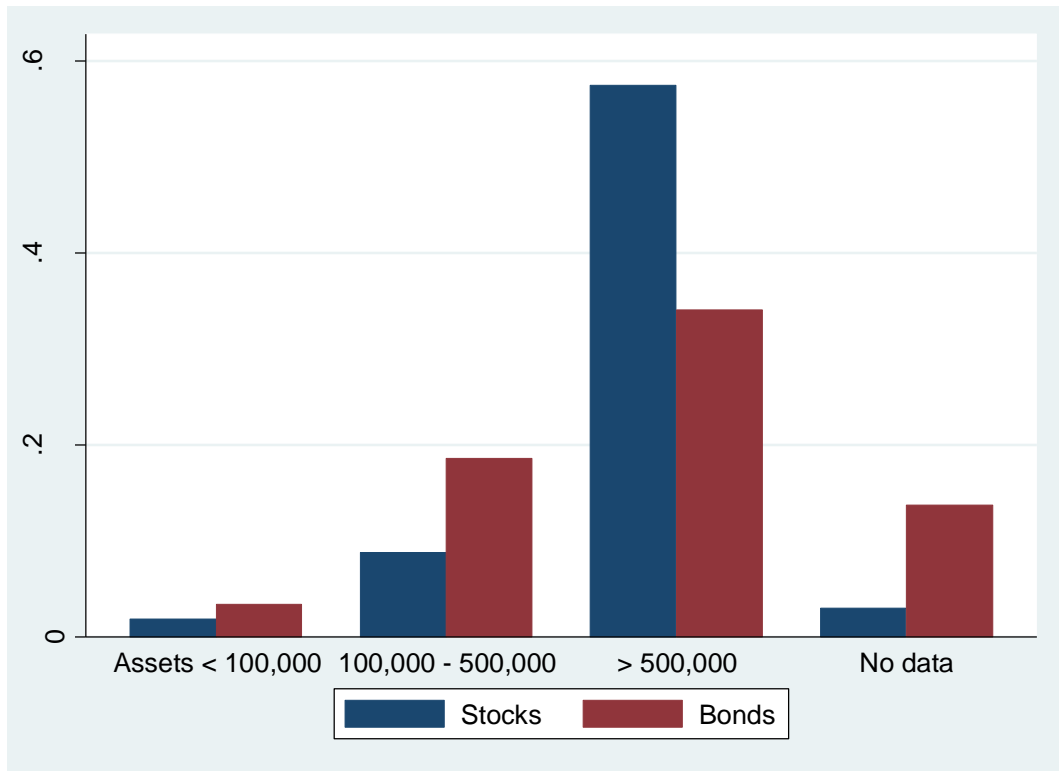## Panel B: Lusardi-Mitchell and Name Banks Score (0 – 4)

Figure 2: Stock and Bond Market Participation by Amount of Financial Assets

Table A1: Financial Literacy and Individual Characteristics

	(1) Financial Literacy	(2) Lusardi and Mitchell
Numeracy	0.133***	0.134***
	[0.046]	[0.043]
Risk aversion	-1.324***	-0.881***
	[0.189]	[0.175]
Higher education	0.160*	0.071
	[0.090]	[0.083]
Female	0.125	0.085
	[0.079]	[0.072]
Age	-0.049	-0.041
	[0.035]	[0.031]
Age squared	0.000	0.000
	[0.000]	[0.000]
Number of children in HH	0.006	-0.008
	[0.041]	[0.038]
Number of adults in HH	-0.024	-0.019
	[0.027]	[0.024]
Log of income	0.482***	0.434***
	[0.125]	[0.122]
Assets low dummy	-0.072	-0.099
	[0.111]	[0.101]
Assets high dummy	-0.207	-0.074
	[0.186]	[0.183]
Assets missing dummy	-0.393***	-0.303**
	[0.127]	[0.118]
R²	0.23	0.18
Observations	529	529

The dependent variable of the regression models is: (1) our financial literacy measure on a scale from 0 to 4, defined as the sum of three dummies for correct answers to the three standard Lusardi-Mitchell financial literacy questions and a 0-1 score for naming foreign banks operating in Thailand, (2) the sum of three dummies for correct answers to the three standard Lusardi-Mitchell financial literacy questions (scale: 0-3). Estimation results are based on OLS.

***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Table A2: Robustness: Different Measures of Financial Literacy

Panel A: Savings Behavior

	(1)	(2)	(3)	(4)	(5)
	Assets other than savings account	Has fixed deposit account	Holds stocks	Insurance	Number of different assets
Financial Literacy	0.072***	0.059***	0.008	-0.034**	0.105***
(LM+banks)	[0.020]	[0.021]	[0.008]	[0.015]	[0.032]
Pseudo-R^2	0.28	0.20	0.39	0.33	0.21
Financial Literacy	0.060***	0.034	0.007	-0.024	0.109***
(LM score)	[0.023]	[0.024]	[0.010]	[0.017]	[0.035]
Pseudo-R^2	0.28	0.20	0.39	0.32	0.21
Financial Literacy	0.178***	0.146***	-0.010	-0.034	0.167**
(LM dummy)	[0.052]	[0.051]	[0.023]	[0.037]	[0.065]
Pseudo-R^2	0.28	0.20	0.39	0.32	0.21
Financial Literacy	0.049***	0.026	0.006	-0.032**	0.086***
(LM +Cole)	[0.018]	[0.019]	[0.008]	[0.014]	[0.030]
Pseudo-R^2	0.29	0.20	0.39	0.33	0.21

Panel B: Borrowing Behavior

	(1)	(2)	(3)	(4)	(5)
	Does not know interest rate on credit card	Finds it difficult to pay off credit card	Number of credit cards	Has Debt	Has debt larger than annual income
Financial Literacy	-0.120***	-0.063**	0.033	0.013	0.002
(LM+banks)	[0.039]	[0.029]	[0.052]	[0.025]	[0.013]
Pseudo-R^2	0.11	0.12	0.08	0.05	0.21
Financial Literacy	-0.121***	-0.074**	0.010	0.031	0.007
(LM score)	[0.042]	[0.031]	[0.059]	[0.027]	[0.014]
Pseudo-R^2	0.11	0.13	0.08	0.05	0.21
Financial Literacy	-0.275***	-0.087	-0.077	-0.061	-0.007
(LM dummy)	[0.084]	[0.076]	[0.129]	[0.062]	[0.033]
Pseudo-R^2	0.12	0.10	0.08	0.05	0.21
Financial Literacy	-0.101***	-0.056**	0.059	0.031	0.002
(LM +Cole)	[0.037]	[0.025]	[0.050]	[0.022]	[0.011]
Pseudo-R^2	0.11	0.13	0.08	0.05	0.21

Notes: The table reports regression results for savings and borrow behavior similar to Table 6 and Table 7 in the paper, but using different measures of financial literacy, as a robustness check. A full set of control variables is included, but not shown here. The table shows marginal effects from probit and count data models, with robust standard errors in brackets. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Table A3: Robustness Checks using OLS

Panel A: Financial Literacy and Savings

	(1) Assets other than savings account	(2) Has fixed deposit account	(3) Holds stocks	(4) Insurance	(5) Number of different assets
Financial Literacy (LM+banks)	0.074***	0.060***	0.010	-0.031*	0.094***
	[0.021]	[0.022]	[0.010]	[0.016]	[0.033]
R^2	0.32	0.24	0.34	0.30	0.52
Financial Literacy (LM score)	0.063***	0.035	0.011	-0.024	0.098**
	[0.023]	[0.025]	[0.012]	[0.019]	[0.038]
R^2	0.32	0.25	0.34	0.30	0.52
Financial Literacy (LM dummy)	0.173***	0.162***	-0.018	-0.047	0.174**
	[0.048]	[0.056]	[0.030]	[0.040]	[0.087]
R^2	0.32	0.24	0.34	0.30	0.51
Financial Literacy (LM +Cole)	0.052***	0.027	0.007	-0.033**	0.067**
	[0.018]	[0.019]	[0.009]	[0.015]	[0.030]
R^2	0.32	0.25	0.34	0.31	0.51

Panel B: Financial Literacy and Borrowing

	(1) Does not know interest rate on credit card	(2) Finds it difficult to pay off credit card	(3) Number of credit cards	(4) Has Debt	(5) Has debt larger than annual income
Financial Literacy (LM+banks)	-0.118***	-0.072**	-0.000	-0.063	0.003
	[0.041]	[0.034]	[0.047]	[0.042]	[0.014]
R^2	0.15	0.11	0.17	0.14	0.12
Financial Literacy (LM score)	-0.118***	-0.090**	-0.025	-0.054	0.008
	[0.043]	[0.038]	[0.057]	[0.045]	[0.016]
R^2	0.14	0.12	0.17	0.14	0.12
Financial Literacy (LM dummy)	-0.284***	-0.103	-0.124	-0.084	0.006
	[0.097]	[0.070]	[0.132]	[0.100]	[0.039]
R^2	0.15	0.09	0.18	0.13	0.12
Financial Literacy (LM +Cole)	-0.097***	-0.071**	0.019	-0.002	0.002
	[0.037]	[0.033]	[0.042]	[0.038]	[0.012]
R^2	0.14	0.11	0.17	0.13	0.12

Notes: The table reports regression results for savings and borrow behavior similar to Table 6 and Table 7 in the paper, but using different measures of financial literacy and OLS estimation, as a robustness check. A full set of control variables is included, but not shown here. The coefficients shown in the table are OLS estimates, with robust standard errors in brackets. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Table A4: Financial Literacy at Household Incomes below Median

Panel A: Savings, Assets and Financial Literacy

	(1) Assets other than savings account	(2) Fixed deposit	(3) Stocks	(4) Insurance	(5) Number of asset types owned
Financial literacy	0.530***	0.297***	0.074	-0.215	0.123**
	[0.130]	[0.105]	[0.128]	[0.141]	[0.051]
Numeracy	0.245	0.255	-0.214	-0.397*	0.045
	[0.188]	[0.157]	[0.181]	[0.206]	[0.080]
Risk aversion	-1.184*	-0.753	0.607	1.865***	-0.218
	[0.633]	[0.509]	[0.601]	[0.588]	[0.233]
Higher education	0.501*	0.511**	0.810**	0.657**	0.306**
	[0.263]	[0.245]	[0.330]	[0.322]	[0.135]
Female	0.394	0.264	-0.235	0.374	0.241***
	[0.251]	[0.205]	[0.270]	[0.265]	[0.091]
Age	0.080	-0.010	0.024	-0.033	0.066*
	[0.137]	[0.088]	[0.135]	[0.106]	[0.040]
Age squared	-0.060	0.039	-0.017	0.031	-0.070
	[0.185]	[0.114]	[0.165]	[0.134]	[0.048]
No of children in HH	-0.045	-0.065	-0.176	-0.305**	-0.004
	[0.103]	[0.089]	[0.147]	[0.142]	[0.049]
No of adults in HH	-0.067	-0.117	0.131	0.234***	-0.005
	[0.094]	[0.078]	[0.087]	[0.090]	[0.032]
Log of income	0.044	0.316	0.393	0.060	0.290**
	[0.351]	[0.270]	[0.313]	[0.356]	[0.118]
Assets low dummy	-0.781**	-0.634**	-0.800**	-1.523***	-0.577***
	[0.330]	[0.282]	[0.405]	[0.388]	[0.167]
Assets high dummy	0.000	-0.236	1.338***	1.268***	0.390***
	[.]	[0.373]	[0.361]	[0.413]	[0.144]
Assets amount missing	0.097	0.241	0.258	-0.863*	0.093
	[0.387]	[0.375]	[0.440]	[0.520]	[0.151]
Constant	-3.121	-2.229	-3.915	-0.266	-2.997***
	[2.869]	[2.070]	[2.865]	[2.406]	[0.988]
Pseudo-R²	0.29	0.22	0.41	0.44	0.17
Observations	164	202	201	202	201

Notes: The table reports regression results for savings behavior, similar to Table 6 in the paper, but with the sample limited to respondents with household income below the median.
***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Panel B: Borrowing and Financial Literacy

	(1) Does not know interest rate on credit card	(2) Has difficulty paying off credit card	(3) Number of credit cards	(4) Has Debt	(5) Has debt larger than annual income
Financial literacy	-0.378**	-0.213	-0.030	-0.056	-0.005
	[0.182]	[0.185]	[0.088]	[0.103]	[0.175]
Numeracy	-0.440	-0.301	-0.054	0.040	-0.287
	[0.294]	[0.297]	[0.151]	[0.166]	[0.227]
Risk aversion	1.017	0.911	-0.601	0.189	-1.346
	[0.722]	[0.817]	[0.452]	[0.429]	[0.953]
Higher education	-0.341	-0.200	0.853**	0.621**	0.353
	[0.451]	[0.452]	[0.359]	[0.267]	[0.500]
Female	0.145	-0.211	-0.052	-0.059	-0.697**
	[0.307]	[0.380]	[0.187]	[0.200]	[0.349]
Age	0.046	-0.290*	0.192**	0.304***	0.399**
	[0.141]	[0.175]	[0.083]	[0.092]	[0.184]
Age squared	-0.053	0.347	-0.212**	-0.393***	-0.492**
	[0.169]	[0.212]	[0.099]	[0.120]	[0.227]
No of children in HH	-0.002	0.035	0.034	-0.182**	0.013
	[0.139]	[0.161]	[0.102]	[0.091]	[0.124]
No of adults in HH	-0.006	-0.051	0.076	0.084	0.081
	[0.085]	[0.125]	[0.058]	[0.070]	[0.123]
Log of income	-0.716*	0.517	0.273	-0.192	-0.058
	[0.395]	[0.478]	[0.256]	[0.259]	[0.420]
Assets low dummy	-0.272	0.156	0.097	0.017	0.042
	[0.412]	[0.456]	[0.305]	[0.279]	[0.544]
Assets high dummy	0.565	-0.920*	0.369	0.314	1.433***
	[0.415]	[0.547]	[0.280]	[0.337]	[0.492]
Assets amount missing	0.610	0.060	0.157	0.070	0.960*
	[0.512]	[0.763]	[0.320]	[0.326]	[0.576]
Constant	4.191	4.554	-5.742***	-5.856***	-8.299*
	[3.442]	[4.021]	[2.032]	[2.158]	[4.288]
Pseudo-R²	0.19	0.13	0.07	0.09	0.26
Observations	93	92	202	195	164

Notes: The table reports regression results for borrowing behavior, similar to Table 7 in the paper, but with the sample limited to respondents with household income below the median.

***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.