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Empowering the Next Generation:  
The Role of Financial Education Mandates in Shaping Literacy

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## ABSTRACT

This thesis investigates the effects of financial education mandates on improving financial literacy among students in the United States. The study utilizes the AIPW estimator to model the outcomes and treatments, aiming to estimate the Average Treatment Effect on the Treated (ATET) with double robustness. By analyzing data from the National Financial Capability Study (NFCS), the research examines the impact of state-level policies on financial literacy scores. The findings suggest that financial literacy mandates lead to positive shifts in outcomes over time, highlighting the importance of targeted interventions in enhancing financial knowledge. The study underscores the significance of incorporating financial education into school curricula to equip students with essential skills for managing personal finances. These insights offer valuable implications for policymakers and educators seeking to promote financial literacy and empower individuals to make informed financial decisions.

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## Chapter 1

### Introduction

*“Financial illiteracy is not an issue unique to any one population. It affects everyone: men and women, young and old, across all racial and socioeconomic lines. No longer can we stand by and ignore this problem. The economic future of the United States depends on it.”* – President’s Advisory Council on Financial Literacy

Financial literacy is increasingly recognized as a fundamental component of individual financial well-being and economic stability. Defined as the ability to understand and effectively apply various financial concepts and skills, it empowers individuals to make informed financial decisions, manage risks, and plan for their future (Lusardi & Mitchell, 2007). However, numerous studies have highlighted a pervasive lack of financial literacy among individuals across different demographic groups and socioeconomic backgrounds, contributing to various financial challenges such as high debt levels, inadequate retirement savings, and poor investment decisions (Fernandes et al., 2014; Klapper et al., 2015).

Recognizing the significance of financial literacy in promoting financial well-being, policymakers have increasingly turned to financial literacy mandates as a means of addressing the knowledge gap and empowering individuals to make sound financial decisions. Financial literacy mandates—which encompass legislative or regulatory requirements mandating financial education in school curricula or educational resources provided by financial institutions to their customers—aim to ensure individuals acquire essential financial knowledge and skills early in life and throughout adulthood thereby enhancing their ability to navigate complex financial

environments and achieve long-term financial security (Bernheim et al., 2001; U.S. Department of the Treasury, 2019; Collins, 2012).

The rationale behind financial literacy mandates stems from the positive impact demonstrated by financial education on individuals' financial behaviors and outcomes. Research has shown that individuals with higher levels of financial literacy tend to exhibit better financial behaviors, such as higher savings rates, more prudent investment decisions, and greater financial resilience (Mandell & Klein, 2009; Kaiser et al., 2022). Moreover, financial education interventions have been associated with improvements in financial literacy levels and behaviors, highlighting the potential effectiveness of targeted educational initiatives (Hsu et al., 2010).

Despite the growing interest in financial literacy mandates, questions persist regarding their effectiveness, implementation, and long-term impact. Critics argue that mandating financial education alone may not be sufficient to address the complex array of factors influencing individuals' financial behaviors and outcomes (Hastings & Mitchell, 2011; Weiss, 2022). Additionally, concerns have been raised about the variability in the quality and content of financial education programs, as well as the challenges associated with measuring their effectiveness (Kaiser & Menkhoff, 2017). As the discussion surrounding the effectiveness and challenges of financial literacy mandates continues, it becomes imperative to delve deeper into understanding their nature and scope.

### **1.1 Financial Literacy Importance**

In an era marked by rapid economic change and increasing personal responsibility for financial decision-making, the concept of financial literacy has emerged as a cornerstone of individual empowerment and societal stability. Financial literacy encompasses a set of skills and knowledge that enables individuals to make informed and effective decisions with their financial



resources. It is not merely the ability to balance a checkbook or understand interest rates; it is the foundation upon which individuals build their financial future, navigate the complexities of the market, and secure their economic well-being.

The relevance of financial literacy today cannot be overstated. As governments worldwide grapple with the strain on social security systems and healthcare provisions, there has been a discernible shift in the burden of financial planning from public programs to individuals (Lusardi, 2019). This transition is evident in the widespread adoption of private contribution plans, such as 401(k)s in the United States, which place the onus of retirement savings squarely on the shoulders of employees. The implication is clear: without a firm grasp of financial principles, individuals are at a heightened risk of inadequate preparation for retirement and unforeseen financial challenges.

Moreover, the financial landscape has grown increasingly intricate, with a proliferation of sophisticated financial products ranging from student loans to annuities. Each product carries its own set of risks and rewards, requiring a nuanced understanding to avoid pitfalls and capitalize on opportunities. The complexity of these products means that informed financial decision-making has profound implications for individual well-being. Those who are financially literate can navigate this terrain with confidence, making choices that align with their long-term goals and values (Yakoboski et al., 2023). Conversely, those lacking in financial knowledge are more vulnerable to scams, predatory practices, and decisions that may jeopardize their financial future.

The correlation between financial literacy and positive financial behaviors is well-documented, with numerous studies indicating that individuals who possess a higher degree of financial knowledge tend to engage in behaviors that are beneficial to their financial health (Kaiser & Menkhoff., 2017). Fernandes et al. (2014) found that financial literacy is positively

associated with downstream financial behaviors, such as budgeting, saving, and investing. Their study demonstrated that individuals with higher levels of financial literacy are more likely to adopt prudent financial practices, leading to greater financial stability and wealth accumulation over time. Specifically, they found that financially literate individuals were more likely to have emergency savings, retirement accounts, and diversified investment portfolios compared to their less financially literate counterparts.

Moreover, individuals with higher levels of financial literacy are more likely to use credit responsibly, avoid high-cost borrowing methods, and make informed purchasing decisions (Fernandes et al., 2014). They are also better able to evaluate financial products and services, compare interest rates and fees, and choose options that align with their financial goals and preferences. Research also suggests that children of financially literate parents are more likely to develop positive financial behaviors and attitudes from an early age, setting them on a path toward greater financial well-being in adulthood (Lusardi & Mitchell, 2007). Conversely, individuals with low levels of financial literacy are more likely to experience financial difficulties, including high debt burdens, financial stress, and inadequate retirement savings (Fernandes et al., 2014).

The importance of financial literacy extends beyond individual financial outcomes to encompass broader societal and economic considerations. Individuals with higher levels of financial literacy are better equipped to withstand financial shocks, such as job loss or unexpected expenses, and are more likely to achieve upward socioeconomic mobility (Hastings et al., 2013). The research suggests that financial literacy can help individuals avoid negative credit behaviors such as debt accumulation and high-cost borrowing, which are often precursors to more severe financial distress. Furthermore, a financially literate population is better

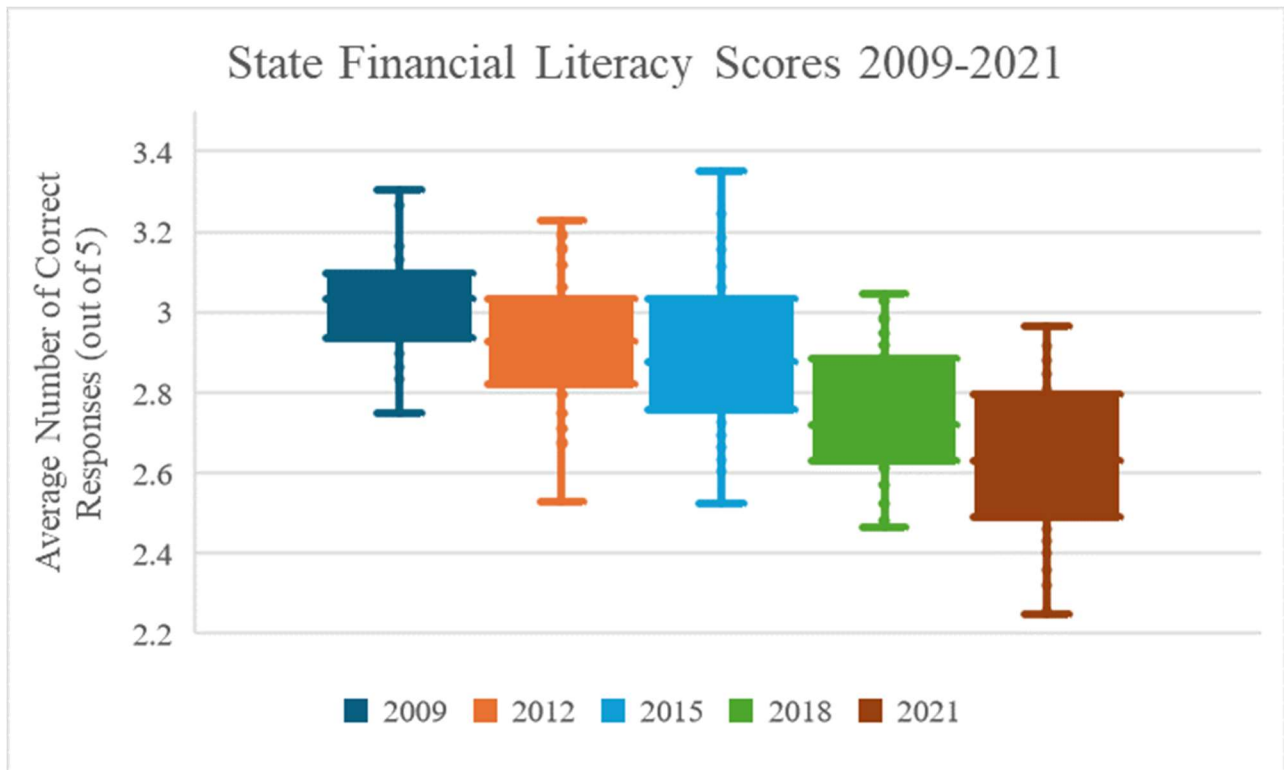
positioned to make informed financial decisions, allocate resources efficiently, and contribute to sustainable economic development (OECD, 2020). Conversely, widespread financial illiteracy can undermine economic resilience, increase systemic risks, and impede progress towards inclusive prosperity (Council for Economic Education, 2022). By enhancing their financial knowledge, individuals can make more prudent choices that contribute to their long-term economic stability and resilience.

## **1.2 Literacy Landscape in the U.S.**

The landscape of financial literacy in the United States presents a complex and concerning picture. Recent data reveals that the percentage of U.S. adults with poor financial literacy increased from 20% in 2017 to 25% in 2023 (Yakoboski et al., 2023). This decline is more pronounced among younger generations, with Gen Z and Gen Y exhibiting the lowest financial literacy rates, at 38% and 45% correct answers, respectively. Additionally, a gender gap persists, with 62% of adult males showing financial literacy compared to 52% of females. Financial literacy also correlates with income, as only 28% of Americans earning less than \$25,000 per year are financially literate.

According to the 2014 S&P Global Financial Literacy Survey, only 57% of U.S. adults are classified as financially literate (Klapper et al., 2015). This places the United States at No. 14 globally in terms of financial literacy levels, with several countries, including Norway, Denmark, Sweden, and Canada, outperforming the U.S. in this regard (Contreras & Bendix, 2020). Moreover, findings from the National Financial Capability Study (NFCS) (Figure 1) reveals a downward trend in financial literacy levels among U.S. adults over time, further highlighting the need for targeted interventions to address this issue.

**Figure 1: Declines in State Financial Literacy From 2009-2021**



**Note:** The figure shows the average number of correct state financial literacy questions from 2009 to 2021. The scores can range from 0 to 5.

Comparing youth financial literacy levels, findings from the OECD Programme for International Student Assessment (PISA) indicate that many high school students in the U.S. also lack basic financial knowledge and skills. The average financial literacy score for 15-year-old students in the U.S. was lower than several other education systems, including Estonia, Finland, and Canada (OECD, 2020). Additionally, the improvement in financial literacy performance among U.S. students between 2015 and 2018 was lower than the average improvement across other OECD economies, signaling a stagnation or slower progress in youth financial literacy in the U.S (Contreras & Bendix, 2020).

Perceptions of financial literacy also vary significantly across different demographic groups. For instance, older individuals generally have more financial literacy, and those who

have lived through prior inflationary periods know more about inflation than younger generations (Lusardi & Streeter, 2023). Men, whites, and individuals from high-income households tend to have higher financial literacy scores compared to women, minorities, and individuals from lower-income households (Klapper et al., 2015; Lin et al., 2019). Moreover, socioeconomic factors play a significant role in determining financial literacy levels in the U.S., with parental education, household income, and wealth influencing youth financial literacy to a greater extent compared to similarly developed economies (OECD, 2020). These disparities, if unattended, are likely to amplify existing inequalities across the population. This has led to debates about the role of financial education in addressing these disparities and the measures needed to ensure equitable access to financial education.

### **1.3 Scope of U.S. Financial Education**

Research suggests that financial literacy is a strong indicator of positive financial outcomes (Lusardi & Messy, 2023). However, despite its importance, financial literacy levels remain remarkably low, even in countries with well-developed financial markets. Improving consumers' financial literacy is challenging, and the impact of financial education programs on financial literacy and ultimately financial well-being is mixed (Congressional Research Service, 2021). This has led to differing opinions on the effectiveness of financial education initiatives and their role in promoting financial literacy.

The federal government spends approximately \$300 million annually on financial literacy initiatives. Yet, the funding for financially focused K–12 educational programs is just under \$5 million from the federal level (U.S. Department of the Treasury, 2019). According to the 2022 Survey of the States by the Council for Economic Education (CEE), only 23 states require high-school students to take a course that integrates personal finance content (Council for Economic

Education, 2022). This is an increase of two states since 2020. Yet only nine states require students to take a stand-alone personal finance course in high school; and three states plus the District of Columbia do not include personal finance in their K-12 curriculum standards. While more states are requiring a personal finance course to graduate high school, fewer are testing students' knowledge in this area.

**Table 1: Status of Personal Finance Education Across the Nation - 2022**

<i>States that require students to take a financial literacy course for high school graduation</i>	Alabama, Iowa, Mississippi, Nebraska, North Carolina, Ohio, Tennessee, Utah, Virginia
<i>States that require a financial literacy course to be offered</i>	Florida, Louisiana, Rhode Island, South Dakota, West Virginia
<i>States that require a financial literacy course to be offered, but the coursework can also be integrated into other subjects</i>	Arizona, Arkansas, Georgia, Idaho, Kentucky, Michigan, Missouri, New Hampshire, New Jersey, New Mexico, New York, North Dakota, South Carolina, Texas
<i>States that require financial literacy standards to be implemented by districts</i>	Colorado, Delaware, Illinois, Indiana, Maine, Maryland, Minnesota, Montana, Nevada, Oklahoma, Oregon, Pennsylvania, Wisconsin
<i>States that include financial literacy in their K–12 standards</i>	Connecticut, Hawaii, Kansas, Massachusetts, Vermont, Washington
<i>States that currently have no financial literacy requirements</i>	Alaska, California, Wyoming, Washington D.C.

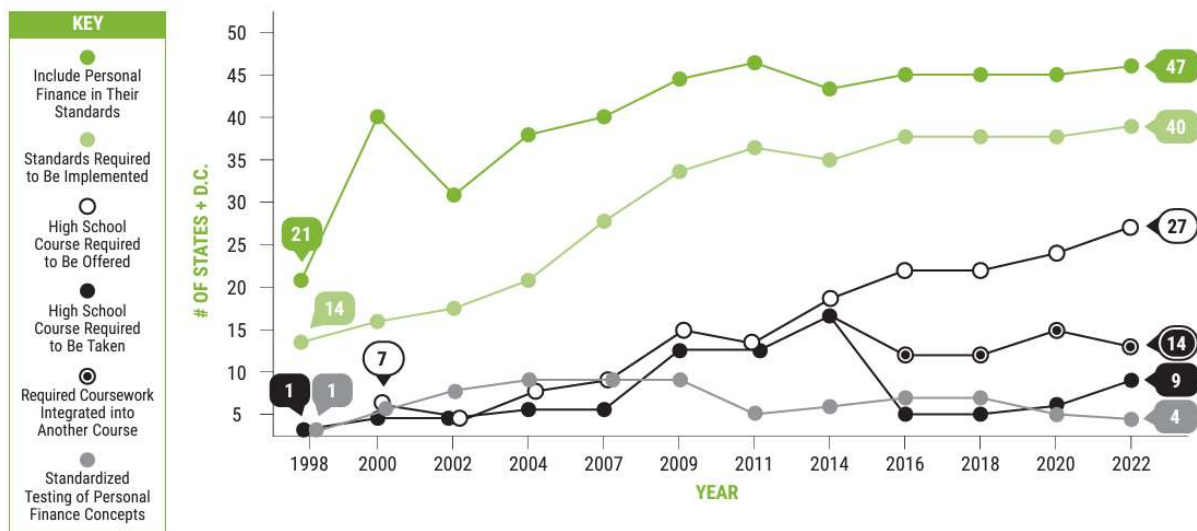
Source: (Council for Economic Education, 2022)

Financial education requirements vary significantly across states in the U.S., with some states having similar education standards but different financial education due to the influence of non-governmental organizations. These organizations often develop unofficial personal finance courses, which may appear as electives in states without a curriculum requirement (Council for Economic Education, 2022). Access to financial and economic instruction is therefore dependent on school district action and ability. There are also significant differences among states without

official financial education requirements. The state of Wisconsin, for example, requires neither a personal finance class nor an economics course before graduation.

The landscape of financial education in the United States has seen significant changes over the past few decades. Economic education, a core skill necessary for understanding the world and making informed decisions, is currently at a standstill<sup>1</sup>. Meanwhile, the number of states requiring students to be tested in economics in 2022 is fewer than in 2011. Furthermore, legislation proposing the removal of economics requirements has been introduced in states including Georgia and South Carolina (Council for Economic Education, 2022). On the other hand, personal financial education has seen a slow but steady upward trajectory (Figure 2). With the sustained increase in K-12 personal financial education requirements over the last decade and a growing body of evidence supporting the positive impact of such requirements on young people's lives, the focus now shifts to how to reach all students in ways that both resonate and educate.

**Figure 2: Historical Comparison - Personal Finance Education 1998-2022**



<sup>1</sup> In 2011, 22 states required economics for graduation: by 2022, this number had only risen to 25 (Council for Economic Education, 2022).

**Note:** Chart depicting the change in financial literacy mandates over time, based on data from the Survey of the States conducted by the Council for Economic Education in 2022. The chart includes a key on the left, which indicates the type of mandate tracked. Taken from (Council for Economic Education, 2022).

However, the path to achieving this is fraught with challenges. When funding varies among districts, so does the quality and effectiveness of financial education, creating inherent inequities throughout the state (Council for Economic Education, 2022). Therefore, funded and intentional statewide approaches can make a difference not only in individual lives but can also help move the “equity needle” for under-resourced communities.

#### **1.4 Goal of This Thesis and Research Questions**

The primary objective of this thesis is to conduct a comprehensive examination of financial education mandates across the United States, with a particular focus on their impact on financial literacy levels. This research aims to contribute to the ongoing discourse on financial literacy education by providing empirical evidence on the effectiveness of such mandates and offering insights into potential future outcomes if all states were to implement financial literacy programs. This thesis seeks to answer the following research questions: What is the current state of financial education mandates across the United States?, How have states performed in terms of financial literacy before and after the implementation of financial education mandates?, and What are the potential future outcomes if all states were to mandate financial literacy programs?

The first part of this research involves a detailed exploration of financial education mandates across the United States. For instance, Utah has a standalone personal finance course required to be taken while other states completely lack mandates. This section provides an overview of similar mandates in other states. The second part of the research will evaluate the



impact of these mandates on financial literacy levels. This will involve a comparative analysis of states' performance in terms of financial literacy before and after the implementation of the mandates. The aim is to ascertain whether these mandates have led to an improvement in financial literacy levels among students.

The third part of the research will involve predicting potential future outcomes if all states were to implement financial literacy programs. This predictive analysis will be based on the successes observed in states that have implemented such programs. For instance, if each state were to implement a successful strategy similar to those observed, we could potentially see a significant increase in financial literacy nationwide over the next three years.

The findings from this research could have significant implications for policymaking in the field of financial education. If financial education mandates are found to be effective in improving financial literacy, there could be a strong case for advocating for their implementation across all states. However, if the results are mixed or show minimal impact, this could indicate a need for re-evaluating the current strategies and exploring alternative approaches to financial education.

## **Chapter 2**

### **Literature Review**

#### **2.1 Financial Education Effect on Literacy**

Financial education plays a crucial role in enhancing financial literacy. Bernheim et al. (2001) conducted a seminal study that underscored the significant positive effects of financial education on financial literacy. By implementing a quasi-experimental design, the researchers were able to observe the effects of mandated high school financial education on students' subsequent financial outcomes. Their findings were significant: exposure to financial education

correlated with an increase in asset accumulation once these students reached adulthood. This study is particularly relevant as it suggests that financial literacy, when instilled at a young age, can have enduring effects, shaping financial decision-making and wealth accumulation in adulthood.

Echoing these sentiments, Ramsey (2023) found that U.S. adults who took a personal finance class in high school are five times more likely to say they graduated high school fully prepared to handle money in the real world than those who didn't take a class. But just 17 percent of American people claimed to have studied personal finance in high school. Moreover, most Americans say learning about money in high school would've made a significant difference in how they deal with money today. Nearly three-quarters of respondents (74%) said they would've made fewer money mistakes, and almost the same number (73%) said they'd be further ahead with their finances (Ramsey, 2023).

But Americans aren't just feeling that they'd be better off financially. Three in four (76%) said they would've felt less stress around money if they'd just learned about personal finance in high school (Ramsey, 2023). These findings suggest that while financial education may not guarantee improved financial literacy and behaviors, it has the potential to positively influence individuals' perceptions of their financial capabilities, decision-making, and overall financial well-being. This supports the notion that financial education, when effectively implemented, can be a valuable tool in enhancing financial literacy and fostering healthier financial behaviors.

The need for financial education is further emphasized in the work of Lusardi (2019), who delves into the consequences of financial illiteracy and the effectiveness of financial education and advocates for financial education by highlighting the critical need for individuals to be well-versed in financial matters due to the increasingly complex financial landscape. By

analyzing research on both financial knowledge and behavior, the study underscores the sobering findings that about one-third of the global population has familiarity with basic financial concepts necessary for everyday decisions (Lusardi, 2019). Lusardi's work serves as a call to action for policymakers, educators, and financial institutions to prioritize financial education and develop programs that effectively translate financial understanding into improved decision-making and behaviors.

## **2.2 Financial Education Effectiveness**

While financial education is often touted as a solution to improving financial literacy, some studies have raised concerns about its effectiveness. Mandell & Klein (2009) presents a critical examination of the long-term effectiveness of high school financial literacy courses. The study examined the differential impact on 79 high school students of a personal financial management course completed 1 to 4 years earlier. The findings indicated that those who took the course were no more financially literate than those who had not. In addition, those who took the course did not evaluate themselves to be more savings-oriented and did not appear to have better financial behavior than those who had not taken the course. This study raises serious questions about the longer-term effectiveness of high school financial literacy courses.

Furthermore, in exploring the relationships between state mandates for financial education and young adults' financial literacy and capability, Carlson and Eadens (2023) found that there was rarely a significant difference in financial literacy and capability among young adults related to the level of financial education they received in high school. This suggests that the mere presence of financial education in school curricula may not be sufficient to improve financial literacy and capability outcomes.

In fact, Weiss (2022) argues that financial literacy programs focus on potential power (financial knowledge) but fail to provide real power (changes to behavior and actions) that can put people in control of their lives. The article cites a 2014 paper that reviewed over 200 studies showing that improved financial literacy can explain just 0.1% of behavior changes that occur (Weiss, 2022). This highlights the need for financial education to go beyond imparting knowledge and focus on influencing behaviors.

However, Kaiser et al. (2022) conducted a meta-analysis of 76 randomized experiments with a total sample size of over 160,000 individuals. They aimed to dispel the idea that financial education lacks benefits; in fact, they aimed to show how financial education not only enhances financial literacy but also significantly influences financial behaviors. The evidence indicates that, generally, financial education initiatives positively influence financial literacy and subsequent financial actions. The magnitude of these effects is significant and comparable to the outcomes of educational programs in other fields, surpassing the average impact reported in previous studies by a factor of three or more.

The study also examined whether financial education is more effective in changing some outcomes than others. The research found that the effects are largest on financial knowledge, though positive effects were found across nearly all financial behaviors studied. Financial education was found to improve behaviors related to budgeting, saving, and credit (Kaiser et al., 2022). The evidence regarding the effects of insurance and remittance payments was less conclusive.

The researchers interpreted the magnitude of the effects using a set of guidelines, restricting the sample to papers published in top economics journals, including only studies with adequate power, and accounting for publication selection bias in the literature. These guidelines

incorporate cost in determining the policy importance of interventions. The guidelines suggest that the effects of the financial education interventions on financial behaviors can be considered “medium” size (Kaiser et al., 2022). Furthermore, using data collected on the cost per participant, the researchers found that, on average, interventions are relatively “low cost” for a medium effect size. This suggests that financial education is, on average, cost-effective.

When accounting for the fact that programs are unlikely to all have the same magnitude of effect, the effects were found to be more than five times as large as those in the original study. To put the effects into further context, the results on financial knowledge were found to be comparable to meta-analyses studying the effects of math and reading education. Similarly, the results on financial behaviors were found to be comparable to meta-analyses of anti-smoking interventions, tailored online health interventions, and energy conservation. These results are robust to the method used. Therefore, it provides empirical evidence that such educational interventions can lead to better financial decision-making and behavior.

### **2.3 Critiques and Limitations of Existing Studies**

The existing studies on financial literacy have significantly contributed to our understanding of its importance and impact on personal finance behaviors. However, there are several critiques and limitations worth noting in these studies. Firstly, many of the studies rely on self-reported measures of financial literacy, which may introduce biases and inaccuracies. Individuals may overestimate their financial knowledge or be influenced by social desirability bias when responding to survey questions about financial literacy (Lusardi, 2019). This reliance on self-reported data could lead to inflated estimates of financial literacy levels and may not accurately capture individuals' actual financial knowledge and skills.

Secondly, the studies often focus on cross-sectional data, which limits our ability to draw causal conclusions about the relationship between financial literacy and personal finance behaviors. While there is evidence to suggest that higher levels of financial literacy are associated with positive financial outcomes, such as increased savings and better debt management (Fernandes et al., 2014), establishing causality requires longitudinal or experimental studies that track individuals over time or randomly assign them to receive financial education interventions.

Furthermore, the literature often overlooks the heterogeneity in financial literacy levels and personal finance behaviors across different demographic groups. For example, studies may fail to adequately account for differences in financial literacy levels among various racial or socioeconomic groups (Kaiser et al., 2022). This oversight could mask disparities in financial knowledge and access to financial resources, potentially leading to ineffective policy interventions that do not address the specific needs of marginalized communities.

Additionally, there is limited research on the long-term effects of financial education interventions and mandates. While some studies have shown short-term improvements in financial knowledge and behaviors following financial education programs (Mandell & Klein, 2009), the durability of these effects over time remains unclear. Longitudinal studies that track individuals' financial outcomes over several years or decades are needed to assess the lasting impact of financial literacy interventions and mandates.

Moreover, the existing literature often lacks consensus on the most effective approaches to financial education and literacy interventions. While some studies advocate for comprehensive financial education curricula that cover a wide range of topics (Bernheim et al., 2001), others suggest that targeted interventions focusing on specific financial skills or behaviors may be more

effective (Klapper et al., 2015). The lack of standardized metrics for assessing financial literacy and evaluating the effectiveness of financial education programs further complicates efforts to identify best practices in this field.

## **Chapter 3**

### **Methodology**

#### **3.1 Data Source Description**

The NFCS, initiated by the FINRA Investor Education Foundation, represents a seminal effort to assess the financial capability of adults in the United States. This nationally representative dataset provides a wealth of information on various indicators of financial capability, including financial behaviors, attitudes, knowledge, and access to financial products and services. The NFCS has been collected every three years since 2009, resulting in five waves of data (2009, 2012, 2015, 2018, and 2021). With a sample size exceeding 25,000 U.S. adults across all 50 states and Washington D.C., the NFCS offers a robust platform for examining the nuances of financial capability.

The dataset's scope extends beyond mere financial literacy assessments. It captures demographic and geographic data, allowing researchers to delve into variations across different population groups and regions. By combining self-reported responses with objective measures, the NFCS provides a comprehensive view of individuals' financial well-being. Researchers can explore questions related to financial behaviors (e.g., savings, debt management), attitudes toward financial risk, knowledge of financial concepts, and access to financial services. Moreover, the longitudinal nature of the dataset enables us to track changes over time, identify trends, and assess the impact of policy interventions.

The NFCS employs a rigorous survey design, ensuring that the sample is representative of the U.S. adult population. Researchers collect data through structured questionnaires administered via various modes (telephone, web, and mail). Key questions focus on financial literacy, financial behaviors, and experiences with financial education. Participants provide insights into their financial decision-making processes, risk perceptions, and exposure to financial products. Additionally, the dataset includes variables related to respondents' socio-demographic characteristics (age, gender, education, income, etc.) and geographic location.

Given that this study draws from the NFCS State-by-State Survey, it also benefits from the rigorous sampling and weighting methods employed by FINRA to ensure the reliability and representativeness of the data. Random digit dialing and address-based sampling techniques are utilized to select households for participation, and survey weights are applied to adjust for nonresponse and demographic characteristics, thereby enhancing the generalizability of the findings. By leveraging the NFCS State-by-State Survey data, this study aims to analyze state-level variations in financial literacy levels and assess the effectiveness of financial education initiatives.

All waves were used for this analysis. Financial literacy scores are evaluated by totaling survey respondents correct answers to the five financial literacy questions. These financial literacy scores serve as outcome variables for evaluating the impact of financial literacy mandates. Changes in these scores before and after the implementation of mandates are analyzed to assess the effectiveness of state-level policies and programs in improving financial literacy among residents. Other individual characteristics collected include gender, age, ethnicity,



education, marital status, income, parent's education<sup>2</sup>. Table 2 shows some descriptive statistics regarding the variables used within the study.

**Table 2: Descriptive Statistics for NFCS Data**

Variable	Categories	Frequency	%
Gender	Male	3,113	53.83
	Female	2,670	46.17
Age	18-24	4,133	18.67
	25-34	4,675	21.12
	35-44	3,732	16.86
	45-54	3,760	16.98
	55-64	3,114	14.07
	65+	2,725	12.31
Ethnicity	White non-Hispanic	15,411	69.61
	Non-White	6,728	30.39
Education	Did not complete high school	218	1.28
	High school graduate - regular high school	2,455	14.42
	High school graduate - GED or alternative	814	4.78
	Some college, no degree	4,952	29.08
	Associate's degree	1,980	11.63
	Bachelor's degree	4,391	25.79
	Postgraduate degree	2,218	13.03
Marital Status	Married	11,493	51.91
	Living with partner	1,921	8.68
	Single	8,725	39.41
Income	Less than \$15,000	2,530	11.43
	At least \$15,000 but less than \$25,000	2,049	9.26
	At least \$25,000 but less than \$35,000	2,099	9.48
	At least \$35,000 but less than \$50,000	2,890	13.05
	At least \$50,000 but less than \$75,000	4,283	19.35
	At least \$75,000 but less than \$100,000	3,351	15.14
	At least \$100,000 but less than \$150,000	3,169	14.31
	\$150,000 or more	1,768	7.99
Parental Education	Did not complete high school	628	5.63
	High school graduate/GED	2,881	25.83
	Some college, no degree	2,248	20.15
	Associate's degree	1,110	9.95

<sup>2</sup> The frequency of gender-related responses is lower due to updated (2021) gender specifications, making the modern questionnaire incompatible with previous gender observations.

	Bachelor's degree	2,645	23.71
	Postgraduate degree	1,521	13.64
	Don't know	103	0.92
	Prefer not to say	19	0.17
Financial Education Offer Status	Yes, but I did not participate	9,725	43.93
	Yes, and I did participate	12,414	56.07
Financial Education Received in High School	Yes	12,414	100
Mandate	No Requirements	2,046	9.24
	K-12 Standards	2,476	11.18
	District Implementation	5,854	26.44
	HS Course Offered	2,062	9.31
	Coursework Integrated	5,825	26.31
	Standalone Course	3,876	17.51

This thesis is interested in knowing if a state-level mandate increases the financial literacy score for exposed individuals in the state. Table 3 shows the states whose interventions fall within the scope of the data, and the type of mandate they enforce.

**Table 3: Mandates Whose Implementation Falls Within the Scope of the Data**

State	Year	Requirement
Alabama	2013	Career Preparedness course with 44% focused on personal finance topics.
Missouri	2019	Stand-alone, half-credit financial literacy course.
Tennessee	2013	Stand-alone, half-credit financial literacy course.
Virginia	2015	Stand-alone, full-credit economics and personal finance course.

Given the dataset encompasses a broad age range of 18 to 65 and older, it is imperative to refine the dataset to focus exclusively on the demographic segment directly impacted by the intervention. This refinement will ensure that the analysis is pertinent to the target group. Tables 4 to 7 present the descriptive statistics for individuals who received treatment in each state.

**Table 4: Descriptive Statistics for Treated Alabama Youth**

Variable	Categories	Frequency	%
Gender	Male	32	50.79
	Female	31	49.21

Ethnicity	White non-Hispanic	77	45.03
	Non-White	94	54.97
Education	Did not complete high school	7	4.09
	High school graduate - regular high school	63	36.84
	High school graduate - GED or alternative	14	8.19
	Some college, no degree	53	30.99
	Associate's degree	10	5.85
	Bachelor's degree	23	13.45
	Postgraduate degree	1	0.58
Marriage	Married	31	18.13
	Living with partner	21	12.28
	Single	119	69.59
Income	Less than \$15,000	51	29.82
	At least \$15,000 but less than \$25,000	29	16.96
	At least \$25,000 but less than \$35,000	36	21.05
	At least \$35,000 but less than \$50,000	17	9.94
	At least \$50,000 but less than \$75,000	19	11.11
	At least \$75,000 but less than \$100,000	8	4.68
	At least \$100,000 but less than \$150,000	5	2.92
	\$150,000 or more	6	3.51
Parental Education	Did not complete high school	7	6.19
	High school graduate/GED	43	38.05
	Some college, no degree	28	24.78
	Associate's degree	6	5.31
	Bachelor's degree	20	17.70
	Postgraduate degree	8	7.08
	Don't know	1	0.88
	Prefer not to say	0	0.00
Financial Education Offer Status	Yes, but I did not participate	31	18.13
	Yes, and I did participate	38	22.22
	No	87	50.88
	Don't know	13	7.60
	Prefer not to say	2	1.17
High School Financial Education	Yes	23	60.53
	No	14	36.84
	Don't know	1	2.63
	Prefer not to say	0	0.00

**Table 5: Descriptive Statistics for Treated Missouri Youth**

<b>Variable</b>	<b>Categories</b>	<b>Frequency</b>	<b>%</b>
Gender	Male	32	50.79
	Female	31	49.21
Ethnicity	White non-Hispanic	43	68.25
	Non-White	20	31.75
Education	Did not complete high school	2	3.17
	High school graduate - regular high school	26	41.27
	High school graduate - GED or alternative	9	14.29
	Some college, no degree	14	22.22
	Associate's degree	3	4.76
	Bachelor's degree	7	11.11
	Postgraduate degree	2	3.17
Marriage	Married	10	15.87
	Living with partner	12	19.05
	Single	41	65.08
Income	Less than \$15,000	17	26.98
	At least \$15,000 but less than \$25,000	17	26.98
	At least \$25,000 but less than \$35,000	9	14.29
	At least \$35,000 but less than \$50,000	5	7.94
	At least \$50,000 but less than \$75,000	5	7.94
	At least \$75,000 but less than \$100,000	6	9.52
	At least \$100,000 but less than \$150,000	2	3.17
	\$150,000 or more	2	3.17
Parental Education	Did not complete high school	2	3.17
	High school graduate/GED	31	49.21
	Some college, no degree	9	14.29
	Associate's degree	8	12.70
	Bachelor's degree	9	14.29
	Postgraduate degree	4	6.35
	Don't know	0	0.00
Prefer not to say	0	0.00	
Financial Education Offer Status	Yes, but I did not participate	10	15.87
	Yes, and I did participate	19	30.16
	No	24	38.10
	Don't know	8	12.70

	Prefer not to say	2	3.17
High School Financial Education	Yes	14	73.68
	No	5	25.31
	Don't know	0	0.00
	Prefer not to say	0	0.00

**Table 6: Descriptive Statistics for Treated Tennessee Youth**

Variable	Categories	Frequency	%
Gender	Male	31	49.21
	Female	31	50.79
Ethnicity	White non-Hispanic	112	63.28
	Non-White	65	36.72
Education	Did not complete high school	11	6.21
	High school graduate - regular high school	56	31.64
	High school graduate - GED or alternative	16	9.04
	Some college, no degree	56	31.64
	Associate's degree	11	6.21
	Bachelor's degree	22	12.43
	Postgraduate degree	5	2.82
Marriage	Married	37	20.90
	Living with partner	29	16.38
	Single	111	62.71
Income	Less than \$15,000	53	29.94
	At least \$15,000 but less than \$25,000	30	16.95
	At least \$25,000 but less than \$35,000	23	12.99
	At least \$35,000 but less than \$50,000	26	14.69
	At least \$50,000 but less than \$75,000	20	11.30
	At least \$75,000 but less than \$100,000	16	9.04
	At least \$100,000 but less than \$150,000	6	3.39
	\$150,000 or more	3	1.69
Parental Education	Did not complete high school	8	6.40
	High school graduate/GED	48	38.40
	Some college, no degree	25	20.00
	Associate's degree	9	7.20
	Bachelor's degree	21	16.80

	Postgraduate degree	12	9.60
	Don't know	1	0.80
	Prefer not to say	1	0.80
Financial Education Offer Status	Yes, but I did not participate	31	17.51
	Yes, and I did participate	58	32.77
	No	66	37.29
	Don't know	18	10.17
	Prefer not to say	4	2.26
High School Financial Education	Yes	43	74.14
	No	11	18.97
	Don't know	2	3.45
	Prefer not to say	2	3.45

**Table 7: Descriptive Statistics for Treated Virginia Youth**

Variable	Categories	Frequency	%
Gender	Male	33	51.56
	Female	31	48.44
Ethnicity	White non-Hispanic	85	45.21
	Non-White	103	54.79
Education	Did not complete high school	6	3.19
	High school graduate - regular high school	43	22.87
	High school graduate - GED or alternative	12	6.38
	Some college, no degree	59	31.38
	Associate's degree	21	11.17
	Bachelor's degree	40	21.28
	Postgraduate degree	7	3.72
Marriage	Married	25	13.30
	Living with partner	13	6.91
	Single	150	79.79
Income	Less than \$15,000	56	29.79
	At least \$15,000 but less than \$25,000	23	12.23
	At least \$25,000 but less than \$35,000	22	11.70
	At least \$35,000 but less than \$50,000	31	16.49
	At least \$50,000 but less than \$75,000	34	18.09
	At least \$75,000 but less than \$100,000	13	6.91
	At least \$100,000 but less than	3	1.60

	\$150,000		
	\$150,000 or more	6	3.19
Parental Education	Did not complete high school	4	3.25
	High school graduate/GED	37	30.08
	Some college, no degree	21	17.07
	Associate's degree	13	10.57
	Bachelor's degree	29	23.58
	Postgraduate degree	16	13.01
	Don't know	3	2.44
	Prefer not to say	0	0.00
Financial Education Offer Status	Yes, but I did not participate	31	16.49
	Yes, and I did participate	68	36.17
	No	74	39.36
	Don't know	13	6.91
	Prefer not to say	2	1.06
High School Financial Education	Yes	55	80.88
	No	12	17.65
	Don't know	1	1.47
	Prefer not to say	0	0.00

Table 8 offers a comparative analysis of financial literacy scores, highlighting the differences between the youth cohort and the broader population. The analysis stratifies the data to compare treated states against all other and neighboring untreated states. This stratification is crucial for evaluating the mandate's impact by considering both geographical proximity and potential spillover effects. The expectation is to observe a notable positive shift in financial literacy scores among the youth in treated states, distinguishing them from both the untreated states at large and their untreated neighboring counterparts.

**Table 8: Financial Literacy Score Comparison of Treated States**

State	One Period Before and After	All Periods
Alabama	***-0.194	***-0.185
youth	***-0.277	***-0.119
neighbors	0.015	0.016
neighbors youth	-0.077	0.163
Missouri	0.006	0.003
youth	***0.149	***0.130

neighbors	0.021	0.026
neighbors youth	0.038	0.058
<hr/>		
Tennessee	***-0.097	***-0.128
youth	***0.127	***-0.189
neighbors	**0.086	**0.063
neighbors youth	**0.175	-0.041
<hr/>		
Virginia	-0.015	** -0.048
youth	***0.129	*0.053
neighbors	0.071	0.066
neighbors youth	0.145	*0.099
<hr/>		

**Note:** This table compares the financial literacy scores between respondents from the treated states and those from the 46 untreated states (including D.C.). It also specifically contrasts the scores of young respondents aged 18-24 from the treated states against their counterparts in the untreated states. Additionally, a comparison is made between the treated states and their respective neighboring untreated states. For Alabama, the neighboring states considered are Mississippi, Georgia, and Florida; for Missouri, the neighbors include Illinois, Iowa, Nebraska, Kansas, Oklahoma, Arkansas, and Kentucky; for Tennessee, the neighbors include Kentucky, Arkansas, North Carolina, Mississippi, and Georgia; for Virginia, the neighbors include West Virginia, Kentucky, North Carolina, and Maryland. Estimated using the NFCS survey weights. \*, \*\*, and \*\*\* mean significance at the 10%, 5% and 1% level respectively.

The results presented in Table 8 reveal a nuanced picture of the intervention's impact on financial literacy. In treated states, the youth cohort's scores show a significant difference when compared to untreated youths, against both neighboring and other states. The mandates appear to have a limited effect on individuals over the age of 25, implying that the impact is most pronounced among the youngest participants, which makes sense as the mandates are implemented in high school education. Notably, treated youths outperformed their counterparts in all other untreated states, with Tennessee being the only state to show a significant difference compared to its untreated neighbors.

The variation in the mandates' impact seems to be state-dependent. For example, Alabama's youth experienced a decline in scores, suggesting a negative impact, while youths from Missouri, Tennessee, and Virginia showed considerable improvements, hinting at a positive



effect of the intervention. This disparity may be attributed to the type of financial education mandate implemented; Alabama offers a career preparedness course with a partial focus on personal finance, whereas the other states provide dedicated stand-alone courses (Table 3).

This observation raises the possibility that the mixed outcomes of financial education reported in previous studies could be largely influenced by the nature of the educational approach adopted. Supporting the findings of Kaiser et al. (2022), the overall direction points to a positive effect of the intervention, indicating that, despite variations, the mandates generally promote financial literacy among young people.

### 3.2 Statistical Model

The NFCS data is a repeated cross-section, individual-level data for which we sample different individuals at different points in time. All variables are categorical, for example  $age = 1$  describes individuals aged 18-24. The treatment occurs at the group level, in this case at the state level, meaning all individuals in a given state are either treated or controls at a given point in time. In the context of this analysis, the model operates under the premise that all individuals within the 18-24 age demographic are subject to intervention during the designated period. Nonetheless, it is acknowledged that the actual impact of such a mandate would likely unfold progressively over time. For instance, if the mandate were enacted in 2013, it would initially affect only those who are 18 years of age. Subsequently, in 2014, the policy would extend to include individuals aged 18 and 19, and so forth. This temporal dimension suggests that the effects of the mandate would incrementally encompass a broader segment of the target population as years advance. We index individuals by  $i$ , groups by  $g$ , and time by  $t$ . We are interested in the effect of a treatment,  $D_{igt} \in \{0,1\}$ , on an outcome,  $Y_{igt}$ . Suppose the potential-

outcome mean of an individual in group  $g$  at time  $t$  that does not receive the treatment is given by the following:

$$E\{Y_{igt}(0)|g, t\} = \gamma_g + \gamma_t$$

where  $\gamma_g$  denotes the group effects, and  $\gamma_t$  denotes the time effects. Also suppose the potential outcome mean for someone who receives the treatment is given by the following:

$$E\{Y_{igt}(1)|g, t\} = \gamma_g + \gamma_t + \delta$$

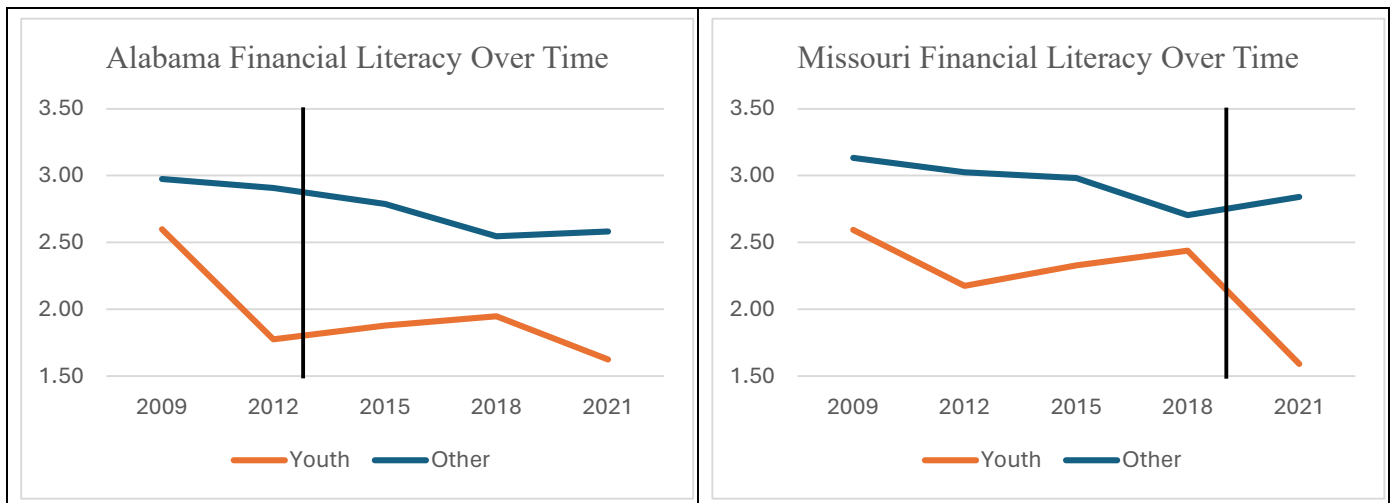
The potential outcomes allow us to think of the regression model:

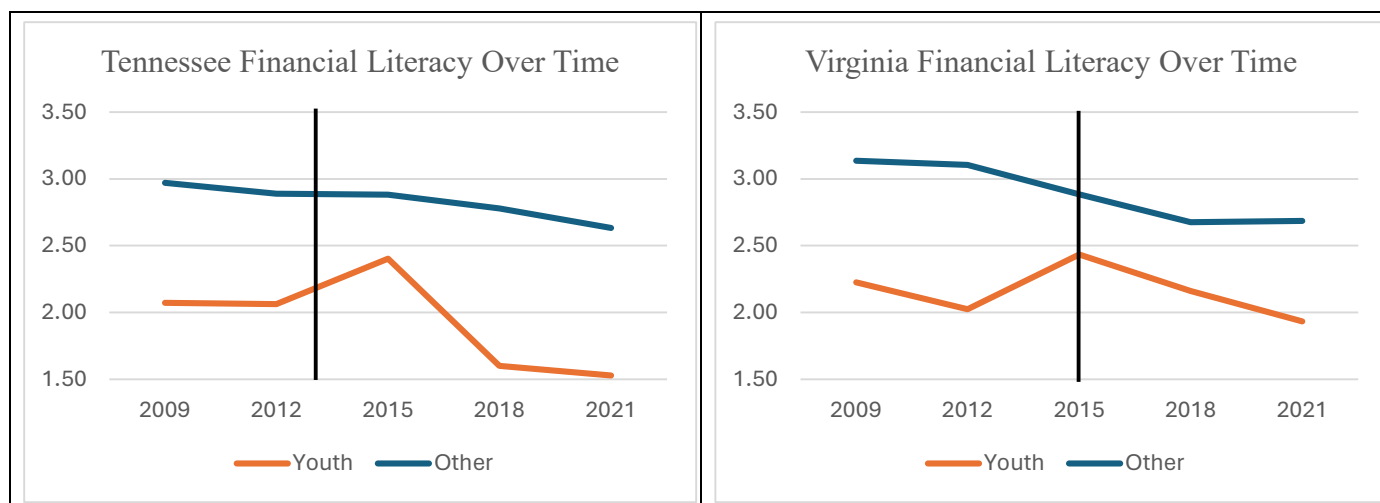
$$Y_{igt} = \gamma_g + \gamma_t + z_{igt}\beta + D_{gt}\delta + \varepsilon_{igt}$$

where  $z_{igt}$  are individual-level characteristics.

The regression analysis yields results analogous to those depicted in Figure 3.

**Figure 3: Financial Literacy Comparison Across Treated States**





**Note:** This figure shows the average financial literacy score of respondents aged 18-24 (youth) versus respondents aged 25+ (other) over time. The black vertical line denotes the year of intervention.

Figure 3 underscores the importance of financial literacy education mandates, particularly for the younger demographic. The graph illustrates that while financial literacy scores for individuals aged 25 and above show less fluctuation and a gradual decline, the scores for the 18-24 age group exhibit more significant variability. This suggests that the younger cohort's financial literacy is more susceptible to changes over time, which makes them the prime candidates for educational interventions. The pronounced variability in the youth scores, especially around the intervention year marked by the black vertical line, indicates that financial education mandates could have a substantial impact on this group. It's crucial to consider that the survey's triennial nature may mask more immediate effects of the mandates, necessitating a closer examination of the data. To expand on these findings, we conduct a more granular analysis to assess the treatment's effects on financial literacy over time.

The original model builds intuition for a case in which the treatment effect is homogenous, meaning it is the same for every state and the treatment effect does not change over time, but nothing precludes us from thinking the treatment effects, say,  $\delta_{st}$ , varies over multiple

state,  $s$ , and time periods,  $t$ . So, we want to allow the treatment effect to vary over treatment-time cohort and over time. Therefore, the treatment effects we estimate are  $ATET(c,t)$  where  $c$  corresponds to the moment in time when a group receives the treatment, a cohort, and  $t$  corresponds to time. For example, a policy might be administered at the state level starting in 2013 for some states and in 2019 for other states. In this case, we would have treatment effects of the form  $ATET(2013,t)$  and  $ATET(2019,t)$ . We are saying that the effect of the policy is different for states treated in 2013 than it is for those treated in 2019. Also, we are saying that the effect changes over time. Thus, if our sample goes from 2009 to 2021, for the 2015 cohort, we have treatment effects of the form  $ATET(2015, 2009)$ ,  $ATET(2015, 2012)$ , ...,  $ATET(2015, 2021)$ .

Therefore, this study employs the Heterogeneous Difference in Differences (HDID) model using the Augmented Inverse Probability Weighting (AIPW) estimator. This approach allows us to estimate the Average Treatment Effect on the Treated (ATET) for each combination of cohort and time, accounting for potential heterogeneity in treatment effects. Our primary interest lies in revealing how the treatment effects evolve across cohorts and time. We define cohorts by the time a state is treated, denoted by  $t$ , where  $t$  ranges from 1 to  $T$ . We denote a cohort by  $g$  and the individuals in our sample by  $i$ , where  $i$  ranges from 1 to  $N$ .

We use an indicator  $G_{ig}$  that equals one if unit  $i$  is first treated at time  $g$ . The units in cohort  $g$  can be denoted by  $G_{ig} = 1$ . When a unit  $i$  is never treated, we denote  $G_{i0} = 1$ . Thus, cohort 0 indicates all the units that are never treated. We assume that once a unit is treated, it will remain treated. We let  $\theta(g, t)$  be the ATET for cohort  $g$  at time  $t$ , which is defined as:

$$\theta(g, t) = E\{y_t(g) - y_t(0) | G_g = 1\}$$

Here,  $y_t(g)$  is the potential outcome at time  $t$  for those first treated at time  $g$ ,  $y_t(0)$  is the potential outcome for those that are never treated, and  $G_g$  equals 1 if a unit belongs to cohort  $g$ .

To define treatment effects, we need a control group. There are two ways to define the control group. One way is to use the units that are never treated as the control group. Let CNEV be an indicator that equals one if a unit belongs to the never-treated group. In particular,  $C_{g,t}^* = G_0$ , For each unit  $i$  in the pooled sample, we observe  $\{\tau_i, y_i, \tau_i, x_i, \tau_i, d_i, \tau_i, z_i, \tau_i\}$ , where  $y_i$  is the outcome,  $x_i$  are pretreatment covariates for the outcome model,  $d_i$  is a treatment indicator,  $z_i$  are covariates for the treatment assignment model, and  $\tau_i \in \{1, \dots, T\}$  is a categorical variable indicating the time when unit  $i$  is observed. Let  $T_t$  equal one if the unit is observed at time  $t$  and zero otherwise. The estimands also require the following notation:

$$m_{g,s}^{treat}(x) = \mathbf{E}(y|x, G_g = 1, \tau = s)$$

$$m_{g,s,t}^{comp}(x) = \mathbf{E}(y|x, C_{g,t}^* = 1, \tau = s)$$

$$w_{g,s}^{treat} = \frac{T_s G_g}{\mathbf{E}(T_s G_g)}$$

$$w_{g,s,t}^{comp}(z) = \frac{\frac{T_s p_{g,t}(z) C_{g,t}^*}{1 - p_{g,t}(z)}}{\mathbf{E}\left\{\frac{T_s p_{g,t}(z) C_{g,t}^*}{1 - p_{g,t}(z)}\right\}}$$

where  $p_{g,t}(z)$  is defined by  $p_{g,t}(z) = Pr(G_g = 1|z, G_g + C_{g,t}^* = 1)$  and the superscript refers to the group we are conditioning on, either the treated group (treat) or the control or comparison group (comp). The AIPW estimand is

$$\begin{aligned} \theta AIPW(g, t) = & \mathbf{E} \left( \frac{G_g}{\mathbf{E}(G_g)} \left[ \{m_{g,t}^{treat}(x) - m_{g,g-1}^{treat}(x)\} - \{m_{g,t,t}^{comp}(x) - m_{g,g-1,t}^{comp}(x)\} \right] \right) + \\ & \mathbf{E} \left[ w_{g,t}^{treat} \{y - m_{g,t}^{treat}(x)\} - w_{g,g-1}^{treat} \{y - m_{g,g-1}^{treat}(x)\} \right] - \mathbf{E} \left[ w_{g,t,t}^{comp}(z) \{y - m_{g,t,t}^{comp}(x)\} - \right. \\ & \left. w_{g,g-1,t}^{comp} \{y - m_{g,g-1,t}^{comp}(x)\} \right]. \end{aligned}$$

This study also accounts for potential correlation within clusters by using cluster-robust standard errors. This technique adjusts the standard errors to account for the fact that

observations within the same state may not be independent. In the context of our model, we cluster at the state level. This means that we allow for arbitrary correlation of the error terms within each state. By doing so, we obtain standard errors that are robust to heteroskedasticity as well as autocorrelation within each state, enhancing the reliability of our inference.

We are going to use the AIPW estimator, which allows us to model the outcome and the treatment. With the AIPW estimator, as long as one of the treatment or outcome model is correctly specified, we will get a consistent estimate of the ATET—a property called double robustness. We model financial literacy scores using the number of correct answers individuals got regarding key financial literacy questions. We conjecture those states with a higher average of correct answers has a higher level of financial literacy than those with a lower average. For the outcome variable, we believe that gender, age ethnicity, education level, marital status, income, and parent’s education level are good predictors of financial literacy; however, only age, ethnicity, marriage, and income is provided for individual across all waves of the NFCS data. We also believe that age affects the mandate as these are implemented to high school students.

All in all, the econometric model can be written as follows:  $Y_{it} = \beta_0 + \beta_1 X_{it} + \gamma S_i + \delta T_t + \epsilon_{it}$ . Where  $Y_{it}$  it is the dependent variable for individual  $i$  at time  $t$ . In our case, financial literacy scores.  $X_{it}$  is a binary variable indicating whether the individual is exposed to or took a financial literacy course in high school.  $S_i$  is a vector of state fixed effects, which controls time-invariant differences across states.  $T_t$  is a vector of year fixed effects, which controls for common shocks over time.  $\epsilon_{it}$  is the error term.

### **3.3 Simple Linear Regression to Determine Control Variables**

We sought to examine the determinants of financial literacy among individuals. To achieve this, we employed a simple linear regression model, which allowed us to explore the

relationship between financial literacy scores (the dependent variable) and a set of independent variables that we hypothesized could influence these scores. The regression analysis was conducted separately for each independent variable to ascertain its unique contribution to the variance in financial literacy scores. The results, presented in Table 9, indicate the extent to which each variable can predict financial literacy. For each unit increase in the independent variable, while holding other variables constant, the financial literacy score is expected to change by the magnitude of the respective coefficient.

The coefficients obtained from the regression models are interpreted as follows: a positive coefficient suggests a direct relationship with financial literacy scores, whereas a negative coefficient indicates an inverse relationship. The statistical significance of each coefficient was determined by its p-value. Variables that exhibited a significant p-value were considered as having a substantial impact on financial literacy scores and, thus, were controlled for in the sample to mitigate potential biases. This rigorous approach ensures that the observed relationships are less likely to be spurious and more reflective of the true effects of the independent variables on financial literacy.

**Table 9: Predictive Power of Dependent Variables**

<b>Variable</b>	<b>Categories</b>	<b>Coefficient</b>
Gender	Male	2.93
	Female	***-0.46
Age	18-24	2.29
	25-34	***0.25
	35-44	***0.53
	45-54	***1.00
	55-64	***1.18
	65+	***1.39
Ethnicity	White non-Hispanic	3.10
	Non-White	***-0.57
Education	Did not complete high school	2.00

	High school graduate - regular high school	***0.32
	High school graduate - GED or alternative	0.11
	Some college, no degree	***0.82
	Associate's degree	***0.94
	Bachelor's degree	***1.24
	Postgraduate degree	***1.30
Marriage	Married	3.16
	Living with partner	***-0.53
	Single	***-0.49
Income	Less than \$15,000	2.39
	At least \$15,000 but less than \$25,000	*0.08
	At least \$25,000 but less than \$35,000	***0.19
	At least \$35,000 but less than \$50,000	***0.48
	At least \$50,000 but less than \$75,000	***0.65
	At least \$75,000 but less than \$100,000	***0.66
	At least \$100,000 but less than \$150,000	***0.98
	\$150,000 or more	***1.17
Parental Education	Did not complete high school	2.59
	High school graduate/GED	0.03
	Some college, no degree	0.04
	Associate's degree	***0.22
	Bachelor's degree	***0.45
	Postgraduate degree	***0.52
	Don't know	0.12
	Prefer not to say	-0.46
Financial Education Offer Status	Yes, but I did not participate	2.73
	Yes, and I did participate	***0.33
Financial Education Received in High School Mandate	Yes	3.06
	No Requirements	2.85
	K-12 Standards	**0.12
	District Implementation	***0.11
	HS Course Offered	0.02
	Coursework Integrated	0.02
	Standalone Course	0.04

**Note:** These regressions were estimated using the NFCS survey weights. \*, \*\*, and \*\*\* mean significance at the 10%, 5% and 1% level respectively.

Gender emerges as a significant predictor, with males exhibiting higher financial literacy scores by a coefficient of 2.93, while females are associated with a slightly lower score, as



indicated by a coefficient of -0.46,, Age also plays a crucial role, with increasing coefficients across age brackets, suggesting a positive correlation between age and financial literacy, culminating in the highest coefficient of 1.39 for individuals aged 65 and above.

Ethnicity and education level further compound the complexity of financial literacy determinants. White non-Hispanic individuals have a baseline higher score, with a coefficient of 3.10, whereas non-White individuals have a lower score by -0.57. A gradient is observed in education levels, where higher educational attainment consistently correlates with higher financial literacy scores, highlighting the profound impact of education on financial acumen. Marital status and income level are also significant contributors. Married individuals boast the highest financial literacy scores, with a coefficient of 3.16, while those living with a partner or single have lower scores. The positive gradient in income brackets underscores the association between higher income and greater financial literacy, with the coefficient peaking at 1.17 for those earning \$150,000 or more.

Parental education, while less pronounced than personal education, still shows a positive trend, with higher parental education levels corresponding to higher financial literacy scores. Interestingly, the availability and participation in financial education offer a unique perspective, with those participating in such programs scoring higher by 0.33 points. Lastly, the presence of financial education mandates within school districts, although showing modest coefficients, suggests a slight improvement in financial literacy scores, reinforcing the value of early financial education.

## **Chapter 4**

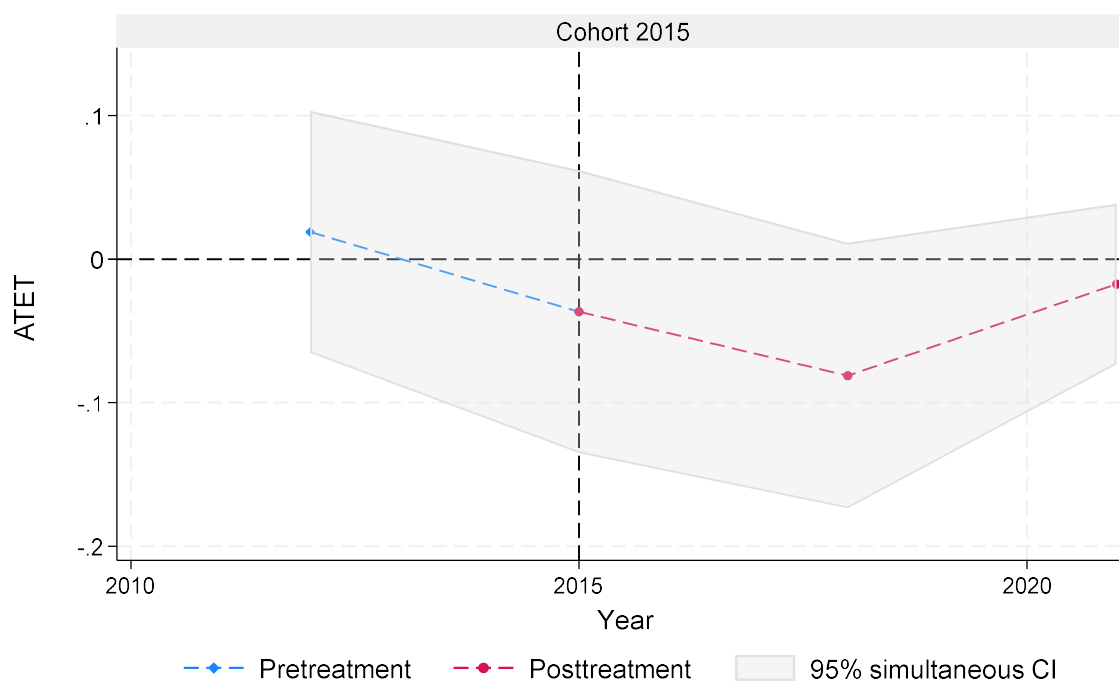
### **Results and Conclusions**

#### **4.1 Main Findings**

After all the controls were placed and we limited the data to individuals aged 18-24, the dataset revealed two main cohorts, 2015 and 2021. The data from the 2015 and 2021 cohorts present an opportunity to apply econometric principles to understand the impact of interventions over time. The Average Treatment Effect on the Treated (ATET) serves as a robust measure to gauge this impact, with the 2015 dataset offering a more comprehensive view due to its extended post-treatment period. Nonetheless, all findings were statistically significant ( $p < 0.05$ ).

**Figure 4: Average Treatment Effect on the Treated for Cohort 2015 Over Time**

**Figure 4: Average Treatment Effect on the Treated for Cohort 2015 Over Time**



In the 2015 cohort (Figure 4), the econometric analysis reveals a distinct shift in the ATET post-intervention. The pre-treatment trend, represented by the blue line with diamond markers, indicates a negative ATET leading up to 2015. This downward trajectory suggests that, in the absence of treatment, the cohort was experiencing a decline in the outcome of interest.

The intervention introduced in 2015 marks a critical juncture, as evidenced by the vertical dashed line. Post-intervention, the red dashed line with square markers initially continues the decline, implying that the treatment did not have an immediate positive effect. However, a notable inflection occurs after 2018, where the ATET begins to rise sharply. This delayed response is indicative of the treatment's effectiveness, albeit with a lag.

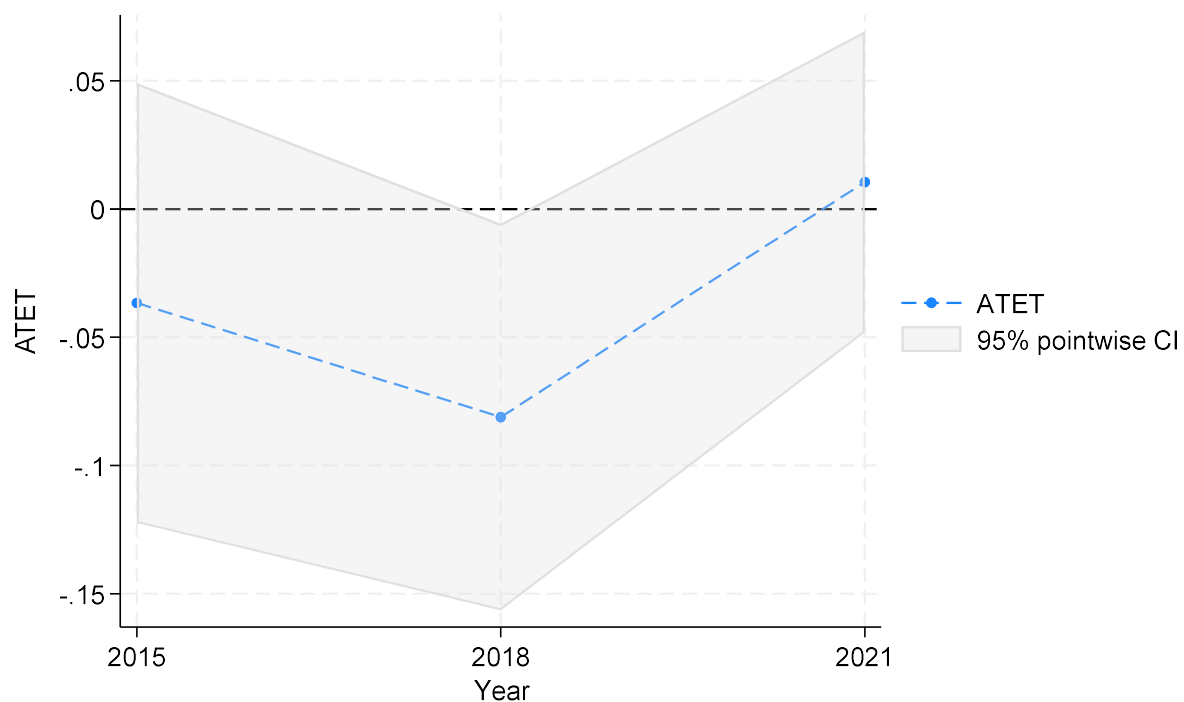
The 95% simultaneous Confidence Interval (CI) around both lines underscores the precision of these estimates. While the pre-treatment period exhibits a consistent trend, the post-treatment period's increased CI width reflects greater variability, suggesting that individual responses to the treatment may differ significantly.

While the 2021 cohort's recent data limits the graphical depiction of its post-treatment period, the 2015 cohort's results are instrumental in informing the overall treatment effect. The initial negative impact, followed by a positive turn, highlights the dynamic nature of the intervention's influence over time. However, the presence of the CI cautions against overgeneralization, emphasizing the need for continued research and monitoring to fully comprehend the long-term implications of the treatment and to refine its application for enhanced effectiveness.

While the 2021 cohort lacks graphical longitudinal representation due to the recency of the data, the ATET for this cohort can inform the overall treatment effect when aggregated over time. Figure 4 illustrates this aggregate effect, with the blue dashed line depicting the ATET across 2015, 2018, and 2021. The observed dip in 2018, followed by an uptick towards 2021, does not necessarily correlate to a specific intervention but rather indicates a general trend in the ATET over time.

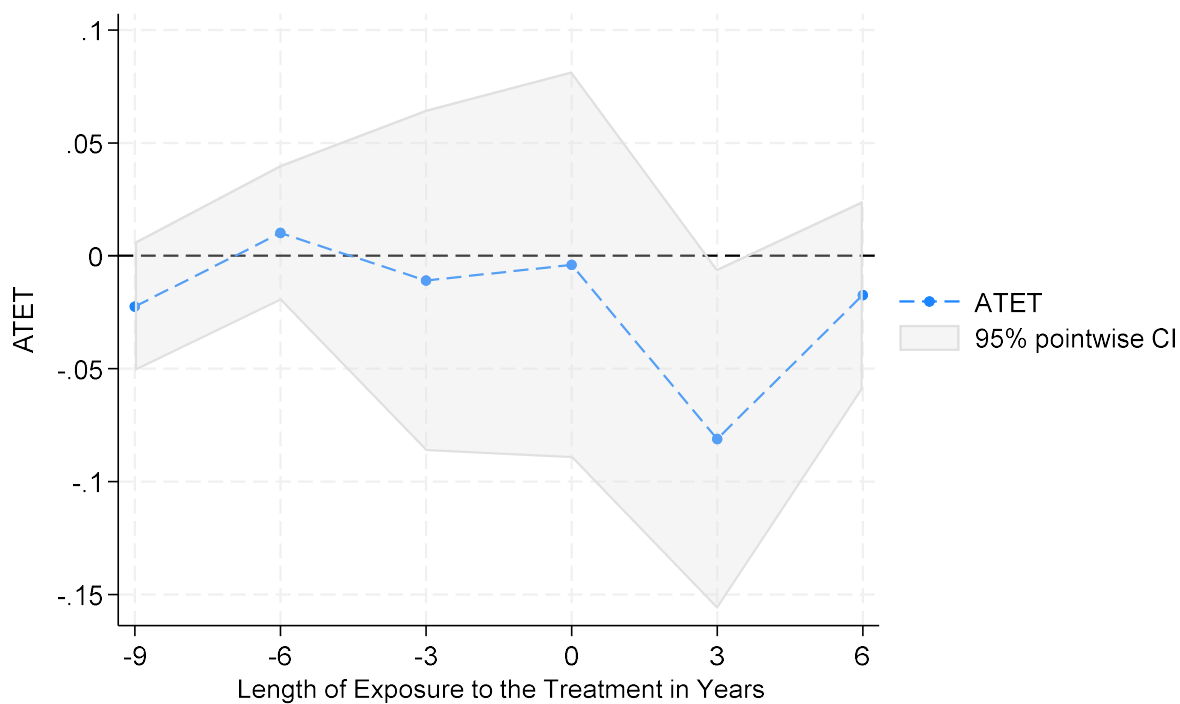
**Figure 5: The Average Treated Effect on the Treated Aggregated Over Time**

**Figure 5: The Average Treated Effect on the Treated Aggregated Over Time**



The data suggest that the mandate interventions led to a positive shift in outcomes after an initial period of decline. The aggregate analysis further indicates a general improvement over time, with the caveat of individual variability. Venturing into the analysis of the treatment's durability, we consider the temporal dimension of exposure and its influence on the Average Treatment Effect on the Treated (ATET). Figure 6 serves as a visual guide, mapping the ATET across different exposure lengths with a blue dashed line.

**Figure 6: Average Treatment Effect on the Treated Based on the Length of Exposure to the Treatment**



The x-axis, marking the passage of years, becomes a timeline of treatment exposure. The y-axis, scaling the ATET from -0.15 to +0.05, captures the magnitude of the treatment's impact. The shaded grey area, representing the 95% pointwise Confidence Interval (CI), provides a statistical backdrop, framing our certainty around the ATET estimates. Observing the ATET's trajectory, we note an initial dip post-treatment commencement, suggesting an adaptation period where the treatment's benefits are not immediately apparent. As we progress towards the third year, the ATET ascends, hinting at the treatment's emergent efficacy. This upward shift, followed by a plateau, paints a picture of a treatment gaining momentum before stabilizing.

The coefficients for negative years of exposure serve as a prelude, offering a baseline against which we measure the post-treatment ATET. Ideally, these coefficients should hover near

zero, affirming the absence of treatment effects prior to its administration. Significant deviations from zero could signal underlying complexities in the data, such as time-varying confounders or nuances in the study's framework.

In essence, the data suggests a narrative of gradual improvement, where the true benefits of the treatment unfold over time. This underscores the importance of patience and persistence in evaluating the long-term efficacy of interventions

## **4.2 Interpretation**

The analysis of the data yields two principal interpretations regarding the impact of financial literacy mandates. Firstly, while the mandates aim to bolster financial literacy, the data does not robustly support a direct positive correlation. This suggests that the mandates alone may not be sufficient to drive a discernible increase in financial literacy scores. However, a closer examination reveals a subtler, yet significant trend. The data indicates a latency period, approximately three years, following the implementation of the mandates, before a positive shift in financial literacy scores becomes evident. This delay could be indicative of a transitional phase necessary for the mandates to take root and effectuate measurable change.

This transitional period could be attributed to several factors. It may reflect the time required for educational institutions to integrate the mandates into their curricula effectively, for teachers to adapt to new instructional methods, or for students to absorb and apply the financial knowledge imparted. Additionally, it may capture the lag between acquiring knowledge and the manifestation of that knowledge in improved financial behaviors and decision-making. The presence of this buffer period underscores the complexity of assessing policy impacts on financial literacy. It suggests that while immediate results may not be apparent, patience and a longitudinal perspective are essential to evaluate the true efficacy of such interventions.

Moreover, it highlights the importance of considering the temporal dynamics of policy implementation and the gradual nature of educational outcomes.

The earlier results also emphasize the critical need for financial literacy mandates to be implemented at the high school level. The data showed that financial literacy is not only lower among high school-aged individuals but also exhibits greater variability, indicating a lack of consistent financial knowledge within this demographic. The positive change in financial literacy scores for this age group post-intervention (Missouri, Tennessee, Virginia) is particularly telling. It suggests that when financial education is introduced during high school, it can have a significant and positive effect on young people's financial knowledge. This is likely because high school students are at a pivotal point in their lives where they begin to make independent financial decisions, such as managing allowances, part-time job earnings, and making choices about college and student loans.

By introducing financial literacy mandates at this stage, students are equipped with the essential skills to make informed financial decisions, which can lead to better outcomes in their immediate and long-term financial well-being. Moreover, these mandates can help establish a foundation of financial understanding that students can build upon as they encounter more complex financial scenarios in adulthood. In conclusion, the mandates appear to steer financial literacy scores in a favorable direction, albeit with a delayed effect. This finding advocates for the sustained application and reinforcement of financial literacy mandates, coupled with ongoing monitoring and assessment, to ensure their long-term success in enhancing financial acumen.

### **4.3 Limitations**

The limitations encountered in this study are multifaceted and stem from the inherent constraints of the dataset and the nascent nature of the financial literacy mandates. The dataset's

longitudinal span is marred by inconsistencies, most notably in the collection of gender data. The 2021 wave alone provides gender-specific insights, a stark contrast to previous waves where such data remains absent due to questionnaire incompatibilities. This discontinuity poses a significant challenge to the analysis, as it precludes a comprehensive understanding of gender's role across time. However, gender was not the only variable impacted. Numerous other variables were not tracked until later waves leading to problematic applications in financial literacy score application. While one individual may have their parent's education noted, they may not have answered a question regarding their exposure to a financial literacy program. Future studies would benefit from standardized data collection methods that ensure continuity and applicability for all variables.

A pivotal limitation arises from the inability to confirm individual participation in mandated financial literacy courses. The study presupposes treatment for all individuals offered such courses, which may not accurately capture the treatment's true effect. This assumption introduces a degree of uncertainty that could skew the results. To mitigate this, subsequent research should aim to incorporate mechanisms that directly ascertain treatment receipt, thereby enhancing the precision of treatment effect estimation.

Another pitfall lies in a broad assumption regarding the treated group. In the context of this analysis, the model operates under the premise that all individuals within the 18-24 age demographic are subject to the intervention during the designated period. Nonetheless, it is acknowledged that the actual impact of such an intervention would likely unfold progressively over time. For instance, if the mandate were enacted in 2013, it would initially affect only those who are 18 years of age. Subsequently, in 2014, the policy would extend to include individuals



aged 18 and 19, and so forth. This temporal dimension suggests that the effects of the mandate would incrementally encompass a broader segment of the target population as years advance.”

Furthermore, with only four states represented in the current dataset, the study’s scope is inherently limited. The recency of the financial literacy mandates further compounds this issue, as comprehensive data reflecting their effects is not yet available. As more states implement these mandates and as longitudinal data accumulates, the opportunity for a more expansive and representative analysis will emerge. This evolution in data availability promises to shed light on the mandates’ efficacy across diverse sociopolitical landscapes.

The delayed implementation of policies and the subsequent lag in data availability present significant challenges to timely analysis. The Council for Economic Education’s release of new information for 2024 and the anticipated updates from FINRA signal a forthcoming wealth of data. However, the full effects of recently adopted policies will not be observable until future cohorts, such as those of 2027 or 2030, have matured. This temporal gap necessitates patience and underscores the importance of ongoing data collection and analysis to capture the long-term effects of financial literacy mandates.

#### **4.4 Areas for Furutre Research**

The evolution of financial literacy mandates into the forthcoming decade underscores a pivotal challenge in economic research: the scarcity of longitudinal data that accurately captures the mandates’ effects. The reliance on cross-sectional data, while informative, does not suffice to unravel the temporal dynamics of financial education’s impact. Indeed, a substantial portion of existing studies may be constrained by this methodological approach, potentially overlooking the nuanced, long-term outcomes of financial literacy initiatives.

The call for a comprehensive panel study is both timely and critical. Such a study would trace the financial literacy journey of individuals from their initial exposure to educational interventions through to the enduring consequences in their later years. This longitudinal approach would illuminate the trajectory of financial knowledge and behaviors, offering a richer, more detailed narrative of financial literacy's influence over the lifespan.

Governmental implementation of these mandates could serve as a catalyst for this endeavor, providing a structured framework for tracking participants over extended periods. This systematic tracking would yield a wealth of data, enabling researchers to discern patterns, measure effectiveness, and substantiate the real-world implications of financial literacy education.

Moreover, the transition from categorical variables to precise data points, such as exact birth years and income levels, would significantly enhance the granularity of the analysis. With access to such detailed information, researchers could more accurately identify who is thriving financially, delve into the reasons behind their success, and calculate reliable statistical measures like means, medians, and variances.

In building upon this study, future research should prioritize the establishment of longitudinal datasets that can support robust econometric analyses. Such datasets would not only bridge the current gap in the literature but also provide a solid foundation for evaluating and refining financial literacy mandates. As we navigate the complexities of financial education policy, the integration of precise, longitudinal data will be instrumental in shaping a financially literate society equipped to face the challenges of the next decade and beyond.

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