Master's programme in Economics

Effect of Financial Literacy on Household Wealth Accumulation among Swedish Households

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Abstract

The objective of this study is to examine the effect of financial literacy on household wealth accumulation among Swedish households. Prior research have suggested that financial literacy plays a significant role in financial decision making. Using household data from The Financial Supervisory Authority (FI) of Sweden and instrumental variable approach, the study aims to isolate the effect of financial literacy on household wealth accumulation. The results show that people with better understanding of basic and advanced financial concepts are less likely to end up in financial distress and more likely to have higher wealth accumulation. The findings of my study supports the viewpoint that policies aimed towards providing financial education might lower the probability of people encountering financial hardships.

1 Introduction

Due to the increasing availability of variety of financial services and products, it is of paramount importance that households should possess the ability to make sensible financial decisions related to saving, investment and management of their debt and wealth. This skill is known as financial literacy. (Behrman et al., 2010). Financial literacy is defined as the ability of people to understand the economic and financial information and to make well informed decisions regarding budgeting, debt management, financial and retirement planning. (Lusardi & Mitchell, 2014).

One of the consequences of globalisation and digitalisation is that financial markets and their services have now become accessible for everyone, whether they are multinational investment firms or small scale investors. People are now in a rare position to decide the amount of debt they want to take on to finance their day-to-day activities as well as long term plans. So, people should be able to comprehend multi-layered financial information as financial choices are not straight forward and often require understanding of complex concepts. Due to accelerated growth of household debt and its association with the global credit crisis, it has put forward the question about the role of low financial literacy, among people, in making incorrect decisions regarding mortgages and credit cards which has resulted in households facing high levels of debt. One of the most important elements of financial literacy is "debt literacy". It captures the capability to implement elementary compounding interest knowledge on daily budgetary decisions and the ability to make uncomplicated decisions related to liability contracts. (Lusardi & Tufano, 2009).

A significant body of literature focuses on the role of financial knowledge in financial decision making. Unfortunately, several studies have shown that people do not possess basic financial education to make well informed decisions and should be provided with necessary financial knowledge. So, lack of financial literacy has serious consequences for household finances and financial security. Due to increasing importance of financial literacy and its role in household wealth accumulation, this study discusses effect of financial literacy on accumulation of household wealth in Sweden.

Financial literacy plays a major role in household financial planning which includes decisions regarding debt, and wealth management. (Lusardi & Mitchell, 2014).

The main thesis question of this study is to investigate the effect of financial literacy on household wealth accumulation among Swedish households. This relationship is analysed through evaluating the following two relationships:

1. What is the effect of the financial literacy on probability of having negative wealth (household indebtedness)?
2. What is the effect of the financial literacy on probability of having high wealth?

As discussed by Lusardi & Tufano (2009), lack of financial knowledge will lead to individuals making ill-informed financial choices that will increase their level of indebtedness. So, debt management is an extremely useful tool when it comes to making borrowing decisions by the households. So, the first research question explores the relationship between financial literacy and household indebtedness by observing the effect of financial literacy on the probability of households having negative wealth.

A study by Van Rooij, Lusardi & Alessie (2012) explores the relationship between financial literacy and household wealth. The study finds a positive association between these two variables. This implies that people with higher level of financial knowledge have higher chances of accumulating wealth which will provide them with the necessary financial security. So, the second research question will analyse this empirical relationship between financial literacy and wealth accumulation for Sweden and observe if the results support this positive relationship as seen in previous studies.

My study aims to explore the empirical relationship between financial literacy and household accumulation of wealth by using the survey data collected by The Financial Supervisory Authority (FI) of Sweden. Financial literacy is measured by basic financial literacy index (BFL) and advanced financial literacy index (AFL). Basic financial literacy index evaluates the level of respondent's knowledge about interest rate, inflation rate and risk diversification. The advanced financial literacy index measures respondent's knowledge of mortgage, probability, and quantitative concepts along with the three concepts from the previous index. I explored the effect of financial literacy on two measures of household wealth. The first outcome variable is indicator of negative wealth and the second is indicator of wealth equal to or higher than median wealth.

To explore the effect of financial literacy on accumulation of household wealth, I first apply simple OLS regression. Due to the endogeneity of financial literacy, the study uses instrumental variable (IV) approach to tackle this problem. As an instrument, I employ variable that captures

attitudes of respondents towards their personal finances which can potentially be categorised under personality traits of respondents. Personality traits was one of the instruments considered by Behrman et al., (2012) in their study.

The findings of OLS suggests a negative association between financial literacy indexes and probability of having negative wealth. It also revealed a positive association between the indexes and probability of having high wealth accumulation. After employing the instrument, the results suggested negative causal relationship between indexes and negative wealth. The IV estimates also showed a positive causal relationship between indexes and high wealth. The OLS regression results between dummies of indexes and household wealth showed similar results. But after the application of instrument, the estimates become insignificant.

The findings of my study suggest that financial literacy plays an important role in household wealth accumulation. People with higher financial proficiency have a better chance of accumulating higher net worth and lower chance of falling into debt. It can be speculated that lack of financial knowledge might result in costly mistakes. While studying the distribution of financial literacy across age, sex, level of education and household income, it can be speculated that respondents displayed higher basic financial literacy as compared to advanced financial literacy.

The study is further divided into five sections. The second section “Previous literature” discusses certain past studies that have investigated the importance of financial literacy and explored its relationship with some of the other important financial decisions. The next section “Data” provides information about the data, variables, their construction, and usage in the study. The fourth section “Methodology” discusses the research methodology adopted by the study. The fifth section is “Empirical analysis and Results” which gives a detailed description of the analysis and the results. The last section “Discussion & Conclusion” concludes the study by providing a brief overview of the results, limitations, contributions of the study and suggestions.

2 Previous Research

Recently, a considerable body of literature has focused its attention on the role of financial literacy and knowledge in making financial decisions. Since responsibility of making several important financial decisions to ensure financial security pre and post-retirement has been shifted to the individuals themselves. Unfortunately, various studies have shown that people lack basic financial knowledge and skills needed to make well informed decisions and to choose certain financial instruments that will provide them protection from financial risks. A significant amount of literature supports the suggestion that provision of financial education to the public will equip them with the necessary tools required to make sound financial decisions.

A study by Lusardi & Mitchell (2007) explores the role of financial literacy in financial decision making. In pursuit of higher understanding of reasons behind the scarcity of retirement planning by the households and low or no wealth as the households approach retirement, the attention has been diverted towards the triggers and outcomes of financial literacy. Their analysis reveals several households have very limited knowledge of simple concepts of economics which are essential for making decisions about investments and savings. Unfortunately, this form of financial ignorance is prevalent across the people of all ages in USA. Their research also reveals that people of other countries also appear to be quite unfamiliar with the simplest financial concepts which could lead to uninformed decisions related mortgages, savings, retirement, and other financial related decisions. Several public and private organizations are adopting initiatives to tackle the issue of financial illiteracy. Experiences of countries like Sweden's privatisation of pension system and Japanese saving campaign provides better knowledge about the different roles played by financial literacy and saving programs.

The study by Lusardi (2008) also states that individuals are dealing with more challenging financial instruments since they are responsible for their financial security. But evidence suggest that these people lack the necessary skills for making well-informed decisions. This study reveals that financial illiteracy is heavily prevalent across the US population, but it is more evident among certain demographic groups like women, Hispanics, African Americans, and groups with low education. The paper suggests that financial literacy influences financial decision making. The results reveal that individuals do not have basic knowledge of financial concepts like risk diversification, distinction between real and nominal values and interest compounding as well as being incapable of performing even the simplest economic

calculations. Knowledge of more difficult financial concepts like basic information about asset pricings, mechanics of mutual funds and distinction between stocks and bonds is even more limited. This lack of knowledge is a likely reason behind lack of stock market participation, exhibiting reckless borrowing behaviour and failure to plan for retirement. The study concludes that programs geared towards providing financial education can enhance the saving behaviour of individuals, but these programs require a certain level of improvement to make them more effective.

A study by Bucher-Koenen & Lusardi (2011) used the SAVE survey to investigate financial literacy in Germany since it has gained more importance in the recent times. One of the reasons behind this public interest in financial literacy is that the monolithic pension program of the country has been modified into a multi pillar program resulting in individuals having to privately provide towards their retirement. Another reason is that more intricate financial products has become available to the public due to accelerated growth of financial markets. The results revealed that certain groups, which are residents of East Germany, low educational attainment groups and women, lacked basic understanding of financial concepts. Specifically, people of East Germany who possess low level of education and income exhibit low level of financial literacy when compared with residents of West Germany. In the East, there is no difference in the level of financial knowledge between genders. An instrumental variable strategy was adopted to explore the causal relationship between financial literacy and retirement planning. In order deal with the endogeneity issue, the paper chooses respondents exposure to other people's financial knowledge within the same geographical region. The study concluded that there exists a positive relationship between financial knowledge and retirement planning.

Various studies whose focus was to investigate the role of financial literacy in financial decision making used a financial literacy index which provided information regarding the level of literacy possessed by the people in the sample. A consensus could be seen among the literature about structure of this index. The index contained questions related to numeracy, inflation, and risk diversification. There were other studies that constructed more advanced indexes to assess the level of understanding for more complex financial concepts.

The study by Lusardi (2012) investigated the level of numeracy among the individuals using different surveys and studies conducted in USA and other countries. Numeracy plays an important role in making decisions related to finance as they require certain complex

calculations. These decisions include management of debt or assets. The results from the surveys and studies are quite worrisome because it reveals that people possess quite low numeracy levels and this is more prevalent among certain demographic groups which have low educational level, women, and elderly people. This result has serious implications as previous research suggests close connection between financial decision making and numeracy and will become more problematic in the recent time as employers and governments have started to shift more of financial responsibility onto individuals. Investing in improvement of mathematical and numeracy skills will provide high returns as they facilitate in making sound financial decisions throughout a person's lifetime. So, this study concluded that financial literacy and numeracy are essential skills needed by people to navigate present day's challenging economic environment.

On the other hand, Behrman et al., (2012) constructed a new financial literacy measure by aggregating a collection of questions pertaining to financial literacy. But this measure can also be decomposed to assess the marginal role of different components of financial literacy on wealth of the household. The microeconomic dataset used in the study is derived from Chilean Social Protection Survey. The study aimed at exploring causal effects of schooling and financial literacy on the accumulation of wealth. It uses instrumental variable (IV) approach to control for biases due to random measurement error and missing variable bias. The paper considers a broad variety of potential instruments which are distributed among these categories: factors pertaining to family background, variables which are age dependent and personality traits of the respondents. The linear regression models provide evidence of existence of compelling positive association of schooling attainment and financial literacy with the outcomes of wealth. In addition, the IV estimates indicate even more stronger financial literacy effects. The effect of schooling will only become positive in the case of its interaction with financial literacy. The result of the study suggests that investment in financial literacy would lead to higher benefits for wealth accumulation.

Lusardi & Mitchell (2009) takes a slightly different approach when discussing causal relationship between financial literacy and retirement planning by using the information about the financial knowledge of the respondents that was acquired by them in school. This means they received this knowledge before they entered the labor market and before they even started retirement planning. It explores many objective and self-evaluated financial literacy measures and associates them with efforts that are made by consumers towards their retirement planning. These measures were made a part of American Life Panel. Their analysis reveals that the

consumers struggled with carrying out simple financial calculations and they also lacked knowledge when it came to concepts like stock market functionings, pricing of assets and diversification of risks. The study also found that people who scored adequately well on objective measures were the ones who reported higher level of knowledge in economics. Lastly the research also concluded that after tackling the problem of biases caused by issue of endogeneity, financial literacy plays an important contributory role to retirement readiness.

Clark, Morrill & Allen (2010) also explored the role played by financial literacy in the process of planning for retirement. As the workers get closer to the age of retirement, they are confronted with many complex decisions and some of them are irreversible. The study used the data of financial literacy and demographics of more than 15,000 workers who are getting closer to their retirement and were working at three large corporations. The data was used to evaluate the mechanism of retirement planning by the workers. The analysis showed that several respondents exhibited limited understanding and knowledge related to retirement benefits provided by the state and company. The study also found that there were misunderstandings regarding the benefits offered by the retirement plan and eligibility ages which impacted the predicted retirement age. In conclusion, the paper states that decisions related to the retirement can have significant impacts on the welfare of workers for their remaining lifetime, but several respondents lack basic knowledge of financial matters which prevents them from making informed choices.

As mentioned above, the lack of financial knowledge and education is a serious issue and can have several negative consequences on the financial security for the individuals. It is evident from the study by Brown et al., (2016) that states that despite the fact that more than three fourths of households in U.S. have consumer debt, there is still limited knowledge regarding the association between debt behaviour and financial education. They analyse the effects of financial training, provided in early stages of adulthood, has on debt outcomes. These effects can be explored through changes in financial literacy particularly course offerings in economics, finance, and mathematics and requirements for graduation which were made compulsory in the curricula of high school at state level over the period of 1990s and 2000s. The data for debt outcomes is taken from FRBNY consumer credit panel that has Equifax credit reports as its base for the years 1999 to 2012. Using the flexible event-study approach, the results reveal that quantitative and financial education has varied but has significant effects on outcomes related to debt for the youth. Increased exposure to financial knowledge leads to better understanding of debt related concepts and the significance of creating a credit report

among the youth. While increased provision of mathematics knowledge results in lesser debt balance on average as well as lesser poor outcomes related to debt. On the other hand, the effect of economic education is quite different from the effects observed in case of financial literacy and mathematics education. The results reveal higher level of debt balance on average and increased repayment problems. In view of declining creditworthiness of an average consumer, it seems that even though knowledge of economics gives the younger population a better understanding of concepts like credit market and borrowing, it still does not assist them in making more informed decisions which are needed to avoid poor outcomes connected to debt.

Households tend to place their risky assets in the form of a balanced investment portfolios as predicted by economic theory. But a study by Von Gaudecker (2015) states one of the costliest mistakes that households commonly make is that they under diversify their investment portfolio. This study explores the role of financial advice and literacy in the process of decision making. It uses data from a Dutch Central Bank Household Survey (DHS). The results provide evidence that people with low levels of knowledge concerning financial concepts and operations or people who do not approach any external source for financial advice are the ones who incur the greatest losses on their under diversified investment portfolio. So, the households which lie below the median level of financial literacy and trust in their capabilities of decision making will lose an average 50 bps as expected. On the other hand, the households that depend on professional public or private sources for financial advice and have higher financial literacy scores and can achieve sensible investment results.

Another evidence of serious repercussions of lack of financial literacy is provided in the study by Lusardi & Scheresberg (2013) which discusses certain methods of borrowing with high interest payments in USA. They also provide a picture of people who are using these borrowing methods. The study uses a sample consisting of more than 26,000 respondents and finds a quarter of Americans when in need of a loan, over the last five years, has turned towards one of these costly methods of borrowing. The results also showed that several young adults used the high cost borrowing methods. The study collects information about the level of financial literacy using well-established questions. It revealed that levels of financial literacy are quite low for the borrowers who use these costly borrowing methods. Low level of financial literacy means that these individuals lack understanding of simple financial concepts as well as numeracy skills. It was also found that people with high financial literacy levels are less prone to engage in these costly borrowing schemes. Their empirical research concluded that along

with financial crisis and composition of the financial system, financial literacy level is also a contributing factor behind people's decision to engage or not engage in costly borrowing.

As mentioned above, financial knowledge plays an important in wealth management of households. A study by van Rooij, Lusardi & Alessie (2012) investigates the association between financial literacy and household wealth using the annual De Nederlandsche Bank (DNB) Household Survey (DHS) for Netherlands. Using the questions in data set, they were able to assess the respondent's level of basic and advance financial literacy. The paper states that this relationship has not been focused much due to scarcity of information related to the levels of financial literacy of the population. Using these financial knowledge measures, this research explores the two possible avenues in which financial literacy can assist in the accumulation of wealth. The first channel shows the likelihood of stock market investment increases with the increase in financial knowledge as the individuals want to take advantage of the equity premium. The paper also discusses impact of financial knowledge on retirement and savings planning. So, the second channel shows that there exists a positive association between financial literacy and crafting of savings plan as well as with planning for retirement. The study provides evidence that even after controlling for determining factors of net worth, financial literacy and wealth still displays a strong positive relationship. To isolate this causal relationship, the study adopted the instrumental variable approach by choosing economics education as an instrument for advanced literacy level.

From this literature review, it is quite clear that there is a positive relationship between financial literacy and financial decision making. Financial education and knowledge provides individuals with the necessary toolkit to make better financial choices. Due to fast growth of financial markets and institutions, individuals are exposed to many complex financial instruments and decisions and the limited understanding of financial concepts is proving to be a hindrance in making sound decisions.

Building upon previous literature, my study investigates the effects of financial literacy on household accumulation of wealth through a slightly different lens. Firstly, I examine the association between these two variables among the Swedish population. In the existing literature, there are few studies that have focused on financial literacy for Sweden including a study by Almenberg & Säve-Söderbergh (2011) who examined the relationship between financial literacy and retirement planning in Sweden and found a positive link between the variables. Another study, which I mentioned in my literature review, is by Lusardi & Mitchell

(2007) that discusses Sweden's experience with privatisation of pension system and provides information about various roles of financial literacy. But these studies do not use household wealth accumulation as an outcome variable. Secondly, I use a different instrument to address the issue of endogeneity. The instrument in my study reflects the attitude of people towards personal finances which is similar to one of the instruments, known as personality trait, considered by Behrman et al., (2012) in their study.

Thirdly, Van Rooij, Lusardi & Alessie (2012) also looks at relationship between financial literacy and household wealth through two channels and found a positive relationship between the variables. But their study was for Netherlands. Another study by Behrman et al., (2012) explores the association of financial literacy and schooling attainment with household accumulation of wealth for US. They found positive relationship between the variables. The aim of my study is also to examine the effect of financial literacy on household wealth accumulation, but it employs a different pathway. It also delves more deeper by exploring the effect of financial literacy on probability of having negative wealth in addition to looking at its relationship with higher wealth accumulation. Lastly, I created a different advanced financial literacy index which measured the level of knowledge possessed by respondent's regarding slightly more complex concepts relating to probability, mortgage and quantitative calculations of cost and profit. A study by Van Rooij, Lusardi & Alessie (2012) also constructed a more sophisticated financial literacy index but the index captured the level of financial knowledge related to investments and portfolio choices.

3 Data

The data used in this study was collected by The Financial Supervisory Authority (FI) of Sweden through survey instrument in autumn 2020. The survey was dispatched along with a cover letter describing the objective of the survey and was intended to be filled out by the person within the household who is relatively more informed about the household finances. To achieve improved outcomes regarding national inclusivity, the survey targeted Swedish households containing people that were aged between 18-79. The sample of households was generated randomly from the population register of Swedish Tax Agency. The respondents were able to answer the survey through postal or online survey. The total number of questionnaires that were answered were 1,320 providing a suitable foundation for examining the present situation and temporal comparison. The survey collected detailed demographic and economic information from the respondents about themselves and their households. It also collected information about state of household finances, attitudes towards personal finance, spending habits and level of financial and quantitative literacy. Before starting the analysis, I removed the missing values from all the variables used in this study and Don't want to answer/Don't know responses were also considered as missing values except in the case of questions that were used to construct the basic and advanced financial literacy index.

3.1 Definitions of Variables

The objective of this study is to investigate the relationship between financial literacy and household wealth. Following table shows list of main variables of this study.

Table 1: List of Main Variables

Variable name	Category
Negative Wealth	Dependent Variable
High Wealth	
Basic Financial Literacy Index	Independent Variable
Dummy for Highest Basic Financial Literacy	
Advanced Financial Literacy Index	
Dummy for Highest Advanced Financial Literacy	

Following table shows list of control variables used in the analysis of this study.

Table 2: List of control variables

Control Variables	Dummy variables
Age	Dummy age 1 = 18-29
	Dummy age 2 = 30-39
	Dummy age 3 = 40-49
	Dummy age 4 = 50-59
	Dummy age 5 = 65-79
Sex	Dummy sex 1 = Male
	Dummy sex 2 = Female
Country of birth	Dummy country of birth 1 = Sweden
	Dummy country of birth 2 = Other country
Level of education	Dummy level of education 1 = School
	Dummy level of education 2 = Upper Secondary
	Dummy level of education 3 = University
Total household income	Dummy Total Household income 1 = less than 200,000 sek
	Dummy Total Household income 2 = 201k-300k sek
	Dummy Total Household income 3 = 301k-500k sek
	Dummy Total Household income 4 = 501k-1000k or greater

3.2 Measuring Financial Literacy

Financial literacy is measured by two financial literacy indexes. The first index is known as basic financial literacy index (BFL). It is generated from survey questions about numeracy, inflation, and risk diversification. The second index is known as advanced financial literacy index (AFL) and it is constructed from questions relating to interest rate (Numeracy), inflation, risk diversification, mortgage, probability and two questions about quantitative calculations of cost and profit.

The basic financial literacy index is created from the combination of three survey questions concerned with knowledge about interest rate (Numeracy), inflation, and risk diversification. Following are the three questions from the survey which are used to construct this index:

1. *Suppose you have $100 in a savings account with 2 percent interest. How much do you think you would have in the account after 5 years if you let the money grow in the account? (Numeracy)*
2. *Suppose the interest rate on your savings account is 1 percent and inflation is 2 percent. If you leave your money in your account for a year, will you be able to buy at the end of the year? (Inflation)*

3. *Is the following statement true or false? Buying shares in a single company is usually safer than buying shares in a mutual fund. (Risk Diversification)*

Following table shows the basic financial literacy index. It is created to provide information about the extent of knowledge that households possess regarding basic concepts of finance. The table shows the number of questions answered correctly by the respondents. The respondents who have answered all three questions correctly are at highest level of basic financial literacy while individuals who have answered zero questions correctly are at the lowest level of basic financial literacy.

Table 3: Basic Financial Literacy Index

Basic Financial Literacy Index	Frequency	Percent	Cumulative
0	18	2.32	2.32
1	69	8.88	11.2
2	174	22.39	33.59
3	516	66.41	100
Total	777	100	

Following table shows dummy variable for highest basic financial literacy which is derived from the basic financial literacy index. The highest level of basic financial literacy means respondents who answered all three questions correctly. In this dummy variable, value 1 means the number of respondents who answered all three questions correctly and 0 means the number of respondents that answered less than 3 questions correctly.

Table 4: Dummy variable for Highest Basic Financial Literacy Level

Highest Basic Financial Literacy Level Dummy	Frequency	Percent	Cumulative
0	261	33.59	33.59
1	516	66.41	100
Total	777	100	

I created another financial literacy index which is called Advanced financial literacy index. It is created from the combination of seven survey questions about interest rate (Numeracy), inflation, risk diversification, mortgage, probability and two questions about quantitative calculations of cost and profit. In addition to the three questions in the basic literacy index, following are the other four questions from the survey which are used to construct this index:

1. *Do you know that you can apply for a grace period for mortgages? (Mortgage)*
2. *If the probability of getting a disease is 10%, how many in 1000 people can be expected to get the disease? (Probability)*
3. *A car dealer offers a used car for SEK 60,000. That's two-thirds of what it cost as new. How much did the car cost as new? (Quantitative question about cost)*
4. *Five people win a lottery and should share the prize equally. If the profit they are going to share is 2 million, how much does each one gets? (Quantitative question about profit)*

The following table shows the advanced financial literacy index. The index provides information regarding the level of advance financial literacy of the respondents. The table shows the number of questions answered correctly by the responding households. The respondents who have the highest level of advance financial literacy are the ones who have answered all the seven questions correctly and respondents possess lowest level of advance financial literacy if they are unable to answer any question correctly.

Table 5:Advanced Financial Literacy Index

Advanced Financial Literacy Index	Frequency	Percent	Cumulative
0	1	0.13	0.13
1	3	0.39	0.51
2	5	0.64	1.16
3	25	3.22	4.38
4	56	7.21	11.58
5	112	14.41	26
6	231	29.73	55.73
7	344	44.27	100
Total	777	100	

Following table shows dummy variable for highest level of advance financial literacy meaning respondents who answered all the seven questions correctly. It is derived from advanced financial literacy index. In this variable, value 1 means the number of respondents that answered all seven questions correctly and value 0 means the number of respondents that answered less than 7 questions correctly.

Table 6: Dummy variable for Highest Advanced Financial Literacy Level

Highest Advanced Financial Literacy Level Dummy	Frequency	Percent	Cumulative
0	433	55.73	55.73
1	344	44.27	100
Total	777	100	

3.3 Measuring Household Wealth

The study has two dependent variables which are negative wealth and high wealth and are taken from "Total net assets". In the survey, the question about total net assets could be answered by choosing one of the 5 options. The responses were scaled from 1 to 5 where value 1 represented Negative Wealth (liabilities exceeding assets), value 2 represented total net assets ranging between 0-99,999 SEK, value 3 represented range between 100,000-999,999 SEK, value 4 represented 1,000,000 SEK or more and value 5 was chosen by respondents who either did not want to answer the question or did not have the information about their total net assets. For analysis, all the missing values were removed from this variable including Don't want to answer/Don't know responses.

A dummy variable was created for option 1 of total net assets which represented negative wealth. In this dummy, value 1 shows number of people with negative wealth and 0 shows the number who answered otherwise. This is my first dependent variable. Following table shows negative wealth statistics.

Table 7: Negative wealth dummy variable

Negative Wealth	Frequency	Percent	Cumulative
0	677	87.13	87.13
1	100	12.87	100
Total	777	100	

Using the options 2,3 and 4 from this question, the study calculates the median value. The median value is 3 meaning total net assets between 100,000 and 999,999 SEK. With the help of this median value, a new dummy variable is created known as High wealth which provides information about number of respondents who have total net wealth equal to or higher than median value meaning individuals who have considerably high level of wealth. In this variable, value 1 shows the number of respondents who have total net wealth equal to or greater than median value and 0 means that the respondents who have total net wealth less than median value. This is my second dependent variable. Following table shows high wealth statistics

Table 8:High wealth dummy variable

High Wealth	Frequency	Percent	Cumulative
0	193	24.84	24.84
1	584	75.16	100
Total	777	100	

3.4 Descriptive Statistics

3.4.1 Financial Literacy and Gender

The following figure shows the level of basic financial literacy among different genders. Looking at the first panel, out of the total 424 men, 307 men got a perfect score by answering all three questions correctly. This means approximately 72.4% of men answered all three questions correctly. This showcases high level of financial literacy among the men. Looking at the second panel, 209 women answered all three questions correctly out of the total of 353 women which means approximately 59% of women got perfect score.

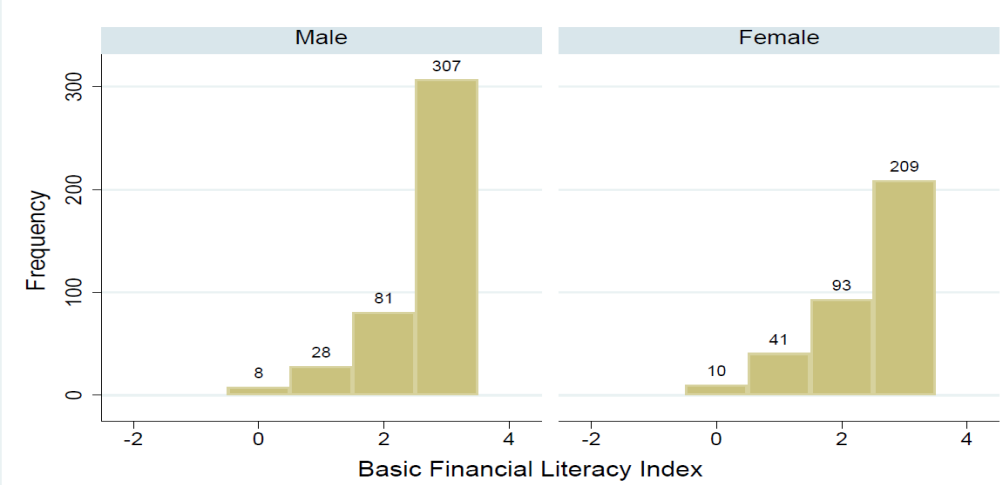

Figure 1: Basic financial literacy among different genders

The following figure shows the level of advanced financial literacy among different genders. Looking at the first panel, out of the total 424 men, 205 men got a perfect score. This means approximately 48.3% of men answered all seven questions correctly. This showcases moderate level of advanced financial literacy among the men. Looking at the second panel, 139 women were able to answer all seven questions correctly out of the total of 353 women which means approximately only 39.3% of women got a perfect score. This shows low level of advanced financial literacy.

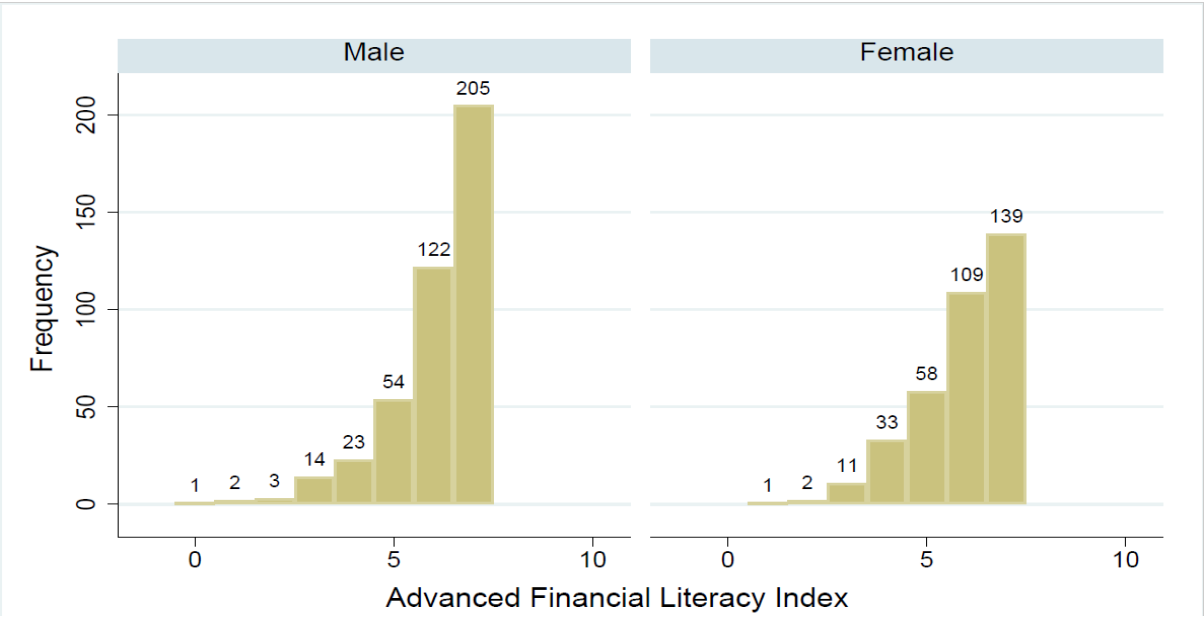

Figure 2: Advanced financial literacy among different genders

3.4.2 Financial Literacy and Age

The following figure shows the level of basic financial literacy among different age groups. The five panels represents different age groups. From figure 3, it can be inferred that the bulk of the respondents are aged between 50 to 79. Looking at first panel, out of 51 respondents, aged between 18-29, 27 of them got a perfect score. In the second panel, out of 113 respondents, aged between 30-39, 68 of them answered all three questions correctly. In the next panel, among the 131 individuals, aged between 40-49, the number of respondents who were able to answer all three questions correctly are 93. One of the noticeable features of this group was that all the respondents were able to answer at least one question correctly. In the next panel, out of 240 respondents, belonging to age group of 50-59, 162 of them got a perfect score while out of the 242 respondents, aged between 65-79, approximately 68.5% of them were able to answer all three questions correctly. These last two groups show considerably high level of basic financial literacy.

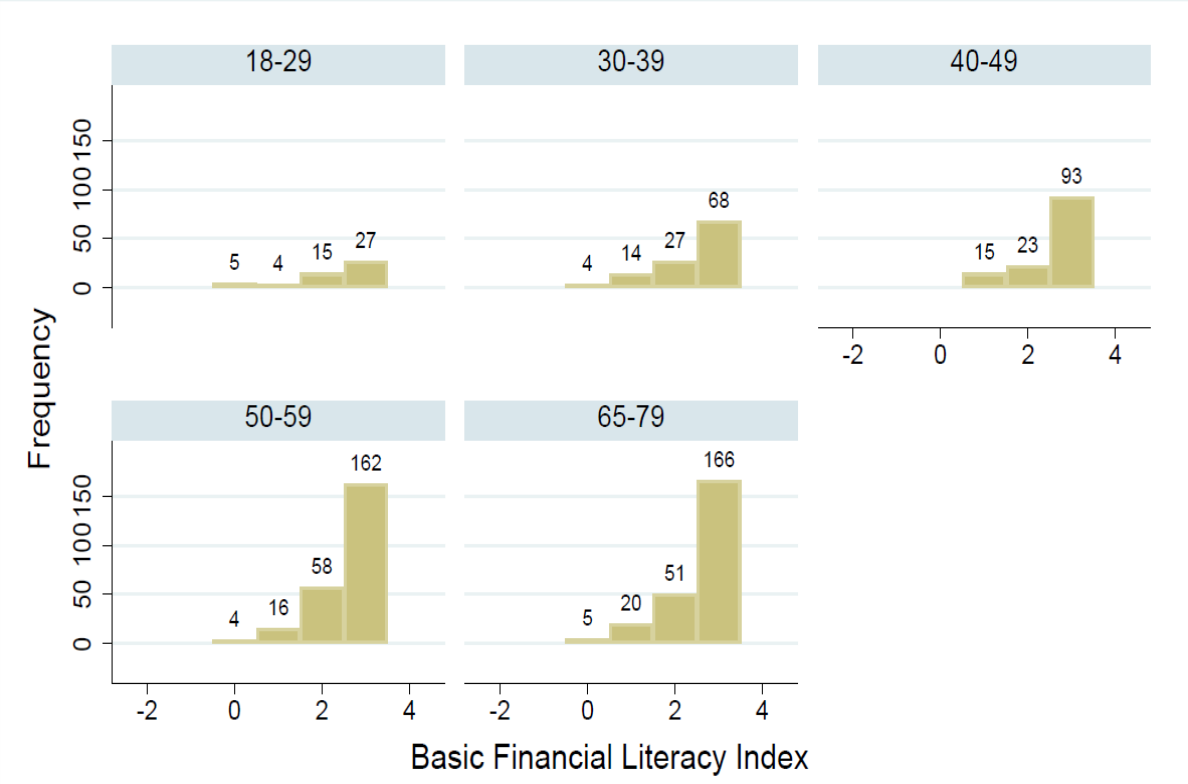

Figure 3:Basic financial literacy among different age groups

The following figure shows the level of advanced financial literacy among different age groups. Looking at first panel, out of 51 respondents, aged between 18-29, only 11 of them got a perfect score revealing low level of understanding of slightly more complex financial concepts. In the second panel, out of 113 respondents, aged between 30-39, 53 of them answered all questions correctly. In the next panel, among the 131 individuals, aged between 40-49, the number of respondents who were able to answer all questions correctly are 73. In the next panel, out of 240 respondents, belonging to age group of 50-59, 114 of them got a perfect score while the out of the 242 respondents, aged between 65-79, approximately 38.0% of them were able to answer all questions correctly. It can be inferred that this last group showcases low advanced financial literacy level, and it is the only group where a respondent was not able to answer any question correctly.

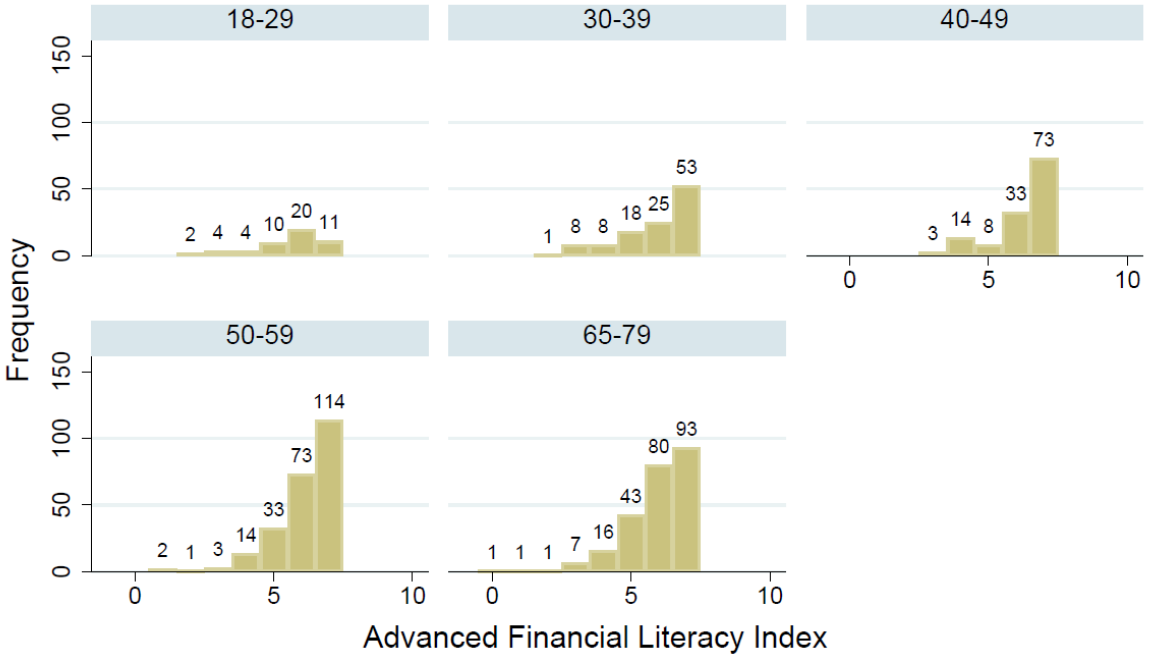

Figure 4: Advanced financial literacy among different age groups

3.4.3 Financial Literacy and Level of Education

The following figure shows the level of basic financial literacy among different levels of education. The panels represent three different educational groups. The smallest group comprises of only 83 respondents with compulsory school education shown in first panel. Almost half of them were able to answer all questions correctly implying a moderate level of basic financial proficiency. Bulk of the respondent have upper secondary or university education. In the second panel, out of 309 respondents, 185 managed to get a perfect score. In the last panel, which is the largest group, 290 out of 385 respondents answered all three questions correctly which means approximately 75.3% of them managed to get a perfect score implying high basic financial literacy level.

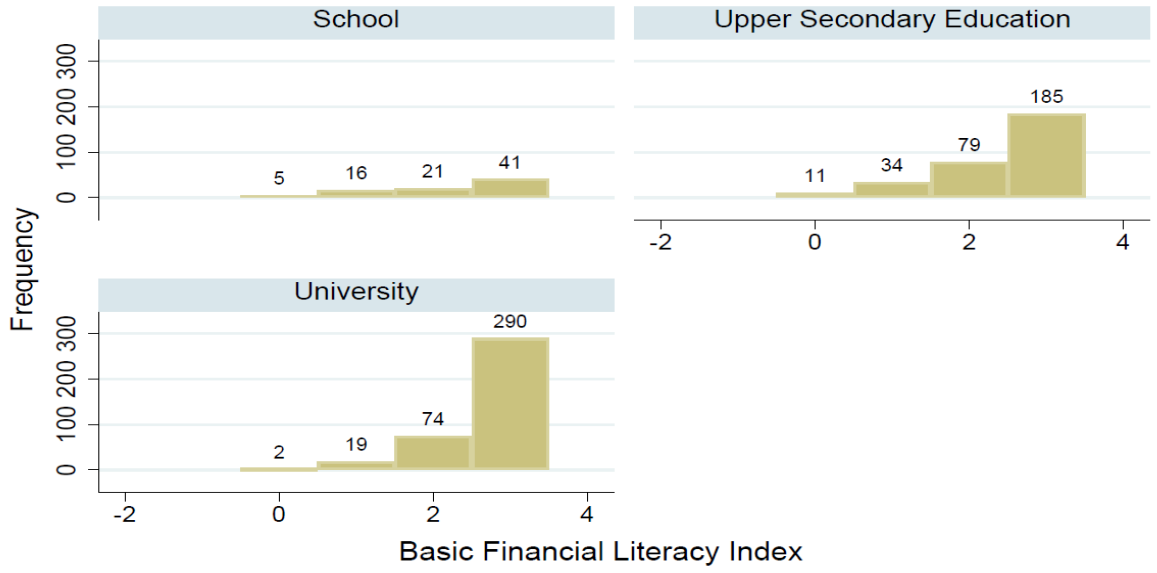

Figure 5: Basic financial literacy among different levels of education

The following figure shows the level of advanced financial literacy among different levels of education. The panels represent three different educational groups. The smallest group comprises of only 83 respondents with compulsory school education shown in first panel. Within this group, only 15 respondents were able to answer all seven questions correctly implying a low level of advanced financial proficiency. Bulk of the respondent have upper secondary or university education. In the second panel, out of 309 respondents, 120 managed to get a perfect score which means only 38.8% of respondents were able to answer all seven questions correctly showing low advanced financial proficiency. In the last panel, which is the largest group, 209 out of 385 respondents answered all seven questions correctly. One noticeable feature is that the respondent who was unable to answer none of the questions correctly belongs to the first group.

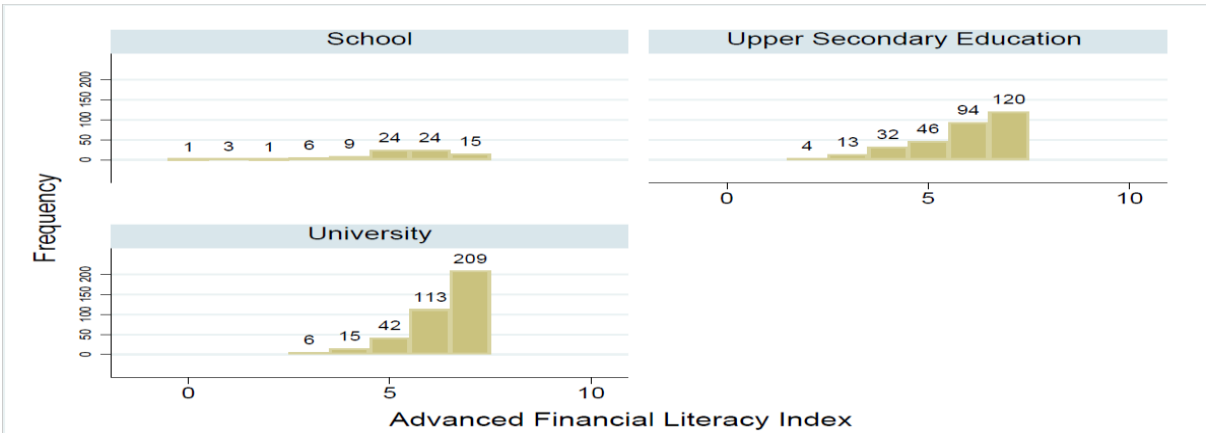

Figure 6: Advanced financial literacy among different levels of education

3.4.4 Financial Literacy and Total Household Income

The following figure shows the level of basic financial literacy among different household income groups. The panels represent different income groups. The smallest group consists of 58 respondents, out of which 26 of them answered all three questions correctly. The next panel shows basic financial literacy statistics for the respondents who have household income between 201,000-300,000 sek. Half of these 108 respondents were able to answer all questions correctly. The last two income groups have bulk of the respondents. In the third panel, 162 out of 258 respondents were able to answer all questions correctly. The largest group consists of 353 respondents with household income between 501,000-1,000,000 sek or more. Approximately 77.6% of these respondents got a perfect score showcasing high basic financial literacy level.

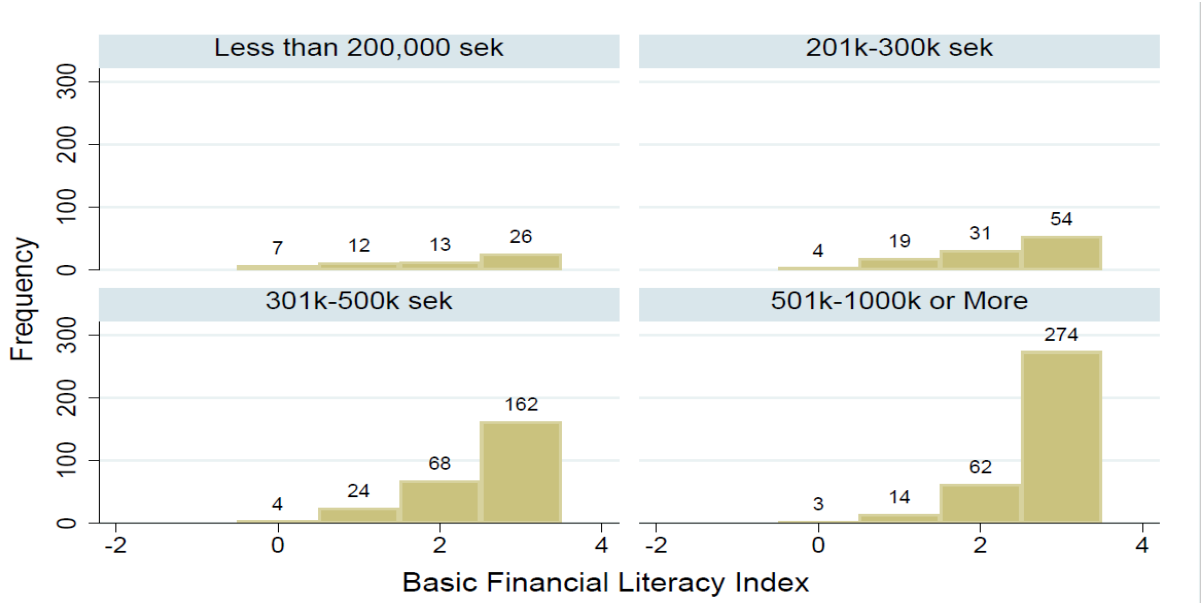

Figure 7: Basic financial literacy among different household income groups.

The following figure shows the level of advanced financial literacy among different household income groups. The panels represent different income groups. The smallest group consists of 58 respondents, out of which only 13 of them answered all questions correctly which implies low advanced financial literacy. The next panel shows advanced financial literacy statistics for the respondents who have household income between 201,000-300,000 sek. Only 30 out of 108 respondents were able to answer all the questions correctly. The last two income groups have bulk of the respondents. In the third panel, 91 out of 258 respondents were able to answer all questions correctly while 93 of them answered 4 questions correctly. This shows low advanced financial proficiency. The largest group consists of 353 respondents with household

income between 501,000-1,000,000 sek or more. Approximately 59.0% of these respondents got a perfect score showcasing moderate advanced financial literacy level.

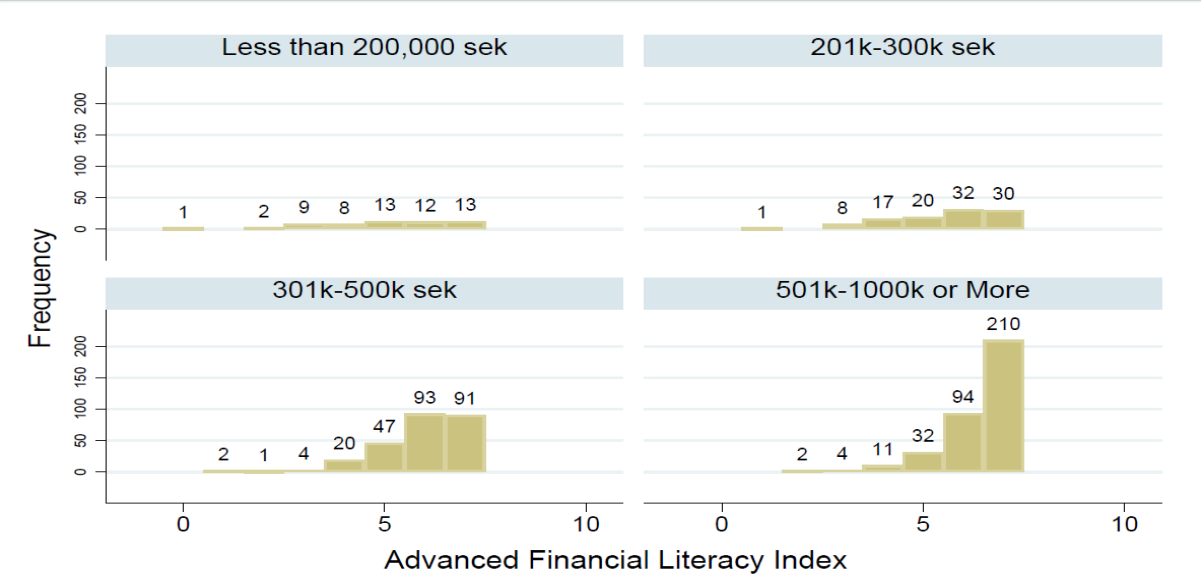

Figure 8: Advanced financial literacy among different household income groups

4 Methodology

The purpose of this study is to investigate the effect of financial literacy on accumulation of household wealth. Ideally to examine this relationship, financial literacy should be randomly distributed across the population. As it is not the case here, financial literacy is an endogenous variable. So, the study uses the instrumental variable (IV) approach. The regression equation is given below:

$$\boldsymbol{Y_i = \alpha_0 + \alpha_1 FL_i + \alpha_2 X_i + \varepsilon_i} \qquad (\mathbf{1})$$

The variable $\boldsymbol{Y_i}$ represents two dependent variables which are Negative wealth and High wealth. The variable $\boldsymbol{FL_i}$ represents basic financial literacy index (BFL) and advanced financial literacy index (AFL) and captures the level of financial literacy for each respondent. The control variables are given by $\boldsymbol{X_i}$**.** There are five control variables used in the study which are age, sex, country of birth, level of education and total household income. This is a cross sectional analysis.

I start the analysis by performing a simple OLS regression given by equation 1. The OLS regression studies the association between financial literacy and outcome variables. But OLS estimates which are exploring the effects of financial literacy on household wealth accumulation maybe biased due to certain reasons.

Financial literacy is an endogenous variable. Firstly, a potential reverse causality bias can arise because of the two way causal relationship between the variables. It means the individual's financial literacy level can be affected by their wealth, so higher wealth can provide individuals with opportunities to gain more financial knowledge resulting in higher level of financial literacy. Secondly, OLS estimates may be subjected to omitted variable bias as financial literacy could be affected by other unobservable variables such as cognitive ability. Thirdly, the study measures financial literacy of respondents through the indexes that I constructed from survey questions. These indexes are vulnerable to measurement errors resulting in biased OLS estimates.

To address these biases, the study uses instrumental variable (IV) approach. It is quite a challenging task to obtain an exogenous source which produces variations in financial literacy which will assist in isolating a causal pathway from financial literacy towards household wealth accumulation. The instrumental variable (IV) estimation was typically implemented to address the issue of simultaneous equation bias and omitted variables bias. The instruments are defined

as variables which are linked to the outcome variable only through the endogenous variable. The two stage least square (2SLS) holds the most prominent position within the framework of instrumental variables (Angrist & Imbens, 1995). The instrument helps to isolate the correlation between endogenous variable and outcome variable. So, 2SLS keeps only the changes in endogenous variable that are caused by the instrument variable (Angrist & Pischke, 2009a). The 2SLS method is carried out in two stages. In the first stage, the endogenous variable is regressed on the instrument variable to estimate the fitted values of endogenous variable using a simple OLS regression. In the second stage, the outcome variable is regressed on these predicted values along with any other control variables.

A good instrument needs to satisfy two conditions, first it should fulfil the exclusion restriction and second is that it should explain the endogenous variable. The exclusion restriction means instrumental variable should only affect the outcome variable through the endogenous variable and there should not be any other causal pathways between the instrumental variable and outcome variable. So, the study required an instrument that has direct impact on financial literacy and an indirect impact on household wealth accumulation only through financial literacy.

Prior studies have adopted this IV estimation approach and used different instruments for financial literacy. For example, the study by Lusardi & Mitchell (2011) used financial literacy mandates of high school applied in multiple states in US and in different time periods .The study by Van Rooij, Lusardi & Alessie (2011) used a different instrument. They used respondent's exposure to the level of economics knowledge before they joined the job market. The paper by Behrman et al., (2012) considered a number of different instruments which can be categorised in these broad groups: family background, age dependent and personality traits.

A study by Behrman et al., (2012) used personality traits as a potential instrument for financial literacy. The instrumental variable used in my study could potentially fall within this category. It is the question in the survey which asked the respondents if "*Personal finance is a source of anger and frustration*". It can be argued that this question captures respondent's attitude towards the management of their own finances. Rai, Dua & Yadav (2019) discusses financial attitudes in their study and defines them as people's inherent disposition towards financial matters. They explored the association of financial behaviour, knowledge, and attitude with financial literacy for Indian working women. Their findings indicted that individual's financial literacy is positively affected by their financial attitudes.

The instrument used in my study is labelled as “IV” in the analysis. The responses of the question were scaled from 1-5. The options 1-4 ranges from “Totally agree” to “Strongly disagree”. The value 5 represents “Don’t know”. For analysis, Don't know responses were considered as missing value and was removed.

There is an indirect pathway by which “people’s attitude towards their personal finance management” can affect their household wealth through financial literacy. Individuals who do not associate feeling of exasperation or frustration with their personal finance management are more likely to adopt a proactive attitude when it comes to manging their own finances and risks associated with it. They maybe more interested in exploring newer financial resources like various entrepreneurship and investment opportunities or financial advisory and assistance programs. These will facilitate them in achieving financial security by accumulating more wealth and avoid financial distress by going into debt. In this case, financial literacy behaves as a mediator because it provides the individuals with the required information and skills to be able to maximise benefits and minimise risks. The people with more positive attitude about their personal finances will likely to be more interested in gaining financial knowledge which will assist them in making well informed financial decisions.

Next, I checked the if this instrument is able predict my endogenous variable. In this case the first stage regression, in 2SLS regression, when both indexes are added linearly with the IV revealed positive correlation which means that people who either strongly or partially disagree with the statement that personal finance is a source of anger and frustration has higher probability of being financially literate. This instrument has strong predictive power for both indexes which can be seen by the F test values which are 19.91 and 22.58 respectively (prob > F = 0.0000 in both cases). The results of this first stage regression for both indexes are shown in table 13 and 14 in appendix**.** The following table shows the Attitude towards personal finances statistics:

Table 9: Statistics of Attitudes towards personal finances (Instrument Variable)

Responses	Frequency	Percent	Cumulative
Totally agree	31	3.99	3.99
Partially agree	67	8.62	12.61
Agree slightly	193	24.84	37.45
Strongly disagree	486	62.55	100
Total	777	100	

My study also analyses impact of highest level of basic and advanced financial literacy on household wealth accumulation. I follow the same procedure in this analysis and use the dummy of IV as an instrumental variable. The F test values when both dummy of indexes are added linearly with the dummy of IV are 9.04 and 3.34 (prob > F = 0.0027 and prob > F = 0.0682 respectively). The results of this regression can be seen in table 15 and 16 in the appendix.

A dummy variable was created from the responses of the IV. In this dummy variable, the value 1 shows the number of respondents which only slightly or completely disagree with the statement "Personal finance is a source of anger and frustration" and value 0 shows the respondents partially or strongly agree with the above statement.

Table 10: Dummy variable of instrument variable

Instrument Dummy	Frequency	Percent	Cumulative
0	98	12.61	12.61
1	679	87.39	100
Total	777	100	

5 Empirical Analysis and Results

The objective of this study is to examine the relationship between financial literacy and household wealth accumulation. I start the analysis by performing a simple OLS regression analysis between financial literacy indexes and household wealth as shown in equation 1.

Table 11 shows OLS and 2SLS regression results between financial literacy indexes and negative wealth. In this table, dependent variable is negative wealth. In panel A, the independent variable is basic financial literacy index which is labelled as BFL. In panel B, the independent variable is advanced financial literacy index which is labelled as AFL. The control dummies are the dummy variables of control variables which consists of age, sex, country of birth, level of education and total household income. Column I and II in both panels show the OLS regression results between financial literacy indexes and negative wealth. Column III shows their IV estimates.

Table 12 shows OLS and 2SLS regression results between financial literacy indexes and high wealth. In this table, the dependent variable is high wealth. In panel A, the independent variable is basic financial literacy index which is labelled as BFL. In panel B, the independent variable is advanced financial literacy index which is labelled as AFL. The control dummies are the dummy variables of control variables which consists of age, sex, country of birth, level of education and total household income. Column I and II in both panels show the OLS regression results between financial literacy indexes and high wealth. Column III shows their IV estimates.

Table 11: OLS and 2SLS regression results between Financial Literacy Indexes and Negative wealth (Panel A)

VARIABLES	(I) Negative Wealth	(II) Negative Wealth	(III) Negative Wealth (IV)
BFL	-0.0475***	-0.0350**	-1.007**
	(0.0159)	(0.0172)	(0.448)
Control Dummies	NO	YES	YES
Constant	0.249***	0.298***	3.053**
	(0.0420)	(0.0896)	(1.327)
Observations	777	777	777
F statistics (1st stage)			5.78
P value			0.0165
R-squared	0.011	0.046	-3.927

OLS and 2sls regression results between Financial Literacy Indexes and Negative wealth (Panel B)

AFL	-0.0205**	-0.0152	-0.551**
	(0.0101)	(0.0112)	(0.217)
Control Dummies	NO	YES	YES
Constant	0.252***	0.307***	3.749***
	(0.0618)	(0.0964)	(1.445)
Observations	777	777	777
F-statistic (1st stage)			8.09
p-value			0.0046
R-squared	0.005	0.044	-2.847

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

OLS Regression results between basic financial literacy index and negative wealth are shown in column I and II of panel A in table 11 and results of OLS regression between advanced financial literacy index and negative wealth is shown in column I and II of panel B in table 11.

Column I of panel A in table 11 shows simple regression results between basic financial literacy index and negative wealth. The coefficient -0.0475 is significant at 1% level of significance. The sign of coefficient value shows that there exists a negative relationship between the variables. The value shows a unitary increase in basic financial literacy index is associated with 4.75 percentage points lower probability of having negative wealth. Column II of this panel shows results of regression analysis between basic financial literacy index and negative wealth while controlling for age, sex, country of birth, level of education and total household income. The result of this regression shows the same relationship between basic financial literacy and negative wealth. The coefficient value -0.0350 is significant at 5% level of significance. The

sign of coefficient value shows that there exists a negative relationship between the variables and the value shows that a unitary increase in basic financial literacy index is associated with 3.50 percentage points lower probability of being in financial distress.

Column I of panel B in table 11 shows simple regression results between advanced financial literacy index and negative wealth. The coefficient -0.0205 is significant at 5% level of significance. The sign of coefficient value shows that there exists a negative relationship between the variables and the value shows a unitary increase in advanced financial literacy index is associated with 2.05 percentage points lower probability of having negative wealth. Column II of this panel shows results of regression analysis between advanced financial literacy index and negative wealth while controlling for age, sex, country of birth, level of education and total household income. The result of this regression has the coefficient value -0.0152 which is not significant at any level of significance.

Column III of both A and B panels in table 11 shows 2SLS regression results between financial literacy indexes and negative wealth. As financial literacy is an endogenous variable, so instrument variable is used to deal with this issue.

Column III of panel A in table 11 reveals the existence of a negative relationship between the basic financial literacy index and negative wealth. The coefficient value -1.007 is significant at 5% level of significance and shows that a unitary increase in basic financial literacy has lower probability of respondents being in financial distress by 0.7 percentage points. The first step of this analysis, which is regression between basic financial literacy index and IV, had the F-statistic of 5.78 and its p-value is 0.0165 (it can be seen at the bottom of column III of panel A in table 11).

Column III of panel B in table 11 shows a negative relationship between advanced financial literacy index and negative wealth. The coefficient value -0.551 is significant at 5% level of significance and shows that a unitary increase in advanced financial literacy lowers the probability of having negative wealth by 5.51 percentage points. The first step of this 2SLS analysis, which is regression between advanced financial literacy index and IV, had the F-statistic of 8.09 and its p-value is 0.0046 (it can be seen at the bottom of column III of panel B in table 11).

Table 12: OLS and 2SLS regression results between Financial Literacy Indexes and High wealth (Panel A)

VARIABLES	(I) High Wealth	(II) High Wealth	(III) High Wealth (IV)
BFL	0.148***	0.101***	1.141**
	(0.0199)	(0.0210)	(0.493)
Control Dummies	NO	YES	YES
Observations	777	777	777
F statistics (1st stage)			5.78
P value			0.0165
R-squared	0.066	0.146	-2.585
OLS and 2sls regression results between Financial Literacy Indexes and High wealth (Panel B)			
AFL	0.0839***	0.0537***	0.625***
	(0.0127)	(0.0137)	(0.240)
Control Dummies	NO	YES	YES
Constant	0.248***	-0.102	-3.224**
	(0.0778)	(0.118)	(1.600)
Observations	777	777	777
F-statistic (1st stage)			8.09
p-value			0.0046
R-squared	0.053	0.137	-1.833

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

OLS Regression results between basic financial literacy index and high wealth are shown in column I and II of panel A in table 12 and results of OLS regression between advanced financial literacy index and high wealth is shown in column I and II of panel B in table 12.

Column I of panel A in table 12 shows simple regression results between basic financial literacy index and high wealth. The coefficient 0.148 is significant at 1% level of significance. The sign of coefficient value shows that there exists a positive relationship between the variables and the value shows that a unitary increase in basic financial literacy index is associated with 14.8 percentage points higher probability of having higher level of wealth. Column II of this panel shows results of regression analysis between basic financial literacy index and high wealth while controlling for age, sex, country of birth, level of education and total household income. The result of this regression shows the same relationship between basic financial literacy and high wealth. The coefficient value 0.101 is significant at 1% level of significance. The sign of coefficient value shows that there exists a positive relationship between the variables and the value shows that a unitary increase in basic financial literacy index is associated with 10.1 percentage points higher probability of having high level of wealth accumulation.

Column I of panel B in table 12 shows simple regression results between advanced financial literacy index and high wealth. The coefficient 0.0839 is significant at 1% level of significance. The sign of coefficient value shows that there exists a positive relationship between the variables and the value shows that a unitary increase in advanced financial literacy is associated with 8.39 percentage points more probability of having higher level of wealth accumulation. Column II of this panel shows results of regression analysis between advanced financial literacy index and high wealth while controlling for age, sex, country of birth, level of education and total household income. The result of this regression has the coefficient value 0.0537 which is significant at 1% level of significance. The sign of coefficient value shows that there exists a positive relationship between the variables and the value shows a unitary increase in advanced financial literacy is associated with 5.37 percentage points more likelihood of respondents having higher level of wealth accumulation.

Column III of both A and B panels in table 12 shows 2SLS regression results between financial literacy indexes and high wealth in both panels. As financial literacy is an endogenous variable so instrumental variable is used to deal with this issue.

Column III of panel A in table 12 shows 2SLS regression results between basic financial literacy index and high wealth. The results show a positive relationship between the variables and coefficient value 1.141 is significant at 5% level of significance and shows that unitary increase in basic financial literacy exhibits the probability of having high wealth accumulation by 14.1 percentage points. The first step of this analysis, which is regression between basic financial literacy index and IV, had the F-statistic of 5.78 and its p-value is 0.0165 (it can be seen at the bottom of column III of panel A in table 12).

Column III of panel B in table 12 shows 2SLS regression results between advanced financial literacy index and high wealth. The results show a positive relationship between the variables and coefficient value 0.625 is significant at 1% level of significance and shows that unitary increase in advanced financial literacy increases the probability of having higher wealth accumulation by 62.5 percentage points. The first step of this 2SLS analysis, which is regression between advanced financial literacy index and IV, had the F-statistic of 8.09 and its p-value is 0.0046 (it can be seen at the bottom of column III of panel B in table 12).

To examine the effects of financial literacy on household wealth, I also looked at the effect of dummies of highest level of financial literacy on household wealth by first performing a simple OLS regression analysis.

The results of OLS regression between dummy of highest basic financial literacy index and negative wealth is shown in column 1 and 2 of Table 21 in appendix and results of OLS regression between dummy of advanced financial literacy index and negative wealth is shown in column 1 and 2 of Table 23 in appendix.

Column I of table 21 in appendix shows simple regression results between dummy variable for highest level of basic financial literacy and negative wealth. The coefficient -0.100 is significant at 1% level of significance. The sign of coefficient value shows that there exists a negative relationship between the variables and the value shows that unitary increase in highest level of basic financial literacy is associated with 1.00 percentage points less likelihood of having negative wealth. Column II of this table shows results of regression analysis between dummy variable for highest level of basic financial literacy and negative wealth while controlling for age, sex, country of birth, level of education and total household income. The result of this regression shows the same relationship between the variables as seen in the previous regression. The coefficient value which is -0.0854 is significant at 1% level of significance. The sign of coefficient value shows that there exists a negative relationship between the variables and the value shows that unitary increase in highest level of basic financial literacy is associated with 8.54 percentage points less likelihood of being in financial distress.

Column I of table 23 in appendix shows simple regression results between dummy variable for highest level of advanced financial literacy and negative wealth. The coefficient -0.0588 is significant at 5% level of significance. The sign of coefficient value shows that there exists a negative relationship between the variables and the value shows that unitary increase in highest level of advanced financial literacy is associated with 5.88 percentage points less likelihood of having negative wealth. Column II of this table shows results of regression analysis between dummy variable for highest level of advanced financial literacy and negative wealth while controlling for age, sex, country of birth, level of education and total household income. The result of this regression shows the same relationship between the variables as seen in the previous regression. The coefficient value -0.0570 is significant at 5% level of significance. The sign of coefficient value shows that there exists a negative relationship between the variables and the value shows that a unitary increase in highest level of advanced financial literacy is associated with 5.70 percentage points less likelihood of being in financial distress.

The results of OLS regression between dummy of highest basic financial literacy index and high wealth is shown in column 1 and 2 of Table 22 in appendix and results of OLS regression between dummy of advanced financial literacy index and high wealth is shown in column 1 and 2 of Table 24 in appendix.

Column I of table 22 in appendix shows simple regression results between dummy variable for highest level of basic financial literacy and high wealth. The coefficient 0.232 is significant at 1% level of significance. The sign of coefficient value shows that there exists a positive relationship between the variables and the value shows that a unitary increase in highest level of basic financial literacy is associated with 23.2 percentage points chances of having high wealth. Column II of this table shows results of regression analysis between dummy variable for highest level of basic financial literacy and high wealth while controlling for age, sex, country of birth, level of education and total household income. The result of this regression shows the same relationship between the variables as seen in the previous regression. The coefficient value 0.173 is significant at 1% level of significance. The sign of coefficient value shows that there exists a positive relationship between the variables and the value shows that a unitary increase in highest level of basic financial literacy is associated with 17.3 percentage points more likelihood of having high wealth accumulation.

Column I of table 24 in appendix shows simple regression results between dummy variable for highest level of advanced financial literacy and high wealth. The coefficient 0.154 is significant at 1% level of significance. The sign of coefficient value shows that there exists a positive relationship between the variables and the value shows that unitary increase in highest level of advanced financial literacy is associated with 15.4 percentage points more likelihood of having higher level of wealth accumulation. Column II of this table shows results of regression analysis between dummy variable for highest level of advanced financial literacy and high wealth while controlling for age, sex, country of birth, level of education and total household income. The result of this regression has the coefficient value 0.109 which is significant at 1% at level of significance. The sign of coefficient value shows that there exists a positive relationship between the variables and the value shows that a unitary increase in highest level of advanced financial literacy is associated with 10.9 percentage points more likelihood of having higher level of wealth accumulation.

Column III of table 21 and 23 in appendix shows 2SLS regression results between dummy variable of highest level of financial literacy and negative wealth using the dummy variable of

IV. The results are insignificant. Column III of table 22 and 24 in appendix shows 2SLS regression results between dummy variable of highest level of financial literacy and high wealth. The regression results are not significant.

6 Discussion and Conclusion

The study aimed to isolate the causal effect of financial literacy on wealth accumulation of households. The data used for this analysis is a household data set collected by the Financial Supervisory Authority (FI) of Sweden. To address the issue of endogeneity of financial literacy, I used the instrumental variable approach. The instrument chosen for this study encapsulated people's attitude towards their own financial management.

Results of simple linear regression imply that people possessing higher basic and advanced financial literacy levels have less probability of having negative wealth. After controlling for age, sex, country of birth, level of education and total household income, similar results are seen for basic financial literacy index but in case of advanced financial literacy index, the results become insignificant.

The second outcome variable of the study is high wealth. The simple linear regression results suggests that people with higher basic and advanced financial literacy are more likely to have high wealth accumulation. After controlling for age, sex, country of birth, level of education and total household income, the results do not change.

As discussed previously, using only the OLS models to estimate the effect of financial literacy on wealth accumulation will give misleading or biased estimates due to issue of endogeneity, omitted variables biases and measurement errors. Applying the instrumental variable approach, the results again indicate a negative relationship between basic financial literacy index and negative wealth, and in case of advanced financial literacy index the estimates imply comparatively stronger negative effect on negative wealth then shown by simple OLS regression. The IV estimates reflecting the effect of indexes on high wealth reveals a stronger positive effect of financial literacy indexes as compared to its OLS counterpart. So, these findings suggest that respondents with better understanding of basic and advanced financial concepts would have a better chance of accumulating more wealth and will be less likely to end up in financial distress. The findings of this study align with the results of prior literature focused on investigating the importance of financial literacy and its effects on various financial decisions and accumulation of household wealth. The results of the OLS estimates between dummies of indexes and household wealth show similar results but IV estimates are not significant.

It can be speculated from looking at the distribution of financial literacy across age, sex, level of education and total household income that respondents performed better when answering basic financial literacy questions as compared to advanced financial literacy questions. Looking at the distribution of financial literacy by gender in figure 1 and 2 and age in figure 3 and 4 respectively, the respondents performed better in terms of basic financial literacy then advanced financial literacy. Similar trend is seen when studying the distribution of financial literacy by education in figure 5 and 6 respectively. Another noticeable feature about this distribution is that respondents with school level education show comparatively higher basic financial literacy than advanced financial literacy. Distribution of financial literacy by total household income also exhibits the same behaviour.

The first contribution of my study to the already existing literature on financial literacy is that I have constructed an advanced financial literacy index. This index focuses on assessing the level of understanding possessed by the respondents regarding more complex financial and quantitative concepts.

The second contribution of my study is that I employ a different instrumental variable to address the problem of endogeneity. The instrument captures people's attitude towards their personal finances. People who have a more positive attitude towards their own finances may be keener to learn and understand various financial concepts resulting in higher likelihood of achieving higher wealth accumulation and lower likelihood of falling into debt.

The third contribution of my study is that I have examined the association between financial literacy and probability of having negative wealth. Negative wealth means that respondent's liabilities are greater than their assets. The findings of my study suggests a negative correlation between these variables. This means individuals possessing higher level of financial literacy have a lower probability of going into financial distress. The reason behind the analysis of this particular channel was to be able to study the relationship between financial literacy and household indebtedness.

The last contribution of my study is that I have explored the effects of financial literacy on household wealth accumulation among the Swedish households. A study by Van Rooij, Lusardi & Alessie (2012) looked at similar relationship but they used households data set for Netherlands.

It is important to acknowledge that the study has certain limitations. Firstly, the data used in this study is cross-sectional which makes it difficult to examine the causal relationship between

financial literacy and household wealth across different time periods. It also restricts the study's ability to examine any changes that have taken place overtime. Secondly, the study faced the challenge of finding the most suitable instrumental variable for the analysis. Efforts were made to find the most appropriate instrument, but it is important to acknowledge that the instrument chosen may not completely fulfil the exclusion restriction. Due to data constraint, the chosen instrument, which captured respondent's attitude towards personal finances, is the best possible option. The aim of this instrument is to address the endogeneity and other forms of biases associated with examining the effects of financial literacy. So, the findings of this study should be interpreted with caution as they might still be potentially affected by lingering endogeneity. Lastly, the data set lacked the quantitative data on household debt. Due to this limitation, it was difficult to investigate the isolated relationship between financial literacy and household debt.

In conclusion, the findings of my study supports the previous literature and suggests that financial literacy plays a significant role in household wealth accumulation. They imply that higher financial literacy leads to better financial decision making which can facilitate the households in building more assets that will provide them with much needed financial security pre and post-retirement. The findings of this study appear to support the idea that policies geared towards providing financial education to the public might assist them in avoiding financial distress. Financial knowledge will provide them with much needed financial guidance and skills which will enable them to make sound and well informed decisions about their personal finances.

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Appendix

Table 13: OLS Regression between Basic Financial Literacy Index and IV

VARIABLES	(1) Finlit_index
IV	0.147***
	(0.0328)
Constant	2.022***
	(0.117)
Observations	777
F statistics	19.91
P value	0.0000
R-squared	0.025

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 14: OLS Regression between Advanced Financial Literacy Index and IV

VARIABLES	(1) AdvFinlit_index
IV	0.246***
	(0.0518)
Constant	5.154***
	(0.184)
Observations	777
F statistics	22.58
P value	0.0000
R-squared	0.028

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 15: OLS Regression between dummy for highest basic Financial Literacy level and Dummy IV

VARIABLES	(1) dum_HighFinlit
dummy_IV	0.153***
	(0.0508)
Constant	0.531***
	(0.0475)
Observations	777
F statistics	9.04
P value	0.0027
R-squared	0.012

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 16:OLS Regression between dummy for highest advanced Financial Literacy level and Dummy IV

	(1)
VARIABLES	dum_AdvFinlit
dummy_IV	0.0979*
	(0.0536)
Constant	0.357***
	(0.0501)
Observations	777
F statistics	3.34
P value	0.0682
R-squared	0.004

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 17: OLS and 2SLS regression results between Basic Financial Literacy Index and Negative wealth

VARIABLES	(1) dummy_nw	(2) dummy_nw	(3) dummy_nw (IV)
Finlit_index	-0.0475***	-0.0350**	-1.007**
	(0.0159)	(0.0172)	(0.448)
age_d1 (18-29)		-	
age_d2 (30-39)		0.125**	-0.238
		(0.0572)	(0.212)
age_d3 (40-49)		0.0511	-0.130
		(0.0565)	(0.138)
age_d4 (50-59)		0.00410	-0.0905
		(0.0530)	(0.0989)
age_d5 (65-79)		-0.0527	
		(0.0527)	
sex1 (Male)		-0.0267	0.175
		(0.0245)	(0.108)
sex2 (Female)		-	-
cb1 (Sweden)		-0.0549	-0.0852
		(0.0465)	(0.106)
cb2 (other country)		-	-
le1 (School)		-	
le2 (Upper Second)		0.00943	-0.221
		(0.0436)	(0.139)
le3 (University)		-0.0429	
		(0.0451)	
thi1 (<200,000 sek)		-	
thi2 (201k-300k sek)		-0.0300	-0.400**
		(0.0542)	(0.199)
thi3 (301k-500k sek)		0.00345	-0.160
		(0.0495)	(0.104)
thi4 (501k-1000k or>)		-0.0134	
		(0.0508)	
age_d1 (18-29)			-0.323
			(0.209)
age_d5 (65-79)			-
le1 (School)			-0.435*
			(0.242)
le3 (University)			-
thi1 (<200,000 sek)			-0.625**
			(0.315)

thi4 (501k-1000k or>)			-
Constant	0.249***	0.298***	3.053**
	(0.0420)	(0.0896)	(1.327)
Observations	777	777	777
F statistics			5.78
P value			0.0165
R-squared	0.011	0.046	-3.927

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 18: OLS and 2SLS regression results between Basic Financial Literacy Index and High wealth

VARIABLES	(1) dummy_hw	(2) dummy_hw	(3) dummy_hw (IV)
Finlit_index	0.148***	0.101***	1.141**
	(0.0199)	(0.0210)	(0.493)
age_d1 (18-29)		-	
age_d2 (30-39)		-0.0446	0.176
		(0.0699)	(0.233)
age_d3 (40-49)		0.00701	0.0337
		(0.0690)	(0.152)
age_d4 (50-59)		0.113*	0.0468
		(0.0647)	(0.109)
age_d5 (65-79)		0.223***	
		(0.0643)	
sex1 (Male)		-0.00190	-0.218*
		(0.0299)	(0.119)
sex2 (Female)		-	-
cb1 (Sweden)		0.0841	0.117
		(0.0568)	(0.116)
cb2 (other country)		-	-
le1 (School)		-	
le2 (Upper Second)		0.0465	0.253*
		(0.0532)	(0.153)
le3 (University)		0.0860	
		(0.0550)	
thi1 (<200,000 sek)		-	
thi2 (201k-300k sek)		0.295***	0.347
		(0.0662)	(0.218)
thi3 (301k-500k sek)		0.280***	0.111
		(0.0605)	(0.114)
thi4 (501k-1000k or>)		0.358***	
		(0.0620)	
age_d1 (18-29)			0.178
			(0.231)
age_d5 (65-79)			-
le1 (School)			0.425
			(0.266)
le3 (University)			-
thi1 (<200,000 sek)			0.325
			(0.347)

thi4 (501k-1000k or>)			-
Constant	0.377***	-0.0388	-2.435*
	(0.0526)	(0.109)	(1.460)
Observations	777	777	777
F statistics			5.78
P value			0.0165
R-squared	0.066	0.146	-2.585

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 19: OLS and 2SLS regression results between Advanced Financial Literacy Index and Negative wealth

VARIABLES	(1) dummy_nw	(2) dummy_nw	(3) dummy_nw (IV)
AdvFinlit_index	-0.0205**	-0.0152	-0.551**
	(0.0101)	(0.0112)	(0.217)
age_d1 (18-29)		-	
age_d2 (30-39)		0.128**	-0.0906
		(0.0573)	(0.137)
age_d3 (40-49)		0.0522	-0.0102
		(0.0567)	(0.0905)
age_d4 (50-59)		0.00359	-0.00666
		(0.0532)	(0.0690)
age_d5 (65-79)		-0.0566	
		(0.0528)	
sex1 (Male)		-0.0311	0.0709
		(0.0243)	(0.0635)
sex2 (Female)		-	-
cb1 (Sweden)		-0.0534	-0.0386
		(0.0466)	(0.0928)
cb2 (other country)		-	-
le1 (School)		-	
le2 (Upper Second)		0.0109	-0.178*
		(0.0439)	(0.108)
le3 (University)		-0.0447	
		(0.0458)	
thi1 (<200,000 sek)		-	
thi2 (201k-300k sek)		-0.0318	-0.365**
		(0.0543)	(0.163)
thi3 (301k-500k sek)		-0.00126	-0.175*
		(0.0497)	(0.0965)
thi4 (501k-1000k or>)		-0.0191	
		(0.0512)	
age_d1 (18-29)			-0.283
			(0.172)
age_d5 (65-79)			-
le1 (School)			-0.499**
			(0.237)
le3 (University)			-
thi1 (<200,000 sek)			-0.595**
			(0.267)
thi4 (501k-1000k or>)			-

Constant	0.252***	0.307***	3.749***
	(0.0618)	(0.0964)	(1.445)
Observations	777	777	777
F-statistic			8.09
p-value			0.0046
R-squared	0.005	0.044	-2.847

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 20: OLS and 2SLS regression results between Advanced Financial Literacy Index and High wealth

VARIABLES	(1) dummy_hw	(2) dummy_hw	(3) dummy_hw (IV)
AdvFinlit_index	0.0839***	0.0537***	0.625***
	(0.0127)	(0.0137)	(0.240)
age_d1 (18-29)		-	
age_d2 (30-39)		-0.0552	0.00965
		(0.0703)	(0.152)
age_d3 (40-49)		-0.000283	-0.102
		(0.0695)	(0.100)
age_d4 (50-59)		0.109*	-0.0482
		(0.0652)	(0.0764)
age_d5 (65-79)		0.229***	
		(0.0647)	
sex1 (Male)		0.00897	-0.0997
		(0.0298)	(0.0703)
sex2 (Female)		-	-
cb1 (Sweden)		0.0795	0.0637
		(0.0571)	(0.103)
cb2 (other country)		-	-
le1 (School)		-	
le2 (Upper Second)		0.0368	0.204*
		(0.0539)	(0.120)
le3 (University)		0.0814	
		(0.0561)	
thi1 (<200,000 sek)		-	
thi2 (201k-300k sek)		0.295***	0.307*
		(0.0666)	(0.181)
thi3 (301k-500k sek)		0.286***	0.128
		(0.0609)	(0.107)
thi4 (501k-1000k or>)		0.363***	
		(0.0628)	
age_d1 (18-29)			0.133
			(0.191)
age_d5 (65-79)			-
le1 (School)			0.498*
			(0.262)
le3 (University)			-
thi1 (<200,000 sek)			0.291
			(0.296)
thi4 (501k-1000k or>)			-

Constant	0.248***	-0.102	-3.224**
	(0.0778)	(0.118)	(1.600)
Observations	777	777	777
F-statistic			8.09
p-value			0.0046
R-squared	0.053	0.137	-1.833

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 21: OLS and 2SLS regression results between Dummy variable of Highest Basic Financial Literacy Level and Negative wealth

VARIABLES	(1) dummy_nw	(2) dummy_nw	(3) dummy_nw (dummy_IV)
dum_HighFinlit	-0.100***	-0.0854***	-2.618
	(0.0252)	(0.0266)	(1.709)
age_d1 (18-29)		-	
age_d2 (30-39)		0.124**	-0.417
		(0.0570)	(0.422)
age_d3 (40-49)		0.0524	-0.222
		(0.0562)	(0.257)
age_d4 (50-59)		0.00475	-0.196
		(0.0527)	(0.203)
age_d5 (65-79)		-0.0489	
		(0.0523)	
sex1 (Male)		-0.0227	0.312
		(0.0244)	(0.242)
sex2 (Female)		-	-
cb1 (Sweden)		-0.0561	-0.125
		(0.0463)	(0.171)
cb2 (other country)		-	-
le1 (School)		-	
le2 (Upper Second)		0.0102	-0.332
		(0.0433)	(0.274)
le3 (University)		-0.0391	
		(0.0446)	
thi1 (<200,000 sek)		-	
thi2 (201k-300k sek)		-0.0338	-0.630
		(0.0538)	(0.433)
thi3 (301k-500k sek)		0.00137	-0.323
		(0.0489)	(0.248)
thi4 (501k-1000k or>)		-0.0106	
		(0.0500)	
age_d1 (18-29)			-0.465
			(0.393)
age_d5 (65-79)			-
le1 (School)			-0.584
			(0.449)
le3 (University)			-
thi1 (<200,000 sek)			-0.756
			(0.546)

thi4 (501k-1000k or>)			-
Constant	0.195***	0.261***	2.448
	(0.0205)	(0.0860)	(1.554)
Observations	777	777	777
F statistics			2.35
P value			0.1258
R-squared	0.020	0.054	-11.140

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 22: OLS and 2SLS regression results between Dummy variable of highest Basic Financial Literacy Level and High wealth

VARIABLES	(1) dummy_hw	(2) dummy_hw	(3) dummy_hw (dummy_IV)
dum_HighFinlit	0.232***	0.173***	2.196
	(0.0318)	(0.0326)	(1.435)
age_d1 (18-29)		-	
age_d2 (30-39)		-0.0435	0.200
		(0.0697)	(0.354)
age_d3 (40-49)		0.00882	0.0398
		(0.0687)	(0.216)
age_d4 (50-59)		0.119*	0.0909
		(0.0644)	(0.170)
age_d5 (65-79)		0.227***	
		(0.0640)	
sex1 (Male)		-0.00374	-0.271
		(0.0298)	(0.203)
sex2 (Female)		-	-
cb1 (Sweden)		0.0857	0.141
		(0.0566)	(0.144)
cb2 (other country)		-	-
le1 (School)		-	
le2 (Upper Second)		0.0513	0.263
		(0.0529)	(0.230)
le3 (University)		0.0932*	
		(0.0545)	
thi1 (<200,000 sek)		-	
thi2 (201k-300k sek)		0.310***	0.423
		(0.0658)	(0.364)
thi3 (301k-500k sek)		0.299***	0.194
		(0.0597)	(0.208)
thi4 (501k-1000k or>)		0.372***	
		(0.0611)	
age_d1 (18-29)			0.183
			(0.330)
age_d5 (65-79)			-
le1 (School)			0.405
			(0.377)
le3 (University)			-
thi1 (<200,000 sek)			0.240

			(0.459)
thi4 (501k-1000k or>)			-
Constant	0.598***	0.0784	-1.054
	(0.0259)	(0.105)	(1.305)
Observations	777	777	777
			2.35
			0.1258
R-squared	0.064	0.151	-4.141

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 23: OLS and 2SLS regression results between Dummy variable of highest Advanced Financial Literacy Level and Negative wealth

VARIABLES	(1) dummy_nw	(2) dummy_nw	(3) dummy_nw (dummy_IV)
dum_AdvFinlit	-0.0588**	-0.0570**	-4.615
	(0.0241)	(0.0255)	(5.525)
age_d1 (18-29)		-	
age_d2 (30-39)		0.136**	-0.158
		(0.0574)	(0.494)
age_d3 (40-49)		0.0599	0.158
		(0.0567)	(0.256)
age_d4 (50-59)		0.00885	0.0296
		(0.0531)	(0.210)
age_d5 (65-79)		-0.0528	
		(0.0526)	
sex1 (Male)		-0.0285	0.409
		(0.0243)	(0.553)
sex2 (Female)		-	-
cb1 (Sweden)		-	
cb2 (other country)		0.0539	
		(0.0465)	
le1 (School)		-	
le2 (Upper Second)		0.0113	-0.545
		(0.0436)	(0.746)
le3 (University)		-0.0434	
		(0.0449)	
thi1 (<200,000 sek)		-	
thi2 (201k-300k sek)		-0.0358	-0.989
		(0.0540)	(1.209)
thi3 (301k-500k sek)		-0.00842	-0.850
		(0.0489)	(1.062)
thi4 (501k-1000k or>)		-0.0209	
		(0.0500)	
age_d1 (18-29)			-1.018
			(1.342)
age_d5 (65-79)			-
cb1 (Sweden)			-0.0629
			(0.302)
cb2 (other country)			-
le1 (School)			-1.296
			(1.648)

le3 (University)			-
thi1 (<200,000 sek)			-1.223
			(1.542)
thi4 (501k-1000k or>)			-
Constant	0.155***	0.184**	2.927
	(0.0161)	(0.0724)	(3.421)
Observations	777	777	777
F-statistic			0.69
P-value			0.4078
R-squared	0.008	0.047	-39.827

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 24: OLS and 2SLS regression results between Dummy variable of highest Advanced Financial Literacy Level and High wealth

VARIABLES	(1) dummy_hw	(2) dummy_hw	(4) dummy_hw (dummy_IV)
dum_AdvFinlit	0.154***	0.109***	3.873
	(0.0308)	(0.0314)	(4.626)
age_d1 (18-29)		-	
age_d2 (30-39)		-0.0661	-0.0169
		(0.0706)	(0.413)
age_d3 (40-49)		-0.00497	-0.279
		(0.0698)	(0.214)
age_d4 (50-59)		0.112*	-0.0988
		(0.0654)	(0.176)
age_d5 (65-79)		0.237***	
		(0.0647)	
sex1 (Male)		0.00868	-0.353
		(0.0299)	(0.463)
sex2 (Female)		-	-
cb1 (Sweden)		-	
cb2 (other country)		-0.0812	
		(0.0572)	
le1 (School)		-	
le2 (Upper Second)		0.0501	0.441
		(0.0536)	(0.625)
le3 (University)		0.104*	
		(0.0552)	
thi1 (<200,000 sek)		-	
thi2 (201k-300k sek)		0.315***	0.724
		(0.0664)	(1.012)
thi3 (301k-500k sek)		0.319***	0.636
		(0.0602)	(0.889)
thi4 (501k-1000k or>)		0.395***	
		(0.0615)	
age_d1 (18-29)			0.647
			(1.123)
age_d5 (65-79)			-
cb1 (Sweden)			0.0886
			(0.253)
cb2 (other country)			-
le1 (School)			1.002
			(1.380)

le3 (University)			-
thi1 (<200,000 sek)			0.632
			(1.291)
thi4 (501k-1000k or>)			-
Constant	0.684***	0.206**	-1.457
	(0.0205)	(0.0891)	(2.864)
Observations	777	777	777
F-statistic			0.69
p-value			0.4078
R-squared	0.031	0.133	-16.189

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1