NAVIGATING FINANCIAL DISTRESS

THE IMPACT OF FINANCIAL LITERACY ON HOUSEHOLD-LEVEL BANKRUPTCY

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Navigating Financial Distress: The Protective Role of Financial Literacy against Bankruptcy

Abstract:

This study explores the protective role of financial literacy in reducing household financial distress, focusing on bankruptcy risk. Using data from the 2022 Survey of Consumer Finances, financial literacy is assessed via the "Big 3" questions and analyzed through linear, threshold and mediation models. Results show a significant negative relationship between financial literacy and bankruptcy, with the highest literacy levels offering the most protection, while intermediate scores have limited benefits. Subgroup analyses reveal that younger age groups, lower income groups and high debt-to-income groups benefit most from literacy improvements. The mediation analyses identify homeownership and credit card management as key behavioral pathways. While financial literacy strongly reduces bankruptcy risk, its effect on foreclosure is less pronounced, influenced more by structural and socio-demographic factors. These findings highlight the need for targeted financial education to support vulnerable populations and inform policy.

Keywords: Financial Literacy, Bankruptcy, Foreclosure, Financial Distress

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1. Introduction

In an era where financial markets are more accessible than ever, understanding essential financial principles has become a key determinant of personal and economic well-being. Yet, financial distress remains widespread: about 2 in 3 Americans are considered financially illiterate and nearly 80% of Americans live paycheck to paycheck, highlighting the vulnerability of many households.[1] Escalating debt levels, now exceeding $12 trillion in the U.S., primarily from credit cards and student loans, highlight the urgent need for robust financial literacy to navigate today's increasingly complex financial landscape.[2] This urgency is further underscored by the staggering $388 billion cost of financial illiteracy to Americans in 2023 alone.[3] Although household-level, non-business bankruptcy (hereafter referred to as bankruptcy) filings have steadily declined since 2010, reaching approximately 434,000 cases in the US (see Figure A1 in the appendix for a detailed graph)[4], the financial knowledge gap remains a significant barrier to economic resilience, impacting both individual households and the broader economy.

This study examines the link between financial literacy, i.e. the knowledge and skills needed to make important financial decisions[5] and severe financial distress, with a specific focus on bankruptcy as the most critical outcome. There is previous research in this area, with some approaching financial distress through a rather non-cognitive lens. For example, Parise and Peijnenburg (2019) found that traits such as emotional stability and conscientiousness play a substantial role in financial decision-making. Inspired by their research, we choose to explore financial distress from a contrasting, more knowledge-based angle, centering our research on the question: "*How does financial literacy influence the likelihood of severe financial distress among households?*"

To address this question, we analyze data from the 2022 Survey of Consumer Finances (SCF). Financial literacy is measured using the widely recognized "Big 3" questions (see Table 1), which assess knowledge of fundamental concepts like interest rates, inflation and risk diversification. We start with simple linear regression to examine the raw relationship between financial literacy and bankruptcy risk. Next, we use multiple linear regression, adding socio-demographic control variables to isolate the unique effect of financial literacy on bankruptcy risk. The results reveal a consistent significant negative relationship: individuals with higher financial literacy are less likely to experience severe financial distress, confirming its role as a critical protective factor. Building on these findings, we conduct threshold analyses to assess whether specific levels of financial literacy offer varying degrees of protection. The results show that achieving the highest literacy score significantly reduces bankruptcy risk, whereas intermediate scores have limited effects.

Subgroup analyses further reveal nuanced impacts: foundational and incremental literacy protects individuals under 30 by mitigating elevated baseline bankruptcy risk. Similarly, continuous improvements benefit those aged 30-45, who, like younger individuals, face heightened baseline risk when financial literacy is limited. For individuals aged 46-65, only the highest literacy level provides significant protection. Income-based analyses reveal substantial benefits for lower middle-income households from continuous literacy

[1] Corporate Finance Institute (2024)
[2] Corporate Finance Institute (2024)
[3] National Financial Educators Council (2024)
[4] United State Courts (2024)
[5] European Commission (2024)

improvements, while foundational literacy appears beneficial for low-income groups in unadjusted models, though structural barriers likely constrain its overall impact. Debt-to-income (DTI) analyses reveal that continuous improvements in financial literacy are crucial for individuals with high debt burdens to mitigate bankruptcy risk. The unadjusted model further highlights the protective effect of financial literacy, showing a significant baseline risk reduction and underscoring the value of attaining highest financial literacy levels.

Additionally, mediation analyses investigate how financial literacy reduces bankruptcy risk through four behavioral pathways: savings behavior, credit card management, homeownership and stock literacy. After testing for potential overlap effects and multicollinearity, homeownership and credit card management emerge as the most significant mediators, highlighting how financial literacy supports better debt management, informed housing decisions and overall financial stability.

In contrast to bankruptcy, foreclosure, examined as a comparative and less severe measure of financial distress, reveals a less pronounced role for financial literacy. While literacy reduces foreclosure risk in unadjusted linear regression, its effects diminish when socio-demographic factors are included, underscoring the greater influence of structural factors like housing policies. Furthermore, our threshold analysis reveals significant protective effects at moderate financial literacy scores but increased risk at lower scores.

Finally, the study includes a robustness analysis to validate the findings, employing a random treatment assignment placebo test, Firth's penalized logistic regression, weighted regression and an outlier exclusion analysis. Additionally, we replicate the simple and multiple linear regressions using 2016 and 2019 SCF data to assess the temporal consistency of our results. While the 2016 findings deviate, reflecting the complexity of financial distress across different economic contexts, this well-rounded approach strengthens the reliability of our findings.

Previous studies have explored related topics, but few have directly examined the link between financial literacy and severe financial distress, as measured by bankruptcy. For instance, Lusardi and Mitchell (2011) and Lusardi (2019) emphasize the importance of understanding basic financial concepts, such as interest rates, inflation and risk diversification, for sound financial decision-making, but they primarily focus on broader outcomes like retirement preparedness and wealth accumulation. Similarly, Domowitz and Sartain (1997) use SCF data to identify factors such as credit card debt and homeownership as significant contributors to bankruptcy risk, though financial literacy is not a focus of their research.[6] Although these studies provide valuable insights, the role of financial literacy as a direct protective factor against severe financial instability remains relatively underexplored.

Additionally, studies like Hastings, Madrian and Skimmyhorn (2013) examine financial literacy's impact on behavior, evaluating if education improves outcomes and exploring public policy to address knowledge gaps. Similarly, Campbell (2006) and Lusardi and Mitchell (2007) argue that inadequate financial literacy, especially prevalent among

[6] Domowitz and Sartain (1997) treat homeownership and credit card debt as control variables, viewing them as household conditions affecting bankruptcy risk. In our study, we consider these as mediators to examine how financial literacy might impact financial distress through better management of debt and homeownership. This approach allows us to explore the indirect effects of financial literacy on bankruptcy risk, rather than merely controlling for these factors.

lower-income and less educated households, often results in costly financial mistakes and poor retirement planning, highlighting the importance of targeted education and accessible financial products to improve financial resilience. Collectively, these studies support our premise that financial literacy serves as a protective factor, reducing the probability of severe financial outcomes like bankruptcy and reinforcing our focus on financial literacy as a vital pathway to financial resilience.

Our study takes a distinct approach by positioning financial literacy as a critical factor in financial stability, examining how gaps in core financial knowledge elevate the risk of severe financial distress. By focusing on bankruptcy as a clear and quantifiable endpoint of financial distress, we provide a robust benchmark for assessing the effectiveness of financial literacy in preventing the most adverse financial outcomes. Furthermore, unlike prior research that treats financial literacy as a single measure, we categorize literacy into distinct levels, allowing for a more nuanced analysis of how varying degrees of financial knowledge influence financial resilience. By identifying specific literacy thresholds, we uncover critical benchmarks that highlight the minimum levels of knowledge necessary to reduce financial vulnerability. This approach enhances understanding of the literacy-distress relationship and reveals how different levels of financial knowledge contribute to varying degrees of financial resilience, offering a deeper perspective on the protective role of financial literacy.

Additionally, our study extends the analysis of financial literacy to a novel domain by incorporating foreclosure as an additional measure of financial distress, allowing us to explore how financial literacy interacts with varying levels of financial distress, from the more severe endpoint of bankruptcy to the relatively less acute challenge of foreclosure. By examining these different levels of financial vulnerability, we provide a broader perspective on the role of financial literacy in promoting resilience across diverse economic contexts. This comparative approach contributes to the existing literature by demonstrating how financial literacy functions as a protective factor across various dimensions of financial stability, further emphasizing its importance for both individuals and policymakers.

Another key contribution of this study is its use of the most recent 2022 SCF data. While SCF data has been widely used in related research, including by Domowitz and Sartain (1997) and Lusardi (2019), this study uniquely leverages the SCF to directly explore how financial literacy mitigates financial distress, with a particular focus on bankruptcy risk. Since financial literacy variables were first incorporated into the SCF in 2016, this study provides updated insights, expanding the understanding of financial literacy's role in addressing severe financial challenges. By utilizing the latest SCF data, it offers a fresh and up-to-date perspective on the relationship between financial literacy and financial distress, particularly in mitigating severe financial risks such as bankruptcy.

Viewing our results through a policy lens, our findings underscore the value of enhancing financial literacy to mitigate severe financial distress, particularly among vulnerable populations. The results from our initial regression models reveal that incremental improvements in financial literacy can significantly reduce bankruptcy risk, highlighting the potential of scalable initiatives to raise baseline financial knowledge across all demographics. Moreover, our subgroup threshold analysis identifies specific literacy levels required to reduce financial vulnerability, providing a concrete basis for designing targeted educational interventions. Priority should focus on the youngest age groups, as they face significant baseline risk and consistently benefit from financial literacy improvements. Similarly, policymakers should target lower-income households and individuals with high debt burdens,

as these groups also exhibit baseline vulnerabilities or derive significant benefits from increased financial literacy. These educational programs could emphasize practical skills aligned with the behavioral pathways highlighted in our study, such as managing high-interest debt, building savings to buffer against income shocks and understanding basic investment principles to promote diversified portfolios.

While financial literacy consistently demonstrates a strong protective effect against bankruptcy, its influence on foreclosure risk is less pronounced and appears to be mediated by socio-demographic and structural factors. This distinction suggests that policies addressing foreclosure should focus on incorporating broader strategies, such as housing-specific interventions, alongside efforts to improve financial literacy.

2. Institutional Setting

Bankruptcy is defined by the United States Courts as a process that "helps people who can no longer pay their debts get a fresh start by liquidating assets to pay their debts or by creating a repayment plan."[7]

This study is exclusively concerned with household-level, non-business bankruptcies as defined under Chapters 7 and 13 of the U.S. Bankruptcy Code. Chapter 7, often called liquidation bankruptcy, is for individuals with low income and significant debt. It involves selling non-exempt assets to pay creditors, with remaining eligible debts discharged, though it may result in the loss of assets and remains on a credit report for up to 10 years. It is also the more common form of bankruptcy, accounting for the majority of individual filings each year. Moreover, Chapter 13, or reorganization bankruptcy, is tailored for individuals with regular income who wish to retain their assets. It allows debtors to catch up on secured obligations, like mortgages, through a structured repayment plan over 3-5 years. After completing the plan, eligible debts are discharged and the bankruptcy remains on a credit report for up to 7 years. In 2023, there were approximately 434,000 individual bankruptcy filings under Chapter 7 and Chapter 13 in the United States, with Chapter 7 accounting for roughly 58% of these cases. For more detailed statistics and trends in household-level bankruptcy filings over the years, see Figure A1 in the appendix.[8]

3. Data

3.1. Description of SCF dataset

This study utilizes data from the SCF. It is a triennial, cross-sectional survey designed to capture a snapshot of the financial and demographic characteristics of U.S. families at specific points in time. Conducted by the Board of Governors of the Federal Reserve System, the SCF introduced questions about financial literacy in 2016 and has since completed three survey cycles, with the latest in 2022. For the purposes of this analysis, we focused primarily on data from the 2022 survey cycle. This choice is made because each survey cycle samples a different set of families, thus precluding the possibility of conducting a longitudinal analysis of trends over time. However, we use the 2016 and 2019 data in our robustness tests to replicate the analysis and test the stability of our results over time.

[7] United State Courts (2024)
[8] United State Courts (2024)

The SCF collects detailed data on families' balance sheets, pensions, income and demographic characteristics, offering valuable insights into the financial health and behaviors of American households. A key variable in this study is bankruptcy, which indicates whether respondents have filed for bankruptcy in the past five years. However, the data does not specify the type of filings it measures. Consequently, this study assumes that the recorded bankruptcies include Chapter 7 and Chapter 13 non-business filings. Another critical variable is financial literacy, measured using the widely recognized "Big 3" questions. These questions assess respondents' knowledge of fundamental financial concepts, as presented in Table 1, and represent a standard approach widely used in studies such as Lusardi (2011) and Parise and Peijnenburg (2019) to evaluate financial literacy effectively.

Table 1
Big 3 Questions

Question 1 - Risk	True or False: Buying a single company's stock usually provides a safer return than a stock mutual fund.
Question 2 - Interest	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 or less than $102?
Question 3 - Inflation	Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, would you be able to buy more than today, exactly the same as today or less than today with the money in this account?

Table 1: Big 3 Questions
This table provides a detailed overview of the "Big 3" financial literacy questions.

Respondents' answers to these questions are used to construct a financial literacy score. Each correct answer earns one point, resulting in a total score that ranges from 0 to 3 points, reflecting the extent to which individuals are equipped to make informed financial decisions.

In handling missing data, the SCF employs a multiple imputation technique to improve data accuracy and completeness. Each missing value is estimated five times, creating five "replicates" or "implicates" for each observation. This method generates five separate imputed datasets, thereby enhancing the reliability of the data by accounting for uncertainty associated with missing values. As a result, while the initial sample in the 2022 data consists of 4,602 families, the dataset contains 23,010 records due to these replicates. However, for privacy and disclosure control, seven observations were removed, bringing the final public dataset to 22,975 records across 4,595 families. The same principle applies to the 2016 and 2019 data, which include 6,248 and 5,777 disclosed families, respectively.[9]

All variables used in this study, along with their definitions and how they are measured, can be found in Table A1 in the appendix. Additionally, an overview of the 2022 dataset is provided through summary statistics in Table A2 and Figures A2 through A5 offer detailed insights into the data distribution across various dimensions. These can also be found in the appendix.

[9] Board of Governors of the Federal Reserve System, Survey of Consumer Finances (2024)

3.2. Adjustment of Data

To streamline the analysis, we average the values of the five imputed observations for each family, yielding a single representative observation per family and resulting in 4,595 independent data points. This aggregation allows us to address missing data efficiently while maintaining the integrity of the dataset. The processed data is subsequently employed to perform a range of analyses. The same procedure is applied to the 2016 and 2019 datasets.

3.3. Weighting

The SCF employs a complex sampling design, where not all respondents have an equal chance of selection. To account for this and address nonresponse, the survey applies weights based on selection probabilities and population data, ensuring the sample accurately represents approximately 126 million U.S. households.[10] While weights are essential for ensuring survey data generate population-representative estimates, their use in regression analyses can introduce inefficiencies, particularly for skewed variables where outliers with high weights may disproportionately distort results. Weighted regressions also increase model variability, reducing statistical precision and obscuring direct theoretical relationships.

Given our focus on exploring theoretical relationships between financial literacy and severe financial distress, unweighted regressions are prioritized in the primary analysis to better capture direct relationships without added complexity. While this approach ensures clarity in examining theoretical underpinnings, it may not fully account for potential clustering effects inherent in the SCF's sampling design. However, we conduct weighted regressions as a part of our robustness test in section 5.

3.4. Choice of regression type

Given the substantial imbalance in our data, with 52 instances of bankruptcy compared to a much larger number of non-bankruptcy cases, we opted for linear regression instead of logistic regression. Logistic regression, which is generally suited for binary outcomes, can produce unstable estimates and struggle to converge in the presence of rare-event outcomes. Thus linear regression makes a more suitable choice for our analysis of financial literacy and financial distress.[11] The general form of the regression equation used in our analysis is presented below:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \ldots + \beta_k X_{ki} + \epsilon_i$$

However, we acknowledge the limitations of applying linear regression to a binary outcome like bankruptcy. Linear regression assumes a continuous distribution for the dependent variable, which does not align with the binary nature of our data. This mismatch can lead to biased numerical estimates and predictions that fall outside the valid probability range of 0 to 1. While these technical limitations affect the interpretation of specific magnitudes, our primary goal is to investigate the theoretical relationship between financial literacy and bankruptcy risk. In this context, linear regression effectively captures the direction and statistical significance of the relationship, which are central to our analysis. Nevertheless, caution should be exercised when interpreting exact coefficients, as they may not fully reflect

[10] Board of Governors of the Federal Reserve System, Survey of Consumer Finances (2024)

[11] We apply a 0.1 significance level to align with the exploratory goals of this study, allowing us to detect potentially meaningful associations between financial literacy and bankruptcy risk that a stricter threshold might overlook. This approach helps reduce the likelihood of Type II errors (failing to detect an effect that actually exists), which is essential given the complex influences on financial behavior. Additionally, in social science research, small effect sizes are common and a 0.1 threshold enables us to capture these nuanced effects.

the true magnitude of effects. To strengthen confidence in our findings, we have conducted a series of robustness checks, detailed in Section 5, including Firth's penalized logistic regression.

4. Empirical Results

Our analysis begins with linear regression models that first examine the standalone effect of financial literacy on bankruptcy risk and then incorporate socio-demographic control variables to better isolate its impact. We further conduct threshold analyses to explore whether distinct financial literacy scores provide unique protection against financial distress, including variations by age, income and DTI levels. To delve deeper, we employ mediation analysis combined with bootstrapping to identify behavioral pathways through which financial literacy indirectly reduces bankruptcy risk. Lastly, we conduct a comparative analysis between bankruptcy and foreclosure, evaluating how financial literacy influences these two distinct types of financial distress, providing a nuanced perspective on its protective role.

4.1. Regression Analysis

Our simple linear regression provides an initial understanding of how financial literacy alone affects bankruptcy probability, without adjusting for other socio-demographic factors. The results from Table 2[12] reveal a significant negative relationship: each one-unit increase in financial literacy correlates with a 0.72 percentage point decrease in the probability of experiencing bankruptcy. These findings highlight that financial literacy plays a meaningful role in reducing financial distress, consistent with Campbell (2006) and Lusardi (2011), who emphasize the broader protective effects of financial knowledge in managing financial challenges.

[12] Note that in most tables, the intercept is not reported, as it does not contribute to the substantive interpretation of predictor effects. However, the intercept is included in the threshold analysis, where the baseline is Score 0, making it relevant to the interpretation.

Table 2
Linear Regression - Financial Literacy and Bankruptcy

	(1)	(2)
Financial Literacy	-0.007174***	-0.004349**
	(0.000124)	(0.03286)
Age		1.223e-04
		(0.29803)
Gender		0.00165
		(0.74325)
Marital Status		0.008782*
		(0.05557)
Children		9.605e-04
		(0.53284)
Income		-2.621e-11
		(0.86764)
Education		-0.001666***
		(0.00548)
Total Financial Assets		-6.638e-12
		(0.82651)
Labor Force		0.01021**
		(0.01617)
Observations	4,595	4,595
Adjusted R-Squared	0.002985	0.005786

Table 2: Linear Regression - Financial Literacy and Bankruptcy
This table examines the relationship between financial literacy and bankruptcy across two models. Column (1) explores the standalone effect of financial literacy on bankruptcy risk, while Column (2) incorporates socio-demographic control variables, including age, gender, marital status, children, income, education, total financial assets and labor force. Statistical significance is denoted as *p<.1; **p<.05; ***p<.01.

We extend our analysis by incorporating a range of socio-demographic variables to examine how these factors, alongside financial literacy, influence bankruptcy risk. The expanded model includes age, gender, marital status, number of children, income, education, total financial assets and labor force participation, enabling us to control for these variables and more precisely isolate the effect of financial literacy on bankruptcy risk. The results from the multiple regression model reveal that financial literacy remains statistically significant, though its effect size decreases compared to the simple regression model. Specifically, a one-unit increase in financial literacy is associated with an approximate 0.43 percentage point reduction in the probability of bankruptcy. This suggests that some of financial literacy's explanatory power overlaps with the socio-demographic variables included in the model.

Higher education levels are also associated with a reduced likelihood of bankruptcy. This aligns with findings by Lusardi (2011) and Hastings et al. (2013), who emphasize the connection between education and stronger financial management skills. Note, Figure A5 in the appendix highlights a strong correlation between education and financial literacy, suggesting that individuals with higher education levels are better equipped to understand and manage complex financial decisions, which may contribute to their lower likelihood of bankruptcy. Marriage is similarly associated with reduced bankruptcy risk, while labor force participation shows a positive link to bankruptcy. Other socio-demographic variables did not

show any significant effects in the multiple linear model, meaning they play less critical roles in predicting bankruptcy risk when financial literacy is accounted for.

Despite the significance of financial literacy, the adjusted R-squared values are low in both models, indicating that while statistically significant, financial literacy and socio-demographic characteristics together explain only a small fraction of the variance in bankruptcy risk. This limited explanatory power underscores the intricate nature of financial distress.

Parise and Peijnenburg's (2019) regression analyses highlight both similarities and differences compared to our findings. While both studies identify marital status as a significant factor in financial distress, their analysis also finds significance for income, age and gender, which do not emerge as significant predictors in our models. Additionally, we observe contrasting results regarding labor force participation. Our analysis suggests that being in the labor force increases the risk of bankruptcy, whereas their findings indicate that being unemployed increases the risk of financial distress. We believe this discrepancy primarily arises from our differing measures of financial distress. In our study, bankruptcy is used as the measure of financial distress. By contrast, their measure, defined as an indicator whether the respondent is delinquent on payment obligations for rent, mortgage, utilities or other bills, captures a broader and less severe spectrum of financial difficulties that may be more common among the unemployed. These differences are further compounded by their emphasis on noncognitive abilities, such as emotional stability and conscientiousness, which act as mediators of financial behavior. Furthermore, their reliance on a longitudinal dataset from the Netherlands (LISS) likely amplifies the role of demographic variables like age and gender, as it captures variations over time in a more heterogeneous context.

4.2. Threshold Analysis

To understand how financial literacy impacts bankruptcy risk, we conduct a threshold analysis to evaluate whether distinct literacy levels provide unique protection against financial distress. This primary analysis examines literacy scores across four thresholds: individuals with no financial literacy (score 0), those with some literacy (score 1 or more), moderate literacy (score 2 or more) and the highest literacy level (score 3). In addition to this analysis, we conduct further assessments to explore how these literacy levels interact with key demographic and financial subgroups, such as age groups, income levels and DTI categories. We also analyze financial literacy as a continuous variable within these subgroups to capture broader trends and incremental effects. By categorizing literacy levels and analyzing them alongside individual circumstances, this approach highlights how financial literacy influences bankruptcy risk across varying demographic and financial contexts, offering a nuanced understanding of its role in mitigating financial distress. Note that the threshold analyses are conducted with the previously used control variables, excluding those that interfere with the threshold variables to ensure accurate results. Unadjusted threshold results are also provided in the appendix for reference.

4.2.1. Financial Literacy Threshold Analysis

Table 3
Financial Literacy Thresholds on Bankrupcy

	Bankruptcy
Financial Literacy - Score 0	0.01222
	(0.41448)
Financial Literacy - Score 1 or more	-0.01063
	(0.26462)
Financial Literacy - Score 2 or more	0.001475
	(0.76757)
Financial Literacy - Score 3	-0.007359**
	(0.04782)
Observations	4,595
Adjusted R-Squared	0.005707

Table 3: Financial Literacy Thresholds on Bankruptcy
This table presents a threshold analysis examining the relationship between financial literacy and bankruptcy risk across incremental levels of financial literacy. Financial literacy is categorized into four levels: Score 0, Score 1 or more, Score 2 or more and Score 3, illustrating how increasing financial literacy influences the probability of bankruptcy. The model includes control variables for age, gender, marital status, number of children, income, education, total financial assets and labor force participation. Statistical significance is denoted as *p<.1; **p<.05; ***p<.01.

In our financial literacy threshold analysis, individuals with the highest literacy level exhibit a significant reduction in the probability of bankruptcy by approximately 0.7 percentage points. This finding highlights the unique protective effect of achieving the highest level of financial literacy. In contrast, the coefficients for intermediate literacy levels are not statistically significant, indicating that moderate improvements in financial literacy do not substantially reduce bankruptcy risk compared to the baseline score of 0. Although, in the unadjusted model, the baseline risk is significant (see Table A3 in appendix), suggesting that individuals with no financial literacy are particularly vulnerable to financial distress. However, when controls are included, this significance diminishes, underscoring the importance of these covariates in explaining financial distress. Thus, while incremental improvements in financial literacy may be broadly beneficial, as shown from prior models, only the highest literacy level demonstrates a significant protective effect against financial distress. This underscores the importance of comprehensive financial education programs designed to advance individuals to the highest literacy level.

4.2.2. Age-Based Threshold Analysis

In this analysis, financial literacy exhibits a significant relationship with bankruptcy risk across most age groups, except for individuals above 65, as shown in Table 4. For individuals under 30, financial literacy emerges as a critical factor in mitigating bankruptcy risk. Specifically, scoring 0 on financial literacy significantly increases bankruptcy risk by 8.7 percentage points, while achieving a foundational score of 1 or higher reduces it by 9.3 percentage points, offering a notable protective effect. Additionally, the continuous financial literacy measure demonstrates a significant negative relationship with bankruptcy risk for this

age group. The model achieves a relatively higher adjusted R-squared of 0.1034 compared to the initial multiple linear regression model, indicating that financial literacy, particularly for younger individuals, plays a meaningful role in reducing financial distress during the early stages of financial independence.

Among individuals aged 30-45, a financial literacy score of 0 is associated with a 6.2 percentage point increase in bankruptcy risk, underscoring the heightened vulnerability of those with no financial knowledge. While higher literacy thresholds do not show significant effects, the continuous measure of financial literacy demonstrates a significant negative relationship with bankruptcy risk. This suggests that gradual improvements in financial literacy may offer some protection for this group. However, the negative adjusted R-squared value in this model indicates that financial literacy, together with the control variables, explains little of the variation in bankruptcy risk. This may be due to competing financial pressures during this life stage, such as managing household expenses, childcare costs and mortgage or loan repayments, which could play a more substantial role in shaping financial outcomes.

For those aged 46-65, financial literacy at the highest level significantly reduces bankruptcy risk, while other thresholds show no significant associations. This highlights the importance of advanced financial literacy during a life stage marked by increased financial responsibilities, such as retirement planning, managing debt and supporting dependents. The unadjusted results in Table A4 align closely with the adjusted findings but further emphasize the benefits for this age group, as the continuous measure is significant and a baseline risk is evident. In contrast, for individuals over 65, no significant relationships are observed between financial literacy and bankruptcy risk at any threshold level. This likely reflects the reduced influence of financial literacy at this stage, as stabilizing factors such as retirement income or social support networks may take precedence. Additionally, the model's low explanatory power for this group, as indicated by negative adjusted R-squared values, reinforces the notion about stabilizing factors taking precedence.

Table 4
Threshold Analysis - Age Groups

A: Age: <30	(1)	(2)
Financial Literacy	-0.009291**	
	(0.026146)	
Financial Literacy - Score 0		0.08700***
		(0.002044)
Financial Literacy - Score 1 or more		-0.09272***
		(1.17e-07)
Financial Literacy - Score 2 or more		0.002244
		(0.779266)
Financial Literacy - Score 3		-8.031e-05
		(0.991252)
Observations	322	322
Adjusted R-Squared	0.03531	0.1034

B: Age: 30-45	(1)	(2)
Financial Literacy	-0.007472*	
	(0.0702)	
Financial Literacy - Score 0		0.06220**
		(0.0314)
Financial Literacy - Score 1 or more		-0.01773
		(0.3843)
Financial Literacy - Score 2 or more		-0.002416
		(0.7937)
Financial Literacy - Score 3		-0.009791
		(0.1965)
Observations	1,054	1,054
Adjusted R-Squared	-0.001673	-0.003163

C: Age: 46-65	(1)	(2)
Financial Literacy	-0.005117	
	(0.1955)	
Financial Literacy - Score 0		-0.01070
		(0.6604)
Financial Literacy - Score 1 or more		-0.005821
		(0.7504)
Financial Literacy - Score 2 or more		0.006505
		(0.5246)
Financial Literacy - Score 3		-0.01374*
		(0.0587)
Observations	1,846	1,846
Adjusted R-Squared	0.01515	0.01519

D: Age: >65	(1)	(2)
Financial Literacy	-2.345e-04	
	(0.9314)	
Financial Literacy - Score 0		0.009638
		(0.548)
Financial Literacy - Score 1 or more		0.01201
		(0.347)
Financial Literacy - Score 2 or more		-0.004421
		(0.538)
Financial Literacy - Score 3		-3.826e-04
		(0.938)
Observations	1,373	1,373
Adjusted R-Squared	-0.0001482	-0.0008978

Table 4: Threshold Analysis - Age Groups
This table presents the results of a threshold analysis examining the relationship between financial literacy and bankruptcy risk across different age groups. Financial literacy is categorized into incremental levels: Score 0, Score 1 or more, Score 2 or more and Score 3, offering a detailed examination of how varying degrees of financial literacy relate to bankruptcy risk within four distinct age groups: under 30, 30-45, 46-65 and over 65. Each panel (A-D) corresponds to one of these age groups. The analysis is divided into two columns for each age group. Column (1) examines the relationship between financial literacy, treated as a continuous variable, and bankruptcy risk within each specific age group. Column (2) evaluates financial literacy across the incremental threshold levels to identify how specific levels of financial literacy relate to bankruptcy risk. Both columns control for gender, marital status, number of children, income, education, total financial assets and labor force participation. Statistical significance is denoted as *p<.1; **p<.05; ***p<.01.

4.2.3. Income-Based Threshold Analysis

The findings in Table 5 highlight significant differences across income quartiles. In the low-income group, financial literacy shows no significant relationship with bankruptcy risk at any threshold level. This suggests that the severe financial pressures faced by this demographic may limit the protective impact of financial literacy alone. However, the unadjusted results in Table A5 (see appendix) reveal that no financial literacy is significantly associated with higher bankruptcy risk in this group. This contrast emphasizes the potential value of foundational financial education as an initial step toward financial resilience, though its effectiveness is likely limited without addressing broader structural challenges.

For the lower middle-income group, the continuous measure of financial literacy is significant, with an effect size of about 1.1 percentage points. However, no specific literacy thresholds show significant effects, suggesting that general financial literacy improvements

may be more impactful than targeting specific levels. In contrast, for the upper middle-income and high-income groups, financial literacy shows no significant effects at all. This may reflect the relative financial stability of these demographics and the diminished relevance of literacy improvements for mitigating bankruptcy risk.

These findings underscore the pivotal role of financial literacy in bolstering financial resilience among lower-income groups. Prior research by Campbell (2006) and Lusardi and Mitchell (2007) similarly highlights how financial literacy can disproportionately benefit vulnerable populations, such as lower-income households. However, the observed divergence between adjusted and unadjusted findings for the low-income group underscores the complex nature of financial distress within this demographic. This complexity suggests that policies integrating financial education with broader systemic interventions may be more effective in addressing the structural vulnerabilities these households face. Notably, the lower-middle income panel is the only group in our analysis with a positive R-squared, indicating that financial literacy's impact may be more consistent and measurable within this bracket, likely due to fewer confounding pressures compared to the lowest-income group.

Table 5
Threshold Analysis - Income Groups

A: Low	(1)	(2)
Financial Literacy	-8.372e-04	
	(0.8701)	
Financial Literacy - Score 0		-0.009426
		(0.7890)
Financial Literacy - Score 1 or more		-0.01287
		(0.5131)
Financial Literacy - Score 2 or more		0.003303
		(0.7590)
Financial Literacy - Score 3		-9.321e-04
		(0.9302)
Observations	1,150	1,150
Adjusted R-Squared	-0.003267	-0.004664

B: Lower Middle	(1)	(2)
Financial Literacy	-0.01101**	
	(0.0249)	
Financial Literacy - Score 0		0.01417
		(0.6910)
Financial Literacy - Score 1 or more		-0.02250
		(0.3343)
Financial Literacy - Score 2 or more		-0.005032
		(0.6541)
Financial Literacy - Score 3		-0.01356
		(0.1346)
Observations	1,151	1,151
Adjusted R-Squared	0.006135	0.004756

C: Upper Middle	(1)	(2)
Financial Literacy	7.835e-05	
	(0.978)	
Financial Literacy - Score 0		6.701e-04
		(0.978)
Financial Literacy - Score 1 or more		-8.267e-04
		(0.961)
Financial Literacy - Score 2 or more		0.01074
		(0.153)
Financial Literacy - Score 3		-0.006072
		(0.196)
Observations	1,146	1,146
Adjusted R-Squared	-0.003294	-0.002552

D: High	(1)	(2)
Financial Literacy	3.991e-04	
	(0.772)	
Financial Literacy - Score 0		-0.006948
		(0.576)
Financial Literacy - Score 1 or more		3.683e-04
		(0.961)
Financial Literacy - Score 2 or more		9.305e-05
		(0.986)
Financial Literacy - Score 3		5.778e-04
		(0.822)
Observations	1,148	1,148
Adjusted R-Squared	-0.004732	-0.006494

Table 5: Threshold Analysis - Income Groups
This table evaluates the relationship between financial literacy thresholds and bankruptcy risk across four income groups: Low, Lower Middle, Upper Middle and High. Financial literacy is categorized into incremental levels: Score 0, Score 1 or more, Score 2 or more and Score 3, providing an assessment of how progressively higher levels of financial knowledge relate to bankruptcy risk within each income bracket. Each panel (A-D) corresponds to one of the income groups and the analysis is divided into two columns. Column (1) examines the

relationship between financial literacy, treated as a continuous variable, and bankruptcy risk within each specific income group. Column (2) evaluates the influence of financial literacy across the incremental threshold levels to assess how specific levels of financial literacy relate to bankruptcy risk. Both columns control for age, gender, marital status, number of children, education, total financial assets and labor force participation. Statistical significance is denoted as *p<.1; **p<.05; ***p<.01.

4.2.3. Debt-to-Income-Based Threshold Analysis

The DTI ratio groups are classified based on guidelines from Wells Fargo, providing a framework to examine how financial literacy influences bankruptcy risk across varying debt levels.[13]

The analysis reveals distinct patterns of impact. In the low-DTI group, neither the financial literacy thresholds nor the continuous measure of financial literacy demonstrate significant effects (see Table 6). However, the unadjusted model, presented in Table A6, shows a baseline risk for this group. This could indicate that when debt levels are manageable, the influence of financial literacy on bankruptcy outcomes may be diminished, with overall financial stability and other structural factors likely playing a more dominant role in reducing financial distress.

In contrast, the medium-DTI group displays an unexpected positive relationship between moderate financial literacy and bankruptcy risk, with a 5.7 percentage point increase associated with achieving this literacy threshold. This counterintuitive result may reflect unique behavioral or contextual factors within this group. For instance, individuals in the medium-DTI category may possess enough financial knowledge to take on additional debt but lack the financial flexibility or advanced skills to manage it effectively under pressure. Furthermore, the relatively small sample size in this group may introduce instability in the estimates. While these findings might warrant further investigation, they underscore the complexity of financial literacy's relationship with financial outcomes in specific debt contexts. Interestingly, the unadjusted model reveals a significant protective effect at the highest literacy level, suggesting that the raw relationship between financial literacy and bankruptcy risk may still favor higher literacy levels, even for individuals in the medium-DTI group.

For the high-DTI group, the continuous measure of financial literacy shows a significant negative relationship with bankruptcy risk, reducing it by 0.9 percentage points and highlighting the critical role of sustained literacy improvements for individuals carrying heavy debt burdens. Furthermore, the unadjusted model reveals that individuals with a score of 0 face a baseline risk of bankruptcy, while the highest literacy level provides significant protection. These findings suggest that advanced financial literacy plays a substantial role in mitigating bankruptcy risk for high-debt households, particularly in unadjusted contexts.

Collectively, these results underscore the varying impact of financial literacy across DTI groups. This variability highlights the importance of tailoring financial education programs to meet the unique challenges and opportunities presented by different debt levels.

[13] A DTI of 35% or less is considered manageable, 36% to 49% indicates moderate risk with limited financial flexibility and 50% or more signals high risk (Wells Fargo, 2024).

Table 6
Threshold Analysis - Debt-to-Income Groups

A: Low

	(1)	(2)
Financial Literacy	-0.001380	
	(0.6043)	
Financial Literacy - Score 0		0.02506
		(0.1909)
Financial Literacy - Score 1 or more		-0.01226
		(0.2949)
Financial Literacy - Score 2 or more		0.004903
		(0.4512)
Financial Literacy - Score 3		-0.003459
		(0.4966)
Observations	2,289	2,289
Adjusted R-Squared	0.0006588	0.0007886

B: Medium

	(1)	(2)
Financial Literacy	0.007202	
	(0.5199)	
Financial Literacy - Score 0		-0.03505
		(0.6390)
Financial Literacy - Score 1 or more		-0.008481
		(0.8656)
Financial Literacy - Score 2 or more		0.05691**
		(0.0311)
Financial Literacy - Score 3		-0.03131
		(0.1399)
Observations	203	203
Adjusted R-Squared	0.01341	0.03327

C: High

	(1)	(2)
Financial Literacy	-0.009401***	
	(0.00476)	
Financial Literacy - Score 0		0.01552
		(0.5492)
Financial Literacy - Score 1 or more		-0.01487
		(0.3910)
Financial Literacy - Score 2 or more		-0.009246
		(0.2569)
Financial Literacy - Score 3		-0.008593
		(0.1330)
Observations	2,067	2,067
Adjusted R-Squared	0.00923	0.008756

Table 6: Threshold Analysis - Debt-to-Income Groups
This table examines the relationship between financial literacy thresholds and bankruptcy risk across three DTI groups: Low, Medium and High. Financial literacy is categorized into incremental levels: Score 0, Score 1 or more, Score 2 or more and Score 3, allowing for an assessment of how progressively higher levels of financial literacy influence bankruptcy risk within varying DTI contexts. Each panel (A-C) corresponds to one DTI group and the analysis is divided into two columns: Column (1) examines the relationship between financial literacy, treated as a continuous variable and bankruptcy risk within each specific DTI group. Column (2) evaluates financial literacy across the incremental threshold levels to assess how specific levels of financial literacy relate to bankruptcy risk. Both columns control for age, gender, marital status, number of children, education, total financial assets and labor force participation. Note that the total number of observations does not sum to the usual 4,595, as 36 individuals with an income of zero are excluded from the analysis. Statistical significance is denoted as *p<.1; **p<.05; ***p<.01.

4.3. Mediating Channels: Saving Behavior, Credit Card Balance, Homeownership and Stock Literacy

This section demonstrates that financial literacy indirectly reduces financial distress through four key behavioral pathways: saving behavior, credit card debt management, homeownership and stock literacy. Each channel represents a distinct mechanism through which financial literacy fosters financial resilience and mitigates bankruptcy risk. Together, these pathways highlight the diverse ways in which financial literacy contributes to financial stability. Note that we do not use control variables in our mediation analysis. This is to maintain a clear focus on understanding the unfiltered pathways through which financial literacy influences bankruptcy risk. Including control variables could obscure these pathways by adjusting for factors that are themselves part of the causal chain. However, we conduct a multiple linear regression and a Variable Inflation Factors (VIF) test to assess potential overlap effects and multicollinearity among mediators, ensuring the robustness of our findings.

Table 7
Mediations

A: Saving Behavior

	Saving Behavior	Bankruptcy	
	(1)	(2)	(3)
Financial Literacy	0.119**		-0.006***
	(0.008)		(0.002)
Saving Behavior		-0.010***	-0.008**
		(0.003)	(0.003)
Observations	4,595	4,595	4,595
Adjusted R-Squared	0.041	0.002	0.004

B: Credit Card Balance

	Credit Card Balance	Bankruptcy	
	(1)	(2)	(3)
Financial Literacy	-0.068***		-0.006***
	(0.009)		(0.002)
Credit Card Balance		0.012***	0.011***
		(0.003)	(0.003)
Observations	4,595	4,595	4,595
Adjusted R-Squared	0.013	0.003	0.005

C: Homeownership

	Homeownership	Bankruptcy	
	(1)	(2)	(3)
Financial Literacy	0.154***		-0.006***
	(0.008)		(0.002)
Homeownership		-0.013***	-0.010***
		(0.003)	(0.003)
Observations	4,595	4,595	4,595
Adjusted R-Squared	0.075	0.003	0.005

D: Stock Literacy

	Stock Literacy	Bankruptcy	
	(1)	(2)	(3)
Financial Literacy	0.078***		-0.006***
	(0.006)		(0.002)
Stock Literacy		-0.013***	-0.010**
		(0.004)	(0.005)
Observations	4,595	4,595	4,595
Adjusted R-Squared	0.035	0.002	0.004

Table 7: Mediations
This table outlines the role of financial literacy in reducing bankruptcy risk through four behavioral pathways: saving behavior, credit card balance management, homeownership and stock literacy. Each panel (A-D) represents one pathway, with three columns analyzing its role. Column (1) examines how financial literacy influences the behavioral pathway. Column (2) explores the direct effect of financial literacy on bankruptcy risk

without accounting for the pathway. Column (3) includes both financial literacy and the pathway in the model to assess whether the pathway mediates the relationship between financial literacy and bankruptcy risk. Statistical significance is denoted as *p<.1; **p<.05; ***p<.01.

Financial literacy significantly influences saving behavior by encouraging individuals to adopt prudent saving practices, consistently spending less than what they earn. This behavior demonstrates heightened financial awareness and forward planning, aligning with the principles of precautionary savings theory (Leland, 1968), which suggests that individuals save to protect themselves against future uncertainties. Through a better understanding of economic risks, financially literate individuals build precautionary savings that help them mitigate potential income shocks or unforeseen expenses. These findings are consistent with the work of Lusardi and Mitchell (2007), who emphasize the role of financial literacy in fostering long-term financial planning and Lusardi (2011) who highlights its importance in promoting financial prudence and reducing financial distress.

In addition to saving behavior, financial literacy plays a pivotal role in managing credit card debt, contributing significantly to lowering bankruptcy risk. Individuals with higher financial literacy are less likely to carry high-interest credit card balances, thereby avoiding the financial strain of revolving debt. This ability to balance immediate spending needs with long-term goals reflects an understanding consistent with intertemporal choice theory (Rae, 1906), which highlights the importance of informed financial decisions over time. By understanding the long-term costs of accrued interest, financially literate individuals are better equipped to avoid debt traps, make strategic financial decisions and prioritize financial stability. These findings align with Lusardi (2019), who highlights the capacity of financially literate individuals to manage credit effectively, reducing the probability of high-cost debt. Furthermore, our analysis affirms the relationship between credit card debt and bankruptcy risk and corroborates Domowitz and Sartain (1997), who identified debt accumulation as a key factor in financial insolvency.

Another critical pathway through which financial literacy promotes financial stability is homeownership. Individuals with higher financial literacy are more likely to purchase and maintain homes, reflecting their ability to navigate complex decisions around mortgages and financial risk management. Supporting this idea, Domowitz and Sartain (1997) found that homeowners are less likely to experience bankruptcy, underscoring the stabilizing effect of homeownership. In their study, they found that a debtor without a home is almost 7 times more likely to file for bankruptcy than the average homeowner, all else equal. By equipping individuals with the skills needed to make informed housing decisions, financial literacy enables them to sustain homeownership and effectively manage periods of financial uncertainty or hardship.

Lastly, stock literacy also plays a crucial role in linking financial literacy to enhanced financial stability. Individuals with greater financial literacy are more likely to adopt diversified stock investment strategies, a behavior rooted in modern portfolio theory (Markowitz, 1952), which advocates for diversification as a way to minimize risk while maintaining returns. By grasping the principles of portfolio diversification and risk mitigation, financially literate individuals are better equipped to handle market fluctuations and safeguard their financial security. This aligns with findings by Lusardi and Mitchell (2011), who emphasized the role of financial literacy in fostering informed investment decisions and by Calvet, Campbell and Sodini (2007) who demonstrated that diversified portfolios are closely associated with greater financial stability. Stock literacy thus emerges as

an essential aspect of financial resilience, significantly contributing to the reduction of bankruptcy risk.

In conjunction with these mediation analyses, we perform a bootstrapping analysis with 1,000 simulations to validate the robustness of our findings and to estimate the proportion of the total protective effect of financial literacy mediated by each pathway. Table 8 summarizes these findings, detailing the contributions of our mediating channels to the impact of financial literacy on bankruptcy risk.

Table 8
Bootstrap

A: Saving Behavior

	Estimate	95% CI Lower	95% CI Upper	P-Value
ACME (Indirect Effect)	-9.23e-04	-0.001792	0.00	0.038**
ADE (Direct Effect)	-0.006250	-0.010256	0.00	0.002**
Total Effect	-0.007174	-0.011186	0.00	<2e-16 ***
Proportion Mediated	0.128707	0.018262	0.34	0.038**
Sample Size Used	4,595	4,595	4,595	4,595
Simulations	1,000	1,000	1,000	1,000

B: Credit Card Balance

	Estimate	95% CI Lower	95% CI Upper	P-Value
ACME (Indirect Effect)	-7.42e-04	-0.001281	0.00	<2e-16***
ADE (Direct Effect)	-0.006431	-0.010691	0.00	<2e-16***
Total Effect	-0.007174	-0.001369	0.00	<2e-16***
Proportion Mediated	0.103471	0.034776	0.30	<2e-16***
Sample Size Used	4,595	4,595	4,595	4,595
Simulations	1,000	1,000	1,000	1,000

C: Homeownership

	Estimate	95% CI Lower	95% CI Upper	P-Value
ACME (Indirect Effect)	-0.00157	-0.00285	0.00	0.004***
ADE (Direct Effect)	-0.00561	-0.01013	0.00	0.010***
Total Effect	-0.00717	-0.01170	0.00	<2e-16***
Proportion Mediated	0.21841	0.04857	0.59	0.004***
Sample Size Used	4,595	4,595	4,595	4,595
Simulations	1,000	1,000	1,000	1,000

D: Stock Literacy

	Estimate	95% CI Lower	95% CI Upper	P-Value
ACME (Indirect Effect)	-7.98e-04	-0.001108	0.00	<2e-16***
ADE (Direct Effect)	-0.006375	-0.010675	0.00	0.002***
Total Effect	-0.007174	-0.011554	0.00	<2e-16***
Proportion Mediated	0.111274	0.058023	0.29	<2e-16***
Sample Size Used	4,595	4,595	4,595	4,595
Simulations	1,000	1,000	1,000	1,000

Table 8: Bootstrap
This table presents the results of a bootstrap mediation analysis examining the indirect (ACME) and direct (ADE) effects of financial literacy on bankruptcy risk through four pathways: saving behavior, credit card balance management, homeownership and stock literacy. The total effect combines the direct and indirect effects, while the proportion mediated quantifies the share of the total effect attributed to the indirect pathway. The analysis uses 1,000 bootstrap simulations for each pathway to estimate the effects and their statistical significance. Statistical significance is denoted as *p<.1; **p<.05; ***p<.01.

The results reveal distinct contributions of the mediating channels: saving behavior mediates 12.9% of the total effect, credit card management 10.3%, homeownership 21.8% and stock literacy 11.1%. While these mediators account for important pathways, the majority of financial literacy's protective effect remains direct. This highlights the broader role of financial literacy in fostering financial resilience through overarching competencies such as decision-making, risk assessment and financial foresight. It is important to note that the bootstrapping analysis examines each mediator in isolation, which does not account for potential overlap or interdependence among pathways. Prudent saving habits may indirectly facilitate homeownership by enabling individuals to build the necessary down payment or improve their creditworthiness. Similarly, stock literacy might indirectly contribute to better financial stability by fostering a greater understanding of risk management, which can enhance both saving behaviors and informed debt management decisions. To address this, we conduct a multiple regression analysis that included all mediators simultaneously to evaluate their unique contributions while controlling for shared variance. Additionally, a VIF test was performed to ensure that multicollinearity among predictors did not distort the observed relationships

The results of the multiple regression analysis reveal that homeownership and credit card management remain statistically significant mediators even when controlling for other pathways (see Table A7 in the appendix). Homeownership, the strongest individual pathway, retains its significant negative association with bankruptcy risk, highlighting its critical stabilizing role in financial resilience. Moreover, credit card balances exhibit a significant positive relationship with bankruptcy risk, underscoring the risks associated with high-interest debt. These findings align with Domowitz and Sartain (1997). In contrast, saving behavior and stock literacy lose statistical significance in the multiple regression model. This result is not due to multicollinearity, as evidenced by low VIF values for all mediators ranging from from 1.06 to 1.14 (see Table A8). Instead, their diminished significance likely reflects indirect contributions through other pathways. For instance, prudent saving habits may enable individuals to achieve homeownership or maintain manageable credit balances, while stock literacy fosters overall financial decision-making but has less immediate relevance to bankruptcy risk compared to other pathways. These findings emphasize the complex interplay between financial literacy pathways and the overarching role of financial literacy in fostering resilience.

4.4. Comparative Analysis: Bankruptcy vs. Foreclosure

Table 9
Linear Regression - Financial Literacy and Foreclosure

	(1)	(2)
Financial Literacy	-0.002855***	-0.001785
	(0.00827)	(0.131)
Age		4.960e-05
		(0.467)
Gender		0.003649
		(0.211)
Marital Status		0.001254
		(0.637)
Children		6.404e-04
		(0.473)
Income		-1.196e-12
		(0.990)
Education		-4.064e-04
		(0.242)
Total Financial Assets		-3.846e-12
		(0.827)
Labor Force		-0.001139
		(0.643)
Observations	4,595	4,595
Adjusted R-Squared	0.0013	0.001403

Table 9: Linear Regression - Financial Literacy and Foreclosure
This table presents the results of two regression models examining the impact of financial literacy on foreclosure risk. Column (1) presents the relationship between financial literacy and foreclosure risk in a simple model. Socio-demographic factors (age, gender, marital status, children, income, education, total financial assets and labor force) are introduced in Column (2). Statistical significance is denoted as *p<.1; **p<.05; ***p<.01.

In addition to analyzing bankruptcy, we explored foreclosure as a less severe indicator of financial distress, assessing whether financial literacy consistently mitigates financial challenges across different levels of severity. The simple model shows a statistically significant protective effect of financial literacy against foreclosure risk. However, when socio-demographic variables are introduced in the multiple linear model, this effect becomes insignificant, indicating that foreclosure risk depends more heavily on factors beyond individual financial literacy.

This comparison highlights differences in the protective effects of financial literacy: while financial literacy appears to consistently reduce bankruptcy risk, even after accounting for socio-demographic controls, its effect on foreclosure risk diminishes once these factors are included. Additionally, education and marital status, which are significant predictors in the bankruptcy model, do not show a significant effect on foreclosure risk. This contrast may imply that financial literacy provides baseline resilience against more severe financial distress, such as bankruptcy, whereas foreclosure, often tied to housing and mortgage-specific issues, may be more dependent on other socio-economic factors.

To further examine this relationship, a threshold analysis is conducted with the same control variables as above (see Table 10) to assess how incremental levels of financial literacy impact foreclosure risk, mirroring the approach used in the bankruptcy analysis.

Table 10
Financial Literacy Thresholds on Foreclosure

	Foreclosure
Financial Literacy - Score 0	-0.006864
	(0.4289)
Financial Literacy - Score 1 or more	0.01123**
	(0.0420)
Financial Literacy - Score 2 or more	-0.005499*
	(0.0572)
Financial Literacy - Score 3	-0.002068
	(0.3369)
Observations	4,595
Adjusted R-Squared	0.002246

Table 10: Financial Literacy Thresholds on Foreclosure
This table presents a threshold analysis examining the relationship between financial literacy and foreclosure risk across incremental levels of financial literacy. Financial literacy is categorized into four levels: Score 0, Score 1 or more, Score 2 or more and Score 3, illustrating how increasing financial literacy influences the probability of foreclosure. The analysis includes controls for age, gender, marital status, number of children, income, education, total financial assets and labor force participation. Statistical significance is denoted as *p<.1; **p<.05; ***p<.01.

At score 1 or more, financial literacy is associated with a significant increase in foreclosure risk. This unexpected increase in foreclosure risk may be due to behavioral factors. People with basic financial literacy might feel overconfident in managing complex financial products, like mortgages. This could lead to risky decisions, such as taking on loans they

cannot afford or avoiding professional advice. Additionally, basic financial knowledge might embolden individuals to enter into financial commitments without fully considering long-term consequences, increasing their vulnerability to foreclosure. At score 2 or more, this trend reverses, with financial literacy beginning to provide a significant protective effect against foreclosure risk. However, no additional benefits are observed at the highest score level, suggesting that reaching a moderate level of financial literacy is sufficient to mitigate foreclosure risk, while further improvements in literacy do not appear to offer extra protection in this context.

It is worth noting that our dataset includes only 17 foreclosure cases out of 4,595 total observations. This small number of cases could impact the reliability of the observed trends, as results may be sensitive to the distribution of these cases or influenced by random variation. Interestingly, when control variables are excluded (Table A9 in appendix), a significant benefit is observed at Score 3, suggesting that advanced financial literacy may independently protect against foreclosure risk in the absence of adjustments for other influences. While this finding underscores the intrinsic value of achieving the highest levels of financial literacy, the limited number of foreclosure cases suggests caution in generalizing these results.

While financial literacy provides protection against bankruptcy the highest literacy level (see Table 3), its relationship with foreclosure risk differs. The threshold analysis reveals that higher financial literacy offers significant protective effects against foreclosure, while basic literacy levels may introduce unexpected risks. These findings suggest that financial literacy serves as a critical tool for mitigating bankruptcy, but its role in addressing foreclosure may require targeted interventions that focus on behavioral factors and housing-specific dynamics. These distinctions could potentially provide potential guidance for policymakers, enabling the development of more targeted strategies to address various forms of financial distress and enhance financial resilience across diverse circumstances.

5. Robustness

Robustness checks are essential for validating empirical findings by ensuring the consistency and reliability of results across different methodological approaches. This section assesses the robustness of our results using multiple methods, including Random Treatment Assignment Placebo Test, Firth's penalized logistic regression, weighted regression and an analysis accounting for outliers. Additionally, we replicate the regression analysis using data from the 2016 and 2019 SCFs to test the consistency of our findings.

5.1. Random Treatment Assignment Placebo Test

We conduct a placebo test by replacing the actual financial literacy variable with a randomly assigned variable. This placebo variable randomly assigns financial literacy scores to each individual in the dataset, ensuring these values are independent of their actual financial literacy level. The purpose of this test is to assess whether our model can falsely detect a significant relationship between bankruptcy risk and a meaningless predictor.

Using the placebo variable in the regression model alongside the same set of control variables, we found no statistically significant relationship between financial literacy placebo and bankruptcy risk, seen in Table A10 in appendix. This result confirms that our model does not detect spurious relationships when the financial literacy variable is replaced with random

data. In contrast, our primary analysis with the actual financial literacy variable identified a significant negative relationship with bankruptcy risk. The lack of significance in the placebo test, combined with the significant findings in the main analysis, supports the validity of our results and reinforces the conclusion that financial literacy plays a protective role against bankruptcy.

5.2. Firth's Penalized Logistic Regression

Firth's penalized logistic regression addresses rare-event bias due to the small number of bankruptcy cases in the dataset. Its penalized likelihood approach corrects small-sample bias, ensuring reliable coefficient estimates for imbalanced binary outcomes like bankruptcy.

As shown in Table A11 in appendix, Firth's regression confirms financial literacy as a significant predictor of reduced bankruptcy risk in both models, with robust significance levels. This affirms the strength of the relationship across both models. While linear regression reflects changes in bankruptcy probability on a linear scale, Firth's regression presents coefficients on the log-odds scale, which can be more appropriate for binary outcomes. Additionally, the penalized approach instills stronger confidence in the reliability of results, particularly for rare-event data. The inclusion of socio-demographic controls in the second model reinforces the role of financial literacy as a protective factor while also highlighting additional significant predictors, such as marital status, education and labor force participation. These variables also emerge as important indicators in the linear regression analysis.

5.3. Weighted Regression

Weighted regression improves population representativeness by addressing sampling biases with survey weights. In the single-variable model, financial literacy remains a significant predictor of reduced bankruptcy risk, with a slightly reduced effect size and significance, reflecting adjustments for representativeness. The adjusted R-squared is marginally lower than in the unweighted model, indicating a trade-off between explanatory power and representativeness. In the multiple linear model, financial literacy remains significant but shows slight reductions in effect size and significance compared to the unweighted model. The adjusted R-squared is also lower, aligning with the single-variable model. Notably, age becomes positively significant in the weighted model, suggesting its increasing relevance when accounting for population-level adjustments. Other predictors, such as education, marital status and labor force participation, remain significant across models, highlighting their consistent relevance. These results, summarized in Table A12, confirm financial literacy's protective role against bankruptcy while accounting for population representativeness, supporting the robustness of the analysis and conclusions.

5.4. Outliers

The removal of outliers in income and financial assets enhances the robustness of our results by addressing the skewed distributions of these variables, which could distort estimates. Outliers are identified using z-scores, calculated as the number of standard deviations each observation is from the mean. Specifically, observations with z-scores greater than 3 or less than -3 are considered extreme and removed from the analysis. Although income and financial assets are not significant predictors in the original linear model, removing their outliers reduces potential noise and ensures they do not interfere with other predictors. After adjustment, financial literacy remains a significant predictor of reduced bankruptcy risk, with a slightly smaller coefficient than in the original model, further validating its protective role. Key variables such as education, marital status and labor force participation also remain

significant, with minimal changes to their effect sizes. These adjustments marginally increase the adjusted R-squared value, suggesting improved model reliability. Results are presented in Table A13 in the appendix.

5.5. Analysis Using 2016 & 2019 SCF Data

The robustness of our findings is supported by the 2019 SCF results, which largely confirm the protective role of financial literacy against bankruptcy risk observed in the 2022 data. In both datasets, financial literacy emerges as a significant predictor of reduced bankruptcy risk in single-variable regressions. In the multiple regression models, financial literacy retains its negative association, though its significance slightly decreases in 2019 (see Table A15) compared to 2022. Education consistently shows a significant protective role across both years, while marital status and labor force participation lose their significance, reflecting shifts in the broader determinants of financial distress.

The 2016 SCF results, however, deviate from these findings, as financial literacy shows no significant association with bankruptcy risk in either the single-variable or multiple regression models (see Table A14). This divergence is likely driven by a complex interplay of factors that are challenging to pinpoint. The lack of significance in 2016 highlights the complexity of the relationship between financial literacy and bankruptcy risk, suggesting that temporal and economic factors may mediate this association. Nonetheless, education remains a consistently significant predictor in 2016, emphasizing its critical role in reducing financial vulnerability. Similarly, labor force participation continues to be a significant factor, highlighting its importance in maintaining financial stability.

Despite the low adjusted R-squared values across all years, the consistent protective effect of financial literacy in 2019 and 2022 underscores its robustness as a key factor in mitigating bankruptcy risk. The variability in 2016 results illustrates the importance of considering temporal and economic contexts when interpreting these relationships. These findings emphasize the conditional impact of financial literacy and the need for further research to explore its evolving role across different economic environments.

6. Conclusion

Our findings underscore the critical role of financial literacy in mitigating severe financial distress, especially bankruptcy risk. Individuals with higher financial literacy face a significantly lower probability of severe financial distress, with the strongest protective effects observed at the highest levels of financial literacy. Subgroup threshold analyses reveal that these benefits are not uniformly distributed; it is individuals in the youngest age groups, those in the lower income quartiles and households with high debt burdens that derive the greatest protective effects.

Mediation analyses highlight that financial literacy promotes financial stability through specific behavioral pathways. Among these, homeownership and credit card management emerges as particularly influential, illustrating how financial literacy fosters concrete practices that mitigate financial distress. In addition to its impact through specific pathways, the direct effects of financial literacy remain substantial, highlighting its overarching importance in fostering resilience against financial challenges. Moreover, our analysis shows that while financial literacy significantly reduces bankruptcy risk, its effect on foreclosure is inconsistent and becomes insignificant when socio-demographic factors are considered. This

may be because foreclosure risk, unlike bankruptcy, is more closely tied to fixed financial commitments like mortgages, where external structural factors can outweigh individual financial behavior. These findings highlight the nuanced role of financial literacy, providing resilience against severe financial distress like bankruptcy but playing a more limited role in addressing less severe yet highly contextual challenges like foreclosure.

These findings could be of value for policymakers. Enhancing financial literacy is critical for reducing severe financial distress, particularly among vulnerable groups such as younger age groups, lower-income households and individuals with high debt burdens. Targeted education programs should emphasize practical skills tied to key behavioral pathways, such as credit management, saving strategies and basic investment knowledge. Early interventions, including foundational literacy programs for young adults and practical adult education, could yield significant long-term benefits. Moreover, to address foreclosure risk, broader strategies such as housing-specific policies and financial counseling programs tailored to structural factors may be necessary. Policymakers could also incorporate financial literacy assessments into broader economic policies to identify at-risk populations and direct resources toward addressing specific gaps. While these findings are promising, additional research is needed to explore the evolving role of financial literacy and external factors in financial distress, ensuring more precise and effective policy responses.

7. Limitations and Future Research

This study offers valuable insights into the relationship between financial literacy and severe financial distress. However, several limitations must be acknowledged.

A significant limitation of this study is the reliance on cross-sectional data, which captures financial literacy and financial distress at a single point in time. This approach makes it difficult to establish causality, leaving unanswered whether higher financial literacy actively reduces bankruptcy risk or whether financially stable individuals are more likely to develop financial literacy. Reverse causality remains a concern, as financially stable individuals often have greater access to resources and opportunities that foster financial literacy, such as professional advice or frequent engagement with financial institutions. Additionally, omitted variable bias poses a challenge since unmeasured factors like conscientiousness, as highlighted by Parise and Peijnenburg (2019), may drive both higher financial literacy and better financial decisions, creating a spurious relationship.

While mediation and threshold analyses provide valuable descriptive insights into mechanisms and relationships, they cannot establish causal links. To address these limitations, future research should employ longitudinal designs to track how financial literacy and financial outcomes evolve over time, helping to clarify whether financial literacy reduces financial distress or develops as a response to it. Experimental approaches, such as randomized controlled trials, could also provide stronger causal evidence by isolating the impact of financial literacy interventions on financial stability. These methodologies would provide a more robust framework for understanding the causal pathways between financial literacy and financial resilience.

Additionally, future research could delve into specific anomalies, such as the absence of a significant relationship between financial literacy and bankruptcy risk in the 2016 data. Examining these inconsistencies across survey cycles or varying economic contexts may

provide valuable insights and enhance the reliability of findings. Understanding whether economic conditions, survey design or other external factors contribute to this variability would strengthen the conclusions about financial literacy's role in mitigating financial distress.

Another limitation lies in the financial literacy measure, which relies on the "Big 3" questions assessing basic concepts like interest rates, inflation and diversification. While recognized and widely used, these questions may not capture the full spectrum of practical financial skills critical for navigating real-world financial decisions, such as managing debt repayment, mortgage terms or retirement planning. Expanding the scope of financial literacy assessments beyond the commonly used "Big 3" questions to include practical skills, such as debt management and retirement planning, would better capture the complex nature of financial literacy. This broader approach would provide a more comprehensive understanding of its role in promoting financial resilience.

Finally, the use of U.S.-specific data could limit the generalizability of the findings to other countries. Differences in financial systems, cultural attitudes toward debt, government policies and definitions of bankruptcy can significantly affect how financial literacy influences financial resilience. Adapting the study framework to international contexts would clarify how financial literacy interacts with diverse economic and institutional factors. Additionally, the relatively small dataset constrains the robustness of statistical analyses. A larger dataset would enable more robust estimations and support deeper subgroup analyses, offering greater insight into the relationship between financial literacy and financial distress.

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9. APPENDIX

Figure A1: Trends in Chapter 7 and Chapter 13 Bankruptcy Filings Over Time

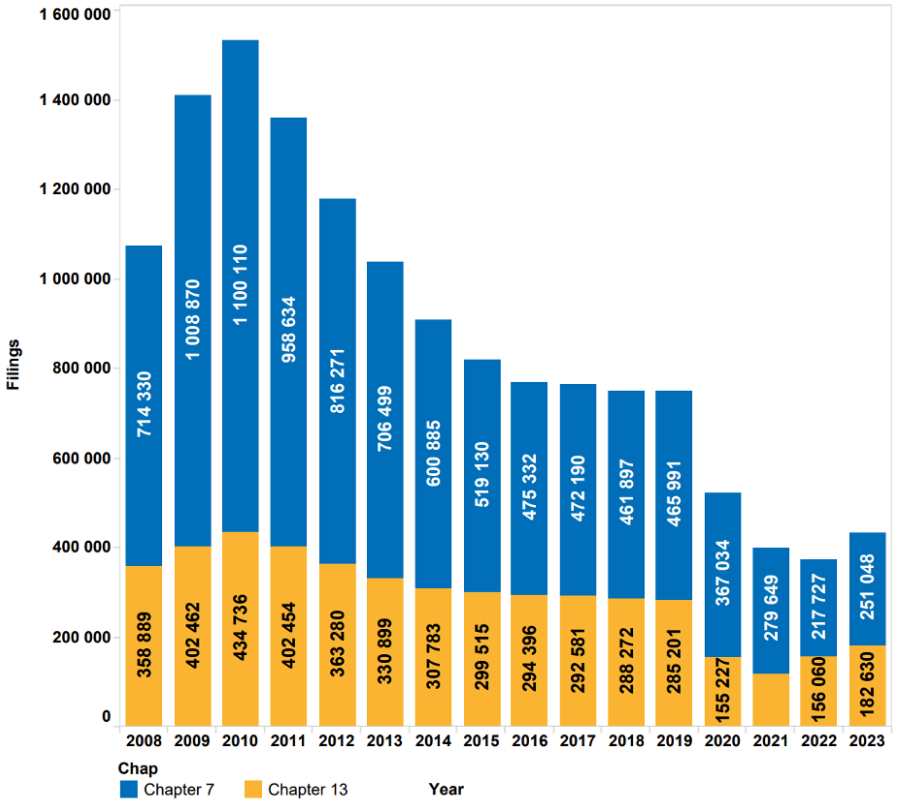

Figure A1: Trends in Chapter 7 and Chapter 13 Bankruptcy Filings Over Time

This figure, sourced from the United States Courts website, illustrates the annual trends in household-level bankruptcy filings under Chapter 7 and Chapter 13 in the United States from 2008 to 2023. Chapter 7 (liquidation) filings, represented in blue, consistently outnumber Chapter 13 (reorganization) filings, shown in yellow, across all years. A peak in total filings is observed around 2010, coinciding with the aftermath of the global financial crisis. Following this peak, bankruptcy filings exhibit a steady decline over the years, reaching their lowest levels in 2021. Chapter 7 filings consistently dominate the distribution.

Figure A2: Distribution of Financial Literacy Scores Across Sample Population

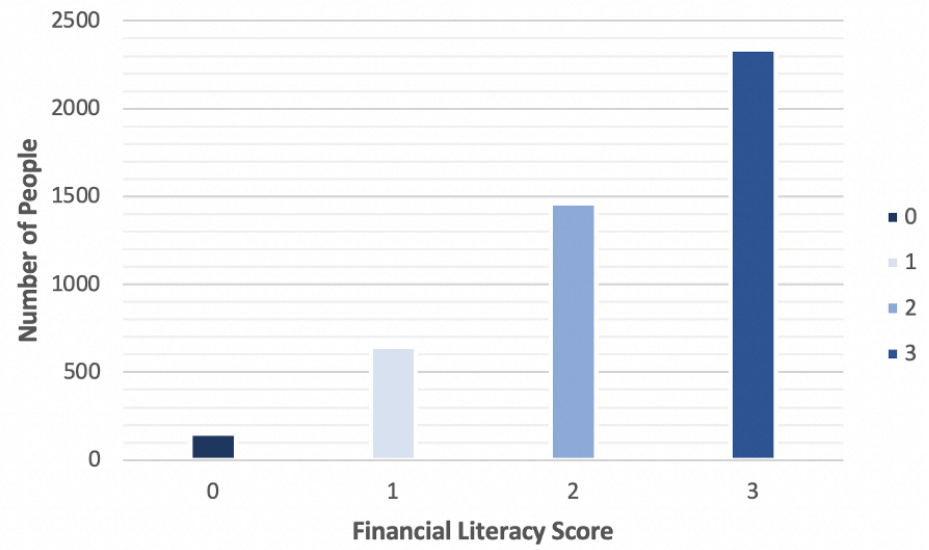

Figure A2: Distribution of Financial Literacy Scores Across Sample Population
This figure displays the distribution of financial literacy scores within the entire sample population, illustrating the range and frequency of financial literacy levels among respondents.

Figure A3: Distribution of Financial Literacy Scores by Gender

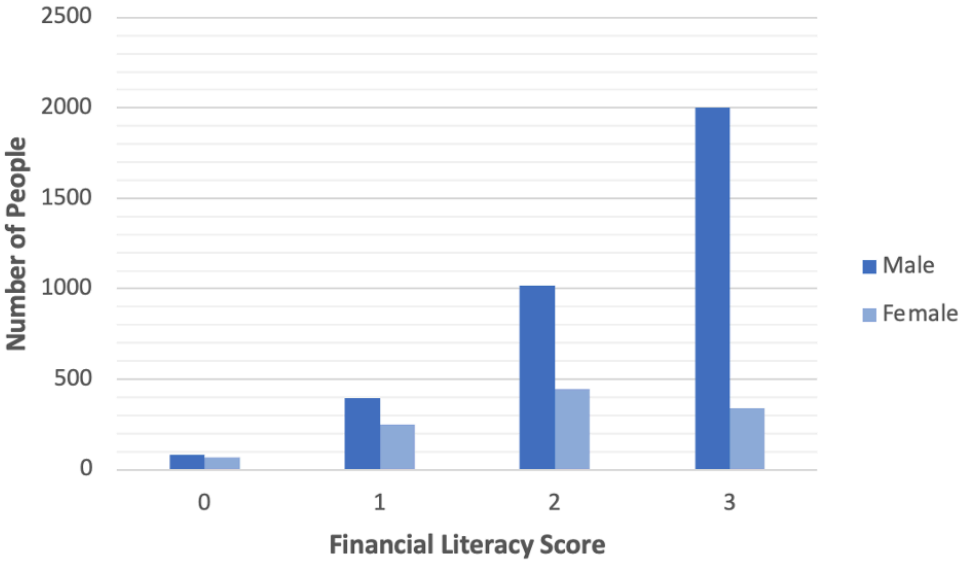

Figure A3: Distribution of Financial Literacy Scores by Gender
This figure presents the distribution of financial literacy scores within the sample population, segmented by gender, to illustrate variations in financial literacy levels between male and female respondents.

Figure A4: Distribution of Financial Literacy Scores by Age

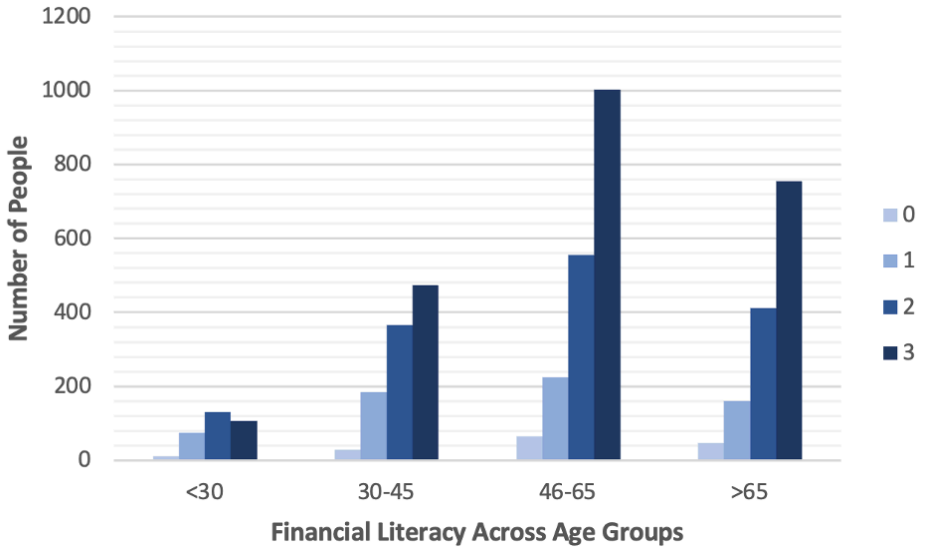

Figure A4: Distribution of Financial Literacy Scores by Age
This figure displays the distribution of financial literacy scores across the sample population, segmented by age groups, to highlight variations in financial literacy levels across different age demographics.

Figure A5: Distribution of Financial Literacy Scores by Education Levels

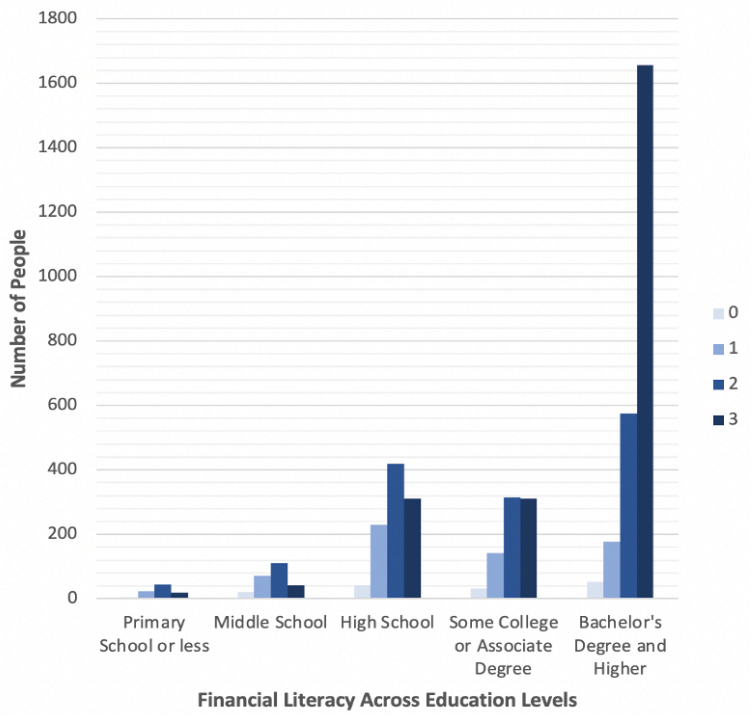

Figure A5: Distribution of Financial Literacy Scores by Education Levels
This figure presents the distribution of financial literacy scores within the sample population, segmented by educational attainment levels: Primary School or Less, Middle School, High School, Some College or Associate Degree and Bachelor's Degree and Higher. The leftmost column in the educational level primary school or less is not showing as it only includes 4 people who scored 0.

Table A1
Variable Definitions

Dependent Variable	
Bankruptcy	Reflects whether respondents have experienced foreclosure in the last five years, with 0 for no and 1 for yes
Foreclosure	Reflects whether respondents have experienced foreclosure in the last five years, with 0 for no and 1 for yes
Independent Variable	
Financial Literacy	Assesses understanding of basic financial concepts, scored from 0 to 3
Control Variables	
Age	Captures the respondent's age in years
Gender	Identifies the respondent's gender, where 1 is male and 2 is female
Marital Status	Indicates the respondent's marital status; 1 if married or living with a partner, and 2 if single or not living with a partner
Children	Notes the number of children the respondents have
Income	Represents total income in dollars, encompassing all sources including wages, business income, interest, social security, pensions, IRA withdrawals and rental income
Education	Indicates the highest level of formal education completed by the respondent, categorized from primary school through doctorate, with codes for specific degrees (e.g., high school diploma, associate, bachelor's, master's, professional, and doctorate)
Total Financial Assets	Assesses the total assets of the respondents, including liquid assets, certificates of deposit, non-money market mutual funds, stocks, bonds, liquid retirement accounts, savings bonds, life insurance cash value, managed assets and other financial instruments
Mediating Variables	
Saving Behavior	Indicates whether respondents spend less than their income or meet/exceed their income level
Credit Card Management	Indicates whether the respondent carries a credit card balance
Foreclosure	Indicates whether the household has experienced foreclosure some time in the last five yeard
Homeownership	Identifies if the respondent owns a home
Stock Literacy	Assesses understanding of diversification, with respondents holding 10 or more stocks considered more financially literate

Table A1: Variable Definitions
This table presents variable definitions from the SCF dataset used in this study. Note that education levels in this study are coded from -1 to 15, where -1 represents "Less than 1st grade," capturing individuals with no formal schooling and levels progress from elementary through middle school (1-7), high school (8), some college or associate degrees (9-11), higher degrees such as bachelor's (12) and master's (13). In the public data set, the highest categories, doctorate (15) and professional degrees (14), are combined, offering a single code for advanced degrees. Hence, a score of 14 is the maximum.

Table A2
Summary Statistics

	Mean	SD	Min	Max	Observations
Dependent Variable					
Bankruptcy	0.0112296	0.1051	0	1	4595
Foreclosure	0.0037432	0.06079	0	1	4595
Independent Variable					
Financial Literacy	2.303591	0.8293026	0	3	4595
Control Variables					
Age	54.46899	16.19049	18	95	4595
Gender	1.238955	0.4264918	1	2	4595
Marital Status	1.367791	0.4822566	1	2	4595
Children	0.73863	1.108118	0	10	4595
Income	1592855	12392867	0	447819607	4595
Education	10.3284	2.8145	-1	14	4595
Total Financial Assets	8455668	64557364	0	1986587000	4595
Mediating Variables					
Saving Behavior	0.6159304	0.4859976	0	1	4595
Credit Card Management	0.3784113	0.4831011	0	1	4595
Homeownership	0.6770403	0.4676584	0	1	4595
Stock Literacy	0.1390642	0.3460512	0	1	4595

Table A2: Summary Statistics
This table summarizes the dependent, independent, control and mediating variables used in our study, based on data from the 2022 SCF.

Table A3
Financial Literacy Thresholds on Bankrupcy (Unadjusted)

	Bankruptcy
Financial Literacy - Score 0	0.026667***
	(0.001874)
Financial Literacy - Score 1 or more	-0.0095859
	(0.313872)
Financial Literacy - Score 2 or more	-2.545e-04
	(0.959122)
Financial Literacy - Score 3	-0.011696***
	(8.39e-04)
Observations	4,595
Adjusted R-Squared	0.003102

Table A3: Financial Literacy Thresholds on Bankruptcy (Unadjusted)
This table presents a threshold analysis examining the relationship between financial literacy and bankruptcy risk across incremental levels of financial literacy. Financial literacy is categorized into four levels: Score 0, Score 1 or more, Score 2 or more and Score 3, illustrating how increasing financial literacy influences the probability of bankruptcy. The model does not include control variables. Statistical significance is denoted as *p<.1; **p<.05; ***p<.01.

Table A4
Threshold Analysis - Age Groups (Unadjusted)

A: Age: <30	(1)	(2)
Financial Literacy	-0.009056**	
	(0.01464)	
Financial Literacy - Score 0		0.09091***
		(3.78e-08)
Financial Literacy - Score 1 or more		-0.09091***
		(2.63e-07)
Financial Literacy - Score 2 or more		-2.576e-17
		(1.000000)
Financial Literacy - Score 3		1.970e-17
		(1.000000)
Observations	322	322
Adjusted R-Squared	0.01541	0.041

B: Age: 30-45	(1)	(2)
Financial Literacy	-0.007470**	
	(0.04796)	
Financial Literacy - Score 0		0.034483*
		(0.0679)
Financial Literacy - Score 1 or more		(-0.018267)
		(0.3683)
Financial Literacy - Score 2 or more		-0.002555
		(0.7805)
Financial Literacy - Score 3		-0.009442
		(0.1820)
Observations	1,054	1,054
Adjusted R-Squared	0.002766	0.001296

C: Age: 46-65	(1)	(2)
Financial Literacy	-0.011284***	
	(0.00198)	
Financial Literacy - Score 0		0.031250*
		(0.052541)
Financial Literacy - Score 1 or more		-0.004464
		(0.806942)
Financial Literacy - Score 2 or more		0.003124
		(0.759444)
Financial Literacy - Score 3		-0.022931***
		(0.000786)
Observations	1,846	1,846
Adjusted R-Squared	0.004639	0.00577

D: Age: >65	(1)	(2)
Financial Literacy	-0.002100	
	(0.4038)	
Financial Literacy - Score 0		4.195e-16
		(1.000000)
Financial Literacy - Score 1 or more		0.01242
		(0.329)
Financial Literacy - Score 2 or more		-0.005123
		(0.470)
Financial Literacy - Score 3		-0.003326
		(0.476)
Observations	1,373	1,373
Adjusted R-Squared	-0.0002206	-0.000673

Table A4: Threshold Analysis - Age Groups (Unadjusted)
This table presents the results of a threshold analysis examining the relationship between financial literacy and bankruptcy risk across different age groups, without including any control variables. Financial literacy is categorized into incremental levels: Score 0, Score 1 or more, Score 2 or more and Score 3, offering a detailed examination of how varying degrees of financial literacy relate to bankruptcy risk within four distinct age brackets: under 30, 30-45, 46-65 and over 65. Each panel (A-D) corresponds to one of these age groups. The analysis is divided into two columns for each age group. Column (1) examines the relationship between financial literacy, treated as a continuous variable, and bankruptcy risk within each specific age group. Column (2) evaluates financial literacy across the incremental threshold levels to identify how specific levels of financial literacy relate to bankruptcy risk. Statistical significance is denoted as *p<.1; **p<.05; ***p<.01.

Table A5
Threshold Analysis - Income Groups (Unadjusted)

A: Low	(1)	(2)
Financial Literacy	-0.0007714	
	(0.8764)	
Financial Literacy - Score 0		0.030303*
		(0.0858)
Financial Literacy - Score 1 or more		-0.012446
		(0.5254)
Financial Literacy - Score 2 or more		0.003925
		(0.7130)
Financial Literacy - Score 3		-0.001715
		(0.8696)
Observations	1,150	1,150
Adjusted R-Squared	-0.00085	-0.002233

B: Lower Middle	(1)	(2)
Financial Literacy	-0.012438***	
	(0.0084)	
Financial Literacy - Score 0		0.051282**
		(0.0167)
Financial Literacy - Score 1 or more		-0.023245
		(0.3180)
Financial Literacy - Score 2 or more		-0.005464
		(0.6234)
Financial Literacy - Score 3		-0.015980*
		(0.0735)
Observations	1,151	1,151
Adjusted R-Squared	0.005152	0.00386

C: Upper Middle	(1)	(2)
Financial Literacy	-0.0008704	
	(0.752)	
Financial Literacy - Score 0		-7.193-e18
		(1.000000)
Financial Literacy - Score 1 or more		-8.026e-17
		(1.000000)
Financial Literacy - Score 2 or more		0.01023
		(0.172)
Financial Literacy - Score 3		-0.007224
		(0.108)
Observations	1,146	1,146
Adjusted R-Squared	-0.0007865	0.0002797

D: High	(1)	(2)
Financial Literacy	0.0005972	
	(0.661)	
Financial Literacy - Score 0		1.486e-17
		(1.000000)
Financial Literacy - Score 1 or more		-3.956e-18
		1.000000
Financial Literacy - Score 2 or more		-6.072e-17
		(1.000000)
Financial Literacy - Score 3		0.001088
		(0.666)
Observations	1,148	1,148
Adjusted R-Squared	-0.0007048	-0.002405

Table A5: Threshold Analysis - Income Groups (Unadjusted)
This table evaluates the relationship between financial literacy thresholds and bankruptcy risk across four income groups: Low, Lower Middle, Upper Middle and High. Financial literacy is categorized into incremental levels: Score 0, Score 1 or more, Score 2 or more and Score 3, providing an assessment of how progressively higher levels of financial knowledge relate to bankruptcy risk within each income bracket. Each panel (A-D) corresponds to one of the income groups and the analysis is divided into two columns. Column (1) examines the relationship between financial literacy, treated as a continuous variable, and bankruptcy risk within each specific income group. Column (2) evaluates the influence of financial literacy across the incremental threshold levels to assess how specific levels of financial literacy relate to bankruptcy risk. Notably, this analysis is conducted without controlling for socio-demographic factors, highlighting the raw relationship between financial literacy and bankruptcy risk. Statistical significance is denoted as *p<.1; **p<.05; ***p<.01.

Table A6
Threshold Analysis - Debt-to-Income Groups (Unadjusted)

A: Low

	(1)	(2)
Financial Literacy	-0.003881	
	0.11102	
Financial Literacy - Score 0		0.021277**
		(0.0402)
Financial Literacy - Score 1 or more		-0.010103
		(0.3858)
Financial Literacy - Score 2 or more		0.002941
		(0.6486)
Financial Literacy - Score 3		-0.007699
		(0.1080)
Observations	2,289	2,289
Adjusted R-Squared	0.0006707	0.000362

B: Medium

	(1)	(2)
Financial Literacy	-0.005654	
	(0.570)	
Financial Literacy - Score 0		3.593e-16
		1.0000
Financial Literacy - Score 1 or more		-3.568e-16
		1.0000
Financial Literacy - Score 2 or more		0.05085*
		0.0519
Financial Literacy - Score 3		-0.05085***
		(0.0098)
Observations	203	203
Adjusted R-Squared	-0.003356	0.02209

C: High

	(1)	(2)
Financial Literacy	-0.011991***	
	(7.13e-05)	
Financial Literacy - Score 0		0.042553***
		(0.0075)
Financial Literacy - Score 1 or more		-0.14665
		(0.3974)
Financial Literacy - Score 2 or more		-0.010781
		(0.1840)
Financial Literacy - Score 3		-0.012667**
		(0.0188)
Observations	2,094	2,094
Adjusted R-Squared	0.00704	0.006183

Table A6: Threshold Analysis - Debt-to-Income Groups (Unadjusted)
This table examines the relationship between financial literacy thresholds and bankruptcy risk across three DTI groups: Low, Medium and High. Financial literacy is categorized into incremental levels: Score 0, Score 1 or

more, Score 2 or more and Score 3, allowing for an assessment of how progressively higher levels of financial literacy influence bankruptcy risk within varying DTI contexts. Each panel (A-C) corresponds to one DTI group and the analysis is divided into two columns: Column (1) examines the relationship between financial literacy, treated as a continuous variable, and bankruptcy risk within each specific DTI group. Column (2) evaluates financial literacy across the incremental threshold levels to assess how specific levels of financial literacy relate to bankruptcy risk. This analysis is conducted without controlling for socio-demographic factors, highlighting the raw relationship between financial literacy and bankruptcy risk. Statistical significance is denoted as *p<.1; **p<.05; ***p<.01.

Table A7
Linear Regression - Financial Literacy and Mediators on Bankruptcy

	Bankruptcy
Financial Literacy	-0.004355**
	(0.02779)
Saving Behavior	-0.004208
	(0.21127)
Credit Card Balance	0.009066***
	(0.00602)
Homeownership	-0.008020**
	(0.02309)
Stock Literacy	-0.005916
	(0.20449)
Observations	4,595
R-squared	0.00697

Table A7: Linear Regression - Financial Literacy and Mediators on Bankruptcy
This table presents a multiple regression analysis evaluating the direct impact of financial literacy and mediating variables on bankruptcy risk. Statistical significance is denoted as *p<.1; **p<.05; ***p<.01.

Table A8
Variance Inflation Factors (VIFs) Table

	VIF
Financial Literacy	1.126940
Saving Behavior	1.120037
Credit Card Balance	1.062961
Homeownership	1.140044
Stock Literacy	1.089266

Table A8: Variance Inflation Factors (VIFs) Table
This table reports VIF values to assess multicollinearity among financial literacy and mediating variables.

Table A9
Financial Literacy Thresholds on Foreclosure (Unadjusted)

	Foreclosure
Financial Literacy - Score 0	2.621-e16
	(1.000000)
Financial Literacy - Score 1 or more	0.01087**
	(0.0484)
Financial Literacy - Score 2 or more	-0.006082**
	(0.0342)
Financial Literacy - Score 3	-0.003420*
	(0.0912)
Observations	4,595
Adjusted R-Squared	0.0027

Table A9: Financial Literacy Thresholds on Foreclosure (Unadjusted)
This table presents a threshold analysis examining the relationship between financial literacy and foreclosure risk across incremental levels of financial literacy. Financial literacy is categorized into four levels: Score 0, Score 1 or more, Score 2 or more and Score 3, illustrating how increasing financial literacy influences the probability of foreclosure. The analysis does not include control variables. Statistical significance is denoted as *p<.1; **p<.05; ***p<.01.

Table A10
Placebo Test - Financial Literacy and Bankruptcy

	(1)	(2)
Financial Literacy - Placebo	-8.698e-04	-8.083e-04
	(0.533)	(0.561130)
Age		1.047e-04
		(0.372136)
Gender		0.00281
		(0.574883)
Marital Status		0.00930**
		(0.042434)
Children		0.001044
		(0.497926)
Income		-2.535e-11
		(0.872028)
Education		-0.002053***
		(3.33e-04)
Total Financial Assets		-6.957e-12
		(0.818376)
Labor Force		0.009874**
		(0.020054)
Observations	4,595	4,595
Adjusted R-Squared	-1.329e-04	0.004871

Table A10: Placebo Test - Financial Literacy and Bankruptcy
This table presents the results of a placebo test examining the relationship between a placebo measure of financial literacy and bankruptcy. The analysis controls for variables including age, gender, marital status, children, income, education, total financial assets and labor force participation. Column (1) displays the simple

placebo regression results, while Column (2) introduces additional controls or adjustments to the specification. The coefficients in each column represent the estimated impact of the placebo measure and other control variables on the likelihood of bankruptcy. The placebo measure shows no significant association with bankruptcy across specifications. The model is based on 4,595 observations. Adjusted R-squared values are reported to assess model fit and significance levels are denoted as (*p<.1; **p<.05; ***p<.01).

Table A11
Firth's Penalized Logistic Regression: Financial Literacy and Bankruptcy

	(1)	(2)
Financial Literacy	-0.5452991***	-0.352362**
	(2.92391e-4)	(0.034712)
Age		0.007692
		(0.457182)
Gender		0.081266
		(0.828811)
Marital Status		0.864500**
		(0.031207)
Children		0.082820
		(0.528291)
Income		8.004e-09
		(0.469797)
Education		-0.135967***
		(0.004938)
Total Financial Assets		8.913e-10
		(0.598655)
Labor Force		0.888512**
		(0.027658)
Observations	4,595	4,595
LRT Statistics	13.11852	35.38087
P-value LRT Statistics	2.924e-04	5.103e-05

Table A11: Firth's Penalized Regression - Financial Literacy and Bankruptcy
This table presents the results of Firth's penalized logistic regression, which is used to address potential bias in logistic regression coefficients, particularly in the presence of rare events or small sample sizes. The analysis examines the relationship between financial literacy and bankruptcy, controlling for variables including age, gender, marital status, children, income, education, total financial assets and labor force participation. Column (1) shows the results from the baseline penalized logistic regression model and Column (2) introduces additional controls or modifications to the specification. The coefficients in each column represent the penalized logistic regression estimates for the impact of each variable on the likelihood of bankruptcy. The model is based on 4,595 observations. Likelihood Ratio Test (LRT) statistics and their associated p-values are reported for both models, indicating the overall significance of the predictors in explaining bankruptcy likelihood. Statistical significance is denoted as *p<.1; **p<.05; ***p<.01.

Table A12
Weighted Regression - Financial Literacy and Bankruptcy

	(1)	(2)
Financial Literacy	-0.006611***	-0.004150*
	(0.00113)	(0.0560)
Age		2.523e-04**
		(0.0361)
Gender		0.001849
		(0.7076)
Marital Status		0.01103**
		(0.0165)
Children		4.236e-04
		(0.7967)
Income		-4.954e-10
		(0.8502)
Education		0.001526**
		(0.0228)
Total Financial Assets		-1.047e-10
		(0.8022)
Labor Force		0.01050**
		(0.0263)
Observations	4,595	4,595
Adjusted R-Squared	0.002089	0.005139

Table A12: Weighted Regression - Financial Literacy and Bankruptcy
This table presents the results of a weighted regression analysis examining the relationship between financial literacy and bankruptcy. The analysis incorporates weights to account for potential heteroskedasticity or sampling differences. Control variables include age, gender, marital status, children, income, education, total financial assets and labor force participation. Column (1) represents the baseline weighted regression model, while column (2) introduces additional controls or refinements to the specification. The coefficients in each column represent the estimated effects of each variable on bankruptcy likelihood under these respective model setups. Statistical significance is denoted as *p<.1; **p<.05; ***p<.01.

Table A13
Outlier Exclusion Analysis - Financial Literacy and Bankruptcy

	Bankruptcy
Financial Literacy	-0.004296**
	(0.03790)
Age	1.449e-04
	(0.23071)
Gender	0.001502
	(0.76727)
Marital Status	0.008609*
	(0.06331)
Children	9.469e-04
	(0.54311)
Income	-3.767e-10
	(0.62040)
Education	-0.001593***
	(0.00922)
Total Financial Assets	-5.399e-11
	(0.67274)
Labor Force	0.01075**
	(0.01291)
Observations	4,539
Adjusted R-Squared	0.005836

Table A13: Outlier Exclusion Analysis - Financial Literacy and Bankruptcy
This table presents the results of a regression analysis, excluding outliers identified using z-scores. Outliers are defined as observations with z-scores greater than 3 or less than -3 for Income and Total Financial Assets, representing extreme deviations from the mean. As a result, the number of observations has decreased to 4,539 after the removal of outliers. Control variables include age, gender, marital status, children, income, education, total financial assets and labor force participation. The coefficients indicate the estimated effects of each variable on bankruptcy likelihood. Statistical significance is denoted as *p<.1; **p<.05; ***p<.01.

Table A14
Linear Regression - Financial Literacy and Bankruptcy (SCF 2016)

	(1)	(2)
Financial Literacy	-0.003023	-6.319e-04
	(0.204)	(0.80811)
Age		2.369e-04
		(0.12295)
Gender		-0.008478
		(0.19175)
Marital Status		-3.790e-04
		(0.94830)
Children		0.003123
		(0.11072)
Income		-3.587e-10
		(0.26248)
Education		-0.0032***
		(3.88e-05)
Total Financial Assets		-6.198e-11
		(0.29040)
Labor Force		0.01630***
		(0.00306)
Observations	6,248	6,248
Adjusted R-Squared	9.856e-05	0.004661

Table A14: Linear Regression - Financial Literacy and Bankruptcy Linear Regression (SCF 2016)
This table examines the relationship between financial literacy and bankruptcy across two models, using the SCF 2016 data. Column (1) explores the standalone effect of financial literacy on bankruptcy risk, while Column (2) incorporates socio-demographic control variables, including age, gender, marital status, children, income, education, total financial assets and labor force to provide a more comprehensive understanding of the factors influencing bankruptcy. The analysis highlights the role of financial literacy alongside other socio-demographic characteristics in shaping bankruptcy outcomes. Statistical significance is denoted as *p<.1; **p<.05; ***p<.01.

Table A15
Linear Regression - Financial Literacy and Bankruptcy (SCF 2019)

	(1)	(2)
Financial Literacy	-0.007770***	-0.004160*
	(1.31e–04)	(0.07003)
Age		-5.977e-05
		(0.64183)
Gender		0.005625
		(0.30606)
Marital Status		-0.001078
		(0.82623)
Children		0.002347
		(0.16171)
Income		-7.756e-12
		(0.96804)
Education		0.002255***
		(0.00127)
Total Financial Assets		-2.819e-11
		(0.64815)
Labor Force		0.007346
		(0.11522)
Observations	5,777	5,777
R-squared	0.002358	0.004552

Table A15: Linear Regression - Financial Literacy and Bankruptcy Linear Regression (SCF 2019)
This table examines the relationship between financial literacy and bankruptcy across two models, using the SCF 2019 data. Column (1) explores the standalone effect of financial literacy on bankruptcy risk, while Column (2) incorporates socio-demographic control variables, including age, gender, marital status, children, income, education, total financial assets and labor force to provide a more comprehensive understanding of the factors influencing bankruptcy. The analysis highlights the role of financial literacy alongside other socio-demographic characteristics in shaping bankruptcy outcomes. Statistical significance is denoted as *p<.1; **p<.05; ***p<.01.

10. AI Appendix

ChatGPT was used as a supplementary tool to enhance the quality of writing and coding in this thesis. For writing, it helped refine language, improve grammar and clarify the presentation of ideas by suggesting rephrasing. For coding, ChatGPT assisted in developing and troubleshooting R code by providing examples, resolving errors and recommending optimizations.