Essays in Household Finance

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Abstract

In recent years, the analysis of household financial decision making has become the main focus for both policymakers and academics. Hence this thesis first sets out to investigate the role of household financial literacy and psychological characteristics in household financial decisions. The results suggest that financial literacy is significantly associated with household financial management and practices such as credit management, cash-flow management, retirement saving and investment. Further, while exploring the importance of stock market literacy on household decision to participate in the stock market, it is found that stock market literacy and trust distinctly influence the probability of household participation in the stock market. Furthermore, stock market literacy not only increases the likelihood of participation but also influences the share of wealth invested in the stock market. Also, economic shocks and future expectations are the key psychological characteristics that explain household decision to invest in stocks. However, upon participation, a larger set of psychological characteristics such as, past economic shock, future expectations, self-confidence, and time preference influence a household decision on how much to invest in stocks. Finally, the thesis examines the unwise financial decisions of households in usecured debt management, credit card debt, mortgage debt management and investment diversification. The results show that financial distress and poverty increase the likelihood of households making unwise financial decisions. However, financial distress is found to outperform poverty in explaining the unwise financial decision of the households. Thus, the thesis brings to light the importance of financial literacy, psychological characteristics and financial distress for understanding household financial decision making.

Statement of Copyright

Dedication

I dedicate this thesis to my father, Ali Gull Balloch, who was the source of motivation and support throughout my life. Unfortunately, my father passed away during my doctoral studies. Even though, he is not here anymore, I am sure, wherever he is, he will be proud to see the outcome of sacrifices and efforts he made for me.

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1 Introduction

The financial ruin created by the ongoing economic crisis has changed the world for millions of people across the globe. This situation has led to an increased sense of urgency in understanding the household financial decision making to foster a resilient economy and avoid the anticipated financial apocalypse. Academic researchers and policy makers attempt to comprehend how households, through their financial decision making, interact with the financial sector. This interaction plays a notable role in the household financial health and functioning of the economy, as it affects both the conduct of monetary policy and stability of financial system.

This thesis attempts to reach a better understanding of the household financial decision making by simultaneously investigating the household financial management, practices and participation. Because the household financial behavior and attitude take an incomprehensible range of forms, the key aspects are studied by analyzing the household overall financial management, retirement saving, cash flow management, credit management, investment management, and stock market participation. In addition, the household unwise financial decision making is examined in different areas of finance such as unsecured debt management, credit card debt management, mortgage debt management and investment diversification management.

While analyzing the household financial decision making, researchers report different household characteristics relating to different financial decisions. For example Hilgert, Hogarth and Beverly, (2003) report relationship between financial knowledge and cash flow management, credit management, saving, and investment. Cole, Sampson and Zia (2009) associate household expenditure, risk aversion, and fatalism with interest in commitment saving and deposit collector products. And Benjamin, Brown, and Shapiro (2013) relate investors cognitive

ability to stock market participation. This thesis specifically focuses on the impact of household financial awareness on different aspects of household financial behavior. For this purpose, indices for household financial literacy and stock market literacy are instituted, while taking into account important aspects of financial and stock markets. This work is motivated by the considerable findings in the existing literature arguing that financial literacy is imperative for the financial wellbeing of both households and overall economy. Such literacy enables the households to make better financial decisions. Academic researchers, such as Hilgert, Hogarth, and Beverly (2003), Muller and Weber (2010), Lusardi and Mitchell (2007b), and Hogarth and O' Donnell (1999) find a positive relation between household financial literacy and financial decision making. Moreover, public and private institutions in developed and developing countries believe that by delivering financial education, important financial and psychological changes in the households can be achieved.

In addition to the household financial literacy, important psychological characteristics are considered by creating measures for the household psychological characteristics such as sociability, economic shock, time preference, future expectations, self-confidence, sense of commitment, risk aversion, and trust. The existing literature also points towards the importance of household psychological characteristics in the understanding financial decision making. For example, Hilgert, Hogarth, and Beverly (2003) and Behrman et al. (2010) argue that the psychological characteristics such as procrastination, regret, risk aversion, generosity, and peer pressure have important implications for the household financial behavior.

The first core investigation in this thesis, conducted in Chapter 2, analyzes the relationship of household financial literacy and other key psychological characteristics with household financial management. Previously, Hilgert, Hogarth, and Beverly (2003), Muller and Weber (2010), Lusardi and Mitchell (2007b), and Hogarth and O'Donnell (1999) find a positive relation between household financial literacy

and financial management. In contrast, Cole and Shastry (2009) do not find any significant relation between household financial literacy or financial education programs and financial management. This is at least in part because different studies employ different measures, techniques, and variables to define and analyze the household financial literacy and financial management. In order to investigate the household financial literacy and financial management, this study first institutes indices for household financial literacy and overall financial management, while taking into account important aspects of financial knowledge and financial management. These household indices are developed by using the American Life Panel (ALP) datasets that provide a wide range of variables.[1] In this study, the household financial literacy index is measured by using twenty nine items from the Basic Financial Literacy, Investing, Life Insurance/Annuities, and General 401K/IRA Knowledge sub-modules of Hung, Parker, and Yoong (2009).[2] Simultaneously, the household overall financial management index is created on the concept adopted by Hilgert, Hogarth, and Beverly (2003). The overall financial management index is based on twenty two aspects of household financial management, categorized as retirement saving, cash flow management, credit management, and investment management. This study uses a different strategy as compared to the ones adopted by Hung, Parker, and Yoong (2009), and Hilgert, Hogarth, and Beverly (2003) by performing categorical principal component (CATPCA) analysis to create financial literacy and financial management indices. The concept of optimal scaling originated by different researchers with Guttman (1941) being the first to introduce it. This strategy makes provision for the discrepancies of normal principal component analysis on categorical data, giving more reliable indices (Breiman and Friedman, 1985; Gilula and Haberman, 1988; Hastie et al., 1994). In addition to

[1] ALP makes it possible to measure the household financial literacy and financial management, and construct proxies for a wide range of household psychological characteristics. Further details on ALP are provided in Section 2.2.

[2] Later in the thesis, other definitions and measurement concepts of financial literacy are utilized.

the household overall financial management, this chapter separately analyzes different aspects of household financial management. For this purpose, the measures for household retirement saving, cash flow management, credit management, and investment management are developed. Another value addition this study brings in the existing literature is that along with household financial literacy and key demographics indicators, the analysis takes into consideration the key psychological variables describing the household attitudes, beliefs, and personality.[3] In this chapter, important demographic characteristics such as gender, age, education, employment, income, and expense indicators are considered. This chapter also develops and uses measures for the household psychological characteristics such as sociability, economic shock, time preference, future expectations, self-confidence, sense of commitment, and risk aversion.

The first notable finding of this chapter is that financial literacy is strongly associated with the household overall financial management and also with the individual aspects of household financial management such as retirement saving, credit management, and investment. Financial literacy consistently explains the financial management even when key demographics and psychological characteristics of the households are accounted for. In addition, the results show that psychological characteristics also significantly explain the household financial management.[4] This study further reports that some household characteristics have different nature and strength of relationship with different aspects of financial management. For example, employment is positively related to investment management but negatively related to cash flow management. In the robustness check, this chapter utilizes different measures of financial literacy that has been widely used in the existing literature (Lusardi and Mitchell, 2014). For example Lusardi and Mitchell (2006),

[3]Along with demographics, it is important to consider the household psychological characteristics for example, Hilgert, Hogarth, and Beverly (2003), Lusardi (2003), and Behrman et al. (2010) acknowledge that without the inclusion of important psychological aspects, the investigation of household financial decision making will be biased.

[4]In particular, some psychological characteristics such as exposure to economic shock consistently explain many aspects of household financial management.

Lusardi and Mitchell (2007), and Lusardi and Tufano (2009) use three fundamental concepts such as capacity to do interest rates calculations, understanding of inflation and understanding of risk diversification to determine financial literacy. This chapter also tests for the robustness of financial literacy by utilizing three items on interest rate, inflation and risk diversification from Hung, Parker, and Yoong (2009) financially literacy scale. Lusardi and Mitchell (2014) recently performed a comprehensive comparison of different types of approaches used to measure financial literacy.[5] The results with this alternative measure of financial literacy show that financial literacy explains the household overall financial management, retirement saving, credit management, and investment management. This chapter further tests for the widely used self-reported measure of financial awareness by the respondents. Following Lusardi (2011), Lusardi and Tufano (2009) and Lusardi and Mitchell (2009) and Bucher-Koenen, Lusardi, Alessie and van Rooij (2012), the self-reported measure of financial literacy is used to investigate its relation with financial decision making. The results suggest that the self-reported measure of financial literacy explains all the financial decisions with varying levels of significance. Further this chapter addresses the endogeneity problem, which is the most discussed issue in investigating the linkage between financial literacy and financial decision making. Previous studies suggest that financial management may itself be a source of financial learning as people do learn through experience (Caskey, 2006; Behrman et al., 2010;Lusardi and Mitchell, 2007; van Rooij ,Lusardi and Alessie, 2007; Hilgert, Hogarth and Beverly, 2003; Lusardi and Mitchell, 2014).[6]

[5]It is found that the percentage of households responding correctly to the three items in this work is in close comparison with the scores reported across the studies mentioned by Lusardi and Mitchell (2014). Further, the percentage of households responding correctly in all three questions in this study is similar to the percentage reported in the studies mentioned by Lusardi and Mitchell (2014).

[6]Many studies are unable to address the endogeneity issue due to unavailability of adequate data in the existing surveys. Some authors are able to test for endogeneity by using different instrument variables as a proxy for financial literacy. For example, Christiansen, Joensen, and Rangvid (2008) used the opening of a new university in a local, Klapper, Lusardi, and Panos (2012) used the number of public and private universities in the Russian regions and the total number of newspapers in circulation, Lusardi and Mitchell (2009) instrumented financial literacy using the fact that different U.S. states mandated financial education in high school at different

This chapter uses the exposure to economics education as an instrument variable for financial literacy as used by van Rooij, Lusardi, and Alessie (2012), The question that are used from American Life Panel (ALP) asks the households how much of their school's education (high school, college or higher degrees) was devoted to economics, where possible responses are a lot, some, little and hardly at all/none. The results suggest that the instrument variable employed in this work significantly explains overall financial management, credit management and investment management of the households. Therefore, this study concludes that financial literacy, measured on the basis of varying concepts, explain the financial decision making of the households.

After determining the relationship between household financial literacy and their financial behavior, the chapter goes on investigating the gap between household financial management and financial literacy. This gap is referred to as household financial spread and measured by subtracting the household overall financial behavior scores from the financial literacy scores, where the higher the difference between the household financial literacy and overall financial behavior, the higher is the household financial spread. This spread is used to determine two segments of population that are households having higher financial management as compared to other households at a given level of financial literacy (negative financial spread) and having lower financial management as compared to other households at a given level of level of financial literacy (positive financial spread). This identification is used to determine what characteristics of the households explain the likelihood of having lower financial management as compared to other households at a given level of financial literacy. The results show that household age positively explains the likelihood of having lower financial management as compared to the level of financial awareness. The difference attributes to the lack of incentive for the older households to manage finance as compared to the younger households.

points in time and they interacted these mandates with state expenditures.

Additionally, male households are found to be more likely to have lower financial management in comparison to their financial literacy. These results fall in line with the findings of Jianakoplos and Bernasek (1998) suggesting that males are less risk averse and of Brake (2005) reporting that males have more responsibilities to manage, hence their financial management can be affected. Further, it is observed that future expectations of the households positively relates to the probability of having positive financial spread while, risk aversion negatively relates to the likelihood of having a positive financial spread. The risk-averse households tend to avoid risk and therefore may have better financial management at a given level of financial literacy.

The Chapter 3 carries out the second core investigation of this thesis by exploring the influence of stock market literacy on household decisions related to stock market.[7] Recently, Georgarakos and Pasini (2011) assess the joint impact of trust and sociability on stock market participation. They show that trust and sociability affect stock ownership through distinct channels, where mistrust lowers the expected return on investment, making stock market participation unattractive, and sociability serves to reduce the fixed cost of participation through cheaper information sharing. Georgarakos and Pasini (2011) document that the more sociable households reduce their participation costs through cheaper information sharing, thereby increasing participation.[8] On the other hand, Bönte and Filipiak (2012)

[7]Recent literature suggests that household participation in the stock market is driven by factors such as optimism (Puri and Robinson, 2007), trust in financial markets (Guiso, Sapienza, and Zingales, 2008), intelligence quotient (Grinblatt, Keloharju, and Linnainmaa, 2011), genetics (Barnea, Cronqvist, and Siegel, 2010), political orientation (Kaustia and Torstila, 2011), the ability to understand investment (Graham, Harvey, and Huang, 2009; Christelis, Jappelli, and Padula, 2010), stock market return experience (Malmendier and Nagel, 2011), educational attainment and financial sophistication (Christelis, Georgarakos, and Haliassos, 2011), financial literacy (Cardak and Wilkins, 2009; Van Rooij, Lusardi, and Alessie, 2011), cognitive ability (Benjamin, Brown, and Shapiro, 2013), and sociability (Hong, Kubik, and Stein, 2004; Bönte and Filipiak, 2012).

[8]The literature identifies different categories of participation cost for example, Vissing-Jorgensen (2002) categorizes participation costs as fixed entry costs, fixed and variable transaction costs and per period trading costs and Andersen and Nielsen (2011), Haliassos and Bertaut (1995), and Campbell (2006) report fixed entry or ongoing participation costs to be the leading explanation for non-participation in the stock market.

report that the household investment decisions are not strongly affected by their social interaction, once the households are aware of shares, bonds and mutual funds. They observe that although social interaction may not influence investment in financial instruments directly, word-of-mouth communication affects individuals' awareness of financial instruments, thereby indirectly affecting investment. Similarly, van Rooij, Lusardi, and Alessie (2011) find that financial literacy plays a key role in understanding the non-participation puzzle. They show that the households with low financial literacy are significantly less likely to invest in stocks. Based on the reports, this study suggests that sociability may actually act as a proxy for the household stock market literacy, and hence introducing stock market literacy, which is the aggregate product of stock market knowledge and awareness, should capture the effect of sociability on stock market participation. Hence, the evidence for the distinct roles of trust and sociability on stock ownership observed by Georgarakos and Pasini (2011) can be explained by the unique and distinct effects of trust and stock market literacy on participation. As in Guiso, Sapienza, and Zingales (2008), this study defines trust as the firm reliance on the characteristics of the financial system such as sound management, quality of investor protection, and effective regulation and supervision.[9]

Unlike Chapter 2, which uses a general measure of financial literacy, an index for stock market literacy is developed by using the investing sub-module of ALP Financial Literacy survey of Hung, Parker, and Yoong (2009). The stock-market-specific literacy index is related to the understanding of the stock market and measures the household knowledge of investing in stocks directly or indirectly through mutual funds or investment accounts. In this way, the analysis is able to reduce the noise in capturing the household knowledge of stock market and study its impact on stock ownership. In addition, the household level of sociability is measured by utilizing

[9]The household level of trust in the stock market cannot necessarily be associated with their knowledge about the stock market. Knowing about the market does not make the market trustworthy.

the broader definition of sociability employed by Hong, Kubik, and Stein (2004), and Georgarakos and Pasini (2011), among others. Based on this definition, the households are considered sociable if they participate in formal training, make donations of money or possessions totaling $500 or more, participate in volunteer work, or spend time helping friends, neighbors, or relatives. Finally, the household trust more specific to the household trust relating to stock market investment decisions is utilized to reduce the noise in measuring trust. The household trust in stock market is measured by analyzing three questions about household level of trust in stock market, trust in stockbrokers, and trust in investment advisers.

This chapter contributes to the existing literature by reassessing the previously documented influence of sociability on stock market participation, once the household stock market literacy is taken into account. Further, this chapter utilizes a theoretical framework to understand the distinct effects of stock market literacy and trust on stock ownership. Third, unlike previous studies which use general financial literacy questions to measure financial knowledge, this work constructs a stock-market-specific literacy index that is related to the understanding of the stock market and measures the household knowledge of investing in stocks directly or indirectly through mutual funds or investment accounts.[10] Fourth, using the rich set of data on household behavior characteristics, this study is able to additionally test for various psychological factors influencing stock market participation. In particular, the impact of economic shock, time preference, future expectations, self-confidence, sense of commitment, and risk aversion on stock ownership is measured. In this way, this study is also able to distinguish the effects of stock market literacy and trust from other psychological characteristics.[11] Previous studies allude to the significant impact of psychological characteristics on stock market

[10] In this way, this study is able to reduce the noise in capturing the household knowledge of the stock market and study its impact on stock ownership.

[11] For instance, by modeling the impact of both trust and stock market literacy in the empirical analysis this study is able to separate their distinct effects, although the two characteristics might often be understood synonymously.

participation, but fail to test adequately for these effects due to data constraints. Hence this study fills a noticeable gap in the literature by considering a wide range of psychological characteristics.

The empirical tests show that stock market literacy and trust in stock market, the two distinct channels of influence, simultaneously affect the probability of household participation in stock market. In addition, before considering the household stock market literacy, significant relationship for sociability is obtained. However, it is observed that the impact of sociability vanishes when stock market literacy is considered in the analysis. Hence, the results suggest that what matters is stock market literacy, rather than sociability, which can be one source of influencing stock market literacy. Furthermore, stock market literacy not only increases the likelihood of participation but also influences the share of wealth invested in stock market. In addition, economic shock and future expectations are the key psychological characteristics that explain a household's decision to invest in stocks; however upon participation, a larger set of psychological characteristics such as economic shock, future expectations, self-confidence, and time preference are found to influence a household decision on how much to invest in stocks. The investigation also show that the household stock market literacy is negatively associated with their stock market participation cost. In addition, it is observed that age and employment are also negatively related to stock market participation cost.

In the separate investigation on what explains stock market participation among high sociability and low sociability households, it is found that stock market literacy is strongly significant for both high sociability and low sociability households.[12] Moreover, although sociability is significant for both groups initially, it becomes insignificant once stock market literacy is considered. Also, it is observed that the

[12]For the segregation purpose, proxy for sociability is used that defines households to be sociable if they participate in formal training, make donations of money or possessions totaling $500 or more, participate in volunteer work, or spend time helping friends, neighbors, or relatives. Using this proxy, the high sociability households are defined as those that participate in two or more sociable activities and low sociability households are defined as those that participate in at most one sociable activity.

trust in stock market is highly significant only for high sociable household groups. The results confirm that no matter how sociable a household is, stock market literacy significantly explains their probability of owning stocks. It is also observed that sociability is insignificant for high sociable but low stock market literate households. As expected, stock market literacy is insignificant for this household group and trust remains strongly significant. For the low sociable but high stock market literate household groups, stock market literacy remains a significant determinant of participation. While testing if sociability defined through other definition can explain stock market participation, it is observed that the alternative sociability measure is positive and remains significant in the presence of trust.[13] However, corroborating the previous findings of this study, when stock market literacy in the model specifications is introduced, the significant association of sociability on stock market participation vanishes, while stock market literacy remains significant, along with trust. This chapter also addresses the arguments maintaining that the magnitude of the coefficient for a variable of interest cannot be compared across the groups as done in the sociability and stock market literacy based group analysis.[14] This chapter utilizes interaction term between stock market literacy and sociability to determine their conditional effects on stock market participation. The results show that stock market literacy consistently explains the stock market participation decision of the households who are not social at all. On the other hand, it is found that sociability does not explain the likelihood of participating in the stock market of the households who have no stock market literacy. From the interaction term, it can be concluded that the effect of stock market literacy are independent of the effect of sociability on stock market participation decision. Further, it is observed that for both completely non-social and stock market illiter-

[13]The household participation in national elections is used as an alternative definition for sociability is used. Previous studies such as Rogers, Gerber, and Fox (2012) argue that participation in elections is a volunteering act for society and fundamentally a social behavior.

[14]This study does not compare the magnitude of the coefficients, and it is only used to determine whether stock market literacy and sociability explain the stock market decisions of the different groups.

ate households, trust explains both the likelihood and the proportion of investment in stocks. Hence, the results obtained in this chapter do not provide supportive evidence of participation explained by social interactions with cheaper information sharing, and peer-group effects; however participation is found to be explained by the household level of stock market literacy and trust.

The final core investigation of this thesis, presented in Chapter 4, analyzes the aspects of household financial decision making ability by studying their unsecured debt management, credit card debt management, mortgage debt management and investment diversification management. This chapter proposes that in addition to exploring the household financial market participation, it is crucial to determine whether the households are able to perform suitable financial trades/transactions. Numerous evidences suggest that households make poor financial decisions, however, it is difficult to pin down why and which households make such financial decisions.[15] It is widely accepted that households make poor or unwise financial decisions because financial decisions are complex, require trade-offs between the present and the future, require assessing risk and uncertainty, involve emotions, and permit little learning from past mistakes (Erta et al., 2013).[16] Numerous studies link poor or unwise financial decision making with psychological biases of the financially week households.[17] For example, Banerjee (2000), Bertrand et al. (2004), Duflo (2006), and Hall (2008) advocate that shortage of financial resources

[15]Poor financial decisions studied so far in the literature include lack of checking accounts (Hilgert et al., 2003), excess interest rate and fee payments (Agarwal et al., 2009), use of high interest payday loans (Agarwal, Skiba, and Tobacman, 2009), suboptimal use of credit card balance transfer offers (Agarwal et al., 2009), intentional credit card non-payment (Massoud et al., 2006), inability to refinance mortgage (Agarwal et al., 2012), non-participation in equity markets (Cole and Shastry, 2009; Li, 2012; Calvet et al. (2007), highly concentrated portfolios (Korniotis and Kumar, 2011; Calvet et al., 2007), disposition effect (Calvet et al., 2009), inertia in trading (Calvet et al., 2009), excessive trading (Korniotis and Kumar, 2011).

[16]In determining which segments of population make poor financial decisions, numerous evidences suggest that the shortage of money and adequate living conditions faced by the financially troubled households can affect their decision making (Orwell, 1937; Scott, 1977; Karelis, 2007; Banerjee, 2000; Bertrand et al., 2004; Duflo, 2006; Hall, 2008; Campbell et al., 2011).

[17]In behavioural biases, lack of self-control (Skiba and Tobacman, 2008), over-optimism (Mann, 2013), over-confidence (Barber and Odean, 2001), inattention (Agarwal et al., 2012; Mann 2013), scarcity (Mani et al. 2013) and lack of financial experience and knowledge (Stango and Zinman 2009) are found to explain household financial decision making.

can modify behavior either by making the financially weak households desperate or vulnerable. Moreover, Baumeister et al. (1998) report that financially weak households have more temptations to resist, that rich can fulfill easily, resulting in willpower depletion. While limited cognitive control argument suggests that cognition control is limited that is depleted when making decisions under the influence of limited financial resources (Robinson et al., 2010).[18] On the other hand, Mullainathan and Shafir (2013) define shortage of financial resources as scarcity, where scarcity constraints negatively influences ones decision making due to the overload of managing limited financial resources.[19]

In the existing literature, poverty is widely used as an indicator of the financial fragility of household. Since poverty only concerns income, it is a narrow classification of household financial hardship. The broader definition should consider the total assets and debt households carry (Social Progress, 2009; Brandolini et al., 2010).[20] In this study, following Brown and Taylor (2008), financial distress is measured through household net worth, where the household with negative net worth is defined as financially distressed.[21] Furthermore, this work includes income based measure of financial hardship to determine its association with unwise financial decisions of households. The income based financial hardship is referred to as poverty and is determined by comparing pre-tax household income against the threshold set at three times the cost of a minimum food diet in 1963 by United States Census Bureau. The difference of income and corresponding poverty thresh-

[18] Cognitive control is also found to affect other behavioral attitudes such as impatience (Shiv and Fedorikhin, 1999).

[19] Different population segments face different forms of scarcity such as financially troubled households face the scarcity of money while the richer segment faces the scarcity of time, and both segments face the scarcity of will-power. Though with different intensities, each scarcity taxes the cognitive capacity of that population segment.

[20] Studies that use wealth based measures of financial hardship such as net worth in understanding the financial decision making of the households include Barwell et al. (2006), Brown and Taylor (2008) and Christelis et al. (2009).

[21] The net wealth consists of net of debt values of household farm, business, checking and saving accounts, stocks, vehicles, bond funds, cash value in a life insurance policy, valuable collection for investment purposes, rights in a trust or estate minus credit card and store card debts, student loans, outstanding medical and legal bills, and loans from relatives.

old captures the depth of poverty, where the higher the difference, the higher is the level of poverty.

In line with the findings of Orwell (1937), Scott (1977) and Karelis (2007), this chapter finds that both measures of financial hardship, namely financial distress and poverty, positively explain the likelihood of making unwise financial decisions. However, financial distress is found to outperform poverty by explaining all the unwise financial decisions with significantly higher marginal effects as compared to the effects of poverty. Moreover, while investigating the level of unwise financial decisions, it is found that financial distress positively explains the level of difficulty faced in paying off credit card debt and investment under-diversification, and negatively explains the mortgage debt to income ratio. Further it is found that financial distress has significant effects on financial decisions that are independent of the financial decisions made in previous period. On the other hand, it is found that the households who made unwise financial decisions in previous period are not necessary more likely to make unwise financial decisions in current period in presence of financial distress.[22]

To investigate if certain segments of the poor pass their values, attitudes and behaviors to their off-spring, this chapter tests if households' childhood poverty can explain their poor financial behavior in later age. The results obtained suggest that what matters in financial decision making is the household own financial hardship irrespective of their financial circumstances during childhood. Later in the chapter, it is investigated if there is any association between exposure to economics education and financial decision making.[23] The results signify that economics education negatively associates with the likelihood of making unwise credit card debt and investment diversification decisions, unsecured debt to income

[22] In other words, households who make unwise financial decisions due to financial distress do not necessarily repeat the same mistake when facing financial distress in future.

[23] Exposure to economics education is determined by using the questions that ask if households have taken course in economics during their first, second or third college education. If the households took a course in economics in any of the college, they are considered having exposure to economics education.

ratio, difficulty in paying off credit card debt and investment under-diversification. With the addition of economics education, financial distress retains significance in explaining unwise financial decisions, while poverty loses the significance of association with all unwise decisions in presence of economics education indicator.

The overall findings of this chapter show that financially distress is overarching in explaining the household financial decision making by accurately indicating the financial scarcity or hardship. This inference is in line with the recommendations of Stiglitz (2009) advising use of stock of debt and assets in measuring household financial hardship. Further, in line with the argument of Brandolini et al. (2010), it is recommended that the policy makers and practitioners should also consider financially distress households as economically deprived segment eligible for public benefits that are provided to poor population segment.

The remainder of the thesis is organized as follows. Chapter 2 presents the chapter on household financial literacy and financial management, Chapter 3 consists of chapter on household stock market literacy, trust and participation, Chapter 4 gives the chapter on financial distress, poverty and financial decision making, Chapter 5 presents the limitations and further research, and Chapter 6 concludes:

2 Household financial literacy and financial management

This chapter examines the importance of financial literacy in explaining the financial management of the households. Using American Life Panel (ALP) surveys, measures for household financial literacy and attitude and beliefs are developed to investigate different aspects of household financial decision making. The household psychological and demographic characteristics are included to control for their effect on financial decision. The results points towards a strong association of household financial literacy with different aspects of financial management. Specifically, overall financial management, retirement saving, credit management, and investment management related decisions are found to be explained by the household financial literacy. In addition, a large set of psychological characteristics, in particular economic shock, is found to be associated with different aspects of household financial management. It is further observed that household different characteristics are related to different aspects of financial behaviour. Simultaneously, the results suggest that different household characteristics explain the probability of having lower financial management as compared to other households at a given level of financial literacy.

2.1 Introduction

"As we recover from the worst economic crisis in generations, it is more important than ever to be knowledgeable about the consequences of our financial decisions. (President Obama, 2011)

The above statement by the President of United States reflects the importance of financial literacy in enabling consumers to engage in appropriate decision making in relation to their personal finances. Such literacy is even more important in periods of economic downturn such as the current financial crisis. In this situation, it is imperative for the individual investors to make careful financial decisions that ensure their financial wellbeing as well as the wellbeing of whole economy. Public and private institutions in developed and developing countries believe that by delivering financial education, essential financial capability can be delivered to the households. For example, the U.S. President's Advisory Council on Financial Literacy, the UK's Money Advice Service, the Australian Securities and Investments Commission, the Reserve Bank of India's Project Financial Literacy, the Center for Financial Services Innovation (CFI)'s Financial Capability Innovation Fund, and the Citigroup's financial education curriculum have been established in an effort to improve the household financial awareness, with an expectation of instigating the household efficient financial market participation.

Primarily, this chapter attempts to reach a clear understanding of the relationship between household financial literacy and financial management, in presence of their financial attitudes and beliefs. In the existing literature, the findings of financial literacy relationship with financial management and attitude are mixed. For example, Hilgert, Hogarth, and Beverly (2003), Muller and Weber (2010), Lusardi and Mitchell (2007b), and Hogarth and O'Donnell (1999) find a positive relation between household financial literacy and financial behaviour. In contrast, Cole and Shastry (2009) do not find any significant relation between household

financial literacy or financial education programs and financial decisions. This is at least in part because different studies employ different measures, techniques, and variables to define and analyze the household financial literacy and financial behaviour.[24] This chapter argues that in order to effectively and credibly measure the influence of financial literacy on financial management, there needs to be consistency of definitions and mode of measurements for both financial literacy and financial management.

In order to investigate the household financial literacy and financial management, this study first institutes indices for household financial literacy and overall financial management, while taking into account important aspects of financial knowledge and financial management. These household indices are developed by using the American Life Panel (ALP) datasets that provide a wide range of variables. In this study, the household financial literacy index is measured by using twenty nine items from the Basic Financial Literacy, Investing, Life Insurance/Annuities, and General 401K/IRA Knowledge sub-modules of Hung, Parker, and Yoong (2009). Simultaneously, the household overall financial management index is created on the concept adopted by Hilgert, Hogarth, and Beverly (2003). The overall financial management index is based on twenty two household financial behaviours, categorized as retirement saving, cash flow management, credit management, and investment management. This study uses a different strategy as compared to the ones adopted by Hung, Parker, and Yoong (2009), and Hilgert, Hogarth, and Beverly (2003) by performing categorical principal component (CATPCA) analysis to create financial literacy and financial management indices. The concept of optimal scaling originated by different researchers with Guttman (1941) being the first to introduce it. This strategy makes provision for the discrepancies of normal principal component analysis on categorical data, giving more reliable indices (Breiman and Friedman, 1985; Gilula and Haberman, 1988; Hastie et al.,

[24] See Lusardi and Mitchell (2006), Lusardi and Mitchell (2007a), and Lusardi and Tufano (2009) for examples.

1994).

In addition to the household overall financial management, this chapter separately analyzes different aspects of household financial management. For this purpose, the measures for household retirement saving, cash flow management, credit management, and investment management are developed. Another value addition this study brings in the existing literature is that along with household financial literacy and key demographics indicators, the analysis takes into consideration the key psychological variables describing the household attitudes, beliefs, and personality. Along with demographics, it is important to consider the household psychological characteristics for example, Hilgert, Hogarth, and Beverly (2003), Lusardi (2003), and Behrman et al. (2010) acknowledge that without the inclusion of important psychological aspects, the investigation of household financial decision making will be biased. In this chapter, important demographic characteristics such as gender, age, education, employment, income, and expense indicators are considered. This chapter also develops and uses measures for the household psychological characteristics such as sociability, economic shock, time preference, future expectations, self-confidence, sense of commitment, and risk aversion.

The first notable finding of this study is that financial literacy is strongly associated with the household overall financial management and also with the individual aspects of household financial management such as retirement saving, credit management, and investment management. Financial literacy consistently explains the household financial management even when key demographics and psychological characteristics of the households are accounted for. In addition, the results show that psychological characteristics also significantly explain the household financial management. In particular, some psychological characteristics such as exposure to economic shock consistently explain many of the aspects of household financial management. This study further reports that some household characteristics have different nature and strength of relationship with different aspects of finan-

cial management. For example, employment is positively related to investment management but negatively related to cash flow management.

In order to gain further understanding of the household financial management, this study develops financial spread by subtracting the household overall financial management score from financial literacy score, where the higher the difference between the household financial literacy and overall financial management, the higher is the household financial spread. This financial spread is used to investigate what explains the difference between household financial literacy and financial management. The financial spread helps in identifying two types of households that are households who have negative financial spread and households who have positive financial spread. In other words, households who have relatively lower financial management as compared to other household and households who have relatively higher financial management as compared to other households at a given level of financial literacy are identified.

The results obtained through probit specification report that age of the households positively explains the likelihood of having a positive financial spread. In other words, older households are more likely to have a lower financial management as compared to their level of financial awareness. These estimates suggest that older household have less financial management not because of their level of financial capability but the difference attributes to the lack of incentive for the older households to manage finance as compared to the younger households. Additionally, it is found that male households are more likely to have lower financial management in comparison to their financial literacy. These results fall in line with the findings of Jianakoplos and Bernasek (1998) suggesting that males are less risk averse and of Brake (2005) reporting that males have more responsibilities to manage. Further, it is observed that future expectations of the households positively relates to the probability of having positive financial spread. Finally, it is found that risk aversion negatively relates to the likelihood of having a positive financial spread. The

risk-averse households tend to avoid risk and therefore may have better financial management at a given level of financial literacy. Further, while investigating the household financial spread by utilizing the difference of financial literacy – behavior score tested through ordinary least square specification, it is found that age, sex and risk aversion explain the difference of financial literacy and financial behavior. Further, it is found that sense of commitment negatively relates to the financial literacy-management gap.

As a robustness check, the final section in this chapter utilizes different measures of financial literacy that has been widely used in the existing literature (Lusardi and Mitchell, 2014). For example Lusardi and Mitchell (2006), Lusardi and Mitchell (2007) and Lusardi and Tufano (2009) use three fundamental concepts such as ability to do interest rates calculations, understanding of inflation and understanding of risk diversification to determine financial literacy. This section also tests for the robustness of financial literacy by utilizing three items on interest rate, inflation and risk diversification from Hung, Parker, and Yoong (2009) financially literacy scale. First, the scores on these items are compared with the scores reported in earlier studies that used similar measure of financial literacy. Lusardi and Mitchell (2014) recently carried out a comprehensive comparison of different types of approaches used to measure financial literacy. It is found that the percentage of households in the sample responding correctly to the three items is in close comparison with the scores reported across the different approaches studied by Lusardi and Mitchell (2014). Further, the percentage of households responding correctly in all three questions in this study is similar to the percentage reported in other studies. The results with this alternative measure of financial literacy show that financial literacy retains its significance in explaining the household overall financial management, retirement saving, credit management, and investment management. Another measure of financial literacy widely used is the self-reported level of financial awareness by the respondents. Following Lusardi (2011), Lusardi and Tufano

(2009), Lusardi and Mitchell (2009) and Bucher-Koenen, Lusardi, Alessie and van Rooij (2012), this section uses the self-reported measure of financial literacy to investigate its relation with financial decision making. The results suggest that the self-reported measure of financial literacy explains all the financial decisions with varying levels of significance. It suggests that the estimates of self-reported measure of financial literacy are consistent with the findings of previous authors who have used such measure in their work.

The final step of the robustness check, addresses the endogeneity problem, which is the most discussed issue in investigating the linkage between financial literacy and financial decision making. Many studies suggest that care has to be taken while analyzing the impact of financial literacy on financial management and practices because the financial management may itself be a source of financial learning as people do learn through experience (Caskey, 2006; Behrman et al., 2010;Lusardi and Mitchell, 2007; van Rooij ,Lusardi and Alessie, 2007; Hilgert, Hogarth and Beverly, 2003; Lusardi and Mitchell, 2014). However, numerous studies are unable to address the endogeneity issue due to unavailability of adequate data in the existing surveys. Some authors are able to test for endogeneity by using different instrument variables as a proxy for financial literacy. For example, Christiansen, Joensen, and Rangvid (2008) used the opening of a new university in a local, Klapper, Lusardi, and Panos (2012) used the number of public and private universities in the Russian regions and the total number of newspapers in circulation, Lusardi and Mitchell (2009) instrumented financial literacy using the fact that different U.S. states mandated financial education in high school at different points in time and they interacted these mandates with state expenditures. Following van Rooij, Lusardi, and Alessie (2012), exposure to economics education is used as an instrument variable for financial literacy in this study. The question that is used from American Life Panel (ALP) asks the households how much of their school's education (high school, college or higher degrees) was devoted to

economics, where possible responses are a lot, some, little and hardly at all/none. The results suggest that the instrument variable employed in this work significantly explains overall financial management, credit management and investment management of the households. Therefore, this study concludes that financial literacy defined and measured on the basis of diverse concepts explain the financial decision making of the households.

The reminder of the chapter is organized as follows: Section 2.2 describes the data and variables, Section 2.3 presents the empirical analysis, and Section 2.4 concludes.

2.2 Data and variables

To test the association of financial management with financial literacy and key psychological characteristics of the households, this chapter uses the data from American Life Panel (ALP) that consists of over 340 diverse surveys and 6,000 representative samples of U.S. consumers aged 18 or above.[25] ALP surveys capture a rich information set that is of scientific and policy interest covering expectations, opinions, financial participation and circumstances, cognition, and demographics.[26] Hence it makes it possible to measure the household financial literacy and financial management, and construct proxies for a wide range of household psychological characteristics. The interviews are conducted via an internet-based panel and take advantage of its computerized nature with visualization and interactive tools

[25]Other databases such as the DNB Household Survey (DHS) of Dutch households and the Survey of Health, Ageing and Retirement in Europe (SHARE) database of multidisciplinary and cross-national household data do not contain adequate information on household financial literacy and stock market participation. For example, although DHS contains information on stockholding status and financial literacy, the number of households that actually possess stocks is very low. For instance, in the 2012 wave, only 218 households out of the 2155 responding households possess stocks. In addition, only 170 households shared information on the amount of money invested in stocks. For the SHARE database, it is found that there is no information on household financial literacy and investment in financial assets.

[26]The sampling weights are constructed by ALP to correct for the sampling error and to make the sample as representative of the population of interest as possible. Following common practice in surveys of consumers, ALP uses three weighting methods that are cell-based post stratification, logistic regression and raking.

supporting the implementation of state of the art experiments with feedback and preloading. Further, the survey questions are also customized for clients who have special requirements, thereby increasing the diversity of surveys. Chang and Krosnick (2010) show that the self-administered computer-based surveys facilitate optimal responding, with higher concurrent validity, less survey satisficing, and less social desirability response bias than in the intercom mode, especially among households with limited cognitive skills. Moreover, question orders and response choices are randomly assigned in order to avoid any response biases due to the order in which they appear.

This study utilizes several ALP surveys in which the panel of respondent is same but response rates are different. The survey with lowest response rate that is used is the Effects of the Financial Crisis survey with average response rate and sample size as 79% and 1,800 respectively, while the average response rate of all surveys used is around 90%. HRS, which is one of the most related databases to ALP has similar response rate, ranging between 81 to 89 percent. The primary unit of study is household where data acquired such as family income, financial management, family expenses and household size are that of the household , while other financial literacy and demographic and psychological characteristics represent that of the household head who is considered primary decision maker in the household.

The following sections describe the construction of the household financial literacy, financial management, and demographics and psychological indices and indicators.

2.2.1 Measuring financial literacy

The measures of financial literacy used in the existing studies are often crude and inconsistent. For example, Lusardi and Mitchell (2006), Lusardi and Mitchell (2007a), and Lusardi and Tufano (2009) use three questions to determine financial literacy of their sample. In contrast, Lusardi and Mitchell (2007b) determine

financial literacy based on five multiple-choice basic financial literacy items and eight multiple choice sophisticated financial literacy items. Lusardi (2008) adopts a broad strategy by creating two financial literacy indices that are basic and advanced indices. The author develops basic financial literacy index through three questions regarding interest rates, the effects of inflation, and the concept of risk diversification and advanced financial literacy through questions about risk and return, bonds, stocks, mutual funds, and basic asset pricing. van Rooij, Lusardi, and Alessie (2011) also adopt a similar strategy by developing basic and advanced financial literacy indices.[27]

This study uses the ALP Financial Literacy survey by Hung, Parker, and Yoong (2009) to develop an index for financial literacy. This survey was in the field between March 2009 and September 2009 with a response rate of 85.87%. The response rate for this survey is higher than other prominent financial literacy surveys such as DNB Household survey and Chen and Volpe survey having response rate of 74% and 51% respectively, while response rate for the Jump$tart survey is less than 50%. Hung, Parker, and Yoong (2009) scale contains five basic financial literacy items, eight sophisticated financial literacy items, five additional items on investment markets and products and five items related to general retirement accounts knowledge. Finally, the Life Insurance subscale consists of four items on life insurance and annuity products. Hung, Parker, and Yoong (2009) conduct a battery of tests to assess the construct validity and find strong reliability and internal consistency, with a highest cronbach alpha as compared to other prominent financial literacy scales. Appendix 2.1 presents the items used from Hung, Parker, and Yoong (2009) financial literacy survey to develop financial literacy index. Since the item responses are a mix of nominal and ordinal data, unlike previous studies that use linear principal component analysis, this work uses categorical principal component analysis (CATPCA) to construct the household financial market literacy

[27] Other definitions and measurement concepts of financial literacy are tested in Section 2.4.

index. CATPCA, the earliest version given by Guttman (1941), is the non-linear equivalent of linear PCA that has been developed for efficiently handling categorical variables and nonlinear relationships. Since Guttman (1941), CATPCA has evolved with the major contributions coming from Kruskal (1965), Shepard(1966), Kruskal and Shepard (1974), Young et al. (1978), and Winsberg and Ramsay (1983).

In the analysis the number of dimensions is set to twenty nine, which is the number of items in the financial literacy questionnaire. In order to find how many components significantly explain the variance of the household data, Kaiser's criterion is used. According to Kaiser's criterion, only principal components having eigenvalue greater than one are considered essential and should be retained. It is suggested that this criterion is most reliable when the number of variables is between 20 and 50. Since there are more than 20 items in the financial literacy questionnaire, this criterion is used to determine significant components. Columns 1 and 2 of Table 2.1 report the results of CATPCA analysis of the household financial literacy index. The optimal scaling level of all items is set to ordinal. The results show that there are eight significant dimensions with eigenvalues greater than one, explaining 52% of the variance of the data. In addition to eigenvalues, CATPCA also provides object scores that are individual scores of households in each dimension. These scores are used to create financial literacy index by taking weighted average sum of all significant components, where the eigenvalues provide the weight of each dimension. The sum of score is then scaled to lie between the range of zero and one to create household financial literacy index. In order to determine the association between different questions in the financial literacy survey and dimensions obtained by the CATPCA, Appendix 2.4 presents the centroid cooridinates of each question in each dimension. The centroid coordinates provide the average of object scores of all cases for a particular category on each dimension. These scores show the contribution of each category in each dimension. For example, it is found that dimension 1 of financial literacy index is mostly

explained by the knowledge of mutual funds and whole life insurance, dimension 2 is mostly explained by knowledge of 401k and IRA plans knowledge and dimension 3 is mostly explained by knowledge of stocks and bonds. Looking at other dimensions, it can be seen that each dimension captures a particular set of household financial knowledge.

The descriptive statistics of Table 2.2 show that the households, on average, report around 60% correct answers. This average score is compatible with other financial literacy surveys such as in Jump$tart respondents score an average of 57% in 1997 with reduced scores reported in subsequent years. In DNB Household survey and Chen and Volpe (1998), respondents, on average, are correct 60% and 53% times respectively.

2.2.2 Measuring overall financial management

Unlike other studies that focus on one aspect of household financial management while studying the relationship between household financial literacy and financial decision making, this study focuses on household overall financial management covering different aspects of household financial decision making.[28] In this study, the household overall financial management index is developed by utilizing the concept used by Hilgerth, Hogarth, and Beverly (2003). Their financial practice indices are based on eighteen financial behaviours of households, covering the household basic money management and sophisticated skills. The indices also include information regarding the use of thirteen financial products, which ranges from savings and checking accounts to credit cards, mortgages, home equity loans, and investment. The indices are categorized as cash flow management, credit management, saving, and investment management.

The overall financial management index in this chapter is based on twenty two

[28]For example, van Rooij, Lusardi, and Alessie (2011) focus on stock market, Behrman, Mitchell, Soo and Bravo (2010) focus on wealth accumulation, and Lusardi and Mitchell (2007a) and (2007b) focus on retirement planning in their papers.

aspects of household financial management, categorized as cash flow management, credit management, retirement saving, and investment management. Appendix 2.2 presents the items used to develop the overall financial management index by adopting the same process as in financial literacy index. The results of the CATPCA analysis of household overall financial management are presented in Columns 3 and 4 of Table 2.1. The results signify that seven dimensions, with eigenvalues greater than one, explain around 48% of the variance of the sample. The eigenvalues of these seven dimensions are used as the weights to develop the household overall financial management index. Appendix 2.5 shows the contribution of each question in the financial management index in each dimension. It can be seen that dimension 1 of financial management index is mostly explained by the credit rating and overdrawn bank account, dimension 2 is mostly explained by the use of checking and saving accounts and dimension 3 is mostly explained by the use of online banking and debt card. As in financial literacy index, it is again observed that each dimension captures particular aspect of household financial management. From the descriptive statistics in Table 2.2, it is found that the sample considered in this study has average financial management score of 0.478 on a scale of zero to one, showing that the household scores are not skewed towards very high or low levels of financial management.

2.2.3 Measuring demographics and psychological characteristics

This study considers key demographic characteristics to control for the heterogeneity of the households. The demographic information such as age, education, employment status, and gender are obtained from the ALP Demographics survey. It is observed from Table 2.2 that the average age of respondents in the sample investigated is 54, and the average highest number of years in education is around 12, with 45% males and 61% employed respondents. The reason for higher average age compared to the average age of US population is that this study only con-

siders individuals who are aged 18 and above. Further, the average sample's age reported in other ALP based studies is above 50 years. Utilizing information from the ALP Effects of the Financial Crisis survey, household total income is calculated as the sum of respondent and partner income from work and other sources. The average of the household income during 17 months starting from October 2009 is taken to deal with abnormal income in any month. The average family income of $72,000 in this study is in close comparison with average income of other studies using ALP that are above $80,000.[29] This study also considers the household total expense, as using income alone in the analysis may be misleading, because higher income may be followed by higher expense. The household monthly expenditures on rent, bills, food, health, and transportation are summed to calculate the total expense. Once again, the household monthly expenditure over twenty months in year 2009 and 2010 are averaged to avoid abnormal expense in certain months. The descriptive statistics in Table 2.2 shows that on average the households in the sample considered expend $3,473 monthly. Furthermore, from Table 2.3 it is found that age is moderately correlated with employment. In addition, income is moderately correlated with expense, and weakly correlated with education and employment.

Hilgert, Hogarth and Beverly (2003) argue that psychological economics acknowledges the role that psychological characteristics (such as procrastination, regret, risk aversion, compulsiveness, generosity, altruism, and peer pressure) play in household economic decisions. Behrman et al. (2010) also state that prior literature shows positive correlation between the household financial literacy and schooling and financial behaviour, but mostly does not have controls for unobserved factors such as risk aversion, intelligence, and motivation that have important implications for financial literacy and financial behaviour. According to them, without inclusion of these variables, the estimated effects of schooling and

[29]Some subjects in the sample have abnormal income. These subjects have been dropped to remove the outliers.

financial literacy on financial management may be biased. This study includes a large set of household psychological characteristics, while analyzing financial literacy and management relationship. In measuring the psychological characteristics of households, this study utilizes information from a wide range of ALP surveys and constructs proxies for economic shock, time preference, future expectations, self-confidence, sense of commitment, and risk aversion. Exact wordings of the questions, choices of responses, and the construction of the psychological variables used in the empirical work are given in Appendix 2.3. From average values in Table 2.2, it can be seen that the households in the sample, on average, are risk averse with low expectations of the future. Further, it is observe that the households on average are moderately self-confident and committed, and prefer present as compared to future. Moreover, Table 2.3 shows that family income and total expense is moderately correlated with future expectations.

2.3 Empirical analysis

This section analyzes whether financial literacy and other key determinants have a distinct and significant impact on household financial management. For this purpose, following Ordinary Least Square (OLS) model is tested:

$$\begin{aligned} FM_i &= \beta_1 FL_i + \beta_2 SO_i + \beta_3 ES_i + \beta_4 OP_i + \beta_5 TP_i + \beta_6 FE_i \\ &\quad + \beta_7 SO_i + \beta_8 CM_i + \beta_9 RA_i + \beta_{10} MA_i + \beta_{11} AG_i + \beta_{12} ED_i \\ &\quad + \beta_{13} EM_i + \beta_{14} IN_i + \beta_{15} EX_i + \varepsilon_i, \end{aligned} \tag{2.1}$$

where dependent variable FM on the left hand side is the household financial management. The independent variables on the right hand side are financial literacy (FL), sociability (SO), economic shock (ES), time preference (TP), future expectations (FE), self-confidence (SC), sense of commitment (CM), and risk aversion (RA), and male (MA), age (AG), education (ED), employment (EM), income

(IN) and expense (EX) indicators.

2.3.1 Analysis of household overall financial management

The results of the overall financial management analysis are given in Table 2.4, where the mean marginal effects, the average of all the individual marginal effects, are reported. The estimates show that financial literacy is consistently positive and highly significant in all model specifications considered (all estimates significant at 1% tolerance level). The household financial literacy is found to have the strongest relation, with a coefficient of 0.108, showing that a one unit increase in financial literacy increases the financial management by 10.8 percent. The significance of household financial literacy for the overall financial management, is in line with the findings of Cole, Sampson and Zia (2009), Lusardi and Mitchell (2007b), Hogarth and O'Donnell (1999), and van Rooij, Lusardi, and Alessie (2011), who find that the households with less financial knowledge have less participation in financial markets. In addition, estimates show that age and income, that are significant at 5% tolerance level, positively explains the household overall financial management. In household psychological characteristics, economic shock (estimate significant at 1% tolerance level), future expectations, self-confidence and sense of commitment (estimates significant at 5% tolerance level) significantly explain the household overall financial management. The positive coefficient obtained for economic shock shows that the households, who participate in financial markets, are impacted more by the economic shock.

2.3.2 Analysis of different aspects of household financial management

Research methods employed to understand financial practices have been overly simplistic. National studies have composed indexes of high, medium, and low based on frequencies of nominal positive responses (Hilgert et al., 2003). Mixed-methods studies have also used composite indexes where financial practices were summed

to create an index ranging from 0 to 5 (Mistry et al., 2008). These summative approaches are limited because they do not account for interactions between financial practices. For example, in analysis, paying bills on time is treated as equivalent to saving for retirement despite having different implications for the household members. In order to gain further insight into the household financial decision making, this chapter creates a separate measure for each of the aspect of household overall financial management that are retirement saving, credit management, cash flow management and investment management. Each of these aspect is tested through Equation 2.1, which is also used in household overall financial management analysis. This strategy helps to determine the different nature and strength of relationship of household characteristics with different aspects of household financial management.

Retirement saving

With the rise in life expectancy and decline in birth rates, publicly financed retirement has become increasingly costly, both in absolute terms and as share of national income (Bohn, 2002). In this scenario, most retirees have to rely more on private savings to finance their increased retirement needs. This section explores the association of household retirement saving with financial literacy and other characteristics of the households. This investigation is performed by using the household total value of pension account as a proxy for retirement saving.[30] Table 2.5 shows that the association between household financial literacy and retirement saving is positive, validating the findings of Hilgert, Hogarth, and Beverly (2003), who find that the households with low scores on the saving index have lower overall financial knowledge. Moreover, Lusardi and Mitchell (2007b) also document a strong positive relationship between financial literacy and retirement planning.

[30]In contrast to the household overall financial management model, which uses the amount of money in pension account individuals have and how much they thought about retirement, this section only uses the balance in pension account as a proxy for retirement saving. In this way, the analysis avoids combining two different kinds of responses to create the proxy, while balance in pension account gives an acceptable measure for retirement saving management.

From the results, it is observed that age, with strong significance (at 1% tolerance level), explains the household saving for retirement. Simultaneously, future expectations, with the highest explanatory power and strong significance (at 1% tolerance level), is positively related to household retirement saving. Furthermore, the results suggest that income (with the third highest coefficient significant at 5% tolerance level) positively relates to the household saving for retirement. In line with the findings of Lusardi (2003), the results imply that education (estimate significant at 1% tolerance level) positively associates with the household retirement saving. Considering the household psychological characteristics, the positive relationship between economic shock and retirement saving relates to the findings of Paxton and Zhuo (2011), reporting positive association between economic shock and formal saving. The authors explain that the households who face economic shock start saving more to smooth income and consumption during shocks as a precaution. Finally, it is found that the households who prefer future over present or have higher future expectations have more retirement saving.

Cash flow management

Cash flow management enables the households to achieve financial independence, a state in which the household income is either equal to or less than their costs of living. Prudent management of cash flows and savings are important for at least two household functions. First, resources can be invested in ways that promote development. The assumption is that higher incomes will lead to more disposable income and thus investment in the home environment. Ultimately these investments promote healthy family and child development (Mayer, 1997). Second, economic resources can buffer against unexpected financial shocks and mitigate family stress (Conger and Donnellan, 2007). In this way, careful financial management may lead to more disposable economic resources, and these assets can buffer unexpected financial events and reduce financial strains directly (Rothwell and Han, 2010). Importantly, asset development can only occur, after the flows

of household income have been managed carefully.

In this study, the household cash flow management is quantified by performing the CATPCA analysis on 11 questions from ALP surveys that are also used in the cash flow management section of overall financial management index. Results reported in Table 2.6 show that the household financial literacy does not have significant association with the cash flow management. This finding is in contrast with the findings of Hilgert, Hogarth, and Beverly (2003), who find a positive relationship between the household cash flow management and financial knowledge. The results further signify that the opportunity cost of time of employed household may deter the household budgeting and financial planning activities.

In the household psychological characteristics, sense of commitment has the highest coefficient (at 5% significance level), showing that the households who are more committed and disciplined have better cash flow management. Finally, it is found that the risk averse households may be more concerned about their cash flows (positive estimates significant at 5% tolerance level), resulting in better cash flow management scores. This result concurs with the findings of Walker (1996) reporting that financial management in the form of budgeting is also important, where a stable budget is positively associated with more economic satisfaction.

Credit management

Debt is an essential source of financial leverage that assists households in smoothing their consumption. However, excess debt can have severe consequences on household financial wellbeing. In addition, high and persistent levels of household debt, referred to as debt overhung, holds back economic recovery, because households continue to deleverage in an attempt to repair their balance sheets (Knoll, 2013).

In order to determine the connection between the household credit management and financial literacy and other characteristics, this study creates a proxy for credit management by using the responses on four questions from ALP surveys that

are also used in the credit management section of overall financial management index. The questions ask individuals how many credit cards they have (general purpose, charge, and branded), do they pay credit card balance in full each month, what is their credit ranking, and are they or were they ever behind their mortgage payment.[31] First, the household average of scores on all four questions is taken, and then this average is scaled to lie between zero and one to create the household credit management index.

The results in Table 2.7 show that the household financial literacy has positive association with highest mean marginal effect, at 1% significance level, with the household credit management. Similar findings have been reported by Hilgert, Hogarth, and Beverly (2003), who document that the households with low credit management indices have lower financial knowledge scores. In demographics, it is found that education (estimate significant at 10% tolerance level), income, and expense (both estimates significant at 5% tolerance level) are positively related to the household credit management. Negative association is reported between economic shock and credit management, signifying that the households who do not manage their credits efficiently might be more exposed economic shock.

Investment

The household investment in financial market helps to increase the household financial welfare by enabling them to make the most of their savings. This household investment also has an effect on the overall economy by moderating the asset prices and market volatility. Saving is a fundamental financial practice. In recent years there has been intense research interest in the saving behavior of low-income households (Beverly et al., 2008). Asset accumulation via saving is beneficial to households for a number of reasons. Saving habits were shown to reduce feelings

[31] General purpose credit cards have a logo from Visa, MasterCard, Discover or American Express, and can be used anywhere those credit cards are accepted. Charge cards are similar to credit cards, except that the full payment of balance is required at the end of each billing period. Branded cards have a merchant's logo on the card, and may or may not have a logo from Visa, MasterCard, Discover, or American Express. Examples of this type of card include Sears cards, Exxon cards, Amazon.com cards, or United Mileage cards.

of financial strain (Loibl, Kraybill, and DeMay, 2011). Shortage of assets can constrain the development of human capital (Nam and Huang, 2009), and financial crises were reported to strain the most successful of marriages (Skogrand, Johnson, Horrocks, and DeFrain, 2011).

This study measures household investment management by averaging the responses on ALP questions asking households if they possess bonds, stocks, and IRA or KEOGH accounts and enquiring the number of saving accounts households posses. Results reported in Table 2.8, show that the household financial literacy have consistent positive estimates with highest mean marginal effects, with 1% significance level, in all specifications tested. This finding corroborates with the findings of Hilgert, Hogarth, and Beverly (2003), who report that the households in the low investment group have less overall financial knowledge and investment knowledge scores. The results further show that employment has the second highest power in explaining household investment. The positive association of education and household investment, reported here, is in line with the findings of Cole and Shastry (2009), who report a positive relation between income from investment and education. Finally, economic shock associates with the household investment positively, as in the retirement saving model. One explanation for such positive association is that the households who have more financial assets are exposed to more economic shock with frequent and larger impacts as compared to the households with less number of such assets. In addition, as argued by Paxton and Zhuo (2011), economic shock may set off the households to invest in more financial assets in order to smooth income and consumption during next economic shock.

2.3.3 Development and analysis of financial spread

After determining the household financial literacy association with financial management, this section investigates what explains the difference between household

financial literacy and financial management. This deviation is referred to as the household financial spread and is determined by subtracting the household overall financial management score from financial literacy score, where the higher the difference between the household financial literacy and overall financial management, the higher is the household financial spread. From this difference, two types of households are identified that are households who have negative financial spread and households who have positive financial spread. In other words, this section identifies households who have relatively lower financial management than other households and households who have relatively higher financial management than other households at a given level of financial literacy.

In order to run the above query, this section creates a dummy variable that is equal to one if the household financial spread is positive and zero if the financial spread is negative. The following probit specification is used to determine what factors contribute to the likelihood of having lower financial management as compared to other households at a given level of financial literacy:

$$\begin{aligned} FS\_prob_i &= \beta_1 SO_i + \beta_2 ES_i + \beta_3 TP_i + \beta_4 FE_i + \beta_5 SO_i \\ &\quad + \beta_6 CM_i + \beta_7 RA_i + \beta_8 MA_i + \beta_9 AG_i + \beta_{10} ED_i \\ &\quad + \beta_{11} EM_i + \beta_{12} IN_i + \beta_{13} EX_i + \varepsilon_i \end{aligned} \tag{2.2}$$

where the dummy dependent variable FS_prob on the left hand side equals to one if financial spread is positive and zero if financial spread is negative. The independent variables on the right hand side are sociability (SO), economic shock (ES), time preference (TP), future expectations (FE), self-confidence (SC), sense of commitment (CM), and risk aversion (RA), , and risk aversion (RA), and male (MA), age (AG), education (ED), employment (EM), income (IN) and expense (EX) indicators.

The results presented in Column 1 to 4 of Table 2.9 show that age of the

household head positively explains the likelihood of having a positive financial spread. In other words, households with older heads are more likely to have a lower financial management as compared to households with younger heads at given level of financial awareness. These estimates suggest that older household have less financial management not because of their level of financial capability. The difference attributes to the lack of incentive for the older households to manage finance as compared to the younger households. Additionally, it is found that households with male heads are more likely to have lower financial management in comparison to households with female heads. These results fall in line with the findings of Jianakoplos and Bernasek (1998) suggesting that males are less risk averse and of Brake (2005) reporting that males are have more responsibilities to manage. Further, it is observed that future expectations of the households positively relates to the probability of having positive financial spread. Finally, it is found that risk aversion of the household head negatively relates to the likelihood of having a positive financial spread. The risk averse households tend to avoid risk and therefore may have better financial management at a given level of financial literacy.

Next, the chapter investigates what explains the level of household financial spread by utilizing the difference of financial literacy – behavior score tested through following ordinary least square specification:

$$\begin{aligned} FS\_level_i &= \beta_1 SO_i + \beta_2 ES_i + \beta_3 TP_i + \beta_4 FE_i + \beta_5 SO_i \\ &\quad + \beta_6 CM_i + \beta_7 RA_i + \beta_8 MA_i + \beta_9 AG_i + \beta_{10} ED_i \\ &\quad + \beta_{11} EM_i + \beta_{12} IN_i + \beta_{13} EX_i + \varepsilon_i \end{aligned} \tag{2.3}$$

where the dummy dependent variable FS_level on the left hand side is the level of household financial spread. All independent variables are as described in

Equation 2.2. The results reported in Column 5 to 8 of Table 2.9 suggest that as in the probit specification, age, sex and risk aversion of the household head explain the difference of financial literacy and financial behavior. Further, it is found that sense of commitment negatively relates to the financial literacy-management gap. Households with high sense of commitment will be committed to all important aspects of their life. The same is true for financial management where a household with higher sense of commitment will have a better financial management score at a given level of financial literacy.

2.4 Robustness check for financial literacy

2.4.1 Alternative measure of financial literacy

The financial literacy measure that this study employs is based on twenty nine items developed by Hung, Parker, and Yoong (2009). In contrast, other studies such as Lusardi and Mitchell (2006), Lusardi and Mitchell (2007a), and Lusardi and Tufano (2009) use three fundamental concepts such as capacity to do interest rates calculations, understanding of inflation and understanding of risk diversification to determine financial literacy. This section also tests for the robustness of financial literacy results by utilizing three items on interest rate, inflation and risk diversification from Hung, Parker, and Yoong (2009) financially literacy scale. First, the scores on these items are compared with the scores reported in earlier studies that used similar measure of financial literacy. Lusardi and Mitchell (2014) recently performed a comprehensive comparison of different types of approaches used to measure financial literacy. The comparison of scores obtained in this study with the sores of twelve studies investigated by Lusardi and Mitchell (2014) show that the percentage of households responding correctly to the three items is in close comparison with the scores reported across other studies. Further, the percentage of households responding correctly in all three comparisons in this study

is similar to the percentages reported in studies discussed by Lusardi and Mitchell (2014). The financial literacy scale based on the three items mentioned above is used to check for the robustness of financial literacy in explaining household financial management. The mean marginal estimates reported in Table 2.10 show that this alternative measure of financial literacy retains its significance at 1% tolerance level in explaining the household overall financial management, retirement saving, credit management, and investment management. It is implied that financial literacy, irrespective of measurement method, explains financial management of households.

2.4.2 Self reported measure of financial literacy

In addition to different items used to measure financial literacy, there are other studies that use self-reported measure of financial literacy. Lusardi and Mitchell (2014) investigate the studies that use self-reported measure of financial literacy. Following Lusardi (2011), Lusardi and Tufano (2009) and Lusardi and Mitchell (2009) and Bucher-Koenen, Lusardi, Alessie and van Rooij (2012) this section uses the self-reported measure of financial literacy to investigate its relation with financial decision making. From Panel B of Table 2.11, it is found that the self-reported measure of financial literacy explains all the financial decisions. It suggests that the estimates of self-reported measure of financial literacy are consistent with the findings of previous authors who have used such measure in their work. Further, it confirms the findings of financial literacy measures earlier reported in this work.

2.4.3 Instrument variable for financial literacy

One of the most argued issues in linking financial literacy with financial decision making is the endogeneity problem. Many studies suggest that care has to be taken while analyzing the impact of financial literacy on financial management because the financial management may itself be a source of financial learning as

people do learn through experience. For example, Caskey (2006) explains that it is difficult to analyze the impact of financial education in firms to financial management of employees because mostly stable firms offer financial education and mostly future oriented people are attracted to stable firms. Behrman et al. (2010) while determining the impact of financial literacy on wealth accumulation discuss the causality issues by saying that financial literacy and schooling, as well as unobserved factors such as ability, intelligence, and motivation can enhance financial literacy and schooling but also directly affect wealth accumulation. Lusardi and Mitchell (2007) also points toward endogeneity issues in their study of financial literacy. According to them, those who attempt to plan for retirement may become more financially knowledgeable in the process and hence planning would be influencing financial literacy rather than the other way around. Hilgert, Hogarth and Beverly (2003) state that the existing literature find the correlation between financial knowledge and behaviour. According to the authors, this correlation does not necessarily mean that an increase in knowledge improves behaviour. Instead, the causality may be reversed in that people may gain knowledge as they save and accumulate wealth, or there may be a third variable, for example, family experiences and economic socialization, that affects both knowledge and behaviour. Lusardi and Mitchell (2014) argue that individuals with high net worth investing in financial markets may be investing in financial literacy to better manage their investment.

Albeit its importance, few authors are able to account for the potential endogeneity of financial literacy and financial behaviour, which is in large part due to unavailability of adequate data in the existing surveys. Some authors are able to test for endogeneity by using different instrument variables to stand in for the questionable measures of financial literacy. For example, Christiansen, Joensen, and Rangvid (2008) used the opening of a new university in a local, Klapper, Lusardi, and Panos (2012) used the number of public and private universities in

the Russian regions and the total number of newspapers in circulation, Lusardi and Mitchell (2009) instrumented financial literacy using the fact that different U.S. states mandated financial education in high school at different points in time and they interacted these mandates with state expenditures.[32]

Following van Rooij, Lusardi, and Alessie (2012), exposure to economics education is used as an instrument variable for financial literacy. The question that is used from ALP asks the households how much of their school's education (high school, college or higher degrees) was devoted to economics, where possible responses are a lot, some, little and hardly at all/none. The results suggest that the instrument variable employed in this work significantly explains overall financial management, credit management and investment management of the households. Hence, it is concluded that the relationship between financial literacy and financial management is caused by household financial literacy.

2.5 Conclusion

In order to reach a clear understanding of relationship between household financial literacy and financial decision making, this chapter devises indices for the household financial literacy and overall financial management by covering many important areas of these two measures. In addition to the household overall financial management, this work also analyzes individual aspects of household financial management separately. For this purpose, measures for household retirement saving, cash flow management, credit management, and investment management are developed. The relationships are tested while controlling for the households key demographic and psychological characteristics. For this purpose, this study creates proxies for household important psychological characteristics such as sociability, economic shock, time preference, future expectations, self-confidence, sense of commitment, and risk aversion. Furthermore, the household financial literacy –

[32]Lusardi and Mitchell (2014) provide a detail study on the instruments used for financial literacy in existing literature.

behaviour gap, referred to as financial spread, is developed by subtracting the household financial literacy scores from their financial management scores. Here, the higher the difference between the household financial literacy and financial management, the higher is the household financial spread. This financial spread is used to study why the household financial management deviates from other households at a given level of financial literacy.

The results suggest a consistent strong and significant relationship between the household financial literacy and financial management. In particular, financial literacy is found to explain the household overall financial management, retirement saving, credit management, and investment management. These relationships consistently retain significance even when the household psychological characteristics are considered in the analysis. Simultaneously, the household psychological characteristics are found to be associated with financial management. However, some of the household characteristics have different nature and strength of relationship with different aspects of financial management. For example, employment is positively related to investment management but negatively related to cash flow management. Further, it is found that older and male households are more likely to have lower financial management as compared to younger households at a given level of financial literacy. These estimates suggest that older household have less financial management not because of their level of financial capability but the difference attributes to the lack of incentive for the older households to manage finance as compared to the younger households. The high probability of male households to have lower financial management as compared to female households can be explained by the findings of Jianakoplos and Bernasek (1998) suggesting that males are less risk averse and of Brake (2005) reporting that males are have more responsibilities to manage. Further, it is observed that future expectations positively and risk aversion negatively relates to the probability of having positive financial spread. Similar results are obtained while considering the difference of

financial literacy – behavior score in ordinary least square specification, where age, sex and risk aversion explain the difference of financial literacy and financial behavior. Further, it is found that sense of commitment negatively relates to the financial literacy-management gap.

The findings in this study reveal several possible implications that can assist in policy and financial education programs development and implementation. For example, the results suggest that financial literacy plays an important role in household financial decision making. Furthermore, the household attitudes, beliefs, and personalities are also found to explain their financial management. These additional factors are found to influence different financial management aspects with different natures and significances. The findings suggest that there is no general formula or strategy to improve the household financial management in all areas, or to improve household financial management for all population segments.

Appendix 2.1: Financial literacy questionnaire

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

[ ] More than $102

[ ] Exactly $102

[ ] Less than $102

[ ] I don't know

2.1.2. 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 in this account in total?

[ ]More than $200

[ ] Exactly $200

[ ] Less than $200

[ ] I don't know

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

[ ] More than today

[ ] Exactly the same

[ ] Less than today

[ ] I don't know

2.1.4. Assume a friend inherits $10,000 today and his sibling inherits $10,000 three years from now. Who is richer because of the inheritance?

[ ] My friend

[ ] His sibling

[ ] They are equally rich

[ ] I don't know

2.1.5. Which of the following statements describe the main function of the stock market?

[ ] The stock market helps to predict stock earnings

[ ] The stock market results in an increase in the price of stocks

[ ] The stock market brings people who want to buy stocks together with those who want to sell stocks

[ ] None of the above

[ ] I don't know

2.1.6. Which of the following statements is correct?

[ ] Once one invests in a mutual fund, one cannot withdraw the money in the first year

[ ] Mutual funds can invest in several assets, for example invest in both stocks and bonds

[ ] Mutual funds pay a guaranteed rate of return which depends on their past performance

[ ] None of the above

[ ] I don't know

2.1.7. If the interest rates [Rise/Fall], what should happen to bond prices?

[ ] They should rise

[ ] They should fall

[ ] They should stay the same

[ ] I don't know

2.1.8. Buying a [Single/Mutual] usually provides a safer return than a company stock?

[ ] True

[ ] False

[ ] I don't know

2.1.9. [Stocks/Bonds/Cap] are normally riskier than [Stocks/Bonds/Cap]

[ ] True

[ ] False

[ ] I don't know

2.1.10. Considering a long time period (for example 10 or 20 years), which asset normally gives the highest return?

[ ] Savings accounts

[ ] Bonds

[ ] Stocks

[ ] I don't know

2.1.11. Normally, which asset displays the highest fluctuations over time?

[ ] Savings accounts

[ ] Bonds

[ ] Stocks

[ ] I don't know

2.1.12. When an investor spreads his money among different assets, does the risk of losing money:

[ ] Increase

[ ] Decrease

[ ] Stay the same

[ ] I don't know

2.1.13. What happens if you buy a company's stock?

[ ] You own a part of the company

[ ] You have lent money to the company

[ ] You are liable for the company's debts

[ ] The company will return your original investment to you with interest

[ ] I don't know

2.1.14. What happens if you buy a company's bond?

[ ] You own a part of the company

[ ] You have lent money to the company

[ ] You are liable for the company's debts

[ ] You can vote on shareholder resolutions

[ ] I don't know

2.1.15. If you were to invest $1000 in a stock mutual fund, it would be possible to have less than $1000 when you withdraw your money.

[ ] True

[ ] False

[ ] I don't know

2.1.16. A stock mutual fund combines the money of many investors to buy a variety of stocks.

[ ] True

[ ] False

[ ] I don't know

2.1.17. It is hard to find mutual funds that have annual fees of less than one percent of assets.

[ ] True

[ ] False

[ ] I don't know

2.1.18. Mutual funds pay a guaranteed rate of return.

[ ] True

[ ] False

[ ] I don't know

2.1.19. Whole life insurance has a savings feature while "term" insurance does not.

[ ] True

[ ] False

[ ] I don't know

2.1.20. The cash value of a life insurance policy is the amount available if you surrender your life insurance policy while you're still alive.

[ ] True

[ ] False

[ ] I don't know

2.1.21. An annuity pays you money every year while you are alive, but stops paying money once you are dead.

[ ] True

[ ] False

[ ] I don't know

2.1.22. An annuity is a financial product that pays a lump sum when you die.

[ ] True

[ ] False

[ ] I don't know

2.1.23. How knowledgeable are you about the retirement plan offered by your employer?

1 to 7 Scale

2.1.24. A person who withdraws money from his 401(k) plan after he turns 59 1/2 must pay taxes on the money that he withdraws.

[ ] True
[ ] False
[ ] It depends on the type of 401(k) plan
[ ] I don't know

2.1.25. A person who withdraws money from her Individual Retirement Account (IRA) plan after she turns 59 1/2 must pay taxes on the money that she withdraws.

[ ] True
[ ] False
[ ] It depends on the type of IRA
[ ] I don't know

2.1.26. A person who has a defined contribution plan through work (like a 401(k) or 403(b) plan) is not eligible to open or deposit money into an IRA.

[ ] True
[ ] False
[ ] It depends on the type of IRA and/or 401(k) plan
[ ] I don't know

2.1.27. There are annual contribution limits on the amount you can save in a 401(k) plan or IRA that depend on your income

[ ] True

[ ] False

[ ] It depends on the type of IRA and/or 401(k) plan

[ ] I don't know

2.1.28. If you are undergoing any financial hardship, you will not incur an extra penalty if you withdraw money from a 401(k) plan or IRA before the age of 59 1/2.

[ ] True

[ ] False

[ ] It depends on the type of IRA and/or 401(k) plan

[ ] I don't know

2.1.29. After age 70 1/2, you have to withdraw at least some money from your 401(k) plan or IRA.

[ ] True

[ ] False

[ ] It depends on the type of IRA and/or 401(k) plan

[ ] I don't know

Appendix 2.2: Overall financial management questionnaire

2.2.1. How many bank accounts (checking) do you have?

2.2.2. How many bank accounts (savings) do you have?

2.2.3. How many credit cards (General purpose, Charge and Branded) do you have?

2.2.4. How many ATM and debit cards do you have?

2.2.5. Have you set up telephone banking?

2.2.6. Have you set up online banking?

2.2.7. Have you set up automatic bill payment?

2.2.8. Have you set up mobile banking?

2.2.9. During the past 12 months, did you carry an unpaid balance on any credit card from one month to the next (that is, you did not pay the balance in full at the end of the month)?

2.2.10. Please estimate your most recent credit rating, as measured by a FICO score?

2.2.11. During the past 12 months, did you overdraw any of your bank accounts?

2.2.12. Who prepared (or will prepare) your 2008 federal income tax return?

2.2.13. In your house how much responsibility do you have for budgeting and managing income?

2.2.14. How often do you (and your partner) keep track of your actual spending?

2.2.15. How often do you (and your partner) set budget targets for your spending?

2.2.16. How much do you shop around for the very best conditions when making major financial decisions?

2.2.17. Are you or were you ever behind your mortgage payment?

2.2.18. Do you currently have any money or assets that are held in an Individual Retirement Account, that is, in an IRA or KEOGH account?

2.2.19. How much have you thought about retirement?

2.2.20. Does your household now or did your household ever have any shares of stock or stock mutual funds?

2.2.21. Does your household now or did your household ever have any bonds?

2.2.22. What is the balance of your pension account now?

Appendix 2.3: Exact wordings of survey questions

2.3.1. Sociability

Who are the people with whom you discuss financial matters?

[ ] Name of the person

The question above is taken from ALP Social Networks survey, which records the name and number of individuals the respondent approaches for seeking financial advice. This survey was in field between September 2009 and November 2010, and has a response rate of 91%. The number of individuals that the households approach for financial advice is used to proxy sociability. This measure directly captures the influence of sociability on household financial decision making. The family, friends and peers from whom the households seek financial advice will transfer their financial know-how and experience that can affect the household financial decisions..

2.3.2. Economic shock

Over the past months there have been reports about the nation's financial problems including large drops in the stock market and in the housing market and increased rates of foreclosures and joblessness. As this financial crisis unfolds, more and more people have been affected in different ways. Have you (or your husband/wife/partner) been affected by these problems?

[ ] No [ ] Yes, a little [ ] Yes, a lot

The above question is taken from ALP Effects of Financial Crisis survey, measuring household exposure to economic shock. The average of the responses over the 22 months between 2009 and 2012 is taken as a proxy for economic shock. By using the average over multiple periods, not only the intensity of the economic shock is captured but also the frequency of the household exposure to economic shock is measured. A household facing the greatest number of economic shocks with highest impact will have the highest economic shock score.

2.3.4. Time preference

Would you prefer to receive 100 dollars today or 100 dollars one year from now?

[ ] 100 dollars today [ ] 100 one dollars year from now

The question is further repeated four times with different amounts offered in one year's time: $105, $110, $115 and $120. These questions measuring time preference of the households is taken from the Economic Conditions module of ALP Economy and Personal Financial Well Being survey. If the households choose to receive money today then they prefer present as compared to the future. The average of the household responses on these five questions is taken and this average is scaled between zero and one to proxy the household time preference.

2.3.5. Future expectations

What are the chances that you (and your husband/wife/partner) will leave an inheritance totaling $10,000 or more? Include properties and other valuable items as well in your total estimate. Remember, 0% means absolutely no chance, and 100% means you are absolutely certain.

For this question, the respondents provide a percentage number between 0 and 100. The question is further repeated twice with an increased inheritance amount of $100,000 and $500,000 respectively. The questions are obtained from the HRS P Expectations and N Healthcare Section survey. This survey was in the field from September 2009 until August 2013 and has a response rate of 98.52%. The proxy for future expectations is based on the weighted average of the responses on the three questions.

2.3.6. Self-confidence

I hardly ever expect things to go my way.

[ ] I strongly disagree [ ] I somewhat disagree [ ] I slightly disagree [ ] I slightly agree

[ ] I somewhat agree [ ] I strongly agree

The Optimism module of ALP Health Expectations survey contains the above-mentioned question that is used to create a proxy for household self-confidence. This survey was in the field from July 2010 to May 2011 and has a response rate of 89.49%. The responses are scaled between zero and one to create the index where zero corresponds to the households who strongly agree and one corresponds to the households who strongly disagree with the above statement.

2.3.7. Sense of commitment

i. How closely do you follow the suggestions of your doctor? Please indicate which of the below.

[ ] I closely follow the suggestions [ ] I loosely follow the suggestions [ ] I rarely follow the suggestions

[ ] I would like to follow the suggestions but I don't manage to do so

ii. Are you currently smoking cigarettes?

[ ] Yes [ ] No

iii. Do you go to a doctor to have a routine examination at least twice a year?

[ ] Yes [ ] No

iv. How many servings of alcohol do you have on a typical day? (One serving is a can of beer, a glass of wine or a shot of liquor.)

[ ] None [ ] 1 [ ] 2 [ ] 3 or more

v. How many times per week do you do some sort of moderate activity (like walking or raking the leaves) for at least 30 minutes?

[ ] None [ ] 1 [ ] 2 [ ] 3 or more

vi. All in all, how many hours per week do you do some sort of moderate activity?

[ ] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5 [ ] 6 or more

vii. On average, how many servings of fruits and vegetables do you eat in a day?

[ ] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5 [ ] 6 or more

viii. And how many servings of cereal fiber or whole grain (wheat bread, whole grain pasta, brown rice, oatmeal, whole grain breakfast cereal, bran or popcorn) do you eat in a typical day? A serving is one slice of bread, 1 ounce of breakfast cereal or $\frac{1}{2}$ cup of cooked cereal, pasta or rice. How many servings of refined grains (white bread, white rice, white pasta, white potatoes or low fiber cereals like crispy rice and corn flakes) do you eat in a typical day? A serving is one slice of bread, 1 ounce of breakfast cereal or $\frac{1}{2}$ cup of cooked cereal, pasta or rice.

[ ] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5 [ ] 6 or more

The eight questions above are part of the Health behaviors/Risk Factors module of ALP Health Expectations survey that are used to create a proxy for household sense of commitment. All above questions reflect how responsibly households treat themselves. Households with sense of commitment will also treat their own lives with commitment/responsibility. The average of the responses on these questions is taken, and proxy for sense of commitment is established by scaling the average between zero and one.

2.3.8. Risk aversion

Suppose that you unexpectedly inherited 1 million dollars. You have the chance to take a risky but possibly rewarding investment option that has a 50-50 chance of doubling the money to 2 million dollars in a month, and a 50-50 chance of reducing the money by one third, to 667,000 dollars in a month. Would you choose to invest in the risky asset?

[ ] Yes [ ] No

Following Barsky, Juster, Kimball, and Shapiro (1997) and Hung, Parker, and Yoong (2010), this study uses the above question from the Risk and Time Preference module of ALP Department of Labor (DOL) Pilot survey, fielded between June 2011 and August 2011 with a response rate of 85.04%, to create the household risk aversion proxy. The above question is repeated if the respondent chooses

the fixed income over the lottery option, with a reduced level of potential loss in income until the respondent switches from the fixed option to the lottery option. However, if the respondent chooses the lottery option in the first question then the questions are repeated with an increased level of potential loss until the respondent switches from the lottery to the fixed amount option. If the proportion of potential loss is defined as $1 - \lambda$ then λ is the risk aversion measure of the households and it is calculated at the point where the households decide to switch from the fixed income to lottery options (or vice versa). For example, if a household is willing to risk all their income, then $\lambda = 0$, showing that the household is a completely risk-taker. In this index, zero corresponds to the lowest risk aversion and one corresponds to the highest risk aversion.

Appendix 2.4: Dimensions of financial literacy

Financial literacy question	Dimensions																													Mean
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
Numeracy	.136	.053	.044	.034	.203	.004	.133	.005	.094	.026	.000	.001	.004	.010	.000	.000	.021	.005	.012	.006	.001	.122	.046	.000	.028	.008	.001	.000	.002	.034
Compound Interest	.202	.047	.109	.018	.127	.000	.075	.004	.043	.015	.017	.001	.013	.004	.001	.000	.016	.001	.042	.014	.014	.172	.034	.002	.025	.006	.000	.000	.000	.034
Inflation	.168	.006	.007	.002	.014	.016	.002	.017	.038	.189	.014	.055	.336	.044	.003	.016	.002	.050	.003	.000	.001	.000	.008	.002	.004	.003	.000	.000	.000	.034
Time Value of Money	.038	.054	.037	.017	.038	.270	.055	.026	.012	.014	.213	.063	.002	.119	.015	.000	.006	.000	.002	.005	.004	.000	.001	.006	.003	.002	.000	.000	.000	.034
Stock Market	.018	.034	.119	.019	.038	.079	.232	.042	.004	.047	.119	.129	.048	.011	.029	.008	.003	.008	.005	.000	.000	.000	.002	.006	.000	.001	.000	.001	.001	.034
Mutual Funds	.403	.012	.001	.024	.087	.000	.000	.001	.025	.040	.008	.009	.007	.029	.000	.000	.002	.006	.000	.029	.049	.022	.001	.054	.001	.046	.064	.036	.044	.034
Bonds	.033	.000	.229	.018	.055	.319	.004	.001	.016	.001	.000	.061	.030	.113	.016	.009	.000	.022	.003	.000	.023	.003	.008	.001	.028	.004	.001	.001	.000	.034
Stocks / mutual Fund	.376	.001	.016	.028	.001	.006	.031	.002	.000	.003	.000	.019	.001	.027	.018	.062	.007	.010	.002	.202	.075	.002	.015	.002	.022	.051	.002	.019	.001	.034
Stocks / bonds	.205	.000	.060	.007	.058	.018	.047	.006	.007	.032	.032	.035	.057	.088	.007	.130	.023	.102	.011	.058	.002	.000	.000	.003	.004	.001	.005	.001	.001	.034
Saving accounts / stocks / bonds	.299	.010	.134	.000	.018	.001	.000	.002	.002	.001	.026	.015	.024	.144	.001	.009	.034	.090	.001	.001	.002	.000	.015	.001	.075	.073	.010	.006	.000	.034
Saving accounts / stocks / bonds	.377	.049	.000	.018	.006	.001	.001	.001	.007	.006	.010	.001	.003	.011	.015	.060	.015	.134	.020	.026	.058	.009	.016	.017	.056	.062	.020	.000	.002	.034
Risk diversification	.372	.010	.012	.020	.053	.000	.002	.009	.000	.005	.010	.001	.027	.024	.029	.010	.075	.045	.003	.037	.062	.031	.007	.038	.010	.041	.059	.003	.007	.034
Stocks	.251	.000	.243	.009	.019	.076	.006	.013	.000	.004	.000	.001	.005	.006	.020	.019	.020	.016	.000	.000	.059	.001	.083	.003	.125	.014	.006	.000	.001	.034
Bonds	.194	.038	.006	.002	.003	.019	.044	.129	.016	.072	.121	.111	.013	.008	.001	.054	.008	.040	.005	.000	.001	.008	.077	.001	.010	.013	.004	.000	.000	.034
Stock mutual fund	.388	.025	.005	.026	.004	.000	.015	.025	.001	.012	.033	.031	.000	.001	.003	.045	.000	.017	.030	.002	.000	.026	.209	.010	.001	.082	.006	.002	.000	.034
Stock mutual fund	.319	.024	.000	.046	.045	.002	.040	.007	.023	.007	.011	.012	.000	.000	.074	.019	.011	.024	.010	.082	.147	.005	.009	.000	.026	.030	.018	.009	.000	.034
Mutual funds	.444	.004	.002	.010	.087	.000	.031	.000	.010	.012	.011	.001	.002	.002	.001	.008	.000	.003	.028	.000	.019	.000	.001	.018	.030	.000	.244	.021	.009	.034
Mutual funds	.025	.054	.031	.001	.182	.017	.018	.000	.368	.020	.054	.064	.000	.045	.071	.013	.003	.002	.000	.013	.007	.004	.002	.004	.000	.000	.002	.001	.001	.034
Whole life insurance	.467	.016	.005	.008	.080	.003	.001	.010	.017	.016	.011	.006	.004	.010	.005	.015	.007	.000	.001	.039	.001	.005	.001	.000	.002	.008	.002	.195	.067	.034
Insurance policy	.236	.031	.004	.116	.004	.001	.111	.046	.066	.050	.005	.001	.022	.008	.010	.000	.010	.000	.024	.029	.002	.010	.000	.170	.022	.007	.007	.007	.000	.034
Annuity	.217	.032	.017	.117	.019	.000	.083	.020	.088	.083	.045	.003	.000	.007	.002	.005	.000	.007	.007	.008	.010	.015	.003	.183	.017	.006	.000	.003	.002	.034
Annuity	.102	.044	.001	.306	.000	.072	.000	.042	.009	.118	.002	.000	.010	.009	.005	.009	.016	.004	.196	.002	.011	.026	.002	.000	.006	.000	.005	.001	.000	.034
Retirement plan	.205	.000	.008	.204	.000	.059	.004	.003	.003	.131	.007	.020	.010	.001	.001	.000	.037	.000	.208	.010	.004	.054	.014	.000	.009	.001	.003	.004	.001	.034
401k plan	.162	.438	.003	.066	.035	.000	.002	.040	.015	.002	.000	.002	.002	.000	.004	.002	.001	.002	.003	.000	.005	.000	.000	.001	.000	.007	.001	.073	.132	.034
IRA plan	.087	.486	.007	.094	.016	.000	.003	.064	.011	.004	.001	.001	.018	.005	.005	.005	.000	.004	.001	.003	.000	.000	.001	.000	.001	.019	.000	.049	.116	.034
401k / IRA plan	.127	.013	.027	.003	.018	.037	.035	.275	.001	.012	.023	.066	.071	.001	.120	.112	.000	.008	.019	.029	.001	.000	.000	.001	.000	.000	.000	.001	.000	.034
401k / IRA plan	.211	.034	.006	.007	.000	.020	.038	.002	.061	.001	.047	.006	.104	.050	.193	.034	.135	.001	.013	.011	.005	.009	.000	.008	.003	.001	.000	.000	.001	.034
401k / IRA plan	.064	.046	.095	.026	.024	.058	.006	.233	.004	.004	.054	.125	.013	.031	.084	.107	.009	.000	.001	.001	.003	.004	.002	.001	.002	.001	.001	.000	.000	.034
401k / IRA plan	.253	.041	.073	.002	.003	.015	.025	.005	.048	.026	.000	.000	.005	.000	.056	.001	.245	.077	.003	.024	.034	.038	.001	.013	.001	.001	.010	.000	.001	.034
Percenage of variance	21.999	5.518	4.485	4.302	4.264	3.765	3.605	3.553	3.412	3.285	3.010	2.901	2.865	2.779	2.716	2.603	2.443	2.337	2.245	2.181	2.068	1.960	1.919	1.883	1.767	1.680	1.626	1.490	1.340	3.448

Appendix 2.5: Dimensions of financial management

Financial management question	Dimension																						Mean
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
Set up online banking	.009	.008	.288	.071	.000	.022	.011	.058	.127	.000	.003	.023	.008	.000	.000	.117	.055	.161	.026	.007	.004	.001	.045
Manage income tax	.168	.113	.093	.069	.006	.022	.003	.001	.010	.008	.015	.251	.109	.351	.002	.005	.003	.004	.031	.006	.002	.001	.058
Shop around	.003	.028	.143	.163	.220	.018	.006	.017	.013	.003	.007	.005	.003	.000	.076	.069	.090	.105	.011	.003	.001	.032	.046
Have savings account	.048	.462	.081	.013	.013	.146	.005	.008	.027	.010	.030	.026	.028	.029	.026	.009	.045	.058	.024	.005	.201	.006	.059
Have stocks	.031	.100	.034	.001	.279	.029	.005	.025	.058	.006	.013	.019	.139	.034	.035	.098	.020	.042	.028	.005	.000	.000	.045
Set uo automatic bill payment	.170	.000	.159	.043	.006	.009	.044	.000	.000	.015	.121	.056	.009	.006	.013	.064	.141	.042	.090	.011	.000	.000	.045
Overdrawn bank account	.397	.015	.050	.008	.005	.015	.001	.001	.033	.001	.000	.007	.136	.005	.006	.021	.044	.015	.070	.168	.018	.001	.046
Set budget targets	.000	.065	.164	.574	.113	.012	.010	.011	.002	.000	.002	.004	.006	.002	.014	.008	.009	.012	.003	.000	.001	.210	.056
Have bondsă	.246	.045	.025	.008	.031	.051	.017	.003	.066	.000	.001	.007	.119	.074	.028	.043	.076	.101	.047	.011	.000	.000	.045
Credit Cards	.080	.102	.069	.030	.013	.069	.183	.114	.037	.358	.093	.005	.005	.024	.035	.030	.006	.011	.017	.018	.008	.013	.060
Credit rating	.418	.062	.084	.018	.023	.016	.024	.013	.005	.001	.016	.002	.032	.017	.032	.001	.015	.014	.022	.314	.002	.003	.052
Behind monthly mortgage payment	.047	.007	.005	.000	.075	.021	.279	.043	.256	.001	.202	.026	.009	.003	.002	.000	.002	.003	.009	.012	.000	.000	.045
Set up mobile banking	.086	.030	.038	.001	.000	.120	.094	.065	.009	.156	.016	.239	.037	.018	.021	.055	.001	.007	.001	.003	.002	.000	.045
Have individual retirement accounts	.113	.005	.002	.024	.301	.018	.003	.003	.037	.030	.005	.036	.000	.068	.311	.001	.019	.014	.001	.005	.001	.002	.045
Carry unpaid balance on credit card	.059	.161	.167	.086	.005	.017	.000	.000	.021	.019	.058	.002	.024	.029	.000	.017	.084	.009	.198	.018	.021	.004	.045
Debit Cards	.051	.148	.285	.072	.021	.044	.014	.023	.024	.012	.131	.031	.146	.073	.010	.046	.034	.095	.007	.004	.052	.007	.060
Keep track of spendings	.010	.036	.113	.558	.199	.012	.009	.016	.002	.004	.003	.002	.002	.003	.020	.034	.020	.026	.008	.001	.002	.161	.057
Amount in pension account	.003	.002	.002	.001	.009	.039	.316	.496	.094	.005	.025	.002	.000	.001	.002	.000	.000	.001	.005	.002	.000	.000	.046
Set up telephone banking	.173	.105	.005	.003	.004	.069	.023	.023	.012	.001	.088	.043	.000	.145	.188	.000	.074	.000	.029	.013	.000	.000	.045
Budgeting and managing income	.078	.096	.094	.028	.052	.026	.001	.054	.140	.020	.119	.034	.055	.003	.045	.145	.003	.020	.059	.007	.002	.003	.049
Think about retirement	.044	.066	.011	.017	.027	.285	.006	.044	.009	.320	.027	.094	.026	.005	.001	.066	.003	.005	.008	.000	.002	.002	.049
Have checking account	.037	.574	.077	.010	.008	.103	.003	.010	.018	.018	.023	.021	.021	.014	.012	.008	.017	.015	.018	.010	.321	.003	.061
Percenage of variance	10.330	10.138	9.044	8.177	6.409	5.291	4.821	4.672	4.549	4.494	4.536	4.252	4.161	4.107	3.996	3.802	3.471	3.453	3.233	2.832	2.918	2.043	5.033

Table 2.1: **Categorical principal component analysis results for financial literacy and overall financial behavior index.** Columns 1 and 2 report the eigenvalues and the proportion of the variance explained by the dimensions of financial literacy index, and Columns 3 and 4 present the eigenvalues and the proportion of the variance explained by the dimensions of overall financial behavior index. For financial literacy index, the total number of dimensions is 29, which is the number of items in financial literacy questionnaire. For overall financial behavior index, the total number of dimensions is 22, which is the number of items in overall financial behavior questionnaire. Optimal scaling level of all the variables is set as ordinal.

Financial Literacy			Financial Management		
Dimension	Total (Eigenvalue)	% of Variance	Dimension	Total (Eigenvalue)	% of Variance
	(1)	(2)		(3)	(4)
1	6.38	21.999	1	2.037	9.259
2	1.6	5.518	2	1.763	8.013
3	1.301	4.485	3	1.737	7.897
4	1.248	4.302	4	1.663	7.561
5	1.237	4.264	5	1.183	5.376
6	1.092	3.765	6	1.059	4.812
7	1.045	3.605	7	1.021	4.643
8	1.031	3.553	8	0.997	4.532
9	0.99	3.412	9	0.962	4.372
10	0.953	3.285	10	0.947	4.306
11	0.873	3.01	11	0.927	4.213
12	0.841	2.901	12	0.88	3.998
13	0.831	2.865	13	0.853	3.875
14	0.806	2.779	14	0.83	3.772
15	0.788	2.716	15	0.811	3.684
16	0.755	2.603	16	0.781	3.548
17	0.708	2.443	17	0.716	3.256
18	0.678	2.337	18	0.694	3.154
19	0.651	2.245	19	0.646	2.937
20	0.632	2.181	20	0.591	2.689
21	0.6	2.068	21	0.498	2.263
22	0.569	1.96	22	0.405	1.84
23	0.556	1.919		-	-
24	0.546	1.883		-	-
25	0.512	1.767		-	-
26	0.487	1.68		-	-
27	0.472	1.626		-	-
28	0.432	1.49		-	-
29	0.389	1.34		-	
Total	29	100		22	100

Table 2.2: **Summary statistics.** This table reports the summary statistics of our sample. The description and construction of all the variables is detailed in Section 2. The data have been obtained from American Life Panel (ALP). The table reports the mean, standard deviation, minimum and maximum values of the variables, and no. of observations.

Variable	Mean	Stdev	Minimum	Maximum	N	ALP survey labels
Age	53	13.10	19	109	1716	Demographics and survey selection
Education	11.842	2.063	4	16	1716	Demographics and survey selection
Employed	0.612	0.487	0	1	1716	Demographics and survey selection
Male	0.446	0.497	0	1	1716	Demographics and survey selection
Income	72000	10150	0	211000	1616	Effects of the Financial Crisis
Expense	3473	3218	0	54000	1692	Effects of the Financial Crisis
Sociability	2.401	1.554	0	5	680	Social Network
Economic shock	0.467	0.252	0	1	1705	Effects of the Financial Crisis
Time preference	0.344	0.320	0	1	1390	Department of Labor (DOL) Pilot
Future expectations	0.293	0.297	0	1	1641	HRS P Expectations and N Healthcare sections
Self-confidence	0.628	0.213	0	1	1547	Health Expectations
Sense of commitment	0.486	0.113	0.1198	0.864	1547	Health Expectations
Risk aversion	0.823	0.171	0.25	1	1393	Department of Labor (DOL) Pilot

Table 2.3: **Correlations matrix.** This table reports the Spearman's rank correlations for all the variables in our sample. The description and construction of all the variables is detailed in Section 2.2.

1	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.Financial literacy	1													
2.Male	-0.264	1												
3.Age	0.175	-0.134	1											
4.Education	0.194	-0.087	-0.019	1										
5.Employed	-0.034	-0.001	-0.502	0.147	1									
6.Income	0.266	-0.118	-0.198	0.316	0.308	1								
7.Expense	0.195	-0.048	-0.213	0.247	0.227	0.632	1							
8.Social network	0.094	0.005	-0.019	0.134	0.000	0.038	0.070	1						
9.Economic shock	0.149	-0.012	-0.056	0.114	0.082	0.168	0.228	0.161	1					
11.Time preference	0.219	-0.180	0.067	0.212	0.030	0.149	0.094	0.090	0.154	1				
12.Future expectations	0.257	-0.104	0.027	0.280	0.047	0.416	0.309	0.047	0.091	0.213	1			
13.Self-confidence	0.144	-0.020	0.158	0.154	-0.058	0.133	0.128	0.076	0.063	0.076	0.181	1		
14.Sense of commitment	-0.006	0.034	0.249	0.066	-0.247	-0.104	-0.079	0.015	-0.092	0.016	0.019	0.067	1	
15.Risk aversion	-0.158	0.151	0.148	-0.156	-0.173	-0.223	-0.132	-0.061	-0.075	-0.150	-0.080	-0.048	0.055	1

Table 2.4: **Analysis of overall financial management.** This table reports mean marginal effects obtained from ordinary least square regressions. The robust standard errors are reported in the parentheses. The dependent variable is the overall financial management index measured through performing categorical principal component analysis on twenty two aspects of household financial management categorized as cash flow management, credit management, retirement saving, and investment. The explanatory variables are financial literacy and demographic and psychological characteristics. ***, ** and * denote significance at 1, 5 and 10 percent respectively.

	(1)	(2)	(3)	(4)	(5)
Financial literacy	0.154***	0.107***	0.0994***	0.145***	0.108***
	(0.014)	(0.015)	(0.016)	(0.029)	(0.032)
Age		0.00108***	0.00103***	0.00117**	0.00122**
		(0.000)	(0.000)	(0.000)	(0.001)
Education		0.00831***	0.00716***	0.00722***	0.00377
		(0.001)	(0.001)	(0.002)	(0.003)
Employed		0.00423	0.00190	-0.0103	-0.00707
		(0.006)	(0.006)	(0.009)	(0.010)
Male		0.000880	0.00139	0.00264	0.00408
		(0.005)	(0.005)	(0.009)	(0.010)
Income (in thousands)			0.000837*	0.00116**	0.00135**
			0.000	-0.001	(0.001)
Expense (in thousands)			-0.000104	0.0000228	-0.00200*
			(0.001)	(0.001)	(0.001)
Social network				0.00650**	0.00357
				(0.003)	(0.003)
Economic shock					0.0704***
					(0.019)
Time preference					0.00338
					(0.015)
Future expectations					0.0389**
					(0.017)
Self-confidence					0.0522**
					(0.022)
Sense of commitment					0.0962**
					(0.040)
Risk aversion					0.00683
					(0.029)
Adjusted R-squared	0.077	0.113	0.112	0.131	0.180
Observations	1709	1709	1611	642	560

Table 2.5: **Analysis of retirement saving.** This table reports the mean marginal effects obtained from ordinary least square regressions. The robust standard errors are reported in the parentheses. The dependent variable is the households' total value of pension account. The explanatory variables are financial literacy and demographic and psychological characteristics. ***, ** and * denote significance at 1, 5 and 10 percent respectively.

	(1)	(2)	(3)	(4)	(5)
Financial literacy	0.0839***	0.0283***	0.0185*	0.0484***	0.0256**
	(0.010)	(0.010)	(0.010)	(0.011)	(0.011)
Age		0.00140***	0.00143***	0.000956***	0.00103***
		(0.000)	(0.000)	(0.000)	(0.000)
Education		0.00942***	0.00708***	0.00687***	0.00451***
		(0.001)	(0.001)	(0.001)	(0.001)
Employed		-0.00933	-0.0128**	-0.00133	0.00720
		(0.006)	(0.006)	(0.006)	(0.005)
Male		-0.00801*	-0.00775*	0.00198	0.00127
		(0.005)	(0.005)	(0.004)	(0.004)
Income (in thousands)			0.00131***	0.00149***	0.00118**
			0.000	0.000	(0.001)
Expense (in thousands)			0.00257***	0.00214**	0.00137*
			(0.001)	(0.001)	(0.001)
Social network				-0.000977	-0.000855
				(0.001)	(0.001)
Economic shock					0.0288***
					(0.008)
Time preference					0.0269***
					(0.007)
Future expectations					0.0345***
					(0.008)
Self-confidence					0.0115
					(0.009)
Sense of commitment					0.0238
					(0.016)
Risk aversion					0.00384
					(0.010)
Adjusted R-squared	0.028	0.116	0.179	0.242	0.327
Observations	1324	1324	1289	539	474

Table 2.6: **Analysis of cash flow management.** This table reports the mean marginal effects obtained from ordinary least square regressions. The robust standard errors are reported in the parentheses. The dependent variable is the household cash flow management index quantified by performing categorical principal component analysis on 11 items related to cash flow management. The explanatory variables are financial literacy and demographic and psychological characteristics. ***, ** and * denote significance at 1, 5 and 10 percent respectively.

	(1)	(2)	(3)	(4)	(5)
Financial literacy	0.00213	-0.0195	-0.00337	-0.00153	0.0185
	(0.018)	(0.020)	(0.021)	(0.041)	(0.044)
Age		0.00152***	0.00156***	0.00137**	0.000660
		(0.000)	(0.000)	(0.001)	(0.001)
Education		-0.00646***	-0.00625***	-0.00102	-0.00281
		(0.002)	(0.002)	(0.004)	(0.004)
Employed		-0.0308***	-0.0295***	-0.0365**	-0.0284*
		(0.008)	(0.009)	(0.015)	(0.017)
Male		0.0109	0.00818	0.0127	0.0126
		(0.007)	(0.008)	(0.014)	(0.015)
Income (in thousands)			-0.0000315	-0.000914	-0.000410
			0.000	-0.001	(0.001)
Expense (in thousands)			-0.00257*	-0.00374	-0.00489
			(0.001)	(0.003)	(0.004)
Social network				-0.00268	-0.00355
				(0.004)	(0.005)
Economic shock					-0.00579
					(0.031)
Time preference					-0.00425
					(0.023)
Future expectations					0.0152
					(0.024)
Self-confidence					0.0165
					(0.036)
Sense of commitment					0.165**
					(0.068)
Risk aversion					0.109**
					(0.049)
Adjusted R-squared	0.000	0.050	0.057	0.047	0.070
Observations	1708	1708	1611	642	560

Table 2.7: **Analysis of credit management.** This table reports the mean marginal effects obtained from ordinary least square regressions. The robust standard errors are reported in the parentheses. The dependent variable is the households debt management index created by using the 4 items related to credit management. The explanatory variables are financial literacy and demographic and psychological characteristics. ***, ** and * denote significance at 1, 5 and 10 percent respectively.

	(1)	(2)	(3)	(4)	(5)
Financial literacy	0.182***	0.112***	0.119***	0.189***	0.195***
	(0.033)	(0.035)	(0.034)	(0.056)	(0.058)
Age		0.00217***	0.00201***	-0.000586	-0.0000276
		(0.001)	(0.001)	(0.001)	(0.001)
Education		0.0130***	0.00925***	0.00882**	0.00850*
		(0.003)	(0.003)	(0.004)	(0.005)
Employed		0.0490***	0.0336**	-0.00780	-0.00250
		(0.013)	(0.013)	(0.017)	(0.019)
Male		-0.00360	-0.00533	0.0174	0.00708
		(0.011)	(0.010)	(0.015)	(0.016)
Income (in thousands)			0.000855	0.00195**	0.00221**
			-0.001	-0.001	(0.001)
Expense (in thousands)			0.00895***	0.00759**	0.00726**
			(0.002)	(0.004)	(0.004)
Social network				-0.000381	-0.00160
				(0.005)	(0.005)
Economic shock					-0.0795**
					(0.036)
Time preference					-0.0119
					(0.026)
Future expectations					0.00412
					(0.027)
Self-confidence					0.0146
					(0.041)
Sense of commitment					0.0262
					(0.066)
Risk aversion					0.0358
					(0.047)
Adjusted R-squared	0.026	0.056	0.093	0.100	0.098
Observations	1614	1614	1548	622	543

Table 2.8: **Analysis of investment management.** This table reports the mean marginal effects obtained from ordinary least square regressions. The robust standard errors are reported in the parentheses. The dependent variable is the average of number of assets such bonds, stocks, IRA or KEOGH accounts, and the number of saving accounts households posses. The explanatory variables are financial literacy and demographic and psychological characteristics. ***, ** and * denote significance at 1, 5 and 10 percent respectively.

	(1)	(2)	(3)	(4)	(5)
Financial literacy	0.225***	0.166***	0.153***	0.262***	0.252***
	(0.028)	(0.029)	(0.031)	(0.052)	(0.057)
Age		0.00152***	0.00146***	0.000115	-0.000449
		(0.000)	(0.000)	(0.001)	(0.001)
Education		0.00947***	0.00826***	0.0125***	0.0149***
		(0.003)	(0.003)	(0.004)	(0.005)
Employed		0.157***	0.151***	0.125***	0.102***
		(0.013)	(0.013)	(0.020)	(0.022)
Male		0.0133	0.0132	-0.0212	-0.0176
		(0.011)	(0.012)	(0.018)	(0.020)
Income (in thousands)			0.00138**	0.000110	0.000173
			-0.001	-0.001	(0.001)
Expense (in thousands)			0.00227	0.00486*	0.00420
			(0.002)	(0.003)	(0.003)
Social network				0.00393	-0.00244
				(0.005)	(0.006)
Economic shock					0.0741*
					(0.041)
Time preference					0.0378
					(0.030)
Future expectations					-0.0112
					(0.034)
Self-confidence					-0.00222
					(0.042)
Sense of commitment					-0.111
					(0.084)
Risk aversion					0.0250
					(0.061)
Adjusted R-squared	0.033	0.132	0.132	0.155	0.168
Observations	1709	1709	1611	642	560

Table 2.9: **Analysis of financial spread.** Columns 1 to 4 of this table report mean marginal effects from probit regressions, where the dummy dependent variable takes the value of 1 if households have positive financial spread and 0 if households have negative financial spread. Columns 5 to 8 report mean marginal effects from ordinary least square regressions, where the dependent variable equals to the level of household financial spread. The robust standard errors are reported in the parentheses. The explanatory variables include household demographic and psychological characteristics. ***, **, * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Probit estimates				OLS estimates			
Age	0.0206***	0.0200***	0.0117**	0.0117*	0.00295***	0.00291***	0.00214***	0.00226**
	(0.003)	(0.003)	(0.006)	(0.006)	(0.000)	(0.000)	(0.001)	(0.001)
Education	0.111***	0.0810***	0.0587**	0.0410	0.0140***	0.0111***	0.00345	0.00292
	(0.017)	(0.019)	(0.029)	(0.033)	(0.002)	(0.002)	(0.004)	(0.004)
Employed	0.160**	0.0691	0.0541	0.0315	0.0213**	0.0120	0.0202	0.0131
	(0.077)	(0.082)	(0.126)	(0.143)	(0.010)	(0.010)	(0.015)	(0.017)
Male	0.379***	0.375***	0.243**	0.219*	0.0614***	0.0654***	0.0575***	0.0485***
	(0.071)	(0.074)	(0.117)	(0.128)	(0.009)	(0.009)	(0.013)	(0.015)
Income		0.0181***	0.0337***	0.0300**		0.000456	0.00195**	0.00119
		(0.006)	(0.011)	(0.013)		(0.000)	(0.001)	(0.001)
Expense		0.00749	-0.00747	-0.00858		0.00248*	0.00159	0.00201
		(0.013)	(0.017)	(0.018)		(0.001)	(0.003)	(0.003)
Social network			0.00654	0.00458			-0.000723	0.000118
			(0.036)	(0.040)			(0.005)	(0.005)
Economic shock				0.176				0.0102
				(0.248)				(0.030)
Time preference				0.256				0.0306
				(0.200)				(0.024)
Future expectations				0.424*				0.0132
				(0.243)				(0.026)
Self-con?dence				-0.265				-0.00951
				(0.291)				(0.037)
Sense of commitment				-0.818				-0.160**
				(0.512)				(0.065)
Risk aversion				-0.752*				-0.102*
				(0.442)				(0.054)
Pseudo/Adjusted R-squared	0.110	0.159	0.095	0.142	0.098	0.105	0.066	0.082
Observations	1692	1596	636	556	1693	1596	636	556

Table 2.10: **Alternative financial literacy measures.** This table reports mean marginal effects from ordinary least square regressions. In Panel A, financial literacy is measured on the basis of three questions on interest, inflation and investment. In Panel B, financial literacy is measured through self-reported measure. In Panel C, financial literacy is instrumented through exposure to economics education in school. In Columns 1 to 3, dependent variable is overall financial management, in Columns 4 to 6 the dependent variable is retirement saving, in Columns 7 to 9 dependent variable is cash flow management, in Columns 10 to 12 dependent variable is credit management, and in Columns 13 to 15 dependent variable is investment management. The robust standard errors are reported in the parentheses. The explanatory variables are financial literacy and demographic and psychological characteristics. ***, **, * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	Overall financial management			Retirement saving			Cash flow management			Credit management			Investment		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Demographic variables	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Psychological variables	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Panel A: Ffinancial literacy based on interest rate, inflation and investment															
Financial literacy*	0.078***	0.070***	0.049***	0.045***	0.024***	0.021***	-0.002	0.005	0.010	0.103***	0.067**	0.053	0.134***	0.121***	0.117***
	(0.008)	(0.018)	(0.019)	(0.009)	(0.007)	(0.007)	(0.012)	(0.029)	(0.032)	(0.020)	(0.032)	(0.034)	(0.018)	(0.033)	(0.036)
R Squared	0.050	0.115	0.179	0.022	0.236	0.331	0.000	0.047	0.071	0.021	0.084	0.080	0.029	0.140	0.156
Number of observations	1708	642	560	1323	539	474	1708	642	560	1614	622	543	1708	642	560
Panel B: Self reported financial literacy															
Financial literacy**	0.029***	0.033***	0.040***	0.017***	0.011***	0.009***	0.002	0.012	0.023**	0.026***	0.012	0.028**	0.012*	0.021**	0.034**
	(0.003)	(0.005)	(0.007)	(0.003)	(0.003)	(0.003)	(0.004)	(0.008)	(0.011)	(0.007)	(0.009)	(0.012)	(0.007)	(0.010)	(0.013)
R Squared	0.060	0.155	0.215	0.022	0.236	0.331	0.000	0.056	0.078	0.013	0.081	0.084	0.002	0.130	0.150
Number of observations	1563	612	559	1323	539	474	1562	612	559	1497	595	542	1563	612	559
Panel C: Instrument variable for financial literacy															
Financial literacy***	0.034***	0.041***	0.036***	0.004	0.002	0.000	-0.018**	0.003	0.006	0.026	0.029*	0.028**	0.051***	0.046**	0.038*
	(0.005)	(0.009)	(0.010)	(0.005)	(0.005)	(0.005)	(0.007)	(0.015)	(0.011)	(0.016)	(0.017)	(0.012)	(0.012)	(0.019)	(0.020)
R Squared	0.025	0.120	0.181	0.000	0.226	0.323	0.003	0.047	0.070	0.000	0.081	0.080	0.011	0.132	0.146
Number of observations	1678	642	560	1304	539	474	1678	642	560	1592	622	543	1678	642	560

3 Household stock market literacy, trust and participation

This chapter studies the importance of stock market literacy and trust for stock ownership decisions. While stock market literacy lowers a household cost of participating in the market, trust increases return expectations from investment in stocks. These two distinct channels simultaneously explain not only the probability of participation but also the share of wealth invested in stocks. Further, it is found that, once the study accounts for stock market literacy, sociability is no longer important for stock market participation, and what matters is literacy rather than sociability. Further, it observed that economic shocks and future expectations are the key psychological characteristics that explain a household decision to invest in stocks; however, upon participation, a larger set of psychological characteristics, including past economic shocks, future expectations, self-confidence and time preference, is found to explain a household decision on how much to invest in stocks.

3.1 Introduction

In explaining the stock market non-participation puzzle, there is a growing literature that studies the psychological factors that act as barriers to stock ownership. Recent literature suggests that household participation in the stock market is driven by factors such as optimism (Puri and Robinson, 2007), trust in financial markets (Guiso, Sapienza, and Zingales, 2008), intelligence quotient (Grinblatt, Keloharju, and Linnainmaa, 2011), genetics (Barnea, Cronqvist, and Siegel, 2010), political orientation (Kaustia and Torstila, 2011), the ability to understand investment (Graham, Harvey, and Huang, 2009; Christelis, Jappelli, and Padula, 2010), stock market return experience (Malmendier and Nagel, 2011), educational attainment and financial sophistication (Christelis, Georgarakos, and Haliassos, 2011), financial literacy (Cardak and Wilkins, 2009; van Rooij, Lusardi, and Alessie, 2011), cognitive ability (Benjamin, Brown, and Shapiro, 2013), and sociability (Hong, Kubik, and Stein, 2004; Bönte and Filipiak, 2012).

Recently, Georgarakos and Pasini (2011) assess the joint impact of trust and sociability on stock market participation. They show that trust and sociability affect stock ownership through distinct channels, where mistrust lowers the expected return on investment, making stock market participation unattractive, and sociability serves to reduce the fixed cost of participation through cheaper information sharing. However, Bönte and Filipiak (2012) report that the household investment decisions are not strongly affected by their social interaction once the households are aware of shares, bonds and mutual funds. They observe that although social interaction may not influence investment in financial instruments directly, word-of-mouth communication affects individuals' awareness of the financial instruments, thereby indirectly affecting investment. Meanwhile, van Rooij, Lusardi, and Alessie (2011) find that financial literacy plays a key role in understanding the non-participation puzzle. They show that the households with low financial literacy are significantly

less likely to invest in stocks. However, the mechanism through which financial literacy influences stock ownership decisions is unclear.

Therefore, this chapter empirically tests whether sociability is capturing the effect of stock market literacy and hence whether it is literacy, rather than sociability, that matters for understanding stock market participation. Georgarakos and Pasini (2011) document that the more sociable households reduce their participation costs through cheaper information sharing, thereby increasing participation. This work argues that sociability actually proxies for the household stock market literacy, and hence introducing stock market literacy, which is the aggregate product of stock market knowledge and awareness, should capture the effect of sociability on stock market participation. Moreover, it is argued that the evidence for the distinct roles of trust and sociability on stock ownership observed by Georgarakos and Pasini (2011) can be explained by the unique and distinct effects of trust and stock market literacy on participation. As in Guiso, Sapienza, and Zingales (2008), this study defines trust as the firm reliance on the characteristics of the financial system such as sound management, quality of investor protection, and effective regulation and supervision. The household level of trust in the stock market cannot necessarily be associated with their knowledge about the stock market. Knowing about the market does not make the market trustworthy. The empirical findings of this work support these conjectures.

To understand the distinct effects of stock market literacy and trust on participation, this work adopts the standard two-asset portfolio model framework. In this theoretical framework, a payment or cost levied for participating in stock market reduces the disposable wealth to be invested in the asset portfolio, hence lowering the expected returns from the portfolio. This escalates the threshold level for the proportion of initial investment in the stock market, below which participation is no longer worthwhile. The literature identifies different categories of participation cost for example, Vissing-Jorgensen (2002) categorizes participation costs as

fixed entry costs, fixed and variable transaction costs and per period trading costs and Andersen and Nielsen (2011), Haliassos and Bertaut (1995), and Campbell (2006) report fixed entry or ongoing participation costs to be the leading explanation for non-participation in the stock market. The contents of the categories of participation cost vary across researches but all these researches report two main components of the participation cost that are the cost paid in monetary terms and the opportunity cost of time and resources. These two aspects of stock market participation cost can be decomposed into the tangible cost, including the bid ask spread paid to the market maker, cost to open the accounts and setting up the trade, fixed and variable brokerage fee/commission, and intangible cost consisting of cost of time and resources spent to understand the principles and working of stock market, acquiring information about different stocks and their risk and return to set the suitable mix of stocks and risk free asset, accessing and selecting brokers, setting up accounts, implementing and carrying out trade and following stock market/economy.

This study reports numerous evidences from the literature reporting that financial knowledge may lead to reduced participation costs, thereby encouraging stock market participation. These evidences show that both tangible and intangible costs of stock market participation are reduced because of financial literacy. For example Khorunzhina (2013) reports that financial education and counselling alleviates the burden on consumers' time and the effort necessary for making financial decisions and reduces the objective cost of stock market participation. In a different context, Andersen and Nielsen (2011) argue that financial education might limit the effect of psychological barriers hence decreasing the non-tangible portion of the participation cost. Finally, Campbell (2006) discusses that non-participating households may be aware of their limited investment skills and may withdraw from risky markets, while other households may delegate the decision making to professionals resulting in higher fees paid by these investors. Based on these evidences,

this chapter argues that the stock market literate households will reduce their cost of participation; and therefore this effect will be diminished. In other words, the higher the household stock market literacy, the lower will be their cost of participation and therefore the greater will be their participation in the stock market. This framework is motivated by recent research showing that financial awareness may lead to reduced pecuniary and non-pecuniary portions of participation cost, thereby encouraging stock market participation (see, for example, Campbell, 2006; Jappelli and Padula, 2013; and Khorunzhina, 2013). When considering the household level of trust in the stock market, the probability of being cheated by participating in the stock market reduces their expected returns. However, the households that trust the stock market have a lower threshold level for the proportion of stock market investment below which participation is not worthwhile and hence participate more in the stock market.

To test these effects empirically, this study uses data from the American Life Panel (ALP), which consists of over 340 diverse surveys and 6,000 representative samples of U.S. consumers of age 18 and above. ALP surveys capture a rich information set that is of scientific and policy interest, such as expectations, opinions, financial participation and circumstances, cognition and demographics. Hence it makes it possible to measure stock market literacy, sociability and trust in the stock market, and also construct proxies for a wide range of household psychological characteristics.

This study contributes to the existing literature in four major aspects. First, it reassesses the previously documented influence of sociability on stock market participation, once the household stock market literacy is taken into account. Second, it utilizes a theoretical framework to understand the distinct effects of stock market literacy and trust on stock ownership. In particular, this study shows that stock market literacy and trust have distinct and significant effects on the probability of participation as well as the proportion of the household wealth invested in

stocks. Third, unlike previous studies which use general financial literacy questions to measure financial knowledge, this work constructs a stock-market-specific literacy index that is related to the understanding of the stock market and measures the household knowledge of investing in stocks directly or indirectly through mutual funds or investment accounts. In this way, this study is able to reduce the noise in capturing the household knowledge of the stock market and study its impact on stock ownership. Fourth, using the rich set of data on household psychological characteristics, this study is able to additionally test for various psychological factors influencing stock market participation. In particular, the impact of economic shock, time preference, future expectations, self-confidence, sense of commitment, and risk aversion on stock ownership is measured. In this way, this study is also able to distinguish the effects of stock market literacy and trust from other psychological characteristics. For instance, by modelling the impact of both trust and stock market literacy in the empirical analysis this study is able to separate their distinct effects, although the two characteristics might often be understood synonymously. Previous studies allude to the significant impact of psychological characteristics on stock market participation, but fail to test adequately for these effects due to data constraints. Hence this study fills a noticeable gap in the literature by considering a wide range of psychological characteristics.

The empirical results show that stock market literacy remains a key characteristic for stock market participation, even after allowing for the effects of sociability, trust and large set of psychological characteristics. Before considering the household stock market literacy, significant relationship for sociability is obtained, but once stock market literacy is accounted for, it is observed that the impact of sociability vanishes. Hence it is found that what matters is stock market literacy, rather than sociability. In fact, in the additional subsample analysis, it is observed that the effect of sociability on participation is insignificant for the households that have low stock market literacy, while it is observed that stock market liter-

acy remains to be a significant determinant of stock ownership even among the households with low sociability. The other important characteristic that explains probability of participation is the household level of trust in the stock market. The result suggests that trusting households are more likely to invest in the stock market, and for a given level of trust, lack of stock market literacy additionally acts as a barrier to stock market participation. Further, it is found that demographic characteristics including age, education and income, and psychological characteristics including economic shock and future expectations significantly influence a household likelihood of investing in the stock market.

While examining if the stock market literate households invest larger proportion of wealth in stocks, a significant positive association between stock market literacy and the proportion of wealth invested in the stock market is obtained. In addition, trust in the stock market is found to have a significant positive impact on investment in risky assets, confirming the finding of Guiso, Sapienza, and Zingales (2008), whereby the more an investor trusts the stock market, the higher is his/her optimal portfolio share invested in stocks. Sociability remains insignificant and does not influence the household portfolio allocation decision. Further, it is found that age, education, economic shock, future expectations, self-confidence, and time preference have significant positive effects, while income has a significant negative effect on the proportion of investment in stocks. It is further observed that some psychological characteristics such as self-confidence and time preference, that do not explain the probability of stock market participation, are now significant. This shows that there are different psychological factors that affect a household decision to participate in the stock market and their level of investment in the stocks.

The investigation of association between household stock market literacy association and their cost barrier to stock market participation suggests that stock market literacy has consistent negative estimates that are significant in all models.

This finding validates the proposition regarding association of stock market literacy with stock market participation cost. In addition, it is observed that age and employment are also negatively related to stock market participation cost.

The findings of this work are of interest to policy makers. First, it shows that trust and stock market literacy have independent effects on participation. This perhaps can explain the ineffectiveness of financial education programs for stock market participation reported in previous studies. Second, it is found that trust and stock market literacy not only affect the probability of stock market participation but also influence a household decision as to how much of their wealth to invest in the stock market. Third, the study shows that psychological characteristics of the households play a key role in their decision to own stocks. These results can benefit strategic endeavors of policy makers promoting stock market participation.

The reminder of the paper is organized as follows: Section 3.2 presents the theoretical model, Section 3.3 describes the data and variables, Section 3.4 reports the empirical analysis, Section 3.5 provides results from the robustness analysis, and Section 3.6 concludes.

3.2 The framework

This section utilizes the framework of Guiso, Sapienza, and Zingales (2008), which is derived from the standard two-asset portfolio model framework, to understand the role of sociability and trust in decisions of households to invest in stock market. In this setup, households have the choice of investing in two financial assets: a risky asset, which yields the return r_s, considered here to be a stock with $E[r_s] = \overline{r_s}$ and standard deviation $\sigma_s > 0$, and a risk-free asset, which yields the return r_f (and $r_f < \overline{r_s}$). This framework assumes that the probability distribution of the returns of the risky asset is normal. Therefore only the expected return and standard deviation are relevant for a household i who chooses the proportion w_i of their initial wealth Y_i to be invested in the risky asset in order to maximize the expected

utility:

$$\max_{w_i} EU\left[r_f Y_i + w_i(r_s - r_f)Y_i\right].$$

The household participates in the stock market if their expected utility from investing their wealth in the stock market and in the risk-free asset is greater than (or equal to) the utility from investing only in the risk-free asset $U[r_f Y_i]$. Thus, the stock market participation condition is:

$$EU\left[r_f Y_i + w_i(r_s - r_f)Y_i\right] \geq U[r_f Y_i]. \tag{3.1}$$

The above participation condition holds if the investors have full trust in the stock market and anticipate that they are going to fully receive the return as determined from the expected utility in equation 3.1.[33] Based on the recent literature pointing out that less trusting households are less likely to participate in the stock market, the effects of trust are included in the above model, building a more realistic framework.[34] An example in which trust prevents people from participation is given by Blondel et al. (1998) who show that about 60% of those who do not vote in the European Parliament elections cites distrust in the European Parliament, lack of interest, or some other reason for not participating. Even if there are considerable advantages of selecting the right candidate, households lacking trust do not bother to cast vote because they do not expect the candidate or the electoral system to be fair. In case of stock market participation, trust is more critical because unlike parliament, in the event of cheating, investors may immediately lose all or partial wealth invested in stocks. In addition, as compared to casting vote, participation in stock market requires considerable resources and time that

[33] The most widely accepted definition of trust defines it as firm reliance on the integrity, ability, or character of a person or thing. Trust can also be defined as a leverage that can be used to do more by relying on someone else as compared to what an individual would otherwise be able to achieve.

[34] See, for example, Guiso, Sapienza, and Zingales (2008), Georgarakos and Pasini (2011), Pevzner, Xie, and Xin (2013) and Carlin, Dorobantu, and Viswanathan (2009).

will be wasted without adding any financial value in case the household is cheated. Trust is quantified as the subjective probability that individuals attribute to the possibility of being cheated.

The trust framework is included in the expected utility in Equation 3.1, where $a_i \ \epsilon[0,1]$ is household i's assessed probability of being cheated by the managers, intermediaries or the firm itself, and hence losing a proportion of their wealth invested in stocks. This probability measures the degree of the household's mistrust and serves as a discount factor applied by the household to their return from investing in the stock market.[35] Hence, household i's expected return on the risky asset is now dependent not only on the risk aversion incorporated in their utility function but also on their trust in the stock market given as $1 - a_i$.The new participation condition, offered now becomes:

$$(1 - a_i)EU\left[(r_f + w_i(r_s - r_f))Y_i + a_i U((1 - w_i)r_f Y_i)\right] \geq U[r_f Y_i].$$

Further presents the first order condition of above participation condition with respect to w_i given as:

$$(1 - a_i)U'[(r_f + w_i(\overline{r_s} - r_f))Y_i](\overline{r_s} - r_f) \geq a_i U'[(1 - w_i)r_f Y_i]r_f. \qquad (3.2)$$

Further, it is argued that investors have to bear additional cost if they decide to invest in stock market (Haliassos and Bertaut, 1995; Vissing-Jørgensen, 2004). This participation cost reduces the initial wealth invested in stocks and risk free asset and as a result decreases the motivation to participate in the stock market.[36] However, the investors bear the participation cost only if they decide to participate

[35]This study assumes a partial equilibrium framework in the sense that the choice of one household does not affect the equilibrium level of a_i.

[36]The literature on stock market participation cost identifies different categories of participation cost. For example, Vissing-Jorgensen (2002) categorizes participation costs as fixed entry costs, fixed and variable transaction costs and per period trading costs and Andersen and Nielsen (2011), Haliassos and Bertaut (1995), and Campbell (2006) reports fixed entry or ongoing participation costs to be the leading explanation for non-participation in the stock market.

in stock market. If they decide to invest only in risk free market, they are able to invest all of their initial wealth in the risk free asset. The fixed cost of participation is included in Equation 3.2:

$$(1-a_i)EU'[(r_f+w_i(r_s-r_f))(1-q_i)Y_i](r_s-r_f) \geq a_iU'[(1-w_i)r_f(1-q_i)Y_i]r_f. \tag{3.3}$$

Georgarakos and Pasini (2011) use the above participation condition to investigate the role sociability in stock market participation, where sociability reduces the cost of participation. This study tests whether the linkage between stock market participation and sociability that Georgarakos and Pasini (2011) establish emperically holds. In recent literature, numerous evidences suggest that financial knowledge may lead to reduced participation costs, thereby encouraging stock market participation (Khorunzhina, 2013). For example, Jappelli and Padula (2013), while analyzing the channel through which financial literacy affects asset allocation, find that financial literacy reduces the participation cost that affects the portfolio choice. Literature also suggests that both tangible and intangible costs of participation faced by the households are reduced with increasing level of their financial literacy. For example Khorunzhina (2013) reports that financial education and counselling alleviates the burden on consumers' time and the effort necessary for making financial decisions and reduces the objective cost of stock market participation. While allowing the participation costs to depend on investor's education as a proxy for the ability to collect and process information, and on age and past participation as proxies for the accumulation of information and experience, Khorunzhina (2013) finds that even when holding labor income fixed, the participation cost is decreasing in education and past stock market experience. Additionally, Andersen and Nielsen (2011) argue that financial education might limit the effect of psychological barriers hence decreasing the non-tangible portion of the participation cost. The authors confirm the finding that individuals with longer periods of

education have lower fixed objective costs. Finally, Campbell (2006) discusses that non-participating households may be aware of their limited investment skills and may withdraw from risky markets, while other households may delegate the decision making to professionals resulting in higher fees paid by these investors. Moreover, van Rooij, Lusardi, and Alessie (2011), Arrondel et al. (2012) and Christelis et al. (2010) establish a positive link between financial literacy and stock market participation, although the mechanism through which financial literacy increases stock market participation is not clearly set out in their work.

This study does not deny the argument given by Georgarakos and Pasini (2011) regarding the association between stock market participation cost and sociability. This study suggests that sociablity while explaining the stock market participation is capturing the effect of stock market literacy on participation in the stock market. This deviation is motivated by numerous evidences in literature showing that social interaction increases the dissemination of information and knowledge. For example, Guiso and Jappelli (2005) show that social learning occurs when potential investors interact sequentially with another investor, and as such, if one is aware then the other one becomes aware. The authors further report that individuals often learn about investment opportunities from peers who are ready informed. Social learning can act as a catalyst in the information dissemination as reported by Watt (1999), showing that social learning takes place in a ring lattice network. According to information sharing channel, the knowledge sharing does not mean that the households will follow what other households decide. The households obtain the information but make a decision based on their own preferences in light of the new information. The same has been mentioned by Banerjee and Fudenberg (2004) and Ellison and Fudenberg (1995), who by analyzing the effect of Word-of-Mouth information sharing show that agents sample previous decision makers and, based on this information, decide which choice to follow. Supported by these findings, this study proposes that sociability increases awareness and hence reduces

the stock market participation cost. Therefore, sociability does not directly affect participation cost and as participation cost is introduced as a function of stock market literacy, therefore, the effect of sociability is already captured by stock market literacy.

3.3 Data and variables

To test the model implications empirically, this chapter again uses American Life Panel (ALP) surveys that are discussed in Section 2.2. As in Chapter 2, primary unit of analysis is household where stock holding status, proportion of investment in stocks, family income, net wealth and total financial assets are that of the household, while financial literacy and demographic and psychological characteristics represent that of the household head who is the primary decision maker in the household. Information on whether households hold stocks or stock mutual funds is obtained from the Effects of the Financial Crisis survey waves fielded between November 2008 and January 2011, with an average response rate of 79%. This study does not consider stock holdings that are part of an IRA, 401(k), Keogh or similar retirement accounts. In the sample investigated, 70% of the housholds participate in the stock market. The Cognition and Aging in the USA survey (fielded between November 2008 and September 2009) is used to acquire information on household share of wealth invested in the stock market, which is calculated as a proportion of total financial assets invested in stocks. The total financial assets are made up of the value of checking accounts, savings accounts, money market accounts, bond funds, balanced or life-cycle funds, foreign investments, index funds, sector funds, other mutual funds, retirement accounts, short-term assets, other stocks or funds not listed, educational savings accounts and life insurance settlements. Finally, the stock market participation cost is measured as the total participation fees paid by the households as a percentage of their investment in stocks. For this purpose, this study used the ALP Financial Services Providers survey, was in the field from

September 2007 until November 2007 and has a response rate of 86.4%. The total participation fees is calculated as the sum of fees paid per year by the investors to all the individuals, professionals and firms for conducting stock market and/or mutual fund transactions/advising, management, and/or planning. It is observed that, on average, households in this sample invest 6.7% of their share of wealth in stocks and face a participation cost equal to 2.4% of their investment in stocks.

3.3.1 Measuring stock market literacy, sociability and trust in the stock market

Unlike Chapter 2, this chapter utilizes the Investing sub-module of ALP Financial Literacy survey of Hung, Parker, and Yoong (2009) to develop an index for stock market literacy.[37] The Investing sub-module consists of Lusardi and Mitchell's (2007b) sophisticated financial literacy items as well as five additional items on investment markets and products. This measure of stock market literacy is used to reduce the noise in capturing the household knowledge of the stock market and study its impact on stock ownership. This stock-market-specific literacy index is related to the understanding of the stock market and measures the household knowledge of investing in stocks directly or indirectly through mutual funds or investment accounts. Appendix 3.1 presents the items used to develop the stock market literacy index. As in Chapter 2, the categorical principal component analysis (CATPCA) is used in this chapter to construct the stock market literacy index for efficiently handling of categorical variables and nonlinear relationships.

Table 3.1 reports the CATPCA results for the stock market literacy index. The optimal scaling level of all items is set to ordinal, and Kaiser's criterion is used to determine the number of significant dimensions. From Table 3.1, it is found that there are three significant dimensions with eigenvalues greater than one, explaining 52% of the variance of our data. The stock market literacy index

[37] The details of this survey has been given in Section 2.2.

is created as the weighted sum of the significant dimensions, where the weight is given by the eigenvalues. The households' stock market literacy scores are scaled to lie between the range of zero and one. The summary statistics in Table 3.2 show that the households in the sample considered has an average stock market literacy score of 0.61. In Panel B of Table 3.2, the sample characteristics of households with different levels of stock market literacy are reported. Comparing the stock ownership characteristics of household groups with literacy scores in the upper and lower quartile, it is observed that around 95% of the high stock market literate households participate in stocks, while around 58% of the low stock market literate households hold stocks. On average, high stock market literate households invest 12% of their financial wealth in stocks, which is about double the sample average (6.7%) and low stock market literate households invest 4% of their wealth in the stock market. It can be sees that the high stock market literate group has an average education of roughly 13 years, is made up of largely male respondents (around 68%), with an average income double that of the low stock market literate group, and has large average net wealth. The sample characteristics suggest that, on average, wealthy households participate more in the stock market and such households have the ability as well as the incentive to be more stock market literate, as they participate more in the stocks.

For creating a measure for household level of sociability, unlike Chapter 2, this chapter utilizes the broader definition of sociability employed by Hong, Kubik, and Stein (2004), and Georgarakos and Pasini (2011), among others. In addition, Unger (1998) refers to sociability as the ease and urgency with which individuals pursue common goals, which will otherwise be impossible or expensive to achieve if individuals operate in isolation. Hence, household involvement through cooperation in the organization of society is used as a measure of sociability. Based on this definition, households are considered sociable if they participate in formal training, make donations of money or possessions totaling $500 or more, participate in

volunteer work, or spend time helping friends, neighbors, or relatives. The information on these sociability characteristics is obtained from various ALP surveys fielded between 2008 and 2013, with a minimum response rate of around 84%.[38]

The sample characteristics for sociable (with sociability proxy equal to one) and non-sociable (with sociability proxy equal to zero) households are reported in Panel C of Table 3.2. It is observed that sociable households participate more in the stock market and hold a greater proportion of their wealth in stocks than non-sociable households. In particular, it is seen that around 73% (42%) of (non-)sociable households hold stocks and on average, (non-)sociable households invest around 6.8% (4.8%) of their wealth in stocks. The average demographic characteristics (age, education, and gender) between the two groups are similar; however it can be observed that sociable households have a larger average income and net wealth than non-sociable households.

In this chapter, additionally, the household trust in stock market measure is included to test the independent effect of trust on stock market participation. To measure the household trust in stock markets, the Trust in Financial Institutions sub-module under the Department of Labor (DOL) Pilot survey is used. This survey, fielded from June 2011 until August 2011, has a response rate of 85.04%. This study incorporates three questions about household level of trust in the stock market, trust in stockbrokers and trust in investment advisers. The choices of responses range from 1 (I do not trust at all) to 5 (I trust completely). The average of the responses to the aforementioned questions is taken, and that average is scaled between zero and one, where zero corresponds to households who have the lowest trust in stock market and one corresponds to those with the highest level of trust in stock market. While previous studies such as Guiso, Sapienza,

[38]More specifically, participation in formal training data is from the Financial Decision-making survey, with a response rate of 97.74%; the charity donations data is from the Health and Retirement Study (Well Being module 62), with a response rate of 83.94%; and we use the Health and Retirement Study (Well Being module 66), which has a response rate of 97.81%, to obtain information on participation in volunteer work, and time spent helping friends, neighbors or relatives.

and Zingales (2008) use trust in bank officials and financial advisers as a proxy for personalized trust in stock market, the measure in this study is more specific to household trust relating to stock market investment decisions.[39]

The summary statistics in Table 3.2 show that the investigated households in this study have an average trust score of 33%. From the correlations reported in Table 3, it can be observed that the key variables – stock market literacy, sociability and trust measures – are not highly correlated with each other.

3.3.2 Measuring demographic and psychological characteristics

This study considers the key demographic characteristics related to stock ownership decisions in the literature, including age, education, employed (indicator for being an employee), male dummy, income and net wealth. For example, Guiso, Sapienza, and Zingales (2008) find that age is negatively related to stock ownership and investment in stocks, while employment is positively related to participation in the risky assets. They further report that males and investors with a college education have a higher proportion of investment in stocks, while employment increases the share of investment in risky assets. Likewise, Guiso, Sapienza, and Zingales (2008), Hong, Kubik, and Stein (2004), Georgarakos and Pasini (2011) and van Rooij, Lusardi, and Alessie (2011) report the importance of education for stock market participation; Haliassos and Bertaut (1995) and van Rooij, Lusardi, and Alessie (2011) find a significant role of gender, observing that stock market participation is much lower among women than men; Haliassos and Jappelli (2002), Campbell (2006) and van Rooij, Lusardi, and Alessie (2011) show that stock market participation increases strongly with income and wealth; and Vissing-Jorgensen (2004) reports that non-financial income is positively related to both the stock ownership and share of investment in stocks.

[39] This study also considers the trust in financial market, which is a more general measure of trust as compare to the measure of stock-market-specific trust. The results with trust in financial market are reported in additional analysis section.

This study obtains the demographic characteristic variables – age, education, employed, and gender – information from the ALP household information. The selected sample of respondents in this study is aged between 18 and 93. As can be seen from Table 3.2, the average age of the respondents is around 51 and the average number of years in education is around 12, with about 42% males and 62% of respondents in employment. The Effects of the Financial Crisis survey is again used to calculate households' total income as the sum of respondents' and their partners' monthly income from work and other sources. The summary statistics in Table 3.2 show that, on average, households in this study's sample have a monthly income of around $7000. To measure net wealth, this chapter uses the HRS Q Income and Assets section survey that is fielded between June 2009 and August 2013 and has a response rate of 97.74%. This work calculates net wealth as the total value of all assets (excluding equity wealth) minus total household debt.

In a similar way as in Chapter 2, the analysis in this chapter includes a large set of psychological characteristic variables, including economic shock, time preference, future expectations, self-confidence, sense of commitment, and risk aversion. Except for socialibility variable, all the psychological variables are constructed in a similar way as in Section 2.2.3.[40] The summary statistics from Table 3.2 show that households in the sample investigated in this chapter on average are largely optimists but at the same time risk averse, with low expectations of the future. Further, it is observed that the households on average are moderately self-confident and committed. From Table 3.3, it is found that overall the psychological characteristics are not strongly correlated with each other, with negative correlations noted between future expectations and risk aversion.

[40]The exact details of the psychological variables are provided in Appendix 2.3.

3.4 Empirical analysis

3.4.1 Who participates in stock markets?

This section investigates the importance of stock market literacy, sociability, trust and other household characteristics for stock market participation. The following binary choice model is tested for the participation condition in Equation (3.4):

$$\begin{aligned} Stock\_prob_i &= \beta_1 SL_i + \beta_2 SO_i + \beta_3 TR_i + \beta_4 AG_i + \beta_5 ED_i + \beta_6 EM_i \\ &+\beta_7 MA_i + \beta_8 IN_i + \beta_9 NW_i + \beta_{10} ES_i + \beta_{11} FE_i + \beta_{12} FE_i \\ &+\beta_{13} RA_i + \beta_{14} SC_i + \beta_{15} SM_i + \beta_{16} TP_i + \varepsilon_i \end{aligned} \tag{3.4}$$

$$\text{and } \varepsilon_i \sim N(0,1),$$

where the response variable Stock_prob on the left hand side is the probability of holding stocks. The independent variables on the right hand side are stock market literacy (SL), sociability (SO), trust (TR), age (AG), education (ED), employment (EM), male (MA), income (IN), net wealth (NW), economic shock (ES), future expectations (FE), self-confidence (SC), sense of commitment (CM), risk aversion (RA) and time preference (TP).

The first set of results is reported in Table 3.4. In contrast to margins reported in Chapter 2, this section reports the fully standardized coefficients to accurately measure the relative association of variables among the various probit models. Winship and Mare (1984), Williams (2009) and Mood (2010) argue that when including different predictor variables in the various probit model specifications, the scaling of the response variable changes and therefore the changes in estimated coefficients might not entirely be due to the suppressor. Standardizing only the response variable does not adequately fix the scaling issue and hence a full standardization (that is, standardization of both response and explanatory variables) is performed. In this way, the changes to reported coefficient estimates in the vari-

ous nested model specifications can be accurately associated with the suppression effect rather than the scaling effect (see Long and Freese, 2006 for details).

The results show that stock market literacy, sociability and trust are strongly significant when considered independently. Moreover, the effect of sociability remains significant contemporaneously with trust. This is in line with the works of Hong, Kubik, and Stein (2004), Guiso, Sapienza, and Zingales (2008) and Georgarakos and Pasini (2011), who find that trust and sociability play distinct roles for stock market participation. However, when stock market literacy is introduced, the relationship between sociability and participation vanishes; and what matters is stock market literacy, along with trust, which is also strongly significant. This finding is also consistent with those documented by Hilgerth, Hogarth, and Beverly (2003), Cardak and Wilkins (2009), Christelis, Jappelli, and Padula (2010), and van Rooij, Lusardi, and Alessie (2011), showing that more financially literate people are more likely to invest in the stock market. These results indicate that sociability actually proxies for stock market awareness, which affects stock market participation. In terms of demographic characteristics, it is found that age, education, employment, income, and net wealth are important indicators of stock ownership, with income having the highest explanatory power (around 53%) for household probability of participation.

Next, this work examines the importance of household psychological characteristics for explaining the probability of participation. A rich set of psychological measures is added to the model specification used in Table 3.4, including economic shock, future expectations, risk aversion, self-confidence, sense of commitment and time preference. In doing so, this work is able to distinguish the distinct roles of stock market literacy and trust from other household psychological characteristics that can explain the probability of participation. Table 3.5 reports the test results. It is found that the introduction of psychological characteristics in the model specifications does not alter the previous results from Table 3.4. In particular, the results

show that stock market literacy and trust remain the significant indicators, along with age, education, employed, and income, even after the introduction of psychological characteristics. Changing stock market literacy by one standard deviation shifts the probability of participation by around 11%, while the equivalent effect of trust in the stock market is around 17%. As before, sociability does not significantly explain stock ownership, once stock market literacy is accounted. With regard to the psychological characteristics, it is observed that past economic shock is positive and strongly significant for stock market participation. This effect may be driven by the fact that during periods of economic downturn and large drops in the stock market, households holding stocks experience a higher exposure to these shocks. It is further found that future expectations is positive and strongly significant, showing that the households who want to leave more inheritance have a higher probability of stock market participation. Risk aversion remains negative and significant at the 5% level, before considering the effect of household trust in the stock market. In addition, some marginal significance is found for time preference, but its relation with participation vanishes when stock market literacy is included in the analysis.

3.4.2 Analysis of household share of investment in stocks

This section test if trust, sociability and stock market literacy reduces the cost barriers and increases the disposable wealth that can be invested between the risky and risk-free assets. The following ordinary least squares regression is estimated:

$$\begin{aligned} Stock\_prop_i &= \beta_1 SL_i + \beta_2 SO_i + \beta_3 TR_i + \beta_4 AG_i + \beta_5 ED_i + \beta_6 EM_i \\ &\quad + \beta_7 MA_i + \beta_8 IN_i + \beta_9 NW_i + \beta_{10} ES_i + \beta_{11} FE_i + \beta_{12} FE_i \\ &\quad + \beta_{13} RA_i + \beta_{14} SC_i + \beta_{15} SM_i + \beta_{16} TP_i + \varepsilon_i \end{aligned} \tag{3.5}$$

where the response variable Stock_prop is proportion of investment in stocks, which is measured as total investment in stocks as a percentage of total financial assets (see data section for details).[41] All explanatory variables are as in Equation 3.4.

The results reported in Table 3.6 show that stock market literacy is consistently positive and highly significant in all model specifications considered. This signifies that stock market literate households are not only more likely to participate in stocks but also investing a larger share of their wealth in stocks. In addition, it is found that trust in the stock market, which is also highly significant, positively affects the share of investment in stocks. These results corroborate those of Guiso, Sapienza, and Zingales (2008), who find that trusting households have a higher portfolio share invested in stocks, conditional on participation. Further, accounting for household trust in the stock market does not change the relationship or the significance of stock market literacy. Changing stock market literacy or trust in the stock market by one standard deviation increases the share of stocks in a household portfolio by 0.087 standard deviation. Sociability remains insignificant in all model specifications and does not explain household portfolio allocation decisions.

In terms of household demographics, it is observed that age, education, and income have a significant association with the proportion of wealth invested in stocks. In addition, it is seen that a large set of psychological characteristics exhibit significance. In particular, psychological characteristics including economic shock, future expectations, self-confidence and time preference significantly explain the heterogeneity in the share of wealth invested in stock market, with past economic shock having the highest explanatory power of around 11% (and highly

[41] Additionally, the wealth invested in stocks as a percentage of total assets is also considered. In this case, the total of households' assets is calculated as the sum of total financial assets and total value of farm equity livestock and equipment, non-farm partnerships, and all other assets (such as trusts, limited partnerships, hedge funds, commodities, timber or mineral rights, valuable art, jewelry, metals, coins and collectables). The results for investment in stocks as a percentage of total assets are not reported, as they are qualitatively identical to those reported in Table 3.6.

significant). Notice that several of the psychological characteristics such as self-confidence and time preference, which did not explain the probability of household participation in stocks, now significantly explain the share of wealth invested in the stock market. This shows that there are distinct psychological characteristics that explain household decision to participate in stock market and household decision on how much to invest in stocks.

3.4.3 Analysis of household stock market participation cost

The model framework of Section 3.2, proposes that the household stock market literacy decreases their participation cost; hence reducing the household cost barrier to stock ownership. This section empirically tests this prediction of cost reduction by estimating the following ordinary least square (OLS) model:

$$\begin{aligned} Stock\_\cos t_i &= \beta_1 SL_i + \beta_2 SO_i + \beta_3 TR_i + \beta_4 AG_i + \beta_5 ED_i + \beta_6 EM_i \\ &\quad + \beta_7 MA_i + \beta_8 IN_i + \beta_9 ES_i + \beta_{10} FE_i + \beta_{11} FE_i \\ &\quad + \beta_{12} RA_i + \beta_{13} SC_i + \beta_{14} SM_i + \beta_{15} TP_i + \varepsilon_i \end{aligned} \tag{3.6}$$

where the response variable Stock_cost is cost of participation in stock market measured as the total participation fees paid by the households as percentage of their investment in stocks. All predictor variables are as defined in Equation 3.5.[42]

The results are reported in Table 3.7. It is found that the household stock market literacy significantly explain the stock market participation cost incurred by the household. The negative estimates for stock market literacy that are significant in all model specifications suggest that households that are knowledgeable in stock market incur less participation cost. These results corroborate with the general findings of Khorunzhina (2013), Andersen and Nielsen (2011), Jappelli and

[42] This specification does not include the households' wealth indicator because of the limited number of observations after including wealth measure.

Padula (2013) and Campbell (2006) that financial literacy/education decreases the household stock market participation cost. The results from the overall model specifications show that one standard deviation increase in stock market literacy reduces household participation cost by 0.18 standard deviation and this result is significant at a 10% tolerance level. Further, it is observed that sociability is insignificant in all model specifications, substantiating the earlier assertion that participation cost is a function of stock market literacy rather than sociability. The conclusions remain the same when incorporating the influence of psychological characteristics. For household demographics, it is found that age and employment are negative and significant at a 5% tolerance level, depicting a reduction in the household participation cost.

3.5 Additional analysis

3.5.1 The effect of sociability on stock market participation

The results thus far provide a consistent picture that stock market literate households and households that trust the stock market are more likely to participate in the stock market. These two characteristics concurrently explain participation. Moreover, the results indicate that sociability does not explain participation per se, but rather mirrors stock market literacy. To further analyze this, separate investigation is carried out in this section on what explains stock market participation among high sociability and low sociability households. This section uses proxy for sociability that defines households to be sociable if they participate in formal training, make donations of money or possessions totaling $500 or more, participate in volunteer work, or spend time helping friends, neighbors, or relatives. Using this proxy, the high sociability households are defined as those that participate in two or more sociable activities and low sociability households are defined as those that participate in at most one sociable activity.

The test results for the two groups are reported in Table 3.8. Interestingly, it is found that stock market literacy is strongly significant for both high sociability and low sociability households. Moreover, although sociability is significant for both groups initially, it becomes insignificant once stock market literacy is considered. Also, it is observed that the trust in stock market is highly significant only for high sociable household groups. The results of this table confirm that no matter how sociable a household is, stock market literacy significantly explains their probability of owning stocks. Further, for high sociable household groups, trust has significant explanatory power for participation.

In order to further understand the role of sociability, this section segregates high and low sociability groups further into high and low stock market literacy groups. Households with the stock market literacy index score above (below) the median are considered high (low) stock market literate. The motivation here is to investigate if high sociability increases the probability of participation for those households who have low stock market literacy and whether high stock market literacy increases the probability of participation for households with low sociability. Table 3.9 reports the results for these two household groups. It is found that sociability is insignificant for high sociable but low stock market literate households. As expected, stock market literacy is insignificant for this household group and as in the previous table, trust remains strongly significant. For the low sociable but high stock market literate household groups, stock market literacy remains a significant determinant of participation. These results confirm that sociability does not play an important role for participation, while stock market literacy remains a significant determinant of stock ownership even among the households with low sociability. Hence, the results do not provide supportive evidence of participation explained by social interactions with cheaper information sharing, and peer-group effects; however participation can be explained by the households' level of stock market literacy.

3.5.2 Alternative measures of sociability

This section tests the association between sociability and stock ownership using two different measures of household sociability. First, the household participation in national elections as an alternative definition for sociability is used. Previous studies such as Rogers, Gerber, and Fox (2012) argue that participation in elections is a volunteering act for society and fundamentally a social behavior. Hence, sociable households will take active part in setting up the organization of their community and exercise their voting rights. Their research finds that, for voting behavior, personal means of contact such as face-to-face canvassing are more motivating than less personal ones such as telephone calls. In this scenario, less sociable households will be difficult to reach and therefore less likely to participate in the electoral process.

The alternative measure of sociability in this section takes the value of one if the households voted in the recent national elections, and zero otherwise. This information is obtained from the ALP Post Election survey, fielded between November 2008 and September 2009, with a response rate of 91.21%. The results with this new measure are reported in Table 3.10. In Panel A, the household probability of participation is examined. It is observed that the alternative sociability proxy is positive and remains significant in the presence of trust. However, corroborating the previous findings of this study, when stock market literacy in the model specifications is introduced, the significant association of sociability on stock market participation vanishes, while stock market literacy remains significant, along with trust. Hence, it is stock market literacy rather than sociability that matters for household probability of participation. In Panel B, the household share of investment in stocks is investigated. Using the alternative measure of sociability, similar results to those reported in Section 3.4.2 are obtained, with sociability negative and insignificant in all specifications. Hence this analysis concludes that stock market literacy and trust are the key indicators of household stock ownership decisions.

In addition to the above alternative measure of sociability, this section also test whether the results obtained through previous proxies of sociability are robust in presence of the sociability measure utilized in Chapter 2. It also allows to test if the sociability measure adopted in Chaper 2 proxies more broader measure of sociability used in this work. The details of this measure of sociability is given in Section 2.2. The results with this measure of sociability are reported in Table 3.11. From Panel A, it can be observed that stock market literacy and trust in stock market characteristics have independent and significant association with the probability of stock market participation. In addition, unlike the findings with two previous sociability proxies, sociability measure employed in this test do not have any association with stock market participation. Furthermore, results suggest that sociability measure used in this test has no association with proportion of investment in stocks. These findings helps to conclude that the independent relationship of stock market literacy and trust with stock market participation decision remains robust to different measures of sociability.

3.5.3 Stock market literacy and sociability interaction

Section 3.5.1 tests the association of stock market literacy and sociability with stock market participation while grouping households in different categories and running separate regression. There are numerous evidences suggesting that the magnitude of the coefficient for a variable of interest cannot be compared across the groups. However, this study does not compare the magnitude of the coefficients, and it is only used to determine whether stock market literacy and sociability explain the stock market decisions of different groups. However, in order to obtain a clean relationship between these indicators, this section utilizes interaction term between stock market literacy and sociability to determine their conditional effects on stock market participation. The new emperical specification constitutes stock market literacy, sociability, interaction between stock market literacy and sociability

and all the explanatory variables used in earlier specifications.

The results are reported in Panel A of Table 3.12. From Column 1 to 3, it is found that stock market literacy consistently explains the stock market participation decision of the households who are not social at all. On the other hand, it is found that sociability does not explain the likelihood of participating in the stock market of the households who have no stock market literacy. From the interaction term, it can be concluded that the effect of stock market literacy are independent of the effect of sociability on stock market participation decision. Column 4 to 5 of Panel A presents the estimates with proportion of investment in stock as a dependent variable in ordinary least square regression. The results suggest that both stock market literacy and sociability are unable to explain the proportion of investment in the stocks. Further, it is observed that for both completely non-social and stock market illiterate households, trust explains both the likelihood and the proportion of investment in stocks. In Panel B of Table 3.12, the alternative definition of sociability is used as in Section 3.5.2. From the results it is observed that similar set of estimates are obtained while adopting the alternative measure of sociability. However, with the new measure of sociability, the stock market literacy is able to explain the proportion of wealth invested in stocks in addition to the likelihood of stock market participation. These results again signify that it is stock market literacy rather than sociability that explain the stock market participation decision.

3.5.4 An alternative measure of trust

The measure of the household trust used in this study is specific to stock market. In order to test if the results obtained in Section 3.4 are robust to different measures of trust, this section utilizes the household trust in financial market measure, which is a more general measure of household trust. In this study, trust in financial market is measured by using the Trust in Financial Institutions module of ALP Department

of Labor (DOL) Pilot survey. Five questions are used to measure trust that ask individuals to what level they trust the stock market, banks, insurance companies, stock brokers and investment advisers. The average of the responses on these questions is taken, and then this average is scaled between zero and one in such a way that zero corresponds to the households who do not trust financial market at all, and one corresponds to the households who completely trust financial market.

Table 3.13 reports the results with the trust in financial market measure. In Panel A, the household probability of participation is examined. The results signify that in presence of trust in financial market indicator, stock market literacy retains significance of relationship with stock market participation. Simultaneously, sociability still remains insignificant in presence of both stock market literacy and trust. Hence, the results suggest that both trust and stock market literacy have independent significant effect on stock market participation. The Panel B explores the household share of investment in stocks while using trust in financial market measure. It is observed that, as with the stock-market-specific measure of trust, the stock market literacy has significant association with proportion of wealth invested in stocks. In addition, the household trust in financial market also significantly relates to the household proportion of investment in stocks. Hence it can be concluded that stock market literacy is associated with stock market participation in presence of different measures of trust.

3.6 Conclusion

This chapter utilizes the standard two-asset portfolio framework to assess the distinct channels of stock market literacy and trust that simultaneously explain household stock ownership decisions. Additionally, this study investigates if the previously documented evidence for sociability is in fact capturing the role of stock market literacy, and hence whether it is literacy, rather than sociability, that matters for understanding stock market participation. This chapter constructs a stock-

market-specific literacy measure and investigates the factors that explain household decisions to participate in the stock market and their wealth allocation in the stock market. Moreover, using a rich set of household psychological characteristic, including past economic shocks, future expectations, risk aversion, self-confidence, sense of commitment, and time preference, this study explains the heterogeneity observed in stock market participation.

The results indicate that stock market literate and trusting households are more likely to participate in stocks and invest a higher proportion of their wealth in the stock market. These two independent household characteristics concurrently remain significant even after accounting for several other important psychological characteristics. It is observed that changing stock market literacy by one standard deviation shifts the probability of participation by 11%, while the equivalent effect of trust in the stock market is around 17%. Moreover, it is observe that trust does not relate to the household stock market participation cost, which is significantly associated with the household stock market literacy.

Further, no association between sociability and participation is found, once the household stock market literacy is considered. In the additional analysis, it is found that sociability is insignificant even among highly sociable households, if they have low stock market literacy, while conversely, significant relation between stock market literacy and participation even among low sociable households is seen. These results indicate that the households with low sociability invest in stocks if they are stock market literate; and hence participation is explained by the household level of stock market literacy rather than their level of sociability. Similar results are obtained while testing an interaction model, where stock market literacy consistently explains the stock market participation decision while sociability has no effect whatsoever.

Further, it is observed that a large set of household psychological characteristics play an important role in the household investment decision making. The

results signify that past economic shocks and future expectations explain household probability of participation, and several other psychological characteristics such as self-confidence and time preference, along with past economic shocks and future expectations, explain household portfolio choice decision of how much to invest in stocks. The findings of this study aid the strategic endeavors of policy makers in promoting stock market participation.

Appendix 3.1: Stock market literacy questionnaire

3.1.1 Which of the following statements describe the main function of the stock market?

[ ] The stock market helps to predict stock earnings

[ ] The stock market results in an increase in the price of stocks

[ ] The stock market brings people who want to buy stocks together with those who want to sell stocks

[ ] I don't know

3.1.2. [Stocks/Bonds/Cap] are normally riskier than [Stocks/Bonds/Cap]

[ ] True

[ ] False

[ ] I don't know

3.1.3. Considering a long time period (for example 10 or 20 years), which asset normally gives the highest return?

[ ] Savings accounts

[ ] Bonds

[ ] Stocks

[ ] I don't know

3.1.4. Normally, which asset displays the highest fluctuations over time?

[ ] Savings accounts

[ ] Bonds

[ ] Stocks

[ ] I don't know

3.1.5. When an investor spreads his money among different assets, does the risk of losing money:

[ ] Increase

[ ] Decrease

[ ] Stay the same

[ ] I don't know

3.1.6. What happens if you buy a company's stock?

[ ] You own a part of the company

[ ] You have lent money to the company

[ ] You are liable for the company's debts

[ ] The company will return your original investment to you with interest

[ ] I don't know

[ ] You have lent money to the company

[ ] You are liable for the company's debts

[ ] You can vote on shareholder resolutions

[ ] I don't know

3.1.7. A stock mutual fund combines the money of many investors to buy a variety of stocks.

[ ] True

[ ] False

[ ] I don't know

3.1.8. If you were to invest 1000 in a stock mutual fund, it would be possible to have less than 1000 when you withdraw your money.

[ ] True

[ ] False

[ ] I don't know

3.1.9. Which of the following statements is correct?

[ ] Once one invests in a mutual fund, one cannot withdraw the money in the first year

[ ] Mutual funds can invest in several assets, for example invest in both stocks and bonds

[ ] Mutual funds pay a guaranteed rate of return which depends on their past performance

[ ] None of the above

[ ] I don't know

3.1.10. Buying a [Single/Mutual] usually provides a safer return than a company stock?

[ ] True

[ ] False

[ ] I don't know

3.1.11. It is hard to find mutual funds that have annual fees of less than one percent of assets.

[ ] True

[ ] False

[ ] I don't know

3.1.12. Mutual funds pay a guaranteed rate of return.

[ ] True

[ ] False

[ ] I don't know

[ ] False

[ ] It depends on the type of 401(k) plan

[ ] I don't know

Table 3.1: **Categorical principal component analysis results for stock market literacy index.** This table reports the eigenvalues and the proportion of the variance explained by the dimensions. The total number of dimensions is 12, which is the number of items in our questionnaire. Optimal scaling level of all the variables is set as ordinal.

Dimension	Eigenvalues	Percentage of variance
1	4.138	34.481
2	1.092	9.104
3	1.004	8.365
4	0.883	7.36
5	0.82	6.832
6	0.74	6.165
7	0.67	5.582
8	0.644	5.365
9	0.563	4.696
10	0.522	4.349
11	0.492	4.098
12	0.432	3.602

Table 3.2: **Summary statistics.** This table reports the summary statistics of our sample. The description and construction of all the variables is detailed in Section 3. The data have been obtained from the American Life Panel (ALP) surveys. Panel A reports the summary statistics (mean, standard deviation, minimum and maximum values) of the variables, the selected sample size (N), and the ALP survey labels. N refers to our selected sample of households that have responded to the survey question(s) used for the variable construction as well as responded to the survey question on whether they own stocks or not. Panel B reports sample characteristics for households with different levels of stock market literacy and Panel C reports sample characteristics for households that are sociable (with sociability proxy equal to one) and non-sociable (with sociability proxy equal to zero). In both Panels B and C, we report the averages, with number of samples provided in parentheses.

Panel A: Summary statistics						
Variable	Mean	Stdev	Minimum	Maximum	N	ALP survey labels
Stock market literacy	0.612	0.248	0	1	1707	Financial Literacy
Sociability	0.929	0.257	0	1	2649	Financial Decision-making; and HRS surveys (Well Being 62, 66)
Trust in stock market	0.330	0.195	0	1	2090	Department of Labor (DOL) Pilot
Age	50.931	15.071	18	93	2711	Demographics and survey selection
Education	11.561	2.115	1	16	2711	Demographics and survey selection
Employed	0.621	0.485	0	1	2711	Demographics and survey selection
Male	0.422	0.494	0	1	2710	Demographics and survey selection
Income	7066	8682	0	146000	2477	Effects of the Financial Crisis
Net wealth	293727	1248477	-954	38000000	2545	HRS Q Income and Assets section
Economic shock	0.458	0.261	0	1	2675	Effects of the Financial Crisis
Future expectations	0.263	0.290	0	1	2480	HRS P Expectations and N Healthcare sections
Risk aversion	0.822	0.181	0.25	1	2098	Department of Labor (DOL) Pilot
Self-confidence	0.605	0.225	0	1	2355	Health Expectations
Sense of commitment	0.531	0.135	0.095	1	2355	Health Expectations
Time preference	0.326	0.318	0	1	2093	Department of Labor (DOL) Pilot

Panel B: Sample characteristics according to stock market literacy levels							
Stock market literacy	Age	Education	Male	Income ($000s)	Net wealth ($000s)	Stock ownership	Share of investment in stocks
$>75^{th}$ percentile	57.789	12.774	0.679	10.164	760.142	0.949	0.120
	(336)	(336)	(336)	(318)	(328)	(336)	(323)
25^{th} to 75^{th} percentile	55.203	11.957	0.438	7.871	358.640	0.820	0.074
	(950)	(950)	(950)	(912)	(928)	(950)	(866)
$<25^{th}$ percentile	49.295	10.829	0.271	5.284	87.880	0.575	0.040
	(351)	(421)	(421)	(382)	(410)	(421)	(351)

Panel C: Sample characteristics for social and non-social households							
Sociability	Age	Education	Male	Income ($000s)	Net wealth ($000s)	Stock ownership	Share of investment in stocks
Social	51.219	11.651	0.418	7.240	309.669	0.727	0.068
	(2460)	(2460)	(2460)	(2315)	(2385)	(2461)	(1873)
Non-social	47.319	10.282	0.410	4.232	56.094	0.420	0.048
	(188)	(188)	(188)	(147)	(160)	(188)	(116)

Table 3.3: **Correlations matrix.** This table reports the Spearman's rank correlations for all the variables in our sample. The description and construction of all the variables is detailed in Section 3.3.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1.Stock Ownership	1																
2.Share of investment in stocks	0.378	1															
3.Stock market literacy	0.316	0.388	1														
4.Sociability	0.120	0.052	0.114	1													
5.Trust in stock market	0.258	0.208	0.190	0.121	1												
6.Age	0.079	0.197	0.219	0.061	0.022	1											
7.Education	0.276	0.195	0.319	0.130	0.118	-0.025	1										
8.Employed	0.079	-0.043	-0.054	0.044	0.023	-0.483	0.123	1									
9.Income	0.113	0.134	0.314	0.026	0.033	0.099	0.071	0.024	1								
10.Male	0.355	0.169	0.255	0.121	0.168	-0.080	0.318	0.215	0.093	1							
11.Net wealth	0.326	0.386	0.418	0.112	0.226	0.360	0.218	-0.198	0.108	0.311	1						
12.Economic shock	0.196	0.164	0.191	0.038	0.010	0.012	0.114	0.034	0.015	0.086	0.118	1					
13.Future expectations	0.304	0.270	0.356	0.137	0.216	0.081	0.255	-0.036	0.112	0.392	0.533	0.074	1				
14.Risk aversion	-0.124	-0.087	-0.176	-0.056	-0.189	0.191	-0.127	-0.124	-0.156	-0.177	-0.051	-0.048	-0.108	1			
15.Self-confidence	0.119	0.157	0.200	0.140	0.120	0.211	0.124	-0.074	0.023	0.140	0.181	0.027	0.158	-0.025	1		
16.Sense of commitment	0.000	0.023	0.032	0.042	0.001	0.191	0.050	-0.190	-0.051	-0.051	0.074	-0.063	0.049	0.038	0.082	1	
17.Time preference	0.136	0.197	0.337	0.047	0.121	0.065	0.186	0.004	0.202	0.169	0.298	0.064	0.171	-0.150	0.080	0.026	1

Table 3.4: **Analysis of stock market participation.** This table reports the fully standardized probit regression estimates of Long and Freese (2006). The robust standard errors are reported in parentheses. The dependent variable is a dummy variable equal to one for households owning stocks and zero otherwise. The explanatory variables are stock market literacy, sociability, trust in stock market and demographic variables. ***, ** and * denote significance at 1, 5 and 10 percent respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Stock market literacy	0.472***	0.150***				0.150***	0.138***	0.138***
	(0.031)	(0.025)				(0.025)	(0.029)	(0.029)
Sociability			0.066***		0.052**	0.01		-0.002
			(0.022)		(0.025)	(0.019)		(0.022)
Trust in stock market				0.221***	0.219***		0.156***	0.156***
				(0.027)	(0.027)		(0.027)	(0.028)
Age		0.092***	0.245***	0.236***	0.231***	0.091***	0.082***	0.082***
		(0.024)	(0.025)	(0.028)	(0.028)	(0.024)	(0.028)	(0.028)
Education		0.135***	0.274***	0.265***	0.259***	0.133***	0.146***	0.146***
		(0.025)	(0.028)	(0.03)	(0.03)	(0.026)	(0.029)	(0.029)
Employed		0.056**	0.087***	0.096***	0.093***	0.056**	0.066**	0.066**
		(0.026)	(0.026)	(0.029)	(0.029)	(0.026)	(0.03)	(0.03)
Male		0.005	0.051**	0.038	0.037	0.006	0.012	0.012
		(0.024)	(0.024)	(0.026)	(0.026)	(0.024)	(0.029)	(0.029)
Income		0.543***	0.423***	0.376***	0.373***	0.542***	0.528***	0.529***
		(0.108)	(0.119)	(0.138)	(0.137)	(0.108)	(0.114)	(0.114)
Net wealth		0.43**	0.093	0.073	0.071	0.429**	0.361*	0.361*
		(0.186)	(0.071)	(0.059)	(0.059)	(0.186)	(0.186)	(0.185)
Pseudo R-Squared	0.133	0.269	0.193	0.228	0.230	0.270	0.293	0.293
Observations	1707	1595	2410	2019	2019	1595	1351	1351

Table 3.5: **Behavioral characteristics explaining stock market participation.** This table reports the fully standardized probit regression estimates of Long and Freese (2006). The robust standard errors are reported in the parentheses. The dependent variable is a dummy variable equaling one for households owning stocks and zero otherwise. The explanatory variables are stock market literacy, sociability, trust in stock market, demographic and behavioral variables. ***, ** and * denote significance at 1, 5 and 10 percent respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Stock market literacy	0.138***		0.138***		0.113***	0.113***
	(0.03)		(0.03)		(0.031)	(0.031)
Sociability		0.046*	-0.001			-0.007
		(0.024)	(0.025)			(0.024)
Trust in stock market				0.203***	0.165***	0.166***
				(0.026)	(0.029)	(0.029)
Age	0.109***	0.232***	0.109***	0.226***	0.107***	0.108***
	(0.031)	(0.028)	(0.031)	(0.028)	(0.031)	(0.031)
Education	0.156***	0.243***	0.156***	0.216***	0.143***	0.144***
	(0.031)	(0.029)	(0.031)	(0.029)	(0.031)	(0.031)
Employed	0.081**	0.113***	0.081**	0.102***	0.068**	0.068**
	(0.032)	(0.029)	(0.032)	(0.029)	(0.032)	(0.032)
Male	0.008	0.021	0.008	0.02	0.017	0.017
	(0.03)	(0.026)	(0.03)	(0.026)	(0.03)	(0.03)
Income	0.476***	0.321***	0.476***	0.3***	0.486***	0.487***
	(0.12)	(0.115)	(0.12)	(0.115)	(0.112)	(0.112)
Net wealth	0.287	0.043	0.287	0.039	0.259	0.26
	(0.215)	(0.047)	(0.215)	(0.045)	(0.194)	(0.194)
Economic shock	0.126***	0.149***	0.126***	0.156***	0.137***	0.137***
	(0.032)	(0.027)	(0.032)	(0.027)	(0.031)	(0.031)
Future expectations	0.105**	0.178***	0.105**	0.163***	0.091**	0.092**
	(0.05)	(0.04)	(0.05)	(0.039)	(0.047)	(0.047)
Risk aversion	-0.062**	-0.059**	-0.062**	-0.034	-0.038	-0.038
	(0.028)	(0.027)	(0.028)	(0.027)	(0.028)	(0.028)
Self-confidence	-0.004	0.039	-0.004	0.028	-0.008	-0.007
	(0.035)	(0.031)	(0.036)	(0.031)	(0.035)	(0.035)
Sense of commitment	-0.015	0.003	-0.015	0.019	-0.011	-0.011
	(0.028)	(0.025)	(0.028)	(0.025)	(0.028)	(0.028)
Time preference	0.012	0.065**	0.012	0.047*	-0.002	-0.002
	(0.03)	(0.026)	(0.03)	(0.026)	(0.029)	(0.03)
Pseudo R-Squared	0.301	0.243	0.301	0.266	0.326	0.326
Observations	1332	1993	1332	1989	1331	1331

Table 3.6: **Analysis of household share of investment in stocks.** This table reports the standardized beta estimates obtained from ordinary least square regressions. The dependent variable is investment in stocks as a percentage of total financial assets. The explanatory variables are stock market literacy, sociability, trust in stock market, demographic and behavioral variables. ***, ** and * denote significance at 1, 5 and 10 percent respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Stock market literacy	0.210***	0.095***		0.097***		0.085***	0.087***
	(0.014)	(0.019)		(0.019)		(0.019)	(0.019)
Sociability			-0.026	-0.044			-0.050
			(0.019)	(0.027)			(0.027)
Trust in stock market					0.082***	0.083***	0.086***
					(0.018)	(0.023)	(0.023)
Age		0.159***	0.190***	0.162***	0.183***	0.156***	0.160***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Education		0.058*	0.096***	0.062**	0.085***	0.055*	0.059**
		(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Employed		-0.013	-0.021	-0.010	-0.027	-0.017	-0.013
		(0.009)	(0.007)	(0.009)	(0.007)	(0.009)	(0.009)
Male		0.021	0.035	0.020	0.034	0.025	0.025
		(0.008)	(0.007)	(0.008)	(0.007)	(0.008)	(0.008)
Income		-0.091***	-0.077***	-0.091***	-0.079***	-0.091***	-0.091***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Net wealth		0.062	0.053	0.062	0.050	0.058	0.058
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Economic shock		0.103***	0.131***	0.104***	0.131***	0.106***	0.107***
		(0.017)	(0.014)	0.017)	(0.014)	(0.017)	(0.017)
Future expectations		0.085**	0.098***	0.087**	0.084***	0.076**	0.078**
		(0.017)	(0.014)	0.017)	(0.014)	(0.017)	(0.017)
Risk aversion		-0.011	-0.012	-0.012	-0.000	-0.000	-0.001
		(0.023)	(0.017)	0.023)	(0.017)	(0.022)	(0.022)
Self-confidence		0.075**	0.073**	0.077**	0.067**	0.073**	0.076**
		(0.023)	(0.018)	0.023)	(0.018)	(0.023)	(0.023)
Sense of commitment		0.015	0.001	0.017	0.004	0.017	0.019
		(0.032)	(0.026)	0.032)	(0.026)	(0.031)	(0.031)
Time preference		0.080***	0.110***	0.079***	0.106***	0.076**	0.075**
		(0.014)	(0.011)	0.014)	(0.011)	(0.014)	(0.014)
Adjusted R-squared	0.044	0.114	0.122	0.115	0.127	0.119	0.121
Observations	1542	1239	1577	1239	1575	1239	1239

Table 3.7: **Analysis of stock market participation cost.** This table reports standardized beta coefficients obtained through ordinary least square method. The dependent variable is the ratio of stock market participation fee to total investment in stocks. The explanatory variables are stock market literacy, sociability, trust in stock market, demographic and behavioral variables. ***, ** and * denote significance at 1, 5 and 10 percent respectively.

	(1)	(2)	(3)	(4)	(5)
Stock market literacy	-0.248**	-0.184*	-0.184*	-0.185*	-0.183*
	(0.029)	(0.029)	(0.029)	(0.03)	(0.029)
Sociability			-0.039	-0.037	-0.041
			(0.004)	(0.004)	(0.004)
Trust in stock market					0.035
					(0.026)
Age		-0.268*	-0.301**	-0.294**	-0.309**
		(0.001)	(0.001)	(0.001)	(0.001)
Education		-0.036	-0.045	-0.047	-0.044
		(0.003)	(0.003)	(0.003)	(0.003)
Employed		-0.255**	-0.260**	-0.256**	-0.264**
		(0.012)	(0.013)	(0.012)	(0.012)
Income		0.016	-0.002	-0.002	-0.000
		(0.001)	(0.001)	(0.001)	(0.001)
Male		-0.077	-0.084	-0.078	-0.088
		(0.008)	(0.008)	(0.008)	(0.008)
Economic shock			-0.087	-0.094	-0.080
			(0.016)	(0.017)	(0.018)
Future expectations			-0.018	-0.013	-0.025
			(0.012)	(0.013)	(0.013)
Risk aversion			-0.075	-0.081	-0.070
			(0.027)	(0.027)	(0.027)
Self-confidence			0.051	0.044	0.060
			(0.018)	(0.019)	(0.02)
Sence of commitment			-0.107	-0.109	-0.105
			(0.033)	(0.034)	(0.034)
Time preference			0.030	0.032	0.030
			(0.014)	(0.014)	(0.014)
Adjusted R-squared	0.055	0.096	0.087	0.08	0.08
Observations	144	141	128	128	128

Table 3.8: **Stock market participation for high and low sociability households.** This table reports the fully standardized probit regression estimates of Long and Freese (2006). Panel A reports regression estimates for the high sociability households, while Panel B reports regression estimates for the low sociability households. We define high sociable households as those that participate in two or more social activities and low sociable households as those that participate in at most one social activity. The robust standard errors are reported in parentheses. The dependent variable is a dummy variable equal to one for households owning stocks and zero otherwise. The explanatory variables are stock market literacy, sociability, trust in stock market and demographic variables. ***, ** and * denote significance at 1, 5 and 10 percent respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: High sociability households						
Stock market literacy	0.422***		0.405***	0.117***		0.092**
	(0.036)		(0.037)	(0.036)		(0.036)
Sociability		0.154***	0.083*	0.010	0.002	0.01
		(0.032)	(0.044)	(0.038)	(0.033)	(0.038)
Trust in stock market					0.202***	0.185***
					(0.031)	(0.033)
Demographics and behavioral characteristics	No	No	No	Yes	Yes	Yes
Pseudo R-Squared	0.108	0.011	0.111	0.277	0.238	0.309
Observations	1345	1984	1347	1088	1565	1087
Panel B: Low sociability households						
Stock market literacy	0.515***		0.508***	0.101***		0.099***
	(0.065)		(0.065)	(0.033)		(0.035)
Sociability		0.140***	0.056	-0.027	0.035	-0.028
		(0.048)	(0.062)	(0.032)	(0.048)	(0.033)
Trust in stock market					0.165***	0.036
					(0.05)	(0.034)
Demographics and behavioral characteristics	No	No	No	Yes	Yes	Yes
Pseudo R-Squared	0.146	0.009	0.147	0.432	0.298	0.436
Observations	358	691	358	244	424	244

Table 3.9: **Stock market participation for households with various sociability and stock market literacy levels.** This table reports the fully standardized probit regression estimates of Long and Freese (2006). Panel A reports regression estimates for households with high sociability and low stock market literacy and Panel B reports regression estimates for households with low sociability and high stock market literacy. We define high sociable households as those that participate in two or more social activities and low sociable households as those that participate in at most one social activity. Households with the stock market literacy index score above (below) the median are considered high (low) stock market literate. The robust standard errors are reported in parentheses. The dependent variable is a dummy variable equal to one for households owning stocks and zero otherwise. The explanatory variables are stock market literacy, sociability, trust in the stock market and demographic variables. ***, ** and * denote significance at 1, 5 and 10 percent respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: Households with high sociability and low stock market literacy					
Stock market literacy	0.212***		0.202***	0.056		0.037
	(0.051)		(0.051)	(0.046)		(0.045)
Sociability		0.103*	0.076	0.033	0.045	0.042
		(0.054)	(0.055)	(0.049)	(0.048)	(0.049)
Trust in stock market					0.235***	0.232***
					(0.047)	(0.047)
Demographics and behavioral characteristics	No	No	No	Yes	Yes	Yes
Pseudo R-squared	0.022	0.005	0.025	0.229	0.269	0.270
Observations	659	659	659	526	525	525
	Panel B: Households with low sociability and high stock market literacy					
Stock market literacy	0.415***		0.411***	0.107**		0.107**
	(0.125)		(0.123)	(0.043)		(0.043)
Sociability		0.076	0.05	0.022	0.017	0.022
		(0.104)	(0.094)	(0.030)	(0.032)	(0.030)
Trust in stock market					0.014	0.001
					(0.033)	(0.035)
Demographics and behavioral characteristics	No	No	No	Yes	Yes	Yes
Pseudo R-squared	0.085	0.003	0.086	0.483	0.425	0.483
Observations	178	178	178	128	128	128

Table 3.10: **Analysis of stock market participation with participation in elections as a sociability measure.** This table reports in Panel A the fully standardized probit regression estimates of Long and Freese (2006), while Panel B reports the standardized beta estimates from ordinary least squares regressions. The robust standard errors are reported in parentheses. The dependent variable in Panel A is a dummy variable equal to one for households owning stocks and zero otherwise. In Panel B, the dependent variable is investment in stocks as a percentage of total financial assets. The explanatory variable sociability takes the value of one if the households have casted their votes in national elections, and zero otherwise. The other explanatory variables are stock market literacy, trust in stock market, and all demographic and behavioral variables previously considered. For readability, we only report estimates for key explanatory variables. ***, ** and * denote significance at 1, 5 and 10 percent respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Results for stock market participation							
Stock market literacy	0.138***		0.134***		0.113***		0.11***
	(0.03)		(0.031)		(0.031)		(0.031)
Sociability		0.069***	0.023			0.056**	0.008
		(0.023)	(0.024)			(0.023)	(0.023)
Trust in stock market				0.203***	0.165***	0.180***	0.166***
				(0.026)	(0.029)	(0.028)	(0.029)
Pseudo R-Squared	0.301	0.286	0.323	0.266	0.326	0.310	0.323
Observations	1332	1688	1316	1989	1331	1684	1315
Panel B: Results for share of investment in stocks							
Stock market literacy	0.095***		0.096***		0.085***		0.086***
	(0.019)		(0.019)		(0.019)		(0.019)
Sociability		-0.008	-0.013			-0.017	-0.021
		(0.008)	(0.010)			(0.008)	(0.0109
Trust in stock market				0.082***	0.083***	0.086***	0.084***
				(0.0183)	(0.023)	(0.019)	(0.023)
Adjusted R-squared	0.124	0.130	0.123	0.135	0.130	0.136	0.129
Observations	1239	1552	1234	1575	1239	1550	1234

Table 3.11: **Analysis of stock market participation with number of individuals respondents approach for financial advice as a sociability measure.** This table reports in Panel A the fully standardized probit regression estimates of Long and Freese (2006), while Panel B reports the standardized beta estimates from ordinary least squares regressions. The robust standard errors are reported in parentheses. The dependent variable in Panel A is a dummy variable equal to one for households owning stocks and zero otherwise. In Panel B, the dependent variable is investment in stocks as a percentage of total financial assets. The explanatory variable sociability takes the value of one if the households have casted their votes in national elections, and zero otherwise. The other explanatory variables are stock market literacy, trust in stock market, and all demographic and behavioral variables previously considered. For readability, we only report estimates for key explanatory variables. ***, ** and * denote significance at 1, 5 and 10 percent respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Results for stock market participation							
Stock market literacy	0.138***		0.134***		0.113***		0.107***
	(0.03)		(0.031)		(0.031)		(0.028)
Sociability		0.021	0.02			0.021	0.001
		(0.025)	(0.025)			(0.024)	(0.029)
Trust in stock market				0.203***	0.165***	0.179***	0.155***
				(0.026)	(0.029)	(0.027)	(0.027)
Pseudo R-Squared	0.301	0.262	0.273	0.266	0.326	0.300	0.326
Observations	1332	1972	1968	1989	1331	1684	1330
Panel B: Results for share of investment in stocks							
Stock market literacy	0.095***		0.094***		0.085***		0.086***
	(0.019)		(0.0187)		(0.019)		(0.019)
Sociability		-0.001	-0.000			-0.017	-0.008
		(0.008)	(0.003)			(0.008)	(0.003)
Trust in stock market				0.082***	0.083***	0.086***	0.087***
				(0.0183)	(0.023)	(0.019)	(0.024)
Adjusted R-squared	0.124	0.130	0.109	0.135	0.130	0.136	0.115
Observations	1239	1551	1238	1574	1239	1549	1238

Table 3.12: **Analysis of stock market participation with allowance for interaction between stock market literacy and sociability.** Columns 1 to 3 of this table report the fully standardized probit regression estimates of Long and Freese (2006), while Columns 4 to 6 report the standardized beta estimates from ordinary least squares regressions. The robust standard errors are reported in parentheses. The dependent variable in Column 1 to 3 is a dummy variable equal to one for households owning stocks and zero otherwise. In Columns 4 to 6, the dependent variable is investment in stocks as a percentage of total financial assets. In Panel A, sociability is measured by the number of social activities household participate in. In Panel B, the sociability variable takes the value of one if the households have casted their votes in national elections, and zero otherwise. The other explanatory variables are stock market literacy, sociability, interaction between stock market literacy and sociability, trust in financial market, and all demographic and behavioral variables previously considered. For readability, we only report estimates for key explanatory variables. ***, ** and * denote significance at 1, 5 and 10 percent respectively.

	(1)	(2)	(3)	(4)	(5)	
Demographic variables	No	Yes	Yes	No	Yes	Yes
Psychological variables	No	No	Yes	No	No	Yes
	Probit estimates			Ordinary least square estimates		
	Panel A: Results with first sociability measure.					
Stock market literacy	1.831***	1.290*	1.458**	0.126***	0.111	0.078
	(0.164)	(0.688)	(0.735)	(0.016)	(0.109)	(0.103)
Sociability	0.300	0.115	0.232	-0.022	-0.019	-0.025
	(0.191)	(0.357)	(0.389)	(0.026)	(0.044)	(0.044)
Trust in stock market	1.610***	1.486***	1.553***	0.083***	0.074***	0.068***
	(0.234)	(0.258)	(0.263)	(0.024)	(0.023)	(0.023)
Stock market literacyXSociability		-0.287	-0.679		-0.026	-0.025
		(0.704)	(0.756)		(0.111)	(0.107)
Pseudo/Adjusted R-Squared	0.167	0.293	0.327	0.062	0.107	0.132
Observations	1386	1351	1331	1284	1257	1239
	Panel B: Results with first alternative sociability measure.					
Stock market literacy	1.790***	1.077**	1.054**	0.123***	0.137**	0.114*
	(0.164)	(0.445)	(0.460)	(0.016)	(0.064)	(0.061)
Sociability*	0.270**	0.058	0.064	0.004	-0.014	-0.010
	(0.135)	(0.146)	(0.152)	(0.012)	(0.012)	(0.011)
Trust in stock market	1.611***	1.484***	1.552***	0.080***	0.075***	0.069***
	(0.235)	(0.261)	(0.266)	(0.024)	(0.024)	(0.023)
Stock market literacyXSociability*		-0.081	-0.273		-0.052	-0.062
		(0.408)	(0.427)		(0.062)	(0.061)
Pseudo/Adjusted R-Squared	0.165	0.290	0.323	0.060	0.107	0.131
Observations	1369	1334	1315	1279	1252	1234

Table 3.13: **Analysis of stock market participation with trust in financial market measure.** This table reports in Panel A the fully standardized probit regression estimates of Long and Freese (2006), while Panel B reports the standardized beta estimates from ordinary least squares regressions. The robust standard errors are reported in parentheses. The dependent variable in Panel A is a dummy variable equal to one for households owning stocks and zero otherwise. In Panel B, the dependent variable is investment in stocks as a percentage of total financial assets. The other explanatory variables are stock market literacy, trust in financial market, and all demographic and behavioral variables previously considered. For readability, we only report estimates for key explanatory variables. ***, ** and * denote significance at 1, 5 and 10 percent respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Results for stock market participation						
Stock market literacy	0.138***		0.147***		0.146***	
	(0.03)		(0.027)		(0.027)	
Trust in financial market		0.118***	0.102***	0.148***	0.101***	
		(0.023)	(0.024)	(0.024)	(0.024)	
Sociability				0.041*	0.02	
				(0.025)	(0.026)	
Pseudo R-Squared	0.133	0.215	0.262	0.216	0.262	
Observations	1707	2013	1350	2013	1350	
Panel B: Results for share of investment in stocks						
Stock market literacy	0.095***		0.088***		0.087***	
	(0.019)		(0.019)		(0.019)	
Trust in financial market		0.066***	0.068**	0.070***	0.069**	
		(0.023)	(0.024)	(0.020)	(0.024)	
Sociability				-0.016	-0.005	
				(0.008)	(0.003)	
Adjusted R-squared	0.124	0.135	0.136	0.090	0.113	
Observations	1239	1574	1238	1574	1238	

4 Financial distress, poverty and financial decision making

This chapter investigates the role of financial distress, poverty and exposure to economics eduction in understanding the unwise financial decisons of the houseolds. The findings of this chapter show that both financial distress and poverty positively explains the probability of making unwise financial decisions. However, financial distress outperforms poverty by explaining all unwie financial decisions and having significantly higher marginal effects as compared to the effects of poverty. In contrast, no evidence is found suggesting that childhood poverty affects the financial decision making in later age. Lastly, exposure to economics eduction is found to negatively explain the unwise financial decisions of the households.

4.1 Introduction

While it is commonly accepted that households make poor financial decisions, it is difficult to pin down why and which households make such financial decisions. Widely accepted explanations suggests that households make poor or unwise financial decisions because financial decisions are complex, require trade-offs between the present and the future, require assessing risk and uncertainty, involve emotions, and permit little learning from past mistakes (Erta et al., 2013). In determining which segments of population make poor financial decisions, numerous evidences suggest that the shortage of money and adequate living conditions faced by the financially troubled households can affect their decision making (Orwell, 1937; Scott, 1977; Karelis, 2007; Banerjee, 2000; Bertrand et al., 2004; Duflo, 2006; Hall, 2008; Campbell et al., 2011).

Despite above findings, it is not clear what drives the unwise financial behaviour of the financially weak households. Massoud et al. (2006) proposes that some financial mistakes are intentional where household has no choice such as not having enough money pay off the credit card debt.[43] On the other hand, the unintentional financial mistakes of the financially fragile households have been associated with psychological biases.[44] For example, Banerjee (2000), Bertrand et al. (2004), Duflo (2006), and Hall (2008) advocate that shortage of financial resources can modify behavior either by making the financially weak households desperate or vulnerable. Ellison (2005) links unwise financial decisions of the rich with low marginal utility of income and of the poor with low financial sophistication. According to Baumeister et al. (1998) financially weak households have more temptations to resist, that rich can fulfill easily, resulting in willpower depletion. In

[43] Massoud et al. (2006) document that individuals who pay penalty fees on their credit cards do so intentionally, where they do not have enough money or they do it unintentionally, where they have money to pay off.

[44] In behavioural biases, lack of self-control (Agarwal et al., 2009), over-optimism (Mann, 2013), over-confidence (Barber and Odean, 2001), inattention (Agarwal et al., 2012; Mann 2013), scarcity (Mani et al. 2013) and lack of financial experience and knowledge (Stango and Zinman 2009) are found to explain household financial decision making.

contrast, limited cognitive control argument suggests that cognition control is limited that is depleted when making decisions under the influence of limited financial resources (Robinson et al., 2010).[45] On the other hand, Mullainathan and Shafir (2013) define shortage of financial resources as scarcity, where scarcity constraints negatively influences ones decision making due to the overload of managing limited financial resources.[46] The scarcity concept itself is related to the notion of bounded rationality where rationality is restricted due to information, cognition and time limitations faced by the households. Further evidence of financial hardship impeding financial decision making is provided by Mani et al. (2013), reporting that many wealthy people habituate the behavior similar to the poor people in an environment of scarcity.[47] Economic and Social Research Council (2012) also suggests that preoccupations with pressing budgetary concerns results in increased chances of households making unwise financial decisions.

In the existing literature, poverty is widely used as an indicator of the financial fragility of household. Poverty is measured by comparing after-tax household income with poverty threshold, minimum income required to meet the basic needs. Since poverty only concerns income, it is a narrow classification of household financial hardship. The broader definition should consider the total assets and debt households carry. The motivation in this study is instigated by the recommendations given by the Stiglitz (2009) that advise use of stock of debt and assets as additional indicators of financial hardship. Brandolini et al. (2010) also advocate the importance of measuring the effect of net worth on household well-being and use of net worth to define eligibility for public benefits. Net worth is an indica-

[45] The theory of ego depletion presented by Baumeister et al. (1998) proposes that self-control is produced with a limited willpower stock that is temporarily used up when people regulate their emotions or resist temptation.

[46] Different population segments face different forms of scarcity such as financially troubled households face the scarcity of money while the richer segment faces the scarcity of time, and both segments face the scarcity of will-power. Though with different intensities, each scarcity taxes the cognitive capacity of that population segment.

[47] Money scarcity might be more critical as poor are unable to use their time to earn more, while other scarcities such as time can be compensated by money as richer households can afford to outsource part of their decision-making.

tor of how fragile a household is to facing transitory income shocks. Households with high net worth can rely on transferring their resources from the future to the present when faced with transitory shocks. In contrast, households that rely heavily on financial debt to smooth their current expenditures deplete their net worth and are financially fragile to potential transitory shocks. Studies that use wealth based measures of financial hardship such as net worth in understanding the financial decision making of the households include Barwell et al. (2006), Brown and Taylor (2008) and Christelis et al. (2009).[48]

This study refers to wealth based measure of financial fragility as financial distress, defined as a tensed cash situation in which a business, household or individual cannot pay the owed amounts on the due date. Such situation can lead the entity to bankruptcy or forced liquidation. The situation is worsened due to the fact that banks and other financial institutions deny loans or charge higher interest rates from the financially distressed household or firm. Following Brown and Taylor (2008), financial distress is measured through household net worth, where the household with negative net worth is defined as financially distressed.[49] Giarda (2013) provides evidence that financial distress persists over long periods, therefore the persistent financial distress can have significantly higher effects as compared to the current financial hardship. In order to capture the persistence of financial distress, the individual financial distress faced in year 2009, 2007, 2005 and 2003 is aggregated. Further, the additional analysis section tests the same specification with financial distress faced only in the current period. Furthermore, this work includes income based measure of financial hardship to determine its association with unwise financial decisions of households.[50] The income based

[48]Campbell (2006) highlights that research on relationship between financial mistakes and wealth is severely impeded because households guard their financial privacy.

[49]The net wealth consists of net of debt values of household farm, business, checking and saving accounts, stocks, vehicles, bond funds, cash value in a life insurance policy, valuable collection for investment purposes, rights in a trust or estate minus credit card and store card debts, student loans, outstanding medical and legal bills, and loans from relatives.

[50]Beside financial hardship indicators, this study considers a rich set of household characteristics.

financial hardship is referred to as poverty and is determined by comparing pre-tax household income against the threshold set at three times the cost of a minimum food diet in 1963 by United States Census Bureau. The difference of income and corresponding poverty threshold captures the depth of poverty, where the higher the difference, the higher is the level of poverty.

The financial decisions studied in this chapter relate to unsecured debt, credit card debt, mortgage debt and investment diversification management.[51] For each type of household financial decision, first the likelihood of making an unwise decision and then the level of unwise financial decision is analyzed to get further insight into household financial decisions. The findings of this chapter suggest that financially distressed households are more likely to make unwise financial decisions. Further, it is found that poor households behave differently as compared to their affluent counterparts in managing unsecured debt, credit card debt and mortgage debt. In line with the findings of Orwell (1937), Scott (1977) and Karelis (2007), both measures of financial hardship positively explain the likelihood of making unwise financial decisions. However, it is found that financial distress overshadows poverty by explaining all the unwise financial decisions with significantly higher marginal effects as compared to the effects of poverty. Further, while investigating the level of unwise financial decisions, it is found that financial distress positively explains the level of difficulty faced in paying off credit card debt and investment under-diversification, and negatively explains the mortgage debt to income ratio. The endogeneity issues in the above specifications give rise to criticism that households may be making unwise financial decisions due to habit formation in previous period irrespective of their current financial situation. Further, it can be argued

[51] Financial mistakes that have been studied include lack of checking accounts (Hilgert et al., 2003), excess interest rate and fee payments (Agarwal et al., 2009), use of high interest payday loans (Agarwal, Skiba, and Tobacman, 2009), suboptimal use of credit card balance transfer offers (Agarwal et al., 2009), intentional credit card non-payment (Massoud et al., 2006), inability to refinance mortgage (Agarwal et al., 2012), non-participation in equity markets (Cole and Shastry, 2009; Li, 2012; Calvet et al. (2007), highly concentrated portfolios (Korniotis and Kumar, 2011; Calvet et al., 2007), disposition effect (Calvet et al., 2009), inertia in trading (Calvet et al., 2009), excessive trading (Korniotis and Kumar, 2011).

that financially weak households may be culturally poor financial decision maker irrespective of their current financial situation (Collins, 1988; Lewis 1959). To answer this criticism, controls for habitual decisions are included by incorporating indicators for unwise financial decisions in previous period and interaction term of this indicator with financial distress. Further, both the aggregate and current financial distress indicators are included in order to discretely analyze the effects of persistent and current financial distress. The results with both aggregate and current financial distress indicators in this modified specification suggest that financial distress has significant effects on financial decisions that are independent of the financial decisions made in previous period. This chapter also finds evidence of presence of habit formation in household financial decision making. Nevertheless, it is found that the households who made unwise financial decisions in previous period are not necessary more likely to make unwise financial decisions in current period in presence of financial distress. In other words, households who make unwise financial decisions due to financial distress do not necessarily repeat the same mistake when facing financial distress in future. Agarwal et al. (2012) also find that borrowers make mistakes in their first refinancing decisions but then they learn from their mistakes and change their behavior. In short, no evidence is found supporting the formation of habit or culture in unwise financial decision making of the financially fragile households.

Another stream of literature suggests that certain segments of the poor pass their values, attitudes and behaviors to their off-spring, and consequently perpetuate poverty from one generation to the next (Glazer and Moynihan, 1963; Ball, 1968; Miller, 1959). In other words, poverty breads poverty, where poor financial decision making is rooted in the culture followed by the poor. This chapter investigates this narrative by testing if a household born in poor family will have poor financial behavior in later age, where childhood poverty is determined by asking the household if the parents were poor during the household childhood. The re-

sults indicate that childhood poverty, except in mortgage debt, does not explain the probability of making any unwise financial decision. Simultaneously, it is found that the introduction of childhood poverty does not modify the significance of relationship between financial distress and unwise financial decisions. Past financial hardship can help the households in anticipating the importance of money. The efforts required to manage expenses and income will make the household members better equipped and prepared to survive during future financial troubles. In addition, personal experience and motivation at later age can compensate for the lack of available opportunities to learn and develop during childhood. Therefore, the results obtained suggest that what matters in financial decision making is the household own financial hardship irrespective of their financial circumstances during childhood.

The last investigation carried out in this chapter explores the association between economics education and financial decision making in presence of financial hardship. Numerous evidences suggest that households with better economics and financial knowledge show better financial behavior (Van Rooji et al, 2011; Lusardi and Mitchell, 2011; Hastings et al., 2011; Yoong, 2011; Clark et al., 2011; Banks et al, 2010; Guiso and Jappelli, 2005). Exposure to economics education is determined by using the questions that ask if households have taken course in economics during their first, second or third college education. If the households took a course in economics in any of the college, they are considered having exposure to economics education. It is found that economics education negatively associates with the likelihood of making unwise credit card debt and investment diversification decisions. Further, the results suggest that financially literate households have lower unsecured debt to income ratio, face less difficulty in paying off credit card debt, and have lower investment under-diversification. With the addition of economics education, financial distress retains significance in explaining unwise financial decisions. On the hand, poverty is unable to explain the probability of making any

unwise decisions in presence of economics education indicator. This finding further supports earlier analysis that financial distress gauge financial hardship in better way while explaining unwise financial decision making.

The findings of this study show that financially distress is overarching in explaining the household financial decision making by accurately indicating the financial scarcity or hardship. This inference is in line with the recommendations of Stiglitz (2009) advising use of stock of debt and assets in measuring household financial hardship. Further, in line with the argument of Brandolini et al. (2010), it is recommended that the policy makers and practitioners should also consider financially distress households as economically deprived segment eligible for public benefits that are provided to poor population segment. It is recommended that financially fragile households need moral and technical assistance in financial decision making that will enable them to make the choices that are in their best interest. Any financial support to poor or financially distressed households without guidance may not be effective as financially troubled households are unable to make wise financial decisions on their own. Further, not only financially troubled households should not be monetary taxed but also they should not be cognitively taxed as their decision making capacity is already compromised while making the ends meet. Filling out long forms, deciphering complicated rules or undergoing lengthy interviews can further consume scarce cognitive resources. These actions are necessary to ensure that the unwise financial decisions made by the financially troubled households do not further deteriorate their financial wellbeing, resulting in their total financial collapse.

The reminder of the chapter is organized as follows: Section 2 describes the data and variables, Section 3 reports the empirical analysis, and Section 4 concludes:

4.2 Data and variables

The data used in this study is acquired from Panel Study of Income Dynamics (PSID), the longest running longitudinal household survey in the world. In PSID family unit is defined as a group of people related by blood, marriage, or adoption that are living together in the same household unit. Unrelated persons are also considered as part of a family unit, provided they are permanently living with the family and share both income and expenses.[52] In this chapter, the unit of study is household, where household wealth and income based measures are that of a family while other household characteristics are that of the family head, who is the primary decision maker in the house. The PSID collects data on a wide array of social, demographic, health, economic, geospatial, and psychological indicators. The panel began in 1968 with a nationally representative sample of over 18,000 individuals living in 5,000 families in the United States. Information about these individuals and their descendants has been collected continuously since then. PSID has gathered almost 30 years of extensive economic and demographic data on a nationally representative sample of approximately 5,000 (original) families and 35,000 individuals in those families. PSID spans all age groups, making it possible to examine wealth data across the complete life cycle. Wealth modules were included in the 1984, 1989, and 1994 waves of the survey. Another wealth module was included in 1999 and is used every 2 years thereafter. These wealth modules incorporate transaction questions about purchases and sales so that in principle, active and passive savings can be distinguished. The PSID has significantly lower item non-response rates on most of its wealth items than either the SCF or the SIPP. The PSID follows and interviews the members of a sample selected in 1968 and

[52] A PSID family can also be made up of a single person who lives alone or shares a household with a non-relative. The PSID family is broader than the U.S. Census Bureau's family unit definition, as it includes cohabiters, single person households, and persons related by blood. Since the PSID family includes several members of the U.S. Census Bureau's definition of a household, we refer to the PSID family unit as a household which is our basis unit of analysis (McKernan and Ratcliffe, 2002). If a PSID sample member is not living with any partner and blood related or unrelated individual, then the household is simply that individual.

their adult offspring plus the members of the supplemental sample added in 1997 and their adult offspring. With the addition of a supplemental immigrant sample in 1997, the PSID was restored to full representativeness of the U.S. household population.

Several prior studies have employed micro-survey data on the behavior of individual families to explore various aspects of the decline in household saving and most of that work, such as Skinner (1996), Hurst and Stafford (2004), and Lehnert (2004) and Juster and others (2006), used data from the PSID (Bosworth and Anders, 2008). However, there are other surveys that provide wealth measures such as Health and Retirement Study (HRS) survey, Asset and Health Dynamics Among the Oldest Old (AHEAD) survey, Survey of Consumer Finances (SCF) and Survey of Income and Program Participation (SIPP). The definition of personal net worth in PSID closely parallels that used in HRS and AHEAD, but fewer and somewhat broader categories are used (US National Research Council, 2001). On the other hand, other surveys lack full population representation, for example Health and Retirement Study (HRS) but do not interview the younger population hence only representing older population segment.[53] Further, Bosworth and Anders (2008) while comparing wealth measures in different surveys find that estimates from the PSID and HRS are quite similar. Bosworth and Anders (2008) also suggest that other surveys such as SCF allows to better capture small asset holdings. However, they further state that the wealth data of the PSID yield very similar results as compared to SCF. Subsequently, PSID provides measures of wealth accumulation and saving across a wide range of families differing in age, marital status, education, income, and the composition of their wealth holdings making it possible to test wide range of hypotheses about saving behavior. The development of key variables using PSID is described in the following sections:

[53]For a detailed comparison of PSID with other surveys please read Bosworth and Anders (2008).

4.2.1 Measuring household unwise financial decisions

This chapter primarily focuses on the household decisions related to unsecured debt , credit card debt, mortgage debt and investment diversification. The following section defines the mechanism of determining household unwise financial decisions in each area:

Unsecured debt management Unsecured debt is a vital source for the households to smooth consumption during financial troubles. Since, unsecured debt does not require pledging property, cash or other valuables, therefore, it is easier for the poor and financially distressed households to obtain unsecured debt. However, for the welfare of the households, it is critical that the household debt burden remains under a threshold level. These debts can be beneficial in some instance, but securing such debt to finance luxuries and other non-essential goods is not considered a wise strategy. Because unsecured debt carries more risk for the creditors, they charge a higher interest rate than for secured debt. Excess level of unsecured debt will significantly decrease the consumable income after monthly interest payments and net worth after principal payment at the maturity of the loan.

In this chapter, household unsecured debt calculate is calculated by summing the household credit card and store card debts, student loans, medical bills, legal bills and loans from relatives. Following Brown and Taylor (2008) and Cox et al. (2002), household unsecured debt to income ratio is calculated to assess the relative indebtedness of the households. High unsecured debt to income ratio signifies the inability of the households to service the debt, resulting in increased chances of financial default. Following Hurst and Willen (2004) and Lawless (2015), the 75th percentile of unsecured debt to income ratio is used as an upper bound to define the unwise level of unsecured debt. Households having unsecured debt to income ratio more than the 75th percentile level are considered making an unwise unsecured debt decision. Further, it is investigated what characteristics explain the household

unsecured debt relative to income by taking the percentage of unsecured debt to income ratio and scaling the reported percentages from zero to one, where zero represents minimum and one represents maximum percentage of unsecured debt relative to income.

Credit card debt management Often, households use their credit cards to purchase items or services they cannot afford, thinking it will be easy to pay off the bill later. What often occurs, however, is the gradual accumulation of large credit card bills that the cardholder cannot pay off in a reasonable amount of time. In some cases, cardholders can only afford to make the minimum payments required by their credit card companies, which often dramatically extends the amount of time it will take to get out of unsecured credit card debt. Many financial experts advise consumers against carrying large amounts of credit card debt. In fact, some recommend that cardholders only charge the amount they can afford to pay back within a credit card billing cycle. Thinking of credit card use as taking on a loan, rather than as an easy way to purchase, may help individuals keep unsecured credit card debt in prospective and decide how best to protect their financial health. In addition, many affluent investors also unknowingly hurt themselves with late credit card payments (Wall Street Journal, 2009). Since, the costs of failing to pay the minimum card balance would be less consequential for rich individuals than for financially troubled individuals; therefore, the financially troubled households should be more diligent in monthly credit card payments. However, evidences suggest that poorer individuals may be more likely to fail to pay off their credit card debt, even though they have sufficient funds on deposit to pay. It is necessary for the households to manage their credit card monthly payment as the interest rate of credit cards, even with low introductory rate, shoots up if the households miss a single payment. At the time of credit card introduction the standards of acquiring credit card debt was very high. However, since 1970's the standards got

lowered to the extent that households with almost no income and assets could obtain a credit card. Currently, an average American family has around $9,000 in debt, and pays around $1,3000 a year on interest payments. According to Massoud et al. (2007) consumers are turning to credit cards to make ends meet because banks are limiting home equity lines, gas and food bills are on the rise, and homeowners are struggling to make their mortgage payments. However, according to National Foundation for Credit Counseling (2009), in the last 12 months,15 percent of American adults have been late making a credit card payment while penalty on the late payment has reached up to $39 per incident (Consumer Action credit card survey, 2008).

Due to the severity of the credit card debt problem, this chapter separately assesses the credit card debt management by determining the efficiency of the households in paying off credit card debt each month. The question which is used asks the individuals how good are they at paying off credit card balances each month on a scale of one to seven, where one represents "not at all well" and seven represents "extremely well". The household unwise credit card decision is a dummy variable that takes the value of one if the households report difficulty in paying off credit card, reflected by score of one to three in the above mentioned questions. On the other hand, the dummy variable takes the value of zero if the households report no difficulty in paying off credit card debt, reflected by the scores of five to seven in the same question. Additionally, chapter investigates the level of difficulty faced in paying off credit card debt by utilizing the same question used to determine the unwise credit card debt decision. To obtain comparable estimates with other financial decisions studied here, the scores are reversed in this specification so that the minimum value of the score represents the maximum difficulty faced.

Mortgage debt management The mortgage debt payment is another important financial commitment of the households. Mortgage remains an important way

of securing assets such as house or car. Without such facility, many households cannot afford these assets on their own. Mortgage monthly payment, if paid on time, can boost the household credit score. In contrast, if the households fall behind on the agreed payments on their loans, the creditors have the right to seize the security for the debt and sell it to recover their investment. Most mortgage companies, in addition to looking at the overall credit score, look at all the money the households owe and the monthly payments on all of that debt. They want to ensure that the household income is enough to cover all their debts, including the mortgage which households are applying for. Any miss-commitment in paying monthly mortgage payment will not only result in reduced credit score and financial penalty but also results in higher payments in the next billing period that will be more difficult to meet. Different institutions use different levels of loan to income ratio to determine the ability of the households to service the mortgage debt. Since the idea behind defining these ratios is to determine household financial capacity to pay mortgage debt payments, in our work, we use the actual status of the household monthly payments. The capacity to make monthly mortgage payment is determine by using the PSID question asking the household heads if they are or their spouse/partner currently more than two months behind on mortgage payments (Read, Stewart and Cava; 2014; Bianco, 2008; Chomsisengphet and Pennington-Cross, 2006). We regard households as making unwise mortgage debt management decision if they are behind their monthly mortgage payment.

In addition to analyzing the ability to pay off mortgage monthly payments, this study investigates the level of mortgage to income ratio of the households. Oversized debt obtained through mortgage contracts can severely harm household ability to service the mortgage debt and decrease the consumable income after monthly mortgage payments. For this purpose, debt on all mortgages is summed and then divided by the income. Higher mortgage to income ratio reflects the vulnerability of the households to fall short in making monthly mortgage payments

and face financial collapse. The chapter investigates what characteristics explain the household mortgaged debt relative to income by taking the percentage of mortgage debt to income ratio and scaling the reported percentages from zero to one, where zero represents minimum and one represents maximum percentage of mortgage debt relative to income.

Investment diversification The final unwise financial decision investigated in this study is related to household investment diversification. Investment diversification is an important tool for households to reduce their risk exposure, thereby improving the performance of their investment. Earlier evidence of under-diversification by the investors is reported by Blume and Friend (1975). Since PSID does not provide data on household investment in each stock, this study is unable to test for stock market diversification. However, PSID provides information regarding household possession of Individual Retirement Account (IRA), stocks, real estate, current and saving accounts, and other savings or assets, such as bond funds, cash value in a life insurance policy, a valuable collection for investment purposes or rights in a trust or estate. In this study, the unwise investment diversification decision indicator takes the value of one if the household have investment in only one asset, and one if the household have investment in more than one asset. Further insight into investment diversification is obtained by investigating the number of assets held by the household. The number of assets is scaled to lie between zero and one, where zero corresponds to the lowest and one corresponds to the highest investment under-diversification.

4.2.2 Financial distress

Following Brown and Taylor (2008), in this study financially distressed households are defined as those who posses negative net worth. The net worth is calculated by PSID and consists of net of debt values of household farm, business, checking and

saving accounts, stocks, vehicles, bond funds, cash value in a life insurance policy, valuable collection for investment purposes, rights in a trust or estate minus credit card and store card debts, student loans, outstanding medical and legal bills, and loans from relatives. Households facing persistent financial distress over long period of time will be more affected as compared to the households who face financial distress for short period. In order to incorporate the length of financial distress faced by a household, this chapter individually determines financial distress for the years 2009, 2007, 2005 and 2003. The aggregate financial distress is the number of times the household faces financial distress faced during these four periods. In this way, financial distress indicator ranges from zero to four, where zero means no financial distress and four means maximum financial distress. In the additional analysis section, the effects of financial distress faced only in year 2009 are also tested.

4.2.3 Poverty

The U.S. Census Bureau determines poverty status in order to track poverty over time, compare poverty across different demographic groups, and as the starting point for determining eligibility for a range of federal assistance programs. The poverty status is determined by comparing pre-tax cash income against a threshold that is set at three times the cost of a minimum food diet in 1963, updated annually for inflation using the Consumer Price Index, and adjusted for family size, composition, and age of householder. "Family" is defined as persons living together who are related either by blood or marriage. These thresholds do not consider geographical or living standard variations. In order to determine the household poverty, this work follow Gabe (2015) and Mykyta and Renwick (2013) by taking the difference of corresponding income threshold defined by the United States Census Bureau and household total annual income. The difference of these two measures gives the poverty level of the households (Orwell, 1937; Scott, 1977;

Karelis, 2007; Banerjee, 2000; Bertrand et al., 2004; Duflo, 2006; Hall, 2008; Campbell et al., 2011).

4.2.4 Measuring exposure to economics education

Numerous evidences suggest that households with better economics or financial knowledge show better financial behavior (Van Rooji et al, 2011; Lusardi and Mitchell, 2011; Hastings et al., 2011; Yoong, 2011; Clark et al., 2011; Banks et al, 2010; Guiso and Jappelli, 2005). PSID does not provide any direct measure of economics or financial literacy of the households. Earlier studies have widely used exposure to economics or financial education during school and college as a proxy for financial literacy to capture the individuals financial capability before entering in financial market (van Rooij, Lusardi and Alessie, 2012; Lusardi and Mitchell, 2009). Such proxy of financial literacy, even though not precise, resolves the endogeneity issue which is the major problem in understanding the linkage between financial literacy and financial decision making. Further, studies suggest that exposure to economics education highly correlates with objective measures of financial literacy (Lusardi and Mitchell, 2009). Based on these arguments and findings, household economics education is determined by using the questions that ask if the households have taken course in economics during their first, second or third college education. If the households took a course in economics in any of the college, they are considered as having exposure to economics education.

4.2.5 Measuring demographic and psychological characteristics

This study incorporates a rich set of household demographic characteristics that can influence household financial behavior such as family income, employment, marriage, education, age, gender and number of children. For example, Calvet et al. (2009), while analyzing under-diversification, inertia in risk taking, and the disposition effect in direct stockholdings, find that the index of financial sophistication

is strongly affected by financial wealth and household size, and relatively weakly by education and financial experience. Agarwal et al. (2009), while analyzing ten different types of household credit behavior, report that the financial mistakes follow a U shaped pattern, with the cost-minimizing performance occurring around age 53. Davies and Lea (1995), Hayhoe, Leach, and Turner (1999), and Norvilitis et al. (2006) associate age to the number of credit cards held, and the attitudes toward debt. Horn and Cattell (1967) report that the younger households make financial mistakes because of inexperience, while the older households make such mistakes because of limited fluid cognitive abilities. Cole and Shastry (2009), Fonseca et al., (2012), Gathergood (2012), and Murphy (2005) relate lack of education to household poor financial behavior. Similarly, Boddington and Kemp (1999) and Norvilitis et al. (2006) find years in college to be associated with the level of debt, with debt increasing with each year in college.

Table 4.1 presents summary statistics of the sample studied in this study. From the table, it is found that the average family income of our respondents is $68,900, average age is 43 years, the average number of years in education is 13, and the average number of children is around 1, with 55% married, 72% males, and 71% employed respondents. Further, it can be seen that households in our sample on average are not financially distressed, are not poor, did not face poverty during childhood. From the median, it can be observed that median income of $53,000 of the sample is comparable to the US median real income of $51,000. From Table 4.2, it is observed that poverty is moderately correlated with family income, marriage, education, age and gender. On the other hand, family income is moderately correlated with employment, marriage and education.

4.3 Empirical analysis

4.3.1 Who makes unwise financial decisions?

This section tests whether financial distress and poverty has distinct and significant association with the likelihood of making unwise financial decision through the following probit specification:

$$\begin{aligned} UFD\_prob_i &= \beta_1 FD_i + \beta_2 PO_i + \beta_3 IN_i + \beta_4 EM_i + \beta_5 MA_i + \beta_6 ED_i \\ &\quad + \beta_7 AG_i + \beta_8 AGS_i + \beta_9 ML_i + \beta_{10} NC_i + \varepsilon_i \end{aligned} \tag{4.1}$$

where the dependent variable UFD_ prob on the left hand side is the probability of making unwise financial decisions as defined in Section 4.2.1. The key independent variables on the right hand side are financial distress (FD) and poverty (PO). Further, a large set of household characteristics including income (IN), education (ED), age (AG), age square (AGS), number of children (NC) and dummies for employed (EM), married (MA) and male (ML) that we outlined in Section 4.2.5 is included.[54]

The test results are reported in Table 4.3, presenting the mean marginal effects for the sample after running the probit specification of Equation 4.1. The reported estimates indicate that financial distress increases the likelihood of making unwise decisions in all four areas. These results are consistent with and without indicator for poverty. The marginal effects show that a unit increase in financial distress increases the probability of making unwise decisions related to unsecured debt, credit card debt, mortgage debt and investment diversification by 28, 12, 8 and 9

[54]To avoid the causality issues, financial mistakes are calculated based on figures in 2011, year preceding the period for which financial distress is included in the tests. However, causality tests are performed in the additional analysis section.

percentage points (estimates significant at 1 percent tolerance level) respectively. Simultaneously, a one thousand dollars increase in the poverty level increases the probability of making unwise unsecured debt management decision by 0.7 percentage points (estimates significant at 1 percent tolerance level). The results concur with the literature suggesting that poor households are poor decision makers when it comes to managing finances (Orwell, 1937; Scott, 1977; Karelis, 2007), such as poor households have lower stock market diversification (Calvet et al., 2009; Calvet et al., 2007; Goetzmann and Kumar, 2008; and Vissing-Jorgensen, 2003). Further, results indicate that magnitude of the estimates for poverty is considerably low. On the other hand, financial distress not only explains all four unwise financial decisions but also has significantly higher impact on financial decision making. Therefore, it can be concluded that net worth financial hardship, such as financial distress, is superior in explaining household financial decision making.

In demographics, family income is negatively associated with the likelihood of making unwise unsecured debt, mortgage debt and investment diversification decisions. Employed households are found to be less likely to make unwise credit card debt decision and more likely to make mortgage debt decisions. Married households are more likely to make unwise unsecured debt and mortgage debt decisions. Married people may have more financial and time constraint, making them vulnerable to make unwise financial decisions. Similarly, education is found to be positively related to the likelihood of making unwise unsecured debt decision. Irwin and Scott (2010) also report that educated households end up acquiring excess level of unsecured debt households as they face less difficulty in raising finance. In contrast, educated households are found to be less likely to make unwise mortgage debt and investment diversification decisions. Further, positive estimate for age and negative estimate for age square show that the household life cycle effect on unwise mortgage debt decisions is quadratic. At young age, the probability of making unwise mortgage debt decision increases with age, while at old age this

probability decreases with age. In contrast to the estimates found for mortgage debt, the age effect on investment diversification decision is inverse, where young households are less likely to make unwise investment diversification decision and at old age this probability increases. Households with male heads are found to be more likely to make unwise unsecured debt and investment diversification decisions, while such households have less chance to make unwise mortgage debt decision. In household size, the number of children negatively relates to unwise unsecured debt and investment diversification decisions. In contrast, the number of children in the household increases the chances of making unwise mortgage debt decisions. The hefty expenses, time commitment and need for an adequate house for large families is an important factor in explaining the probability of making unwise mortgage debt decisions.

4.3.2 What explains the level of unwise financial decision?

This section investigates the characteristics of the households that explain their unsecured debt to income ratio, level of difficulty faced in paying off credit card debt, mortgage debt to income ratio and investment under-diversification.[55] Following ordinary least squares regression is estimated:

$$\begin{aligned} UFD\_level_i &= \beta_1 FD_i + \beta_2 PO_i + \beta_3 IN_i + \beta_4 EM_i + \beta_5 MA_i + \beta_6 ED_i \\ &\quad + \beta_7 AG_i + \beta_8 AGS_i + \beta_9 ML_i + \beta_{10} NC_i + \varepsilon_i \end{aligned} \tag{4.2}$$

where the response variable UFD_level is the unsecured debt to income ratio, level of difficulty faced in paying off credit card debt, mortgage debt to income ratio and level of investment under-diversification. All explanatory variables are as

[55] In investment under-diversification, the number of assets households hold are scaled between zero and one, where zero represents the highest diversification and one represents the lowest diversification.

in Equation 4.1.

The estimates reported in Table 4.4 show that financial distress positively associates with the level of difficulty faced in paying off credit card debt and investment under-diversification. On the other hand, financial distress decreases the mortgage debt to income ratio. Further, poor households face lower difficulty in paying off credit card debt and hold higher mortgage debt to income ratio. In line with the findings of Section 4.3.1, poverty has economically lower marginal effects as compared to the effects of financial distress. Hence, financial distress is more important in explaining not only the likelihood of making unwise decisions but also the level of unwise financial decisions.

In demographics, family income negatively relates to unsecured debt to income and mortgage debt to income ratios. Higher family income reduces the household dependence on unsecured debt and mortgage debt. However, higher income households can afford to obtain higher debts, as they have the financial capacity to service such debts, reflected in their debt to income ratio. Similarly, employed households have lower unsecured debt to income ratio and face less difficulty in paying off credit card debt. This finding is consistent with the finding of Kim, Chatterjee, and Eun Kim (2012), reporting a similar negative relationship between amount of student loans and work status for respondents currently in college. Further, married households have more mortgage debt to income ratio and investment under-diversification, and they face less difficulty in paying of credit card debt. Education is found to be positively related to unsecured debt to income ratio, mortgage debt to income ratio and investment under-diversification.

As in Section 4.3.1, similar quadratic life cycle effect of age is observed on mortgage debt to income ratio and investment under-diversification. For young households, age increases the level of mortgage to income ratio and, for older households, age decreases this ratio. Kim, Chatterjee, and Eun Kim (2012) also find that the age profile significantly influences the household monthly mortgage

payments relative to their monthly income. In contrast, reverse quadratic life cycle effect is obtained, with age having a negative and age square having a positive association with investment under-diversification. Young households may have more energy, incentives and skills to manage multiple financial assets. In contrast, older households do not have capacity or incentive to manage multiple assets in old age. Furthermore, households with male heads are found to hold higher investment under-diversification, showing the higher investment risk they carry. Similar finding is reported by Jianakoplos and Bernasek (1998), suggesting that females are more risk averse. The number of children is negatively related to the investment under-diversification, suggesting that the households with greater number of children may be investing in more assets to finance their children's future needs.

4.3.3 Childhood poverty and unwise financial decisions

This section investigates if poor financial behavior is transferred from one generation facing financial hardship to its next generation. Significant amount of literature suggests that certain segments of the poor pass their values, attitudes and behaviors to their off-spring, and consequently perpetuate poverty from one generation to the next (Glazer and Moynihan, 1963; Ball, 1968; Miller, 1958).

In this study, the poverty faced during childhood is determined by asking the household if the parents were poor during the household childhood. The results reported in Panel A of Table 4.5 indicate that childhood poverty, except for mortgage debt decision (estimate significant at 1 percent tolerance level), does not explain the probability of making unwise financial decisions. This finding supports the earlier argument that it is not necessary that a household born in poor family will have poor financial behaviour. Simultaneously, it is found that the introduction of childhood poverty indicator does not modify the significance of relationship between financial distress and unwise financial decisions. The Panel B of Table 4.5, show that poverty faced by the household during childhood only explains the

unsecured debt to income ratio (estimate significant at 1 percent tolerance level). Therefore, it can be concluded that what matters is the household personal financial hardship rather than any financial hardship faced by parents during the household childhood.

4.3.4 Economics education and financial decision making

Households with exposure to economics or finance education face lower barriers to gathering and processing information, and thus, may be better equipped to manage their financial resources. Better economics and financial knowledge and skills will enable the households make better financial decision, and hence such households may be less likely to make unwise financial decisions. Numerous evidences suggest that households with better financial knowledge show better financial behavior. For example, financially knowledgeable households have better stock market (van Rooij, Lusardi and Alessie, 2011) and retirement planning behavior (Lusardi and Mitchell, 2011; Ameriks ,Caplin and Leahy, 2003; Clark et al., 2011; Guiso and Jappelli, 2005; Hastings et al., 2011; Yoong, 2011; Lusardi and Mitchell, 2007; McHugh et al, 2011).

This section proposes that good financial decisions can help accumulate wealth, and therefore, financially literate households may face low instances of financial distress. French and McKillop (2014) also report that financial knowledge and skills is correlated with higher debt burdens. In particular, the authors find that better money management ability reduces the debt to income levels. Gathergood (2012) find that poor financial knowledge is positively associated with over-indebtedness. A possible reason for the positive correlation between knowledge and wealth accumulation is that knowledgeable individuals take advantage of the financial markets such as stock market (Van RooijLusardi and Alessie, 2011). Further, economics and financial skills help planning for the future, hence higher savings and investments that result in higher wealth accumulation (Lusardi, 1999; Lusardi

and Mitchell, 2007, 2009, 2011; Ameriks et al. 2003). Thus, financial knowledge and skills will indirectly affect the unwise financial decisions of the households by reducing the frequency/intensity of the financial distress.

Panel A of Table 4.6 report the estimates that show that economics education negatively associates with the likelihood of making unwise credit card debt management decision (estimates significant at 5 percent tolerance level), where economics education reduces the probability of making such decision. Similar result is found by Scholnick et al. (2013), who suggest that failure to pay monthly credit card balance is related to low levels of financial knowledge. Further, Disney and Gathergood (2012) find that financially illiterate individuals are more likely to report credit arrears or difficulty paying their debts. Moreover, economics education reduces the probability of making unwise investment diversification decision (estimates significant at 10 percent tolerance level). In contrast, economics education and likelihood of making unwise mortgage debt decision are positively associated (estimates significant at 10 percent tolerance level); however, the significance of estimates is inconsistent in different specifications. Subsequently, it is found that significance of financial distress in explaining the likelihood of unwise unsecured debt, credit card and mortgage debt management decisions is retained in the company of economics education. In contrast, with the addition of economics education, poverty loses significance of relationship with the probability of making unwise unsecured debt, credit card debt and mortgage debt management decisions. These estimates suggest that poverty can be compensated by financial knowledge and skills but the same is not true for financial distress. Next, this section considers the level of unwise financial decisions as dependent variables and analyze through OLS specification. The results, reported in Panel B, suggest that financially literate households have lower level of unsecured debt to income ratio, face lower difficulty in paying off credit card debt, and have lower investment under-diversification.

4.3.5 Alternative measure of financial distress

The financial distress measure that is used earlier in this chapter relates to the difference of assets and debts. In this section, a different measure of financial distress is employed that does not take into account household net worth. One possible alternative is the household bankruptcy that can arise due to inability of the household to pay off creditors. As argued by Mann et al. (2012), bankruptcy is the remedy for financial distress, not its cause, a counter mobility institution rather than an adverse event in its own right. Thus, bankruptcy filing is a weak proxy for financial distress, where not all financially distressed households opt to declare bankruptcy. On the other hand, Cava and John Simon (2003) mention seven dimensions of financial stress that are related to cash constraint. These dimensions include inability to pay utility bills or registration or insurance fee on time due to shortage of money, ask family or friends for financial assistance and inability to raise emergency money. All the dimensions mentioned by Cava and John Simon (2003) relate to difficulty in managing money by the households. Therefore, the difficulty in managing money, capturing all the dimensions explaining the households financial distress, is used in this section as an alternative proxy of financial distress. The information about the level of difficulty faced by households is provided by PSID. The question that is used asks the households how good they are at managing money on scale of one to seven, where one represents "not at all well" and seven represents "extremely well".

The results with the alternative measure of financial distress are reported in Table 4.7. As in previous sections, all other characteristics of the households are controlled for; however, for the ease of readability only estimates for financial distress and poverty are reported. Panel A examines the household probability of making unwise financial decisions. It is observed that the alternative financial distress proxy is positive and remains significant in case of unsecured debt, credit card debt and investment diversification management decisions (estimates signifi-

cant at 1 , 1 and 10 percent tolerance levels respectively). Panel B investigates the household level of unsecured debt to income ratio, difficulty in paying off credit card debt, mortgage debt to income ratio and investment under-diversification. Using the alternative measure of financial distress, similar results to those reported in Section 4.3.2 are obtained, positive estimates for the level of difficulty faced in paying off credit card debt and investment under-diversification (estimates significant at 1 and 10 percent tolerance levels respectively). Hence it may be concluded that financial distress, irrespective of its measurement strategy, is the key indicator of household unwise financial decisions.

4.3.6 Additional analysis

Section 4.3.1 report the independent effect of financial distress on financial decision making. However, the major issue with this specification is that financial decisions made in 2011 may be derived from the financial decisions made in previous period. In other words, households may be making unwise financial decisions due to habit formation in previous period irrespective of their current financial situation. This section includes the controls for habitual decisions, thereby acquiring estimates specific to financial distress. Another possible issue in earlier analysis is that the financial distress is a slow moving process, therefore, it might be correlated to the financial decisions in previous period and current period. In order to test for the existence of such effects, the specification in Section 4.3.1 is re-tested with allowance for interaction between financial distress and unwise financial decisions in 2009. This section follows Brambor, Clark, and Golder (2005) approach by taking into account all constitutive terms in calculating marginal effects for the two indicators of interest; that is financial distress and unwise financial decision in 2009.

The results are reported in Panel A of Table 4.8. The first key finding from this specification suggest that financial distress has significant positive effects on

financial decisions in 2011 that are independent of the financial decisions made in 2009. Further, the significant estimates obtained for unwise financial decision in 2009 indicate presence of habit formation in household financial decision making. This result points towards existence of poverty culture where households make unwise financial decisions because of their values. However, from the estimates obtained for the interaction term, it is found that the households who made unwise financial decisions in 2009 do not necessarily repeat unwise financial decisions in 2011 in presence of financial distress. This finding concurs with the earlier argument that households do not make unwise financial decisions because of the poverty culture. Furthermore, as in childhood poverty, household who face financial hardship may be better equipped to make financial decisions during future financial troubles.

In the analysis, financial distress captures the aggregate effects of financial hardship faced during 2009, 2007, 2005 and 2003 on unwise financial decisions. This aggregate measure of financial hardship will also have effect on financial decisions made in 2009. In order to control for this effect, the above specification is re-tested with only the current financial hardship, which is indicated by the financial distress in 2009. In this case, interaction term is the product of financial distress in 2009 and unwise financial decisions in 2009. The results are reported in Panel B of Table 4.8. The estimates signify that financial distress faced in 2009 has significant relationships with unwise financial decisions made in 2011 that are independent of the financial decisions made in 2009. Additionally, similar results are obtained for previous financial decisions and its interaction with the current financial distress.[56]

[56]In this section, the unwise financial decisions are calculated based on 2011 figures and all independent variables are measured from the figures in 2009. This section re-deploy the specification by placing financial decisions based on 2009 figures and independent variables based on 2007 figures. Due to the unavailability of the financial distress module prior to 2009, only unsecured debt and credit card debt decisions can be investigated. From the results obtained, it is found that changing the sampling period does not modify the significance of financial distress and poverty. Therefore, it is conclude that the findings of this chapter are robust to different sampling period and not merely circumstantial.

4.4 Conclusion

This study investigates how different forms of money scarcity affect financial decision making of the households. This scarcity concept links to the notion of bounded rationality theory, which argues that rationality is restricted due to information, cognition and time limitations faced by the households. The chapter refers to the scarcity of money as financial hardship and consider both income and net worth measures of financial hardship. The income based measure of financial hardship is referred to as poverty and measured by comparing poverty threshold with household income. The net worth measure of financial hardship is called financial distress and is measured by subtracting household total debt from total assets. In addition, a large set of demographic characteristics is considered to control for the household heterogeneity.

The results of this chapter suggest that both financial distress and poverty have positive and independent association with the probability of making unwise financial decisions. However, financial distress is superior in explaining decision making because financial distress not only explain all the financial decisions but also have significantly higher marginal effects on financial decisions as compared to poverty. Further, while allowing the financial distress to interact with previous financial decisions, it is found that the effects of financial distress and previous financial decisions on unwise financial decisions are independent of each other. The positive association between financial distress and recent unwise financial decisions shows financial distress has independent effect on financial decision irrespective of the previous financial decisions. Further, the estimates of the interaction term between financial dress and previous financial decisions with varying directions signify that households do not necessarily repeat same unwise behavior while facing financial distress in future.[57]

[57]For the interaction term, negative estimates are obtained for unsecured debt and investment diversification management while positive estimates are obtained for mortgage debt management (all estimates significant at 1% tolerance level).

These households may learn from their experience and restrain themselves from replicating unwise financial decisions whenever they can. Further, while investigating whether the financial hardship faced during childhood affects financial decision making in later age, it is found that childhood poverty does not explain the probability of making any unwise financial decision. Simultaneously, it is found that introduction of this measure does not modify the significance of relationship between financial distress and unwise financial decisions. These findings suggest that financially troubled households make unwise financial decisions because of their circumstances, therefore, financially troubled and financially sound households behave similarly in absence of financial hardship.

Moreover, this chapter investigates the effects of economics education on financial decision making in presence of financial hardship, where economics education is determined by the exposure to economics education during college. The results show that economics education reduces the likelihood of making unwise financial decisions. Further, with the introduction of economics education, financial distress retains significant relationship with financial decision making. On the contrary, the addition of economics education results in poverty losing significance of relationship with the financial decision making. This contradiction implies that the knowledge and skills gained through financial education may compensate for poverty, while the same is not true for financial distress.

Based on the findings of this study, financial distress is recommended as a better measure to capture the effect of household financial hardship on financial decision making. Further, it is advocated that household financial circumstances result in unwise financial decisions, while their values or culture is unrelated to financial decision making. Therefore, financially troubled households should not be left alone by holding them responsible for their situations and absolving the financial system from its responsibility. In particular, the financially troubled households need moral and technical assistance that will enable them to overcome cognitive stress,

resulting in better financial decision making. Any income support to financially troubled households without guidance may not be effective as financially troubled households are unable to make wise financial decisions on their own. Further, financially distress households should also be considered as economically deprived segment of the population requiring special consideration from the policy makers. Further, not only financially troubled households should not be monetary taxed but also they should not be cognitively taxed as their decision making capacity is already compromised while making the ends meet. Filling out long forms, deciphering complicated rules or undergoing lengthy interviews can further consume scarce cognitive resources. These actions are necessary to ensure that the unwise financial decisions made by the financially troubled households do not further deteriorate their financial wellbeing, resulting in their total financial collapse. The policy makers should also make sure that financially troubled households, lacking financial decision making ability, are not exposed to predatory lenders, who seek rent from the household compromised economic and cognitive state. Suitable policies and good governance is required to protect the financially troubled households from such rent seekers.

Table 4.1: **Summary statistics.** This table reports the summary statistics of our sample. The description and construction of all the variables is detailed in Section 4.2. The data have been obtained from the PSID. Panel A reports the summary statistics that are mean, standard deviation, minimum, maximum, 25th percentile, median and 75th percentile values and sample size (N). Panel B reports group based sample characteristics for households.

Panel A: Summary statistics of independent variables								
Variable	Mean	Std. Dev.	Minimum	Maximum	25th percentile	Median	75th percentile	N
Financial distress	0.738	1.061	0	4	0	0	1	24561
Poverty	-54633	77471	-130800	29580	-74000	-37000	-11000	22306
Parents poor	0.338	0.473	0	1	0	0	1	1905
Finanical literacy	0.063	0.243	0	1	0	0	0	24625
Family income	68905	67118	0	91000	27000	53000	90500	24611
Employed	0.709	0.454	0	1	0	1	1	24625
Married	0.553	0.497	0	1	0	1	1	24191
Education	13.090	2.655	0	17	12	13	15	24625
Age	43.512	14.812	17	98	32	41	53	24625
Male	0.724	0.447	0	1	0	1	1	24625
Number of children	1.328	1.445	0	11	0	1	2	24122
Panel B: Group based summary statistics of dependent variables and key independent variables								
	Unwise unsecured debt decision	Unwise credit card debt decision	Unwise mortgage debt decision	Unwise investment diversification decision	Unsecured debt to income ratio	Difficulty in paying off credit card debt	Mortgage debt to income ratio	Under-diversification
Panel B1: Sample characteristics for full sample								
	0.091 (24122)	0.144 (1216)	0.032 (24122)	0.201 (24122)	0.001 (24122)	1.479 (1351)	0.01 (24122)	0.247 (24122)
Panel B2: Sample characteristics according to financial distress levels								
Financial distress=0	0.051(14335)	0.123(736)	0.026(14335)	0.175(14335)	0.001(14335)	1.331(810)	0.012(14335)	0.245(14335)
Financial distress=1	0.106(5215)	0.137(294)	0.035(5215)	0.228(5215)	0.001(5215)	1.536(336)	0.007(5215)	0.242(5215)
Financial distress=2	0.144(2795)	0.253(123)	0.055(2795)	0.237(2795)	0.001(2795)	2(134)	0.007(2795)	0.246(2795)
Financial distress=3	0.228(1549)	0.173(58)	0.036(1549)	0.25(1549)	0.001(1549)	1.927(68)	0.008(1549)	0.259(1549)
Financial distress=4	0.302(667)	0.25(24)	0.039(667)	0.282(667)	0.002(667)	1.693(26)	0.006(667)	0.3(667)
Panel B3: Sample characteristics for financially literate and illiterate households								
Financially literate	0.084(120)	0.067(90)	0.059(120)	0.142(120)	0.001(120)	1.133(98)	0.006(120)	0.197(120)

Table 4.2: **Correlations matrix.** This table reports the Spearman's rank correlations for all the variables in our sample. The description and construction of all the variables is detailed in Section 3.

	Financial distress	Poverty	Childhood poverty	Finanical literacy	Family income	Employed	Married	Education	Age	Male	Number of children
Financial distress	1										
Poverty	-0.193	1									
Childhood poverty	0.106	-0.015	1								
Finanical literacy	-0.029	0.083	0.025	1							
Family income	-0.155	0.672	0.002	0.094	1						
Employed	-0.048	0.276	-0.054	0.038	0.314	1					
Married	-0.136	0.435	0.046	0.051	0.564	0.145	1				
Education	-0.051	0.437	-0.097	0.084	0.367	0.213	0.080	1			
Age	-0.112	0.313	0.101	0.020	0.510	-0.035	0.449	0.089	1		
Male	-0.088	0.328	0.018	0.041	0.401	0.135	0.629	0.033	0.131	1	
Number of children	0.055	-0.214	0.051	-0.030	-0.061	-0.069	0.084	-0.233	-0.047	-0.053	1

Table 4.3: **Analysis of probablity of unwise financial decisions.** This table reports mean marginal effects from probit regressions that take into account financial distress, poverty, and a rich set of demographic characteristics. The robust standard errors are reported in the parentheses. In columns 1 to 3, the dependent variable takes the value of 1 if the households have unsecured debt to income ratio of greater than 75th percentile value. In columns 4 to 6, the dependent variable takes the value of 1 if the households face any difficulty in paying off credit card debt. In columns 7 to 9, the dependent variable takes the value of 1 if the households are behind their mortgage payment. In columns 10 to 12, the dependent variable takes the value of 1 if the households only invest in one financial asset. ***, **, * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	Unsecured debt			Credit card debt			Mortgage debt			Investment diversification		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Financial distress	0.271***		0.284***	0.125***		0.122***	0.0833***		0.0855***	0.0818***		0.0912***
	(0.010)		(0.010)	(0.044)		(0.044)	(0.014)		(0.014)	(0.009)		(0.009)
Poverty		0.000901	0.00725***		-0.00478	-0.00275		-0.000252	0.00131		-0.0000268	0.00156
		(0.002)	(0.002)		(0.005)	(0.005)		(0.003)	(0.003)		(0.002)	(0.002)
Family income	-0.0226***	-0.0282***	-0.0262***	-0.00397	-0.00311	-0.00186	-0.0133***	-0.0153***	-0.0144***	-0.0174***	-0.0188***	-0.0181***
	(0.003)	(0.003)	(0.003)	(0.011)	(0.011)	(0.011)	(0.003)	(0.004)	(0.004)	(0.002)	(0.003)	(0.003)
Employed	0.0179	-0.00576	-0.0143	-0.292***	-0.290***	-0.295***	0.0863**	0.0851*	0.0872**	0.0374	0.0219	0.0205
	(0.031)	(0.032)	(0.033)	(0.105)	(0.105)	(0.105)	(0.042)	(0.044)	(0.044)	(0.024)	(0.025)	(0.025)
Married	0.187***	0.185***	0.213***	-0.0995	-0.120	-0.105	0.266***	0.266***	0.272***	0.00415	0.00847	0.0107
	(0.035)	(0.037)	(0.038)	(0.142)	(0.142)	(0.143)	(0.052)	(0.055)	(0.055)	(0.027)	(0.029)	(0.029)
Education	0.0981***	0.102***	0.0898***	-0.0194	-0.0136	-0.0190	-0.0158**	-0.00864	-0.0124*	-0.00524	-0.00402	-0.00760**
	(0.006)	(0.006)	(0.006)	(0.020)	(0.020)	(0.020)	(0.006)	(0.007)	(0.007)	(0.004)	(0.004)	(0.004)
Age	-0.00551	-0.000529	-0.00647	-0.00463	-0.00566	-0.00558	0.0980***	0.0984***	0.0988***	-0.0224***	-0.0227***	-0.0235***
	(0.005)	(0.006)	(0.006)	(0.021)	(0.021)	(0.021)	(0.010)	(0.010)	(0.010)	(0.004)	(0.004)	(0.004)
Age square	-0.0000454	-0.000139**	-0.0000379	0.00000835	0.0000195	0.0000162	-0.000997***	-0.00101***	-0.00100***	0.000141***	0.000135***	0.000154***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male	0.185***	0.162***	0.181***	-0.0708	-0.0659	-0.0689	-0.128**	-0.147**	-0.148**	0.214***	0.202***	0.207***
	(0.038)	(0.039)	(0.041)	(0.124)	(0.124)	(0.125)	(0.055)	(0.058)	(0.058)	(0.028)	(0.030)	(0.030)
Number of Children	-0.0506***	-0.0293***	-0.0502***	0.00971	0.0145	0.00623	0.0473***	0.0528***	0.0496***	-0.0511***	-0.0414***	-0.0458***
	(0.010)	(0.010)	(0.011)	(0.044)	(0.045)	(0.045)	(0.011)	(0.012)	(0.012)	(0.008)	(0.008)	(0.008)
Pseudo R-Squared	0.102	0.050	0.104	0.031	0.024	0.032	0.041	0.035	0.040	0.023	0.018	0.023
Observations	24122	21915	21915	1216	1207	1207	24122	21915	21915	24122	21915	21915

Table 4.4: **Analysis of level of unwise financial decisions.** This table reports mean marginal effects from OLS regressions that take into account financial distress, poverty, and a rich set of demographic characteristics. The robust standard errors are reported in the parentheses. In columns 1 to 3, the dependent variable is the households' unsecured debt to income ratio. In columns 4 to 6, the dependent variable is the difficulty in paying off credit card debt. In columns 7 to 9, the dependent variable is the mortgage to income ratio. In columns 10 to 12, the dependent is the investment under-diversification. ***, **, * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	Unsecured debt			Credit card debt			Mortgage debt			Investment diversification		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Financial distress	0.120***		0.117***	0.168***		0.162***	-0.0197		-0.0134	0.00725***		0.00905***
	(0.018)		(0.015)	(0.051)		(0.051)	(0.015)		(0.016)	(0.002)		(0.002)
Poverty		0.00581***	0.00754***		-0.00952**	-0.00745*		0.0209***	0.0207***		0.000282	0.000415
		(0.002)	(0.002)		(0.004)	(0.004)		(0.004)	(0.004)		(0.000)	(0.000)
Family income	-0.00964***	-0.0143***	-0.0135***	-0.0137	-0.00914	-0.00795	-0.0273***	-0.0445***	-0.0446***	-0.000368	-0.000644	-0.000588
	(0.001)	(0.002)	(0.002)	(0.010)	(0.010)	(0.010)	(0.004)	(0.007)	(0.007)	(0.000)	(0.001)	(0.001)
Employed	-0.229***	-0.238***	-0.240***	-0.219*	-0.222*	-0.227*	0.170***	0.165***	0.166***	0.00861	0.00505	0.00487
	(0.048)	(0.048)	(0.049)	(0.123)	(0.124)	(0.124)	(0.041)	(0.041)	(0.041)	(0.006)	(0.006)	(0.006)
Married	-0.0672**	-0.0560*	-0.0512*	-0.246*	-0.272*	-0.253*	0.463***	0.464***	0.463***	0.0295***	0.0294***	0.0298***
	(0.031)	(0.031)	(0.031)	(0.147)	(0.149)	(0.148)	(0.036)	(0.038)	(0.038)	(0.007)	(0.008)	(0.008)
Education	0.0402***	0.0396***	0.0360***	-0.0217	-0.0131	-0.0181	0.0693***	0.0661***	0.0665***	0.00922***	0.00910***	0.00882***
	(0.004)	(0.004)	(0.004)	(0.021)	(0.021)	(0.021)	(0.009)	(0.009)	(0.009)	(0.001)	(0.001)	(0.001)
Age	-0.00512	-0.00855	-0.00882	0.00351	-0.000629	0.000750	0.0774***	0.0820***	0.0821***	-0.00730***	-0.00742***	-0.00744***
	(0.006)	(0.007)	(0.007)	(0.022)	(0.022)	(0.022)	(0.005)	(0.005)	(0.005)	(0.001)	(0.001)	(0.001)
Age square	0.00000580	0.0000252	0.0000422	-0.0000784	-0.0000367	-0.0000520	-0.000704***	-0.000744***	-0.000746***	0.0000639***	0.0000648***	0.0000661***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male	0.0896*	0.0582	0.0665	-0.0189	-0.0142	-0.00986	0.0284	0.0428	0.0419	0.0615***	0.0611***	0.0618***
	(0.049)	(0.048)	(0.048)	(0.138)	(0.140)	(0.139)	(0.046)	(0.046)	(0.046)	(0.007)	(0.008)	(0.008)
Number of Children	-0.0107	0.00762	0.00318	0.0567	0.0609	0.0495	0.0381***	0.0535***	0.0540***	-0.0139***	-0.0115***	-0.0119***
	(0.015)	(0.016)	(0.016)	(0.049)	(0.050)	(0.049)	(0.012)	(0.013)	(0.013)	(0.002)	(0.002)	(0.002)
Adjusted R-Squared	0.011	0.007	0.011	0.037	0.031	0.039	0.033	0.037	0.037	0.023	0.021	0.022
Observations	24122	21915	21915	1351	1342	1342	24117	21911	21911	24122	21915	21915

Table 4.5: **Household childhood poverty.** Panel A of this table reports mean marginal effects from probit regressions and Panel B of this table reports the mean marginal effects from OLS regressions that take into account parents poverty, financial distress, poverty and a rich set of demographic characteristics. In columns 1 to 3 of Panel A, the dependent variable takes the value of 1 if the households have unsecured debt to income ratio of greater than 75th percentile value. In columns 4 to 6 of Panel A, the dependent variable takes the value of 1 if the households face any difficulty in paying off credit card debt. In columns 7 to 9 of Panel A, the dependent variable takes the value of 1 if the households are behind their mortgage payment. In columns 10 to 12 of Panel A, the dependent variable takes the value of 1 if the households only invest in one financial asset. In columns 1 to 3 of Panel B, the dependent variable is the households' unsecured debt to income ratio. In columns 4 to 6 of Panel B, the dependent variable is the difficulty in paying off credit card debt. In columns 7 to 9 of Panel B, the dependent variable is the mortgage to income ratio. In columns 10 to 12 of Panel B, the dependent is the investment under-diversification. The robust standard errors are reported in the parentheses. ***, **, * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	Unsecured debt			Credit card debt			Mortgage debt			Investment diversification		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: Results for unwise financial decisions												
Childhood poverty	0.0807***	0.00887	0.00922	0.135	0.103	0.105	0.185***	0.167***	0.168***	0.020	-0.002	-0.001
	(0.027)	(0.028)	(0.028)	(0.098)	(0.100)	(0.100)	(0.036)	(0.036)	(0.036)	(0.021)	(0.021)	(0.021)
Financial distress		0.280***	0.283***		0.118***	0.116***		0.078***	0.078***		0.090***	0.091***
		(0.011)	(0.011)		(0.045)	(0.045)		(0.014)	(0.015)		(0.009)	(0.009)
Poverty			0.007***			-0.003			0.001			0.001
			(0.002)			(0.005)			(0.003)			(0.002)
Pseudo R-Squared	0.051	0.103	0.104	0.026	0.033	0.033	0.040	0.044	0.044	0.018	0.023	0.023
Observations	21915	21915	21915	21915	1207	1207	1207	1207	21915	21915	21915	21915
Panel B: Results for level of unwise financial decisions												
Childhood poverty	0.135***	0.111***	0.112***	0.140	0.094	0.099	-0.016	-0.011	-0.007	-0.006	-0.008*	-0.008
	(0.033)	(0.034)	(0.034)	(0.105)	(0.105)	(0.105)	(0.030)	(0.028)	(0.027)	(0.005)	(0.005)	(0.005)
Financial distress		0.110***	0.113***		0.162***	0.156***		-0.020	-0.013		0.009***	0.009***
		(0.015)	(0.016)		(0.051)	(0.051)		(0.016)	(0.015)		(0.002)	(0.002)
Poverty			0.007***			-0.007**			0.020***			0.000
			(0.002)			(0.004)			(0.004)			(0.000)
Adjusted R-Squared	0.008	0.012	0.012	0.031	0.039	0.040	0.035	0.035	0.037	0.021	0.022	0.022
Observations	21915	21915	21915	21915	1342	1342	1342	1342	21915	21915	21915	21915

Table 4.6: **Household exposure to economics education.** Panel A of this table reports mean marginal effects from probit regressions and Panel B of this table reports the mean marginal effects from OLS regressions that take into account financial literacy, financial distress, poverty, and a rich set of demographic characteristics. In columns 1 to 4 of Panel A, the dependent variable takes the value of 1 if the households have unsecured debt to income ratio of greater than 75th percentile value. In columns 5 to 8 of Panel A, the dependent variable takes the value of 1 if the households face any difficulty in paying off credit card debt. In columns 9 to 12 of Panel A, the dependent variable takes the value of 1 if the households are behind their mortgage payment. In columns 13 to 16 of Panel A, the dependent variable takes the value of 1 if the households only invest in one financial asset. In columns 1 to 4 of Panel B, the dependent variable is the households' unsecured debt to income ratio. In columns 5 to 8 of Panel B, the dependent variable is the difficulty in paying off credit card debt. In columns 9 to 12 of Panel B, the dependent variable is the mortgage to income ratio. In columns 13 to 16 of Panel B, the dependent is the investment under-diversification. The robust standard errors are reported in the parentheses. ***, **, * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	Unsecured debt				Credit card debt				Mortgage debt				Investment diversification			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Panel A: Results for unwise financial decisions																
Economics education	-0.263	-0.275	-0.261	-0.277	-0.436**	-0.445**	-0.427**	-0.437**	0.321	0.337	0.325	0.339*	-0.278*	-0.278*	-0.274*	-0.275*
	(0.177)	(0.175)	(0.178)	(0.176)	(0.212)	(0.215)	(0.212)	(0.215)	(0.202)	(0.205)	(0.203)	(0.206)	(0.152)	(0.152)	(0.154)	(0.154)
Financial distress		0.177***		0.186***		0.127***		0.125***		0.130**		0.124**		0.015		0.018
		(0.039)		(0.039)		(0.044)		(0.044)		(0.052)		(0.052)		(0.035)		(0.035)
Poor			0.004	0.007			-0.005	-0.002			-0.019	-0.014			0.007	0.007
			(0.005)	(0.005)			(0.005)	(0.005)			(0.016)	(0.015)			(0.005)	(0.005)
Pseudo R-Squared	0.070	0.086	0.071	0.088	0.028	0.036	0.029	0.037	0.095	0.105	0.097	0.106	0.043	0.043	0.046	0.046
Observations	1877	1877	1862	1862	1216	1216	1207	1207	1877	1877	1862	1862	1877	1877	1862	1862
Panel B: Results for level of unwise financial decisions																
Economics education	-0.160**	-0.159**	-0.163**	-0.011**	-0.317**	-0.326**	-0.301*	-0.310*	-0.157	-0.155	-0.161	-0.159	-0.058*	-0.058*	-0.057*	-0.057*
	(0.077)	(0.076)	(0.079)	(0.000)	(0.156)	(0.158)	(0.156)	(0.158)	(0.117)	(0.116)	(0.117)	(0.115)	(0.030)	(0.030)	(0.031)	(0.031)
Financial distress		0.0521		0.089*		0.169***		0.164***		0.091		0.093		-0.005		-0.004
		(0.034)		(0.000)		(0.050)		(0.051)		(0.114)		(0.113)		(0.008)		(0.009)
Poor			0.007	0.000			-0.009**	-0.007*			0.004	0.005			0.002	0.002
			(0.006)	(0.000)			(0.004)	(0.004)			(0.005)	(0.004)			(0.001)	(0.001)
Adjusted R-Squared	0.031	0.032	0.032	0.033	0.031	0.040	0.033	0.042	0.015	0.016	0.015	0.016	0.016	0.048	0.051	0.051
Observations	1877	1877	1862	1862	1351	1351	1342	1342	1877	1877	1862	1862	1877	1877	1862	1862

Table 4.7: **Alternative measure of financial distress.** Panel A of this table reports mean marginal effects from probit regressions and Panel B of this table reports the mean marginal effects from OLS regressions that take into account alternative measure of financial distress, poverty, and a rich set of demographic characteristics. In columns 1 to 3 of Panel A, the dependent variable takes the value of 1 if the households have unsecured debt to income ratio of greater than 75th percentile value. In columns 4 to 6 of Panel A, the dependent variable takes the value of 1 if the households face any difficulty in paying off credit card debt. In columns 7 to 9 of Panel A, the dependent variable takes the value of 1 if the households are behind their mortgage payment. In columns 10 to 12 of Panel A, the dependent variable takes the value of 1 if the households only invest in one financial asset. In columns 1 to 3 of Panel B, the dependent variable is the households' unsecured debt to income ratio. In columns 4 to 6 of Panel B, the dependent variable is the difficulty in paying off credit card debt. In columns 7 to 9 of Panel B, the dependent variable is the mortgage to income ratio. In columns 10 to 12 of Panel B, the dependent is the investment under-diversification. The robust standard errors are reported in the parentheses. ***, **, * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	Unsecured debt			Credit card debt			Mortgage debt			Investment diversification		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: Results for unwise financial decisions												
Financial distress*	0.117***		0.116***	0.392***		0.395***	0.020		0.021	0.046*		0.045*
	(0.030)		(0.030)	(0.039)		(0.039)	(0.046)		(0.046)	(0.025)		(0.025)
Poor		0.000	0.003		-0.005	-0.012		-0.000	-0.018		-0.000	0.007
		(0.002)	(0.005)		(0.005)	(0.005)		(0.003)	(0.016)		(0.002)	(0.005)
Pseudo R-Squared	0.078	0.050	0.079	0.149	0.024	0.150	0.092	0.035	0.093	0.043	0.018	0.046
Observations	1877	21915	1862	1216	1207	1207	1877	21915	1862	1877	21915	1862
Panel B: Results for level of unwise financial decisions												
Financial distress*	0.00519		0.00380	0.518***		0.520***	0.042		0.042	0.012*		0.011*
	(0.031)		(0.031)	(0.038)		(0.038)	(0.033)		(0.034)	(0.006)		(0.006)
Poor		0.006***	0.007		-0.009**	-0.012***		0.021***	0.003		0.000	0.002
		(0.002)	(0.006)		(0.004)	(0.004)		(0.004)	(0.005)		(0.000)	(0.002)
Adjusted R-Squared	0.031	0.008	0.032	0.170	0.031	0.174	0.015	0.001	0.015	0.047	0.021	0.051
Observations	1877	21915	1862	1351	1342	1342	1877	21915	1862	1877	21915	1862

Table 4.8: **Interaction analysis.** Panel A of this table reports mean marginal effects from probit regressions with agregate financial distress indicator and Panel B of this table reports the mean marginal effects from probit regressions with current financial distress indicator taking into account taking into account interaction between unwise financial decisions in 2009 and financial distress. In columns 1 and 2, the dependent variable takes the value of 1 if the households have unsecured debt to income ratio of greater than 75th percentile value. In columns 3 and 4, the dependent variable takes the value of 1 if the households face any difficulty in paying off credit card debt. In columns 5 and 6, the dependent variable takes the value of 1 if the households are behind their mortgage payment. In columns 7 and 8, the dependent variable takes the value of 1 if the households only invest in one financial asset. The robust standard errors are reported in the parentheses. ***, **, * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	Unsecured debt		Credit card debt		Mortgage debt		Investment diversification	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Panel A: Results with interaction term for financial distress and unwise financial decision in 2009							
Financial distress	0.176***	0.154***	0.061	0.174***	0.039**	0.038**	0.089***	0.090***
	(0.014)	(0.016)	(0.052)	(0.040)	(0.016)	(0.017)	(0.011)	(0.011)
Unwise decision in 09	0.811***	0.906***	1.462***	-0.070	1.434***	1.439***	0.416***	0.418***
	(0.031)	(0.033)	(0.184)	(0.212)	(0.055)	(0.055)	(0.022)	(0.022)
FD*Unwise decision09	-0.268***	-0.214***	0.103	-0.0693	0.330***	0.321***	-0.126***	-0.127***
	(0.046)	(0.047)	(0.129)	(0.138)	(0.049)	(0.051)	(0.040)	(0.040)
Poverty		0.012***		0.006		0.004		0.003*
		(0.002)		(0.005)		(0.003)		(0.002)
Pseudo R-Squared	0.153	0.165	0.159	0.081	0.164	0.167	0.041	0.041
Observations	23556	21431	1216	1985	23012	21220	21431	21431
	Panel B: Results with interaction term for financial distress in 2009 and unwise financial decision in 2009 interaction term							
Financial distress 2009	0.572***	0.418***	0.143	0.395***	-0.057	-0.045	0.156***	0.159***
	(0.045)	(0.060)	(0.120)	(0.095)	(0.046)	(0.047)	(0.035)	(0.035)
Unwise decision in 09	1.000***	1.048***	1.465***	-0.153	1.429***	1.433***	0.422***	0.423***
	(0.038)	(0.038)	(0.169)	(0.210)	(0.055)	(0.055)	(0.023)	(0.023)
FD09*Unwise decision09	-0.602***	-0.438***	0.308	0.001	0.712***	0.688***	-0.134***	-0.136***
	(0.060)	(0.071)	(0.304)	(0.320)	(0.101)	(0.106)	(0.047)	(0.047)
Poverty		0.011***		0.006		0.003		0.003
		(0.002)		(0.005)		(0.003)		(0.002)
Pseudo R-Squared	0.151	0.161	0.160	0.081	0.157	0.161	0.038	0.038
Observations	23769	21915	1207	1985	23517	21689	21915	21915

5 Limitations and further research

The major limitation of this thesis is that some of the findings in Chapter 2 are affected by the lack of required information. The ALP surveys, used in Chapter 2 and Chapter 3, provide information on household psychological characteristics, financial literacy, and financial decision making, but its panel is small in terms of both time and number of respondents. Specifically, because not every respondent has participated in all ALP surveys, the sample size is significantly reduced when the psychological characteristics are included in the specifications. Therefore, the samples considered in this thesis may not be fully representative of United State population, in particular family income and age are found to be higher than the United States averages. Having said that, this thesis makes every effort to efficiently utilize the ALP surveys by creating suitable proxies for Chapter 2. As a result, the sample investigated in this chapter is similar in size to the samples accepted and used by other researchers studying this area of finance. In addition, this study is able to carry out a thorough investigation of households even at a reduced sample, as it gives consistent results across the different model specifications considered.

Furthermore, Chapter 3 argues that the household stock market literacy influences their stock market participation decisions by reducing the stock market participation cost faced by them. The ALP surveys allow investigating the relationship between the household stock market literacy and stock market participation. However, this chapter is unable to carry out a detailed investigation of the relationship between stock market literacy and stock market participation cost because of limited data. Similar sample representation issue is faced here where family income and age seem to be on the higher side of the United States averages. For further research, the investigation can be carried out in detail to understand the relationship between the stock market literacy and stock market participation cost.

Such study will warrant the findings of Chapter 3 and add important value to the existing literature.

Another drawback of this thesis is that the study in Chapter 4 requires the use of time series data. Since ALP surveys are not periodically conducted, therefore PSID surveys, which are frequently fielded, are utilized to carry out the investigation in Chapter 4. However, unlike ALP surveys, PSID surveys do not have information regarding the household financial literacy. Therefore, even though the household financial literacy is expected to influence financial decision making capability, Chapter 4 is unable to analyze the effect of household financial literacy on the financial decision making ability. In order to compensate for the effects of financial literacy, exposure to economics education is included in the analysis. Further, this thesis is unable to measure household financial mistakes due to unavailability of the required data. Instead, unwise financial decisions are studied to analyze the effect of financial distress and poverty on financial decision making. For further research, with the availability of household time series data on financial distress and indicators of financial literacy and financial behavior, the distinct link of financial distress and financial literacy with financial decision making can be investigated.

The last limitation of this thesis is that it is unable to investigate the effects of regional and occupational characteristics on household financial decision making. Regional characteristics such as culture, religion, economy and political structure can have significance influence on household financial behavior. However, the thesis was unable to acquire the cross-country household data on financial behavior, financial awareness, demographics, and psychological characteristics. Occupational characteristics can also influence financial decision making, however, due to limited sample size such characteristics cannot be included in the analysis. In future, the availability of suitable data will enable this study to investigate the household financial decisions across different regions, revealing valuable insights into

the household financial decision making in presence of cultural, occupational and structural differences in their countries.

6 Conclusion

This thesis explores the household financial decision making by looking at different aspects of household financial management and financial market participation. Specifically, the role of financial awareness is investigated in this study, while controlling for the diversity of the households using a rich set of psychological characteristic variables, including economic shocks, future expectations, risk aversion, self-confidence, sense of commitment, and time preference. Additionally, this study explores the relationship of household financial distress with their financial decision making ability by analyzing different financial mistakes and levels of financial vulnerability.

Overall, the findings of this study points towards a strong association of household financial literacy with financial decision making. The household financial literacy is found to explain their overall financial behavior, retirement saving, credit management, investment, and stock market participation. The household financial literacy remains a significant explanatory characteristic of their financial behavior even when household psychological characteristics are considered in the analysis. Simultaneously, the household psychological characteristics are also found to be associated with their financial behaviors. However, it is found that some of the characteristics of households have different nature and strength of relationship with different financial behaviors, for example, employment is positively related to investment but negatively related to cash flow management. In addition some psychological characteristics, such as exposure to economic shock, consistently explain many of the aspects of household financial behavior. Further, it is found that older and male households are more likely to have lower financial management score as compared to financial literacy score. These estimates suggest that older household have less financial management not because of their level of financial capability. The difference attributes to the lack of incentive for the older house-

holds to manage finance as compared to the younger households. While, results regarding male households fall in line with the findings of Jianakoplos and Bernasek (1998) suggesting that males are less risk averse and of Brake(2005) reporting that males are have more responsibilities to manage. Further, it is observed that future expectations positively and risk aversion negatively relates to the probability of having positive financial spread.

The detail analysis of joint impact of both trust and stock market literacy suggests that stock market literate and trusting households are more likely to invest in stocks. Both these characteristics of the households retain significant even in the presence of several other important psychological characteristics. Furthermore, significant relationship between the household sociability and stock market participation decision is obtained in the absence of household stock market literacy. However, the significance of the impact of sociability disappears, when stock market literacy is considered in the analysis. The result suggests that the household participation in stock market is explained by the household level of stock market literacy rather than their level of sociability. It is also reported that stock market literate households face lower cost of participation in stock market as compared to their counterparts.

Furthermore, while analyzing the association between financial hardship and unwise financial decisions of the households, it is found that both poverty and financial distress have positive and independent association with the probability of making unwise financial decisions. However, financial distress outperforms poverty in explaining decision making because financial distress not only explain all the financial decisions but also have significantly higher marginal effects on financial decisions as compared to poverty. It is also found that the effects of financial distress and previous financial decisions on unwise financial decisions are independent of each other. The positive association between financial distress and recent unwise financial decisions shows financial distress has independent effect on financial

decision irrespective of the previous financial decisions. On the other hand, the positive association between previous financial decisions and current unwise financial decision may suggest presence of poverty culture where the financially weak households make unwise financial decisions because of their values. However, estimates of the interaction term between financial dress and previous financial decisions with varying directions signify that households do not necessarily repeat same unwise behavior while facing financial distress in future.These households may learn from their experience and restrain themselves from replicating unwise financial decisions whenever they can.

Further, while investigating whether the financial hardship faced during childhood affects financial decision making in later age, it is found that childhood poverty does not explain the probability of making any unwise financial decision. Simultaneously, it is found that introduction of this measure does not modify the significance of relationship between financial distress and unwise financial decisions. These findings suggest that financially troubled households make unwise financial decisions because of their circumstances, therefore, financially troubled and financially sound households behave similarly in absence of financial hardship.While investigating the effects of economics education on financial decision making in presence of financial hardship, the results show that economics education reduces the likelihood of making unwise financial decisions. Further, with the introduction of economics education, financial distress retains significant relationship with financial decision making. On the contrary, the addition of economics education results in poverty losing significance of relationship with the financial decision making. This contradiction implies that the knowledge and skills gained through financial education may compensate for poverty, while the same is not true for financial distress. Based on the findings of this study, financial distress is recommended as a better measure to capture the effect of household financial hardship on financial decision making. Further, it is advocated that household

financial circumstances result in unwise financial decisions, while their values or culture is unrelated to financial decision making.

The findings of this thesis are of interest to policy makers and academic researchers. For example, the results suggest that financial literacy plays an important role in household financial decision making. Furthermore, the household attitudes, beliefs, and personalities are also found to explain their financial management. These additional factors are found to influence different financial management aspects with different natures and significances. The findings suggest that there is no general formula or strategy to improve the household financial management in all areas, or to improve household financial management for all population segments. Similarly, the findings signify that trust and stock market literacy have independent effects on participation. This perhaps can explain the ineffectiveness of financial education programs for stock market participation reported in previous studies. It is also found that trust and stock market literacy not only affect the probability of stock market participation but also influence a household decision as to how much of their wealth to invest in the stock market. The study also shows that psychological characteristics of the households play a key role in their decision to own stocks. These results can benefit strategic endeavors of policy makers promoting stock market participation.

Moreover, the findings of this thesis show that financially distress is overarching in explaining the household financial decision making by accurately indicating the financial scarcity or hardship. This inference is in line with the recommendations of Stiglitz (2009) advising use of stock of debt and assets in measuring household financial hardship. Further, in line with the argument of Brandolini et al. (2010), it is recommended that the policy makers and practitioners should also consider financially distress households as economically deprived segment eligible for public benefits that are provided to poor population segment. It is recommended that financially fragile households need moral and technical assistance in

financial decision making that will enable them to make the choices that are in their best interest. Any financial support to poor or financially distressed households without guidance may not be effective as financially troubled households are unable to make wise financial decisions on their own. This purhaps can explain why authors such as Cole, Sampson and Zia (2009) find that financial education provision failed while financial incentive provision succeeded in acquiring required financial behaviour from the households. Further, not only financially troubled households should not be monetary taxed but also they should not be cognitively taxed as their decision making capacity is already compromised while making the ends meet. Filling out long forms, deciphering complicated rules or undergoing lengthy interviews can further consume scarce cognitive resources. These actions are necessary to ensure that the unwise financial decisions made by the financially troubled households do not further deteriorate their financial wellbeing, resulting in their total financial collapse.

Moreover, there are some evidences suggesting that firms make extensive use of household financial mistakes in gaining extra profit (McGovern and Moon, 2007). They report that, even if it makes the households vulnerable, many firms use complex investment strategies to seek rent from the financially fragile households. The policy makers should make sure that financially troubled households, lacking financial decision making ability, are not exposed to predatory lenders, who seek rent from the household compromised economic and cognitive state. In contrast, there are evidences reporting that firms might not know that the customers are making unwise financial decisions, as the firms respond to observed consumer demand that may be driven by household psychological biases. In such situation, financial market left on its own will not make the households wise financial decision makers and may further deteriorate financial wellbeing of the households who participate in financial market. Weaken financial situation of the households will hinder the growth and stability of the overall economy. Therefore, suitable policies, good gov-

ernance and timely interventions are required to ensure that financially troubled households make financial decisions in best of their and overall economy interests.

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