# Financial Literacy and Financial Crime: A Regression Discontinuity Approach*

Paul G. Freed† and John Hackney‡

July 2025

**Abstract**

This study investigates how personal financial literacy shapes the propensity of households to engage in financial crime. Using administrative data on financial crime charges linked to comprehensive public records, we exploit a policy-based discontinuity in birth dates that exogenously assigns certain high school cohorts to a mandatory year-long financial literacy course. We track the criminal behavior of the individuals for six years following the treatment. Our estimates suggest that exposure to the financial literacy intervention reduces the individual propensity to commit financial crime by approximately 37%. Other common types of non-financial criminal behavior remain largely unaffected. The reductions are driven by sizable declines in embezzlement and tend to concentrate in low-income neighborhoods. Additional analyses finds that the reductions are predominantly explained by an improvement in the household balance sheets of young employees.

**Keywords:** Household Finance, Financial Crime, Financial Literacy, Behavioral Finance

**JEL Codes:** D12, D14, G40, G51, G53

*We thank Annamaria Lusardi, Tim Kaiser, Sheisha Kulkarni, Hank Bessembinder, Philip Bond, Doug Cumming, Jarrad Harford, Chris Hrdlicka, Jonathan Karpoff, Da Ke, Jennifer Koski, Jordan Nickerson, Stephan Siegel, Denis Sosyura, Mike Wittry and seminar participants at the Stanford Financial Education Symposium, Virtual Household Finance Seminar, University of Washington Finance PhD Alumni Conference, Boca-ECGI Conference, and University of South Carolina. Any errors are our own. The authors acknowledge financial support from the the Moore School Research Grant Program.

†University of Virginia, Darden School of Business. Contact: freedp@darden.virginia.edu

‡University of Arkansas, Walton College of Business. Contact: jhackney@walton.uark.edu

> "These crimes are not violent, but they are not victimless... [they] can destroy a company, wipe out a person's life savings, cost investors billions of dollars, and erode the public's trust in institutions."
>
> – Description of Financial Crime, Federal Bureau of Investigation

# 1 Introduction

Financial crime imposes significant costs on households and firms. In the United States alone, total damages from financial crime exceed $300 billion annually (FBI (2022)). Some financial crimes, such as the Bernie Madoff Ponzi scheme or the FTX cryptocurrency fraud, are highly sophisticated and widely publicized. However, the vast majority of financial crimes are committed by regular individuals (Rosales and Jiménez-Rubio (2017)), and range from embezzlement, or the misappropriation of company funds by an employee for personal use, to retail fraud, or the use another person's credit card without permission. Recent data suggests that financial crimes cost firms about 5% of annual revenue and contribute to as many as 30% of small business failures (Black and Fennelly (2020); ACFE (2022)). At the same time, 15% of US households report falling victim to financial fraud schemes (Gallup (2023)). These statistics imply not only a large total cost of financial crime, but also a large number of individual financial criminals. Despite the pervasive nature of these crimes, very little empirical research examines the motivations for financial crime or the policies that could help to reduce it.

Financial crime is characterized by three primary features: nonviolent means, abuse of trust, and monetary motivation (USDOJ (1989)).[1] The last feature suggests that policies focused on the alleviation of financial constraints may also help to curb financial crime as a consequence. Motivated by this conjecture, we ask whether financial literacy affects the propensity of individuals to commit financial crime.

[1]The full definition of financial (white-collar) crimes is as follows: "those illegal acts which are characterized by deceit, concealment, or violation of trust and which are not dependent upon the application or threat of physical force or violence. Individuals and organizations commit these acts to obtain money, property, or services; to avoid the payment or loss of money or services; or to secure personal or business advantage."

We address this question using administrative data on the universe of financial criminal charges from the court system of the state of Virginia, which we link to the residential addresses and personal information of a near-complete sample of the Virginia population.[2] Typically, information on individual financial crimes is managed by municipalities, where it is often not digitized and largely inaccessible. Our final dataset allows us to observe not only specific crimes and defendants, but also a rich set of individual characteristics such as age, gender, race, family size, and homeownership. As such, this data affords us a unique opportunity to explore financial crime in a broad sample of regular individuals.

Our focus on financial literacy is motivated by two observations. First, financial literacy is one of the most significant components of financial well-being, leading to more saving (Bernheim and Garrett (2003);Lusardi and Mitchell (2007), Cole et al. (2011); Lusardi and Mitchell (2011); Van Rooij et al. (2012)), stock market participation and investment returns (Van Rooij et al. (2011); von Gaudecker (2015); Clark et al. (2017), Bianchi (2018)), and effective debt management (Lusardi and Tufano (2015), Brown et al. (2016); Lusardi et al. (2020)). Second, research suggests that financial literacy can be readily improved in a population through education policy (Bernheim et al. (2001); Kaiser et al. (2022); Lusardi and Mitchell (2023)), especially for the young (Brown et al. (2016); Urban et al. (2020)). As such, financial literacy interventions may reduce the incentives to commit financial crime by strengthening the personal balance sheets of economically constrained young individuals.

Identifying the causal effect of financial literacy on financial crime is challenging given its correlation with a variety of unobservable individual characteristics, such as cognitive ability (Agarwal and Mazumder (2013)) and broader human capital (Lusardi and Mitchell (2014), Lusardi and Mitchell (2023)). To overcome this challenge, we leverage the passage of a Virginia Board of Education policy (Code of Virginia § 22.1-200.03) that requires a year-long standalone financial literacy course for all high-school students beginning with the 2015 class cohort. We sort individuals into treatment and control groups based on birth dates near

[2]To illustrate the granularity of the data, we plot the home addresses of individuals charged with financial crimes in the city of Richmond, VA in Figure 1.

the cutoff for the 2015 class cohort, or September 30, 1996. By focusing on students near this arbitrary threshold, we can create treatment and control groups of individuals that are closely matched, and estimate the effect of financial literacy training using a regression-discontinuity framework.[3] This approach is akin to a large and robust literature in economics using an individual's assignment to a birth cohort to identify exogenous variation in educational or policy-level treatment.[4] Importantly, selection into the treatment cohort is unlikely in our setting since students are already assigned to a class cohort by the time the intervention is proposed.

Using this RDD framework, we find a strong, negative relation between receiving the financial literacy training and the propensity to commit financial crime. The estimates suggest that receiving the treatment reduces the probability of committing of financial crime by 32–37% relative to the mean for at least six years. Consistent with the identifying assumptions, we find no differences in density and no differences in other observable characteristics around the cutoff for the 2015 class cohort. The estimates are also robust to a wide variety of high-dimensional fixed effects, alternative bandwidths around the threshold, and higher order polynomial regression discontinuity designs. Finally, we find an effect only around the threshold for the 2015 class cohort and not for class cohorts either preceding or following 2015 where no differences in financial literacy treatment exist. This last finding suggests that neither differences in overall education (i.e., Cole et al. (2014)) nor time in the labor force are driving the main result.

We verify that the mandatory financial education classes in Virginia correspond to improved financial literacy using survey data on Virginia residents from the Financial Industry Regulatory Authority (FINRA). Specifically, we find that past personal finance course attendance strongly positively predicts tested financial literacy scores in the 18-24 age group

[3]This approach differs from earlier work using variation in financial education policies across states (Bernheim et al. (2001); Brown et al. (2016); Urban et al. (2020)).

[4]See, i.e., Carpenter and Dobkin (2017), Wherry et al. (2018), Avdic and Karimi (2018), Bailey et al. (2024), Cornelissen and Dustmann (2019), Felfe et al. (2020), Takaku and Yokoyama (2021), Clark (2023), Cook and East (2024)

that is the focus of our study. Moreover, the estimated coefficient for the financial literacy treatment is larger than that of income, and comparable to that of a college education. This result supports recent findings that financial education positively impacts consumer financial behavior, especially for the young (Brown et al. (2016); Urban et al. (2020)).

The richness of the administrative judicial data also allows us to examine which types of financial crime are affected by financial literacy training. We divide financial crimes into several categories– embezzlement, financial fraud, forgery, and counterfeit– and find the main results are driven primarily by a reduction in embezzlement, defined as the misappropriation of funds placed in one's trust. The effect is sizable, corresponding to an over 60% decrease relative to the sample mean. This result is important, because it also points to a likely underlying mechanism, since trusted employees become embezzlers when they develop a non-shareable financial problem (Cressey (1953), Williams (2006)).[5]

We also apply our methodology to criminal behavior more broadly. To the extent that financial literacy impacts financial crime primarily through a relaxation of financial constraints, we would expect little to no effect on other common types of crime without monetary motivation. Consistent with this intuition, we find no effect of financial literacy on the propensities to commit violent crimes, drug-related crimes, or vandalism. We also find negative but insignificant effects for non-financial crimes that involve some monetary incentive (i.e., larceny), which is consistent with the relatively smaller monetary gains from these crimes and higher legal penalties (Maddan et al. (2012)). These additional tests provide evidence that financial literacy reduces financial crimes specifically, rather than crime more broadly.

We next test for possible economic mechanisms, beginning with the role of financial constraints. Initial analysis shows that residents in a neighborhood in the lowest quartile of income are 106% more likely to commit a financial crime, suggesting that economic constraints are indeed important and that financial literacy interventions may be particularly

[5]Embezzlement also tends to be more common and less sophisticated than other financial crimes (Fan et al. (2010), Makowsky and Wang (2018), Attanasi et al. (2019)).

significant for this population. Consistent with this intuition, we find that the effects of the financial literacy intervention are much stronger for residents of low-income neighborhoods, who experience a 42–48% decrease in the propensity to commit financial crime relative to residents of higher-income neighborhoods. Conversely, individuals in high-income neighborhoods experience no change in the probability of committing a financial crime after treatment. As such, we find *a priori* evidence that one likely channel through which financial literacy affects financial crime is through a relaxation of financial constraints.

We directly test for specific mechanisms through which financial literacy can reduce the propensity to commit financial crime using a sample of highly-detailed Census microdata from the Survey of Income and Program Participation (SIPP). We find that treated individuals reduce reliance on credit card debt and increase precautionary savings and investments. The effects are dramatic; for example, the financial literacy treatment nearly doubles the allocation of assets into the stock market and increases the probability of maintaining a savings account by 51%. Altogether, this shift in behavior is consistent with the hypothesis that the effect of financial literacy on financial crime operates through a reduction in economic and financial constraints.

We consider several, non-mutually-exclusive alternative explanations for our results. First, individuals receiving financial education may become more sophisticated, and therefore better able to hide their financial crimes. To explore this alternative mechanism, we test whether the number of reported financial crimes responds to the implementation of mandatory financial literacy courses using incident-level data from the Data Analysis and Reporting Team (DART) of the Virginia Department of State Police. Consistent with our main results, we find that the time-varying proportion of local residents that receive financial education is negatively related to the number of reported instances of embezzlement, but not other financial crimes. Given the improbability of individuals or businesses failing to report the loss of sizable sums of money and the relative simplicity of most embezzlement occurrences, these results suggest that financial literacy courses do not lead to more sophisticated

financial criminals who simply avoid prosecution.

Because embezzlement typically involves an abuse of trust and relies on ex ante access to funds, we also examine whether treated individuals are more likely to obtain a financial or managerial position. Utilizing detailed employment data from SIPP, we find that individuals receiving the financial literacy treatment are no more likely to be in a managerial role, an accounting or bookkeeping department, or a financial industry. As such, we find no evidence of selection into occupations with greater access to funds and greater ability to cover up financial crimes.

Second, financially literate individuals may also be better equipped to avoid becoming *victims* of financial crime. This explanation implies that the baseline effects are due to a lack of opportunity for financial criminals, rather than a reduction in the financial constraints of the potential perpetrators. However, we find that the reduction in financial crime is concentrated in embezzlement, which is committed against existing businesses and not peers or classmates. In addition, we find that treated individuals are no more likely to open a business than untreated individuals, indicating that these are not the business owners against which embezzlement occurs. As such, the overall evidence is inconsistent with a reduction in the number of potential financial crime victims.

Third, treated individuals may also self-select into higher education that provide less opportunity to commit financial crime, or experience an increase in mobility and subsequently leave the state. For example, financially literate individuals may choose to attend college, thereby reducing the opportunity to commit embezzlement, or move to Wall Street for employment, and therefore commit financial crimes elsewhere. We find no significant differences in the selection of treated individuals into college attendance, post-graduate education, or professional degree programs, and no differences in migration. As such, these results suggest that the observed reduction in financial crime is unlikely to be driven entirely by the education decisions or enhanced mobility of treated individuals.

Finally, while the financial literacy requirement applies to all public schools, the results

may be confounded by non-random selection into particular schools. For example, parents are likely to consciously choose the school their children attend, and this selection could reflect family characteristics that simultaneously affect their children's predilection toward crime. Using family-level identifiers from our main dataset, we therefore compare the propensities to commit financial crime by siblings originating from the same family, but in near-adjacent educational cohorts. This design holds constant family characteristics, whether economic or social, that may potentially confound the main results. Consistent with the baseline design, we find that individuals receiving the treatment are around 50% less likely to commit financial crime relative to their siblings near the same age.

This study is the first to examine how financial literacy, enacted via educational interventions, can influence the individual propensity of committing financial crime. Also, it is the first in the broad economics literature to relate specific types of educational interventions to associated types of criminal behavior. As a result, our paper rests at the intersection of several major topics, such as household finance, financial literacy, educational economics, public policy, and criminology.

Financial literacy research traditionally explores the efficacy of financial education in improving financial knowledge and/or the effect of financial literacy on financial and economic outcomes. Early work in financial education finds little to no effect on financial literacy (Fernandes et al. (2014)), but more recent analyses suggest that modern changes to financial education are bearing fruit (Lusardi and Mitchell (2023)). For example, in a meta-analysis of 76 randomized experiments, Kaiser et al. (2022) finds that financial education produces sizable increases in financial literacy, which subsequently influences individual savings, budgeting, and credit behavior. Brown et al. (2016) and Urban et al. (2020) both find that the effects of financial education are particularly important for young people. Overall, financial literacy and improved financial behavior can substantially improve individual welfare (Lusardi and Mitchell (2014), Parise and Peijnenburg (2019), Brown et al. (2019), Song (2020), Keys et al. (2023), Lusardi and Mitchell (2023)) while also spilling over to neighbors

(Haliassos et al. (2020)). Despite this extensive literature on the financial and economic implications of financial literacy, little is known about its effect on financial crime, which has long-lasting implications for individuals and substantial social costs. Our findings suggest that accounting for the spillover effects of financial literacy programs on criminal behavior dramatically increases the welfare gains associated with such policies, as the value of the spillover effects *alone* suggests the benefits far outweigh the implementation costs.

Additionally, this study makes a significant contribution to the literature on finance and financial crime. This literature generally focuses on the role of banks and other financial institutions in effecting large-scale, sophisticated financial crimes (Gao et al. (2020), Leong et al. (2024)), or on misconduct by individuals in the financial services sector (Karpoff and Lou (2010), Dimmock et al. (2018), Parsons et al. (2018), Dimmock et al. (2021), Egan et al. (2022), Lel et al. (2023)). We add to this literature by examining the determinants of financial criminal behavior in a much broader population of individuals and for a larger set financial crimes, which are pervasive but remain relatively under-explored due to lack of data. Our findings therefore add important depth and nuance to our understanding of the determinants of financial crime more generally.

Finally, this study contributes to the literature on crime and economics more broadly, which focuses on the interactions of poverty, education, and criminal behavior. This literature finds that income shocks have a negative effect on general criminal behaviors (Mehlum et al. (2006), Cook and Kang (2016), Cortés et al. (2016), Bignon et al. (2017), Watson et al. (2020), Khanna et al. (2021), Melander and Miotto (2023)), while high levels of personal debt are positively related to criminal behavior (Aaltonen et al. (2016), van Beek et al. (2021)). We find corroborating evidence that personal financial literacy enhanced through education interventions reduces the propensity to commit crime by strengthening household balance sheets.

## 2 Financial Literacy Requirement

In 2009, the Virginia Board of Education (VBOE) unanimously approved a financial literacy course requirement for graduation in the public school system (Code of Virginia § 22.1-200.03). The requirement went into effect for the graduating cohort of 2015, or the students with birthdays after September 30, 1996. The policy requires students to attend stand-alone financial literacy classes, rather than learn the material embedded in other courses such as mathematics. The course requirement was largely driven by concerns of financial literacy in the state following the Global Financial Crisis, and its general goal was to improve the state of the economy by improving individual financial behaviors.[6] The passage of the requirement was not without resistance, as local groups were concerned that students would have to sacrifice other electives and face busier schedules.

The learning objectives of the course are set by the state government and passed to the individual school districts.[7] As such, the objectives are homogeneous across all schools and include a broad range of general economics topics as well as specific financial and personal finance topics, the latter of which serve as the main focus of the course. For the general economics portion, the course covers concepts such as supply and demand, equilibrium prices and wages, business formation and types of business organizations, and the market value of productivity and human capital. Additionally, students are required to know details of the financial system, including the roles of currency, the purpose of the Federal Reserve System, the tools of monetary policy, and the international monetary system.

The personal financial topics covered include precautionary saving, such as understanding banking transactions and statements in detail, and savings and consumption decisions, such as understanding the costs and benefits of purchasing or leasing a vehicle or the costs and benefits of renting. Course objectives also include knowledge of effective debt management and the impact of credit card features on personal financial planning. Additionally, students

[6] For a description of the program's goals, see: Stated Goals

[7] The most recent course objectives can be found in Internet Appendix IA.2.

must be familiar with saving as it relates to investments, and thus must be familiar with the functioning of the stock market. Finally, the course covers tax planning and payments and other broad financial planning decisions, such as evaluating discretionary spending choices.

Overall, the course familiarizes students with the economic system, and places particular emphasis on improving personal financial decision-making skills. In Section 6, we explore whether the course indeed influences the students' financial behavior along several the dimensions related to course topics.

# 3 Data and Variables

## 3.1 Sample and Variables

We combine several novel datasets to examine how a financial literacy intervention targeted at adolescents shapes the propensity to commit financial crimes. We use administrative criminal court records from the state of Virginia linked to the residential addresses and personal information of a near-complete sample of the Virginia population. The resulting dataset grants us a comprehensive view of individuals' criminal records along with detailed demographic data.

We obtain detailed information on all criminal cases and hearings from circuit and district courts in Virginia covering the years 2008-2020. Circuit and district courts handle nearly all crimes committed in the state across all levels of severity, providing us with rich information on criminal behavior at the individual level. Criminal court data include the names of the defendants, along with information on the leveled charges, hearing and sentencing, and the birth day and month of the recorded individuals.

We report summary statistics for key variables in Table 1. Our main analysis is cross-sectional, with each individual appearing once. The full version of the dataset is comprised of about 5.5 million individuals (age 18+) linked to detailed criminal charges. We restrict the sample to individuals between 18 and 30 since the financial literacy treatment in 2015

only effects younger individuals. The resulting dataset is thus roughly evenly split between individuals that receive the financial literacy intervention and those that do not. Around the optimal bandwidth of 16 months on either side of the birth date cutoff, there are 118,689 individuals.

We report variables from the administrative court system data in Panel A of Table 1. We define *Financial Crime* as an indicator variable that is equal to one if individual is charged with a financial crime. Financial crimes include embezzlement, fraud, forgery, and counterfeit following the delineations in the court system of Virginia and the literature on financial crime. *Embezzlement* is defined as an individual wrongfully taking funds entrusted to them, typically in an employer-employee relationship. *Fraud* refers to general financial fraud, such as healthcare fraud, real estate fraud, or identity theft. This crime is the act of deception, false statements, or misleading others for financial gain. *Forgery* is defined as the falsification of financial documents or signature and *Counterfeit* is a specific type of forgery involving a note, coin, or bill of a banking institution with the intent to defraud. Given our complete coverage of criminal charges, we also define additional indicator variables for the following crimes unrelated to finance: *Murder*, *Assault*, *Drugs*, or any drug-related crime, and *Vandalism*, or the intentional destruction of property. We also include the variable *Larceny*, which broadly relates to the theft of property. Because of the relatively small proportion of the population that commits crime, we re-scale all indicator variables in Panel A to be equal to 100 for readability.

The summary statistics show that the overall probability of committing a financial crime is 0.708%. The most common types of financial crime are *Forgery* (0.255%) and *Embezzlement* (0.243%), followed by *Fraud* (0.173%) and *Counterfeit* (0.078%). The statistics also demonstrate the pervasive nature of financial crime- committing a financial crime is more common than committing *Murder*, *Assault*, or *Vandalism*. Of all reported crimes, offenses related to drugs are most common.

We augment crime data with public records information from L2 Data. This dataset

is mainly comprised of voter registration records, supplemented by information collected or calculated by the data provider.[8] From this dataset, we acquire information on the individuals' names, home address, birthday, and demographics. We link this data to the criminal charges using the full name and birthday of the individual.[9] We define indicators for race, *Black or African American*, *White*, *Asian*, *Hispanic*, and *Other*, and gender, *Male* and *Female*, as well as imputed family size. Race is determined algorithmically by L2 Data based on the full name and home address of the individual, and *Family Size* is calculated using individual surnames and specific home addresses. On average, 17.1% of the individuals in the sample are black, 54% are white, 4.3% are Asian, and 8.5% are Hispanic. The average family has just over 2 members, and the average age is about 24 years old, which matches the tracking of individuals in the 6 years post-high school.

Finally, we gather individual property and home ownership records from the Virginia state tax assessor and recorder offices. We match these data by individual name and address to the court data. We define *Homeowner* as an indicator variable equal to one if an individual owns a home. To illustrate the granularity of the data, we plot the specific residential addresses of individuals charged with financial crimes in neighborhoods in the city of Richmond, VA in Figure 1. Additionally, for a preliminary test, we gather data from the FINRA National Financial Capability Survey, which we discuss in Section 5. We also gather block group-level neighborhood income levels from the US Census. We use microdata from the Survey of Income and Program Participation (SIPP) conducted by the US Census, which we discuss in greater detail in Section 6.

[8] A similar version of this dataset is applied in Bernstein et al. (2022).

[9] In order to minimize measurement error, we restrict the sample to individuals who register to vote at least three years after they graduate from high school. In addition, to improve matching, we remove full names which are duplicates following Engelberg et al. (2022).

# 4 Empirical Design

Our identification strategy exploits the sharp discontinuity in grade level assignment for individuals born before and after September 30, 1996. Individuals born after this date are assigned into a class cohort that receives mandatory financial education, while those born before are assigned to a class cohort that does not. If this cutoff is truly arbitrary, then the observed outcomes relating to financial crime around the cutoff date may be attributed to assignment to either the treated or untreated cohort.

The identification strategy assumes that parents do not have precise control over their child's birth date with respect to the cutoff, or over their eventual assignment into a class cohort. A rich literature in economics uses similar designs for assignment into kindergarten cohorts, and finds no evidence of timing of births with regard to class assignment (see, i.e., Gormley Jr et al. (2005); Gormley Jr and Gayer (2005)). Selection into the treatment cohort is even more unlikely in our setting since Virginia instituted the mandate in 2009, long after students are already assigned to class cohorts. As such, parents would need to force their child to repeat a grade in order to receive the financial literacy class, rather than simply enroll them early as in the kindergarten case. In support of the identifying assumptions, we find no evidence of bunching of individuals on either side of the Sept. 30, 1996 cutoff (Figure IA.2). Thus, the evidence suggests that the variation in treatment from this design may be considered as good as random, and that the results from this empirical approach provide plausibly exogenous estimates of the impact of financial literacy on financial crime.

Formally, our primary approach estimates the discontinuity in outcomes around the birth date cutoff using the following local linear regression:

$$
\begin{aligned}
Y_{it} = \alpha_0 &+ \alpha_1(\text{Financial Literacy})_t \\
&+ \alpha_2(\text{Month of Birth})_t \\
&+ \alpha_3(\text{Financial Literacy} \times \text{Month of Birth})_t \\
&+ \alpha_4 X_i + \epsilon_{it}
\end{aligned}
\tag{1}
$$

where $Y_i$ is an indicator variable representing an individual criminal charge. We multiple binary dependent variables by 100 to enhance the interpretability of the tables. *Financial Literacy*$_t$ is an indicator variable for whether an individual is required to take a financial literacy course to graduate the Virginia school system, while *Month of Birth*$_t$ is the specific month the individual is born. Given the cutoff date of September 30, 1996 (i.e., the end of September), we can exploit the sharp cutoff between birth months. The granularity of the data allows us to apply a stringent set of fixed effects to supplement the design. In the full specification, $X_i$ is a vector of individual-level fixed effects, including *Tract*$\times$*Gender*$\times$*Race*, family size, and home ownership status. The empirical analyses therefore compare individuals in the same Census tract with the same gender and race but differing treatment status, while also accounting for family size and home ownership status.[10] Notably, the running variable *Month of Birth* controls for any effect of age, such as the propensity to commit more crimes when older.[11] Overall, exploiting both the quasi-random variation in birth dates and high-dimensional fixed effects provides us with clean estimates of the causal effect of financial literacy on financial crime.

We primarily estimate Equation 1 using a local linear regression with an optimal bandwidth, which is 16 months on either side of the cutoff in our setting (Imbens and Kalyanaraman (2012)). However, we also estimate the discontinuity in criminal outcomes using a wide variety of bandwidths ranging from 6 to 24 months, as well as with higher-order, non-linear

[10] In Table 2 we show that the results are similar without fixed effects or with various combinations of fixed effects.

[11] We illustrate in Internet Appendix Table IA.1 that the positive relationship between age and the propensity to commit financial crime is entirely explained by the treatment, which effects younger cohorts.

polynomials. We discuss the results of this analysis in Section 5.3 below.

# 5 Main Results

## 5.1 Education and Financial Literacy

Despite early work showing a limited impact of financial education on financial literacy (Fernandes et al. (2014), recent meta-analyses of randomized experiments show strong positive effects of educational interventions on financial knowledge (Brown et al. (2016); Kaiser and Menkhoff (2017); Urban et al. (2020); Kaiser et al. (2022)). We directly examine whether the Virginia financial education mandate corresponds to greater financial literacy using data from the FINRA National Financial Capability Study (NFCS) surveys. The survey data includes both demographic information, including income and education, and whether the respondent took a high school level financial literacy course. The surveys also ask six questions on financial topics with multiple choice answers, such as: "If interest rates rise, what will typically happen to bond prices?" We report summary statistics and relevant survey questions for this dataset in Table IA.2 in the Internet Appendix. Using the total score of correct answers on the survey, we examine how taking a high school financial literacy course relates financial literacy.[12] Specifically, we regress the number of correct answers on indicator variables for completing a high school literacy course, college attendance, and having household income of at least $50,000.

We plot the coefficients from this regression in Figure 2. For the 18-24 age group, taking a high school financial literacy course is the single strongest predictor of financial literacy. The coefficient estimate indicates that taking the personal finance course is associated with 58.9% higher financial literacy scores relative to the mean. Comparatively, college attendance is associated with a 54% higher financial literacy score relative to the mean. When we expand

[12]We cannot apply the main regression discontinuity design because the NFCS surveys do not ask detailed birth date information. For this test, we use an indicator for whether an individual reports taking a high school financial literacy course with financial literacy.

the analysis to all ages, the literacy course remains a strong predictor, but of slightly smaller magnitude than that college attendance or household income. Specifically, individuals who completed the Virginia high school education course have 18% higher financial literacy scores relative to the mean relative to those that did not. Although these result do not have a causal interpretation, they provide suggestive evidence that the personal finance intervention we examine in this study does indeed positively affect financial literacy. In Section 6, we directly test the effect of this intervention on the financial decisions of individuals, such as debt usage, investment, and saving, using detailed Census microdata from SIPP.

### 5.2 Baseline Results

This subsection explores the effect of financial literacy on the propensity to commit financial crime. We begin by visually examining whether the propensity to commit a financial crime displays a discontinuity for individuals born around the September 30, 1996 cutoff. Figure 3 suggests that such a discontinuity does exist – individuals who are born just after the cohort assignment date, and thus receive the financial literacy course, exhibit a notably lower financial crime rate compared to individuals born just before. Overall, this figure offers some preliminary evidence that a financial education treatment has a causal effect on reducing individual likelihood of committing a financial crime. Table 2 provides the corresponding regression estimates from the specification outlined in Equation 1. This analysis estimates the effect of the financial literacy course treatment using a sharp regression discontinuity design with a local linear specification. We calculate the optimal bandwidth to be 16 months on either side of the cutoff using the procedure outlined in Imbens and Kalyanaraman (2012). In Section 5.3, we examine the robustness of the results to different bandwidths and higher-order polynomials.[13]

In column 1, we show results for a specification that includes only linear controls. The resulting coefficient estimates indicate that the financial literacy treatment leads to a 0.228

[13] Additionally, we illustrate our results are robust to a wide array of clustering levels in Figure IA.1 in the Internet Appendix.

drop in the propensity to commit a financial crime. The economic magnitude of this effect is sizable, representing a 32.2% drop relative to the mean. We add tract fixed effects in column 2, which controls for time-invariant local characteristics on a granular level. Finally, we augment the specification with gender, race, and family size fixed effects in column 3, and the full set of fixed effects in column 4, which includes $Tract \times Gender \times Race$ fixed effects. The estimates remain stable regardless of the set of fixed effects included, indicating a roughly 33–36.6% drop in the probability of committing a financial crime for those individuals receiving the financial literacy classes relative to the sample mean. Overall, the remarkable stability of the estimates across specifications implies that these results are consistent with a causal interpretation, whereby the financial literacy intervention reduces the probability of committing a financial crime.[14]

We perform several diagnostic tests for the main design. First, we test for discontinuities in density around the threshold (McCrary (2008), Cattaneo et al. (2021)). If individuals strategically select into either the treatment or control group, we would expect to find greater densities on either side of the cutoff. We plot the density estimates around the threshold in Figure IA.2. We find no such visual discontinuities in density, and thus no evidence of manipulation around the threshold. Formal tests of manipulation around the threshold using local polynomial density estimators also fail to reject the null hypothesis of equal densities across the threshold, with a t-statistic of 0.391 and corresponding p-value of 0.696 (Cattaneo et al. (2020)). We also test for discontinuities in other individual characteristics that should not be affected by the sorting into class cohorts. Overall, we find no statistical differences in the densities of individuals along various demographic characteristics, which we illustrate in Table IA.5 in the Internet Appendix.

[14]We also illustrate our results are robust to two alternative definitions of *Financial Crime*. We include crimes of bad checks or check fraud in the *Financial Crime* measure in Internet Appendix Table IA.3 and include bribery in Internet Appendix Table IA.4.

### 5.3 Alternate Bandwidths, Polynomials, and Fixed Effects

In this subsection we explore the robustness of the main result to alternative bandwidths around the cutoff and higher-order polynomials. We present these results in Table 3, Panel A.

First, we examine several alternative bandwidths. Columns 1–4 presents the estimates from these analyses, using bandwidths from 6 months to 24 months on either side of the threshold. Across all alternative bandwidth specifications, the estimates remain statistically significant and economically meaningful. The estimates indicate that receiving the financial literacy treatment reduces the propensity to commit financial crime by 19–36% relative to the sample mean.

Columns 5–6 present estimates applying a second and third degree polynomial, respectively. We select these specific higher order polynomials since polynomials higher than an order of three may produce bias (Gelman and Imbens (2019)). In both cases, we find that the estimates remain statistically significant and economically similar to the baseline effects. Specifically, we find that the financial literacy treatment lowers the probability of committing a financial crime by 35–39% relative to the sample mean. Overall, these results indicate that the discontinuity in individual financial crimes between treated and untreated cohorts is robust to a series of alternative estimation strategies.

Table 3, Panel B presents the results utilizing a variety of alternative fixed effects specifications. Columns 1–3 apply *Block Group* fixed effects, which is a highly granular geographic unit roughly comparable to a city block. In the most stringent specification applying *Block Group*$\times$*Gender*$\times$*Race* fixed effects, the results show a statistically significant reduction in the propensity to commit financial crime. Columns 4–6 leverage *Birth Month* fixed effects, which help to rule out confounding concerns relating to the season or month of birth.[15] Taken together, the results of this table demonstrate the robustness of our main finding to

[15]We also more formally rule out seasonality in birth outcomes in Figure IA.3 in the Internet Appendix, where we illustrate that no birth months are correlated with the probability of eventually committing a financial crime.

the inclusion of a wide range of fixed effects and specification choices.

### 5.4 Alternative Thresholds

We next look for potential effects at different thresholds of the running variable, *Month of Birth*. The main threshold, whereby individuals born on or before September 30, 1996 are required to take financial literacy credits to graduate high school, is the only hypothesized threshold where a discontinuity should be expected. This threshold compares the treated 2015 cohort to the untreated 2014 cohort. Other thresholds at annual intervals along the running variable compare either both treated or both untreated cohorts. As such, we would expect to find no discontinuities at other thresholds, and these can act as useful placebos that can rule out spurious effects and validate the main design. We test for discontinuities around the threshold for both the 2014 cohort, which compares the 2014 (untreated) cohort to the 2013 (untreated) cohort, and the 2016 cohort, which compares the 2016 (treated) cohort to the 2015 (treated) cohort. We report these results in Figure 4.[16] The figure shows that only the main threshold is statistically significant, consistent with Table 2, while the discontinuities between the other cohorts remain statistically insignificant and near zero. This suggests that the main design is capturing a valid discontinuity in outcomes as a result of the financial literacy intervention.

An analysis of this type also allays concerns related to time spent in the labor force. An individual born one day after the threshold cutoff is nearly the same age as an individual born one day before, but the individual born just after will spend slightly less time in the labor force, while also being required to earn credits in financial literacy. If time spent in the labor force is relevant to committing financial crime, then this may represent a confounding concern. However, as no other cohort comparison presents a concrete discontinuity in financial crime, this confounding possibility may be largely dismissed. Additionally, these tests also help to rule out concerns relating to effects relating to the season of birth (Buckles and

[16] In this specification, we apply a bandwidth of 12 months on either side of the threshold to ensure we compare only members of specific annual cohorts.

Hungerman (2013)), or to general education effects (Cole et al. (2014)).

### 5.5 Types of Financial Crime

This subsection details the types of financial crimes affected by the financial literacy intervention. While there are many types of financial crimes, we focus on four main categories: embezzlement, fraud, forgery, and counterfeit. This classification strategy follows from the broad categories of financial crimes discussed in the economics and criminology literature (Gottschalk (2010)). We construct indicator variables for each of the four sub-categories, multiplied by 100 for ease of interpretation. Figure 5 reports the relative proportions of the categories of financial crimes, as well as the percent of the sample that is charged with the respective crimes. As the figure suggests, embezzlement and forgery are the most common financial crimes, followed by fraud, with relatively few individuals committing counterfeiting crimes.

We conduct the baseline analysis for each of the sub-categories of financial crime, and report the results in Table 4. The reported estimates correspond to changes in the probability of committing certain financial crimes in the roughly 5–6 years following the treatment. Column 1 reports a statistically significant decline in embezzlement as a result of the treatment. The estimate shows that the financial literacy intervention reduces the propensity to commit embezzlement by about 61% relative to the mean. Columns 2 reports the effects of financial literacy education on financial fraud, forgery, and counterfeiting, respectively. In each specification, the coefficient estimate is negative, but insignificant at conventional levels. In Figure 6, we visually show the discontinuity in the propensity to commit embezzlement, and the lack of discontinuity in the other types of financial crime.

Overall, this subsection suggests the principle reduction in the propensity to commit financial crimes is concentrated in embezzlement, rather than fraud, forgery, or counterfeit. One key difference between embezzlement and the other categories is that the latter crimes tend to be detailed and premeditated. Embezzlement, on the other hand, tends to occur more

quickly and easily, with relatively little planning or organization (Green (1993)). As such, embezzlement is fairly common, affecting as many as 22% of small businesses (ACFE (2022)). In addition, employees primarily become embezzlers due to underlying financial problems (Cressey (1953), Williams (2006)). The results of this section thus provide some evidence that financial education does not necessarily shift individuals from professional criminals or con-artists into law abiding citizens, rather it shifts the individual behavior or incentives of employees or managers tasked with managing their employers' or customers' funds. These key differences relate to possible economic and behavioral mechanisms underlying the main results, which we discuss in more detail in Section 6.

Additionally, these results serve to largely rule out cohort-related mechanisms, such as a general reduction in the overall propensity to become a *victim* of financial crime. As the entire educational cohort becomes treated, it may be the case that individuals reduce financial crime simply due to fewer potential victims. However, we find no difference in crimes against *individuals* in the cohort, only crimes against businesses and employers. At the same time, the results of a later section (Section 7) show no changes in the treated cohort's probability of starting a business or becoming a manager. Altogether, this points to specific changes in individual behavior driving the results, rather than that of other members of the same treated cohort.

### 5.6 Severity of Financial Crime

Although we do not observe the precise amounts of financial loss, we can analyze the impact of financial literacy on the severity of financial crime via the latter's classification as a felony or a misdemeanor. In the state of Virginia, crimes involving financial losses of at least $1,000 are classified as felonies, while those under $1,000 are considered misdemeanors. Therefore, in this subsection we test whether financial literacy tends to reduce the propensity to commit serious financial crimes or more minor offenses.

To do so, we first construct two indicator variables – *Misdemeanor* and *Felony* – that are

equal to 100 if the financial crime is a misdemeanor or felony, respectively. We then estimate our baseline RDD with these indicators as dependent variables, and report the results in Table 5. The results of columns 1 and 2 show that the financial literacy treatment reduces the probability of committing small-scale financial crimes under $1,000. The coefficient estimates indicate a reduction of approximately 33% in the propensity to commit misdemeanor financial crimes relative to the sample mean. We find that the financial literacy treatment also significantly reduces severe, felony financial crime across various specifications (columns 3 and 4). The coefficient estimates suggest that the financial literacy intervention lowers the propensity to commit felony financial crime by approximately 34% relative to the sample mean. Taken together, the results of this subsection indicate that the financial literacy treatment is associated with reductions in financial criminal behavior across the spectrum of severity, including crimes with very high social costs.

### 5.7 Other Common Types of Crime

In this subsection, we test the effect of the financial literacy intervention on the probability of committing other types of non-financial crime. First, we test for discontinuities in crimes that are not financially motivated, such as murder, assault, or vandalism. These tests serve as useful placebos, since financial literacy has no direct hypothesized relation to crimes without a monetary incentive. We then explore a common property crime, larceny, which has some monetary motivation but is usually of smaller scale and results in harsher legal penalties (Maddan et al. (2012)). We re-run the main specification testing for discontinuities in these common non-financial crimes as a result of the financial literacy intervention. We report these results in Table 6.

Column 1 shows the impact of the financial literacy treatment on *Murder*, while columns 2–4 shows results for assaults, drug charges, vandalism, and larceny, respectively. *Assault* is defined as a charge of assault (aggravated or otherwise), *Drugs* is defined as a charge of possession or use of an illegal drug, *Vandalism* is defined as the deliberate damage to

property, and *Larceny* is defined as the theft of property. Overall, the results show that the financial literacy treatment has no effect on any of the other crime categories, with statistically insignificant coefficient estimates reported in all columns.

Taken together, these results are broadly consistent with a lack of effect of financial literacy on crimes that are more generally unrelated to finance, as well as property crimes. Elements of these latter crimes may carry a monetary incentive, but these crimes are not "white-collar" crimes as financial crimes are; they do not have the same scale as crimes such as financial fraud, embezzlement, forgery, or counterfeiting, and tend to incur harsher punishments (Barnett (2000); Maddan et al. (2012)). The results in this section suggest that financial literacy reduces criminal behaviors relating to financial or monetary crimes, rather than crime more broadly.

## 6 Economic and Behavioral Mechanisms

We next explore the economic mechanisms and channels by which financial literacy may affect financial crime. Given the large literature suggesting financial literacy reduces financial constraints, we hypothesize that a reduction in the financial incentives to commit financial crime may serve as a possible economic mechanism. To test this conjecture, we first focus on the determinants of financial crime as an antecedent, then explore how financial literacy interventions differentially effect areas by income levels. Finally, we examine how the financial literacy intervention shapes financial behavior and well-being looking at detailed data on household financial activity.

### 6.1 Economic Determinants of Financial Crime

The individual-level determinants of financial criminal behavior are generally unclear and poorly understood. Overall, more research has been done in the individual-level determinants of criminal behavior, especially related to property crime. One clear takeaway from this literature is that property crime is related to factors such as low income or high debt

obligations (Bignon et al. (2017), Watson et al. (2020), Khanna et al. (2021), van Beek et al. (2021), Melander and Miotto (2023)). According to this research, individuals find themselves in an economically constrained position and turn to property crime as a means to alleviate their economic situation.

We therefore first examine whether neighborhood-level income influences the probability of committing financial crime. We perform this analysis using Census block group-level income quartiles and our measure of financial crime. Panel A of Figure 7 shows the distribution of block groups in the lowest income quartile across the state of Virginia. Low income neighborhoods (block groups) are geographically widespread, from rural areas in eastern Virginia to dense urban and suburban areas around major cities such as Richmond and Norfolk. To directly test the relation between income and financial crime, we regress the financial crime indicator on income quartile indicators, and plot these estimates in Panel B of Figure 7.

The results suggest a strong, monotonic relationship between neighborhood income and financial crime. The estimates show that living in a neighborhood in the lowest income quartile is associated with a 106% greater probability of being charged with a financial crime relative to the sample mean.[17] Overall, the results of this subsection establish the importance of financial constraints in understanding the antecedents of financial crime.

### 6.2 Financial Literacy and Financial Constraints

Given the relationship between economic constraints and financial crime, we hypothesize a primary channel by which the education treatment may exert downward pressure on financial crime is via a relaxation in financial constraints. A broad literature illustrates that financial literacy reduces these constraints, namely via its effect on behaviors including precautionary saving, investment, and debt management (see Lusardi and Mitchell (2023) for an in-depth review of this literature). If the effect on financial constraints serves as a principal eco-

[17] We also perform a similar analysis examining the demographic and individual-level determinants, which we report in Table IA.6 in the Internet Appendix. These results suggest racial and ethnic minorities are at a higher risk of being charged with financial crime, and that simply owning a home is associated with a decrease in the probability of being charged with a financial crime by about 91%.

nomic channel, we expect that the reductions in financial crime should be most pronounced in low-income neighborhoods since these are the most constrained ex ante. We test this conjecture by including and interaction between *Financial Literacy* and *Low Income* in the main specification, where *Low Income* is the block group-level indicator variable for whether a neighborhood is in the lowest quartile of household income. We present the results of this analysis in Table 7.

We find negative, statistically significant coefficients on the interaction term, suggesting that the effects of the financial literacy intervention tend to concentrate in low-income areas. The coefficient estimates suggest that individuals residing in a low-income neighborhood experience a 42–48% decrease in the propensity to commit financial crime after treatment relative to residents of higher-income neighborhoods. This result is consistent with the hypothesis that the effect of financial literacy on financial crime is mediated through the impact on economic well-being. It is also consistent with both the literature and existing evidence on financial education and financial constraints, and the broad literature on the determinants of certain criminal behaviors.

### 6.3 Financial Literacy and Financial Behavior

In this subsection we directly examine the effect of the financial literacy treatment on individual financial behavior. Despite the large literature documenting the positive effects of financial literacy on financial decision-making, it is important to examine whether these effects hold in our setting for our financial education treatment. We therefore gather a small but highly detailed sample of individual balance sheet microdata from the Survey of Income and Program Participation (SIPP). We restrict the sample to individuals between 18 and 30 who live in Virginia and who graduate from high school. Notably, the SIPP data collects the birth month and year of the respondents, which allows us to apply the same identification strategy as the main analysis. We test three key elements of financial behavior, as motivated by prior findings in the literature.

First, we examine the effect of the financial literacy requirement on debt management, focusing on high interest debt. We define *Credit Card DTI* as the ratio of credit card debt to annual income. Second, we examine individual investments, which relates to savings behavior and wealth. We define *Investments* as the ratio of the sum of stock and bond investments over total assets. Finally, we define *Savings Account* as a indicator variable equal to one if the respondent maintains a savings account at their bank. These three variables capture a wide spectrum of financial behaviors which are shown to be related to financial education and literacy in the extant literature (see, i.e., Bernheim et al. (2001); Brown et al. (2016); Kaiser et al. (2022)). We report summary statistics of SIPP variables in Table IA.7 in the Internet Appendix.

We plot the visual discontinuities of these three measures in Figure 8. Panel A plots the discontinuity in high interest credit, panel B plots the discontinuity in investments, and panel C plots savings behavior. As the sample is significantly smaller than the main design, we widen the bandwidth to include more observations. However, at the same threshold as the main design, sharp discontinuities can be seen in the financial outcomes. We test these discontinuities more formally in Table 8.

We leverage the richness of the survey microdata to control for a large set of individual characteristics, including income, net worth, demographics, citizenship, employment, and education. Across all specifications, there are sizable, statistically significant discontinuities in the examined financial behaviors. We observe large declines in high interest debt, increases in the amount of personal assets in investments, and a sharp increase in the number of individuals with savings accounts at their bank as a result of the financial literacy training. These results suggest that individuals alter behaviors related to debt, consumption, investing, and precautionary saving. The estimates are non-trivial: for example, the amount of assets allocated to investments nearly triples for those individuals required to have taken the financial literacy course.

Overall, these sizable changes in financial behavior allow young workers to have larger

savings with lower debt expenses, both are which are related to being less constrained and less likely to commit crime (Aaltonen et al. (2016), van Beek et al. (2021)). The results suggest that changes in financial behavior that reduce the incentives to misappropriate funds act as a primary economic mechanism by which financial literacy reduces financial crime.[18] This is altogether consistent with the literature on financial constraints, misconduct, and certain types of criminal behavior (Cortés et al. (2016), Dimmock et al. (2021)).

# 7 Alternative Mechanisms

In this subsection we explore several alternative, non-mutually-exclusive interpretations of the results. In particular, we analyze explanations related to criminal sophistication, occupational choice, education following high school, migration, and selection into particular schools. Finally, we discuss other potential economic and behavioral mechanisms.

## 7.1 Improvement in Criminal Sophistication

The first alternative explanation is that individuals receiving financial literacy training become more sophisticated, and thus less likely to be caught committing a financial crime. According to this explanation, the observed decrease in the propensity to be charged with a financial crime is due to a lack of detection rather than an actual decrease in criminal behavior.

We note first that the curriculum of the financial literacy course is unlikely to generate more sophisticated financial criminals. The course topics include broad discussions of the overall economy, such as supply and demand, as well as personal financial topics like credit scores, interest rates, and saving and spending. As such, these concepts are unlikely to directly translate into a greater ability to "cook-the-books". Nevertheless, we directly examine the impact of financial literacy on the number of reported local financial crimes using

[18] We also find no discontinuity in labor income, suggesting these financial metrics primarily serve as the mechanism. We report this in Table IA.8 in the Internet Appendix.

administrative information from the the Data Analysis and Reporting Team (DART) of the Virginia Department of State Police. This dataset contains information on *reported* crimes, regardless of eventual prosecution, and thus provides a broad view of overall local criminal activity. Given the large dollar amounts associated with the average financial crime, it is unlikely that individuals will fail to notice and report the crime, even if the perpetrator is unknown.

Table IA.9 shows the results of a county-level Poisson regression of the number of reported financial crimes (*Financial Crimes*) on *Treated %*, which is the time-varying proportion of the county population with mandatory financial literacy training. We first report the results including only year fixed effects, then CBSA×Year fixed effects, then additional county controls with CBSA×Year fixed effects.[19] Across all specifications, we uniformly find a negative relation between the financial literacy of the population and the number of reported financial crimes. Taken together with the nature of the financial literacy curriculum, the results suggest that individuals are not simply becoming more sophisticated in their criminal behavior and consequently eluding detection.

Because embezzlement requires access to funds, it may be the case that financial literacy affects financial crime via occupational selection. For example, treated individuals may be more likely to become managers, work in financial roles such as accounting or bookkeeping, or work in financial industries with greater access to funds and greater discretion in concealing theft. In these cases, the observed decrease in the propensity to be charged with a financial crime following the financial literacy treatment would be the result of employment decisions rather than a relaxation of financial constraints. We directly test for these effects using detailed occupation data from SIPP. Specifically, we construct dummy variables equal to one if an individual becomes a manager, works in an accounting role, or works in a financially industry, and re-implement the RDD framework. The results in Table IA.10 in the Internet Appendix show no differences between treated and untreated individuals in

[19]CBSA's encompass multiple counties, allowing for cross-county comparisons within these still-narrow geographic areas.

occupation choice, and thus suggest that this alternative story is unlikely to explain the main results.

A related explanation is that individuals receiving financial education are subsequently less likely to become victims of financial crime. As such, the observed decrease in financial crime propensity is due to a reduction in the potential pool of victims, rather than a relaxation of financial constraints. To explain our findings, this alternative story would require that individuals primarily commit financial crimes against people in their own cohort, and thus that crimes against other *individuals* would be most affected. However, we find that the reduction in financial crime is not driven by crimes against people, such as fraud, but rather by embezzlement from existing businesses. In addition, column 4 of Table IA.10 shows that treated individuals are no more likely to own their own business. Therefore, this alternative mechanism is unlikely to be driving our results.

### 7.2 Educational Selection

Another possibility is that more financially-literate individuals are more likely to go to college or seek out post-graduate education. As such, these individuals may have lesser opportunity to commit financial crimes because they are in school. For example, individuals who decide to attend college may be less likely to be employed, and therefore less able to commit embezzlement.

We test these possibilities using detailed education information contained in SIPP. Specifically, we examine whether treated individuals are more likely to go to college, attend a masters program, or obtain a professional or doctorate degree, and present the results in Table IA.11 in the Internet Appendix. Overall, we find no discontinuity in an individual's probability of earning a bachelor's or graduate degree. As such, we find no evidence of self-sorting into different educational levels as a result of the treatment.

### 7.3 Migration

There may also be some concern that more financially literate individuals are able to migrate out of the state of Virginia, and thus that we simply do not capture their financial crimes in our data. As preliminary evidence against this explanation, we note that there is no difference in density around the assignment threshold. Therefore, the data suggest that we are able to capture nearly identical numbers of treated and untreated individuals in our sample. Nevertheless, we again utilize SIPP data to test for migration effects in our RDD framework. Specifically, we test for discontinuities in the probability of current Virginia residents being born in Virginia, or alternatively, in the probability of individuals born in Virginia migrating out of state at some point.

We report these results in Table IA.12 in the Internet Appendix. Column 1 shows that current Virginia residents who are treated are no more or less likely than untreated residents to be born in Virginia. Similarly, column 2 looks at the full SIPP sample and shows that individuals born in Virginia are no more or less likely to have moved states. In both cases, the coefficient estimate is statistically insignificant and near zero. As such, we find no evidence of differences in mobility between treated and untreated individuals.

### 7.4 Within-Family Sibling Cohort Strategy

To mitigate concerns about non-random selection into certain types of schools, we apply an alternative empirical design looking within families. Since parents are likely to consciously choose the school their children attend, school selection could reflect family characteristics that simultaneously affect their children's predilection toward crime. We therefore utilize family fixed effects to examine variation in financial crime across siblings in near-adjacent educational cohorts.[20] For this test, we define *Financial Literacy* as an indicator variable for whether an individual is required to take a financial literacy course, and compare differences in outcomes relating to financial crime across siblings within the same family. This design

[20]This strategy is similar to that employed by Figlio et al. (2024) or Arold (2024).

employs the family-level identifiers provided by L2 Data, which are calculated based on the history of the surnames of individuals living in the same residence. To account for any effects related to gender within families, we interact the *Family* fixed effect with *Gender*. As such, we estimate the effect of the financial literacy intervention on financial crime among siblings of the same gender. Finally, we remove identifiable married couples (i.e., non-siblings in the same house) from the analysis.

We report these results in Table IA.13 in the Internet Appendix. Across all specifications, the financial literacy intervention has a negative and statistically significant relation to financial crime. Furthermore, the economic magnitudes are almost identical to those estimated in the baseline RDD design. The main strength of this additional test is that it holds constant a wide variety of economic and social characteristics associated with families, as well as a number of selection-related effects. However, this test may also be subject to more confounding variation relating to time trends than the main regression discontinuity design as it compares individuals across years, rather than weeks or months. Overall, this test provides some additional supporting evidence suggesting that financial literacy has a causal, negative impact on financial crime, even examining outcomes from within family groups.

### 7.5 Risk Preferences

Finally, we acknowledge the possibility of other alternative mechanisms that may partially explain the observed effects of financial literacy on financial crime, but are difficult to test directly. One such mechanism relates to risk-assessment. Notably, engaging in financial crime is a high-risk activity, which carries the distinct possibility of criminal punishment. Adolescents who receive a financial education may be better able to assess these risks as they enter the workforce. For example, a number of studies find that financial literacy is related to a lower propensity to engage in gambling, or gambling-like behavior, as individuals are better able to assess the risks and rewards (Watanapongvanich et al. (2021), Watanapongvanich et al. (2022), Cho (2022)). To some extent, our lack of findings for overall criminal behavior

mitigates this concern, since this is also a high-risk activity. However, we cannot completely rule out the possibility that changes in risk assessment or perception partially explain the main results.

## 8 Conclusion

Financial crime carries sizable costs for both firms and individuals and shapes elements of modern financial markets. In this study, we explore the causal effect of financial literacy on the propensity to commit financial crime. We exploit the passage of a mandatory high school financial literacy course in Virginia, as well as a rich administrative dataset on criminal outcomes for millions of Virginia citizens. Overall, we find the effect of financial literacy is large– exposure to the financial literacy course is associated with a 37% decline in the propensity to commit a financial crime for at least six years following the treatment. These declines are concentrated in less sophisticated and more common financial crimes like embezzlement.

We explore several economic mechanisms that may explain the main results. We find that the effects are largest for individuals living in economically disadvantaged areas. We also find sizable improvements in financial behavior, such as increases in investments and precautionary saving. Taken together, these results suggest that improvements in the financial conditions of young workers, particularly those that are most constrained, reduce the economic incentives to commit financial crime.

This study provides the first evidence suggesting that financial literacy fundamentally shapes the landscape of financial crime. The results imply that a rising level of financial literacy in a population can reduce aggregate financial crime, and as such, can have significant implications for policymakers. Additionally, the results suggest particularly beneficial effects for individuals from low-income groups, who subsequently commit fewer financial crimes that have long-lasting consequences, and for small businesses, which are frequently the targets of embezzlement. This study therefore suggests that accounting for the previously unknown benefits of financial literacy interventions on criminal behavior dramatically increases the

welfare gains associated with such policies.

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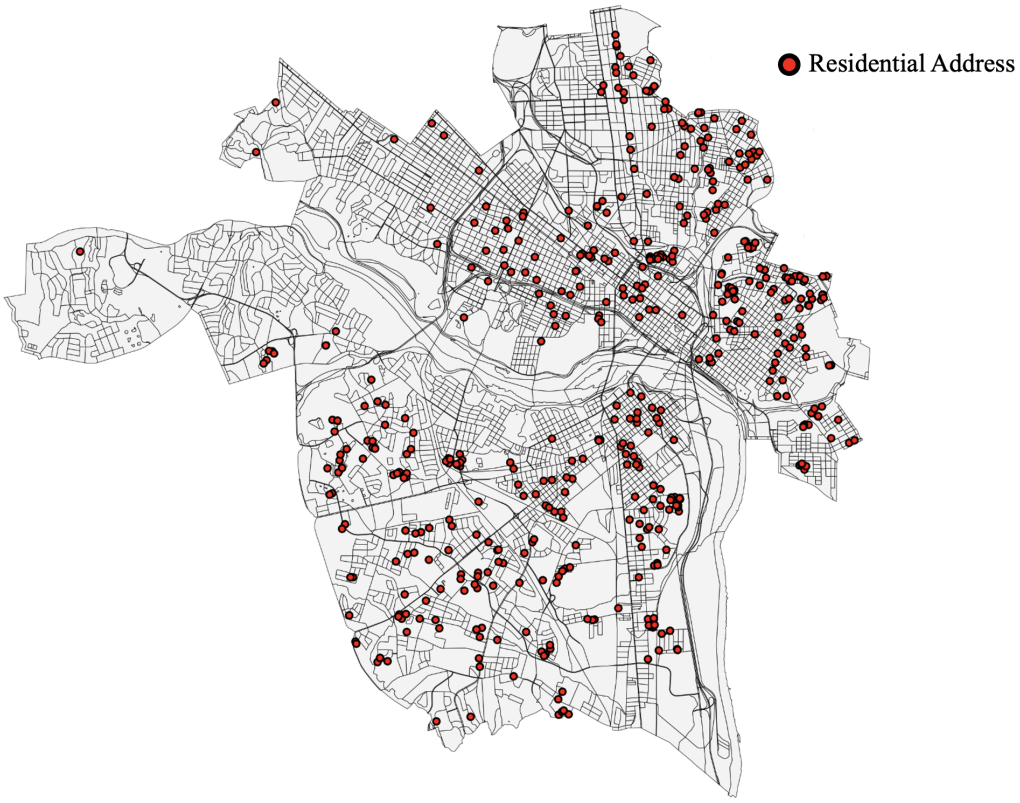
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## Figure 1. Residential Addresses: Richmond

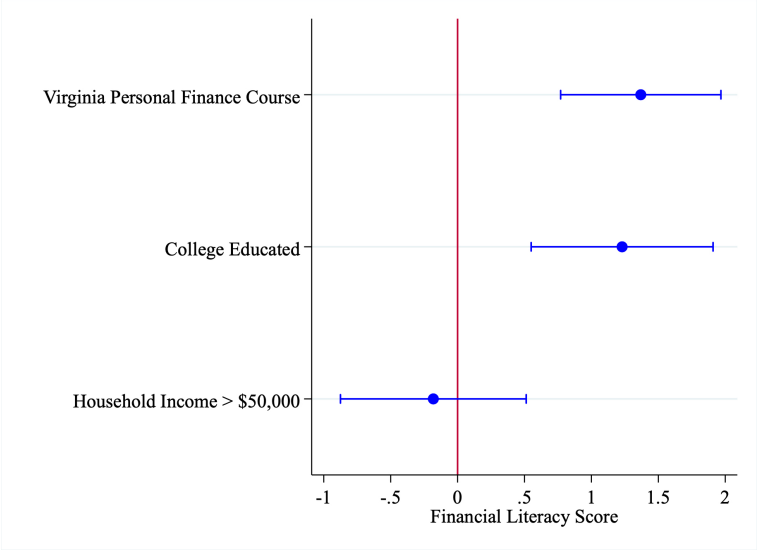
This figure plots the residential addresses of individuals charged with financial crimes in the city of Richmond, Virginia. The data is plotted from the full sample of individuals between 18 and 30 years of age for values of *Financial Crime*. The residential addresses are indicated in red.



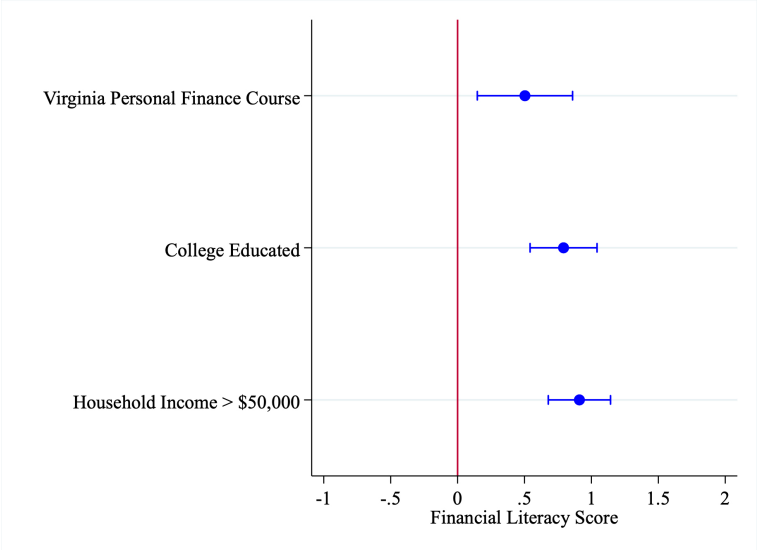
## Figure 2. Financial Literacy

This figure illustrates the relative predictive power of taking the high school financial literacy course on tested financial literacy metrics for different age groups. The sample data is from the FINRA National Financial Capability Study (NFCS) surveys. We constrain the sample to individuals in the state of Virginia following the passage of the mandatory financial literacy course requirement. The dependent variable, *Financial Literacy Score* is a 0-6 score of correct finance questions from the survey. We include three explanatory indicator variables. *Virginia Personal Finance Course* is an indicator equal to one for whether an individual reports taking a financial literacy course in high school. *College Educated* is a dummy variable equal to one for whether an individual completes a bachelor's or postgraduate degree. *Household Income > $50,000* is an indicator equal to one if the reported income is greater than $50,000. We report summary statistics relating to the survey data in Table IA.2 in the Internet Appendix.

### Panel A. Sample: Ages 18-24

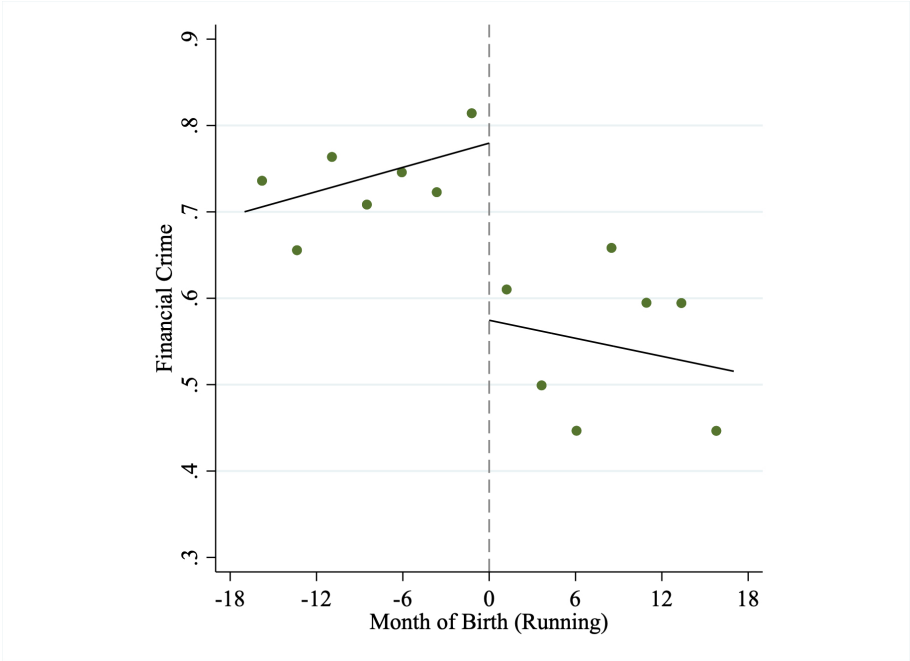



### Panel B. Sample: All Ages



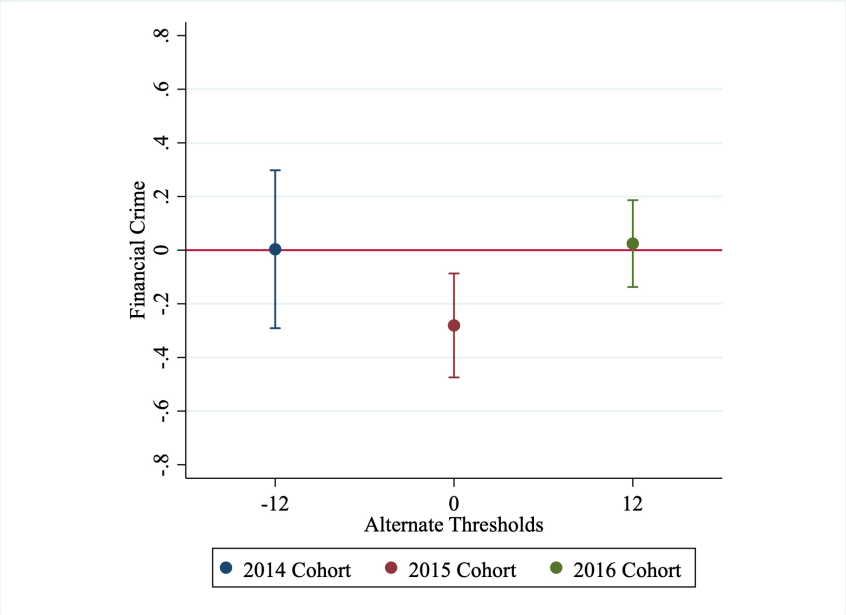
## Figure 3. Discontinuity in Financial Crimes

This figure reports the probability of committing a financial crime conditional on receiving a financial literacy intervention in adolescence. The x-axis displays the running variable, month of birth, which assigns individuals into treatment or control cohorts. For positive values above the threshold, individuals receive mandatory financial education. For negative values below the threshold, individuals do not receive financial education. The y-axis reports the probability of being charged with a financial crime (*Financial Crime)*. The black lines represent the fitted values of a first-degree polynomial.



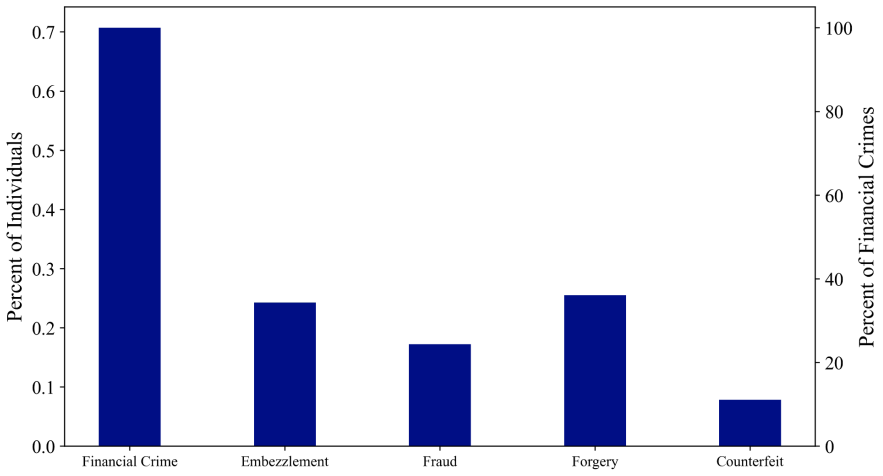
## Figure 4. Alternative Thresholds

This figure reports the main specification using a set of alternative thresholds. The y-axis presents the coefficient estimates for the discontinuity in *Financial Crime*, which we define as an indicator variable equal to 100 if an individual is charged with a financial crime. The x-axis shows the coefficient estimates for associated cohorts. The "2015 Cohort" represents a comparison between the 2015 cohort and the 2014 cohort (the main sample), "2014 Cohort" represents a comparison between the 2014 cohort and the 2013 cohort, and "2016 Cohort" represents a comparison between the 2016 cohort and the 2015 cohort. The vertical lines represent 95% confidence intervals and the standard errors are clustered at the level of the running variable.



## Figure 5. Composition of Financial Crime

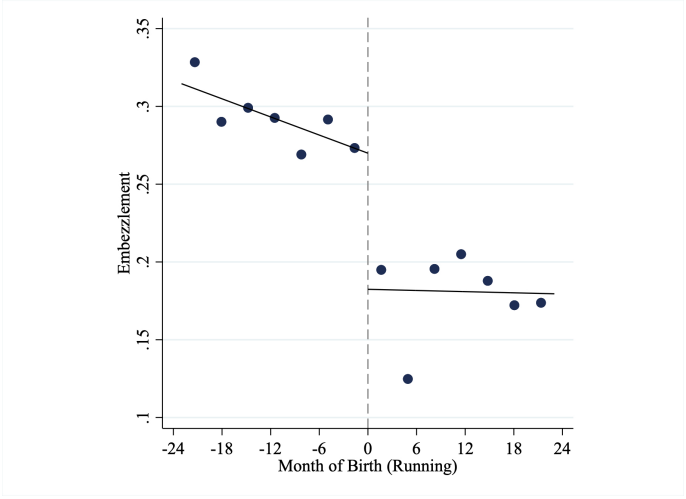
This figure reports the overall probability of being charged with any financial crime (*Financial Crime*), along with the probabilities of each of its components of embezzlement (*Embezzlement*), fraud (*Fraud*), forgery (*Forgery*), and counterfeit (*Counterfeit*). The y-axes present the percent of individuals in the sample charged with a financial crime (left) and the proportion of total financial crime that each category represents (right).



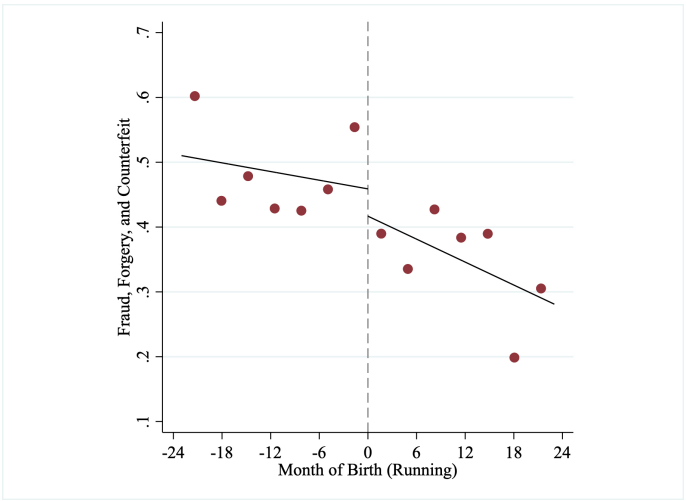
## Figure 6. Discontinuities in Types of Financial Crimes

This figure reports the probability of committing different types of financial crime conditional on receiving a financial literacy intervention in adolescence. Panel A presents the discontinuity for embezzlement, while Panel B presents the discontinuity for fraud, forgery, and counterfeit. The x-axis displays the running variable, month of birth, which assigns individuals into treatment or control cohorts. For positive values above the threshold, individuals receive mandatory financial education. For negative values below the threshold, individuals do not receive financial education. The y-axis reports the probability of being charged with a particular financial crime. We widen the bounds of the y-axis to accommodate the smaller samples of the individual financial crime categories. The black lines represent the fitted values of a first-degree polynomial.

### Panel A. Embezzlement



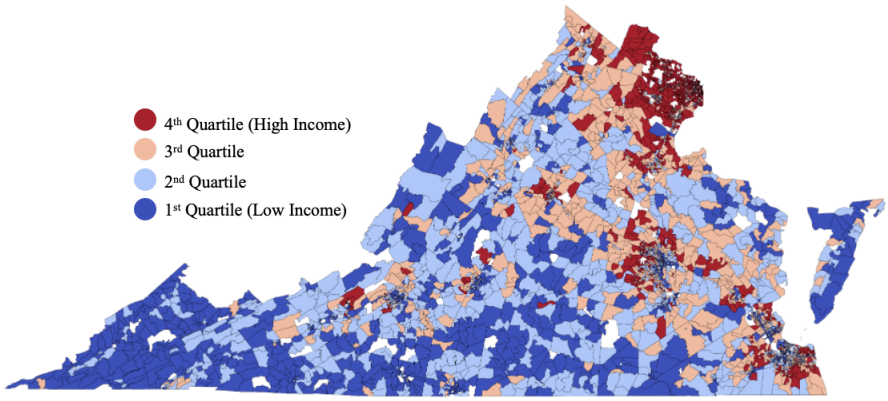

### Panel B. Fraud, Forgery and Counterfeit



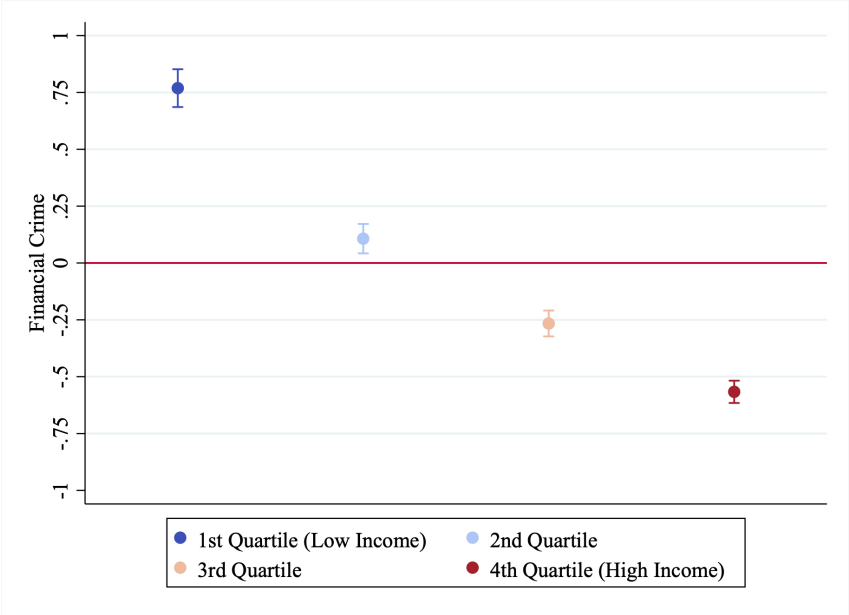
## Figure 7. Income and Financial Constraints

This figure illustrates details relating to local income and financial crimes in Virginia. Panel A presents a map of the state of Virginia where block groups in the lowest income quartile are highlighted in blue, and highest income quartile are highlighted in red. Panel B presents coefficient estimates of regressions of *Financial Crime* on quartile indicators of local income (*Income (Block Group)*. *Financial Crime* is defined as an indicator variable equal to 100 if an individual is charged with a financial crime.

### Panel A. Virginia Geography



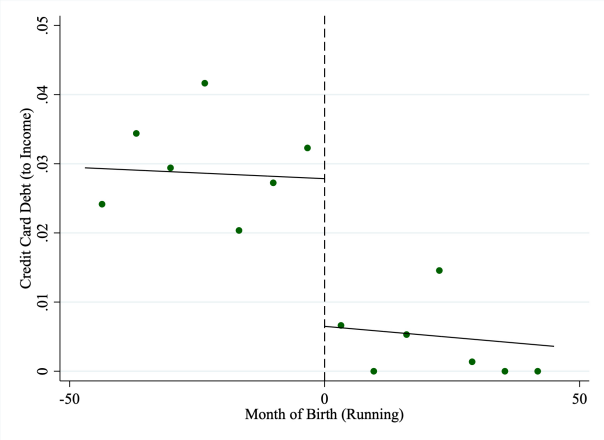

### Panel B. Income and Financial Crime



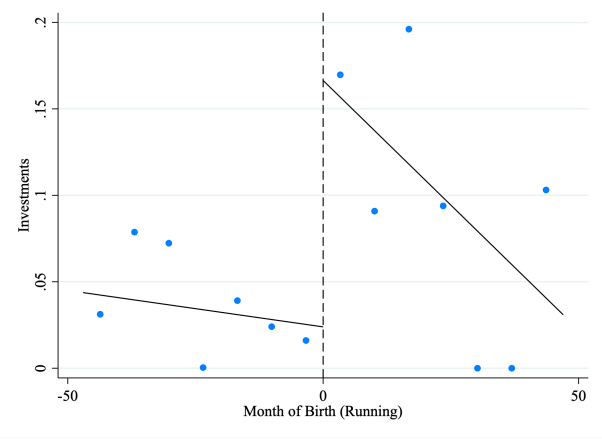
# Figure 8. Discontinuities in Financial Behavior

This figure reports the differences in financial behaviors as a result of receiving a financial literacy intervention in adolescence. The x-axis presents the running variable, month of birth, which assigns individuals into treatment or control cohorts. For positive values above the threshold, individuals receive mandatory financial education. For negative values below the threshold, individuals do not receive financial education. The black lines represent the fitted values of a first-degree polynomial. Panel A reports the results for high interest credit (*Credit Card DTI*), defined as the ratio of credit card debt to income. Panel B reports the results for investments (*Investments*), defined as the ratio of investments in stocks and bonds to total personal assets. Panel C reports the results for savings (*Savings Accounts)*, which is defined as an indicator equal to one if an individual maintains a savings account.

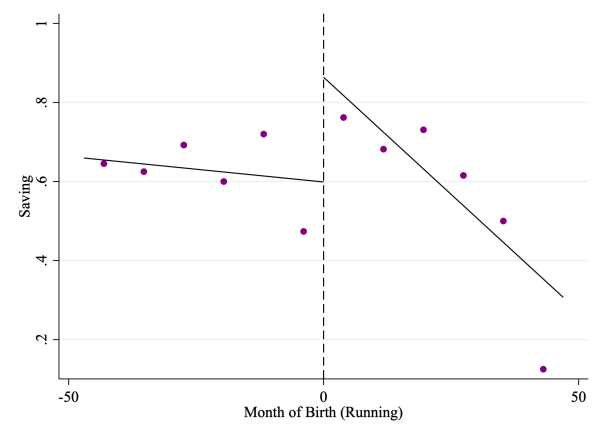
**Panel A. High Interest Credit**




**Panel B. Investments**




**Panel C. Savings Accounts**



## Table 1. Summary Statistics

This table reports the summary statistics of the key variables used in the study. Crime data is from the district and circuit criminal court systems of the state of Virginia. Demographic variables are provided by L2, sourced from Virginia voter registration records. *Financial Literacy* is sourced from data on individual's birth dates provided by L2. *Homeowner* is sourced from deeds data from county recorder offices in Virginia, while data on block group-level income (*Income (BG)*) is sourced from the US Census. We define variables in Section 3.

| | Mean | SD | Median |
|---|---|---|---|
| Panel A: *Crime Data (%)* | | | |
| Financial Crime | 0.708 | 8.383 | 0 |
| Embezzlement | 0.243 | 4.928 | 0 |
| Fraud | 0.173 | 4.155 | 0 |
| Forgery | 0.255 | 5.046 | 0 |
| Counterfeit | 0.078 | 2.797 | 0 |
| Misdemeanor | 0.296 | 5.430 | 0 |
| Felony | 0.407 | 6.367 | 0 |
| Murder | 0.022 | 1.494 | 0 |
| Assault | 0.511 | 7.133 | 0 |
| Drugs | 4.530 | 20.795 | 0 |
| Larceny | 2.161 | 14.539 | 0 |
| Vandalism | 0.008 | 0.900 | 0 |
| Panel B: *Demographics* | | | |
| Black or African American | 0.171 | 0.377 | 0 |
| White | 0.542 | 0.498 | 1 |
| Asian | 0.043 | 0.202 | 0 |
| Hispanic | 0.085 | 0.279 | 0 |
| Other | 0.480 | 6.913 | 0 |
| Male | 0.446 | 0.497 | 0 |
| Female | 0.554 | 0.497 | 1 |
| Family Size | 2.426 | 1.211 | 2 |
| Age | 23.574 | 3.541 | 23 |
| Panel C: *Financial Literacy* | | | |
| Financial Literacy | 0.551 | 0.497 | 1 |
| Panel D: *Economic Variables* | | | |
| Homeowner | 0.072 | 0.259 | 0 |
| Income (BG) | 94,150.35 | 51,546.41 | 82,344 |

## Table 2. Financial Literacy and Financial Crime

This table reports the effect of a financial literacy intervention on the probability of being charged with a financial crime. The dependent variable is *Financial Crime*, an indicator variable equal to 100 if an individual is charged with a financial crime such as financial fraud, embezzlement, forgery, or counterfeiting. The explanatory variable of interest is *Financial Literacy*, an indicator variable equal to one if an individual is required to take a financial literacy course to meet the requirements of graduating the Virginia high school system. The unit of observation is the individual. The bandwidth in the specification is 16 months on either side of the threshold, which we calculate as the optimal bandwidth. The linear controls include the running variable, *Month of Birth*, and *Month of Birth* × *Financial Literacy*. Standard errors are clustered at the level of the running variable. The t-statistics are denoted in parenthesis. Statistical significance is indicated by ***, **, and * at the 1%, 5%, and 10% level, respectively. See Table 1 for sample descriptive characteristics.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| DV: Financial Crime | | | | |
| Financial Literacy | -0.228*** | -0.237*** | -0.252*** | -0.259*** |
| | (-2.798) | (-3.029) | (-3.486) | (-3.260) |
| Linear Controls | Yes | Yes | Yes | Yes |
| Tract×Gender×Race FE | No | No | No | Yes |
| Tract FE | No | Yes | Yes | No |
| Gender FE | No | No | Yes | No |
| Race FE | No | No | Yes | No |
| Family Size FE | No | No | Yes | Yes |
| Homeowner FE | No | No | Yes | Yes |
| Observations | 138892 | 137083 | 120868 | 118689 |
| R-squared | 0.000 | 0.015 | 0.019 | 0.083 |

# Table 3. Alternative Bandwidths, Polynomials, and Fixed Effects

This table reports the effect of a financial literacy intervention on the probability of being charged with a financial crime using a variety of alternative specifications. Panel A shows results for various bandwidths and polynomials. Panel B shows results for alternative sets of fixed effects. The dependent variable of interest is *Financial Crime*, an indicator variable equal to 100 if an individual is charged with a financial crime such as financial fraud, embezzlement, forgery, or counterfeiting. The explanatory variable of interest is *Financial Literacy*, an indicator variable equal to one if an individual is required to take a financial literacy course to meet the requirements of graduating the Virginia high school system. The unit of observation is the individual. The bandwidth (*Bandwidth*) denotes the number of months on either side of the birth-month treatment assignment threshold. The linear controls include the running variable, *Month of Birth*, and *Month of Birth* × *Financial Literacy*. The 2nd and 3rd degree controls indicate the associate variables for 2nd and 3rd degree polynomials. Standard errors are clustered at the level of the running variable. The t-statistics are denoted in parenthesis. Statistical significance is indicated by ***, **, and * at the 1%, 5%, and 10% level, respectively. See Table 1 for sample descriptive characteristics.

## Panel A: Alternate Bandwidths and Polynomials

| DV: Financial Crime | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Financial Literacy | -0.380** | -0.281*** | -0.217*** | -0.173** | -0.298*** | -0.276** |
| | (-2.965) | (-3.005) | (-2.763) | (-2.378) | (-3.207) | (-2.398) |
| Linear Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| 2nd Degree Controls | No | No | No | No | Yes | Yes |
| 3rd Degree Controls | No | No | No | No | No | Yes |
| Tract×Gender×Race FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Family Size FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Homeowner FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Bandwidth | 6 | 12 | 18 | 24 | 24 | 24 |
| Observations | 38304 | 82690 | 126026 | 168112 | 168112 | 169994 |
| R-squared | 0.162 | 0.107 | 0.079 | 0.066 | 0.066 | 0.023 |

## Panel B: Alternate Fixed Effects

| DV: Financial Crime | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Financial Literacy | -0.209** | -0.235** | -0.361** | -0.229*** | -0.247*** | -0.245*** |
| | (-2.100) | (-2.201) | (-2.693) | (-4.002) | (-4.500) | (-4.461) |
| Linear Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Block Group×Gender×Race FE | No | No | Yes | No | No | No |
| Birth Month×Gender×Race FE | No | No | No | No | No | Yes |
| Block Group FE | Yes | Yes | No | No | No | No |
| Birth Month FE | No | Yes | No | Yes | Yes | No |
| Gender FE | No | Yes | No | No | Yes | No |
| Race FE | No | Yes | No | No | Yes | No |
| Family Size FE | No | Yes | Yes | No | Yes | Yes |
| Homeowner FE | No | Yes | Yes | No | Yes | Yes |
| Observations | 115139 | 99475 | 65755 | 138892 | 122486 | 122486 |
| R-squared | 0.235 | 0.243 | 0.344 | 0.000 | 0.005 | 0.006 |

## Table 4. Types of Financial Crimes

This table reports the effect of a financial literacy intervention on the probability of being charged with various types of financial crimes. The dependent variables of interest are *Embezzlement*, *Fraud*, *Forgery*, and *Counterfeit*, which correspond to indicator variables equal to 100 if the individual has been charged with the respective financial crime. The explanatory variable of interest is *Financial Literacy*, an indicator variable equal to one if an individual is required to take a financial literacy course to meet the requirements of graduating the Virginia high school system. The unit of observation is the individual. The bandwidth in the specification is 16 months on either side of the threshold, which we calculate as the optimal bandwidth. The linear controls include the running variable, *Month of Birth*, and *Month of Birth* × *Financial Literacy*. Standard errors are clustered at the level of the running variable. The t-statistics are denoted in parenthesis. Statistical significance is indicated by ***, **, and * at the 1%, 5%, and 10% level, respectively. See Table 1 for sample descriptive characteristics.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Embezzlement | Fraud | Forgery | Counterfeit |
| Financial Literacy | -0.143** | -0.042 | -0.028 | -0.036 |
| | (-2.461) | (-0.819) | (-0.692) | (-1.203) |
| Linear Controls | Yes | Yes | Yes | Yes |
| Tract×Gender×Race FE | Yes | Yes | Yes | Yes |
| Family Size FE | Yes | Yes | Yes | Yes |
| Homeowner FE | Yes | Yes | Yes | Yes |
| Observations | 118689 | 118689 | 118689 | 118689 |
| R-squared | 0.081 | 0.075 | 0.074 | 0.076 |

## Table 5. Crime Severity

This table reports the effect of a financial literacy intervention on the probability of being charged with a misdemeanor or felony financial crime. The dependent variable in columns 1 and 2 is *Misdemeanor*, which is defined as an indicator variable equal to 100 if an individual is charged with a misdemeanor financial crime. The dependent variable in columns 3 and 4 is *Felony*, which is an indicator variable equal to 100 if an individual is charged with a felony financial crime. The explanatory variable of interest is *Financial Literacy*, an indicator variable equal to one if an individual is required to take a financial literacy course to meet the requirements of graduating the Virginia high school system. The unit of observation is the individual. The bandwidth in the specification is 16 months on either side of the threshold, which we calculate as the optimal bandwidth. The linear controls include the running variable, *Month of Birth*, and *Month of Birth* $\times$ *Financial Literacy*. Standard errors are clustered at the level of the running variable. The t-statistics are denoted in parenthesis. Statistical significance is indicated by ***, **, and * at the 1%, 5%, and 10% level, respectively. See Table 1 for sample descriptive characteristics.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Misdemeanor | Misdemeanor | Felony | Felony |
| Financial Literacy | -0.098** | -0.098** | -0.139** | -0.140** |
| | (-2.464) | (-2.488) | (-2.076) | (-2.075) |
| Linear Controls | Yes | Yes | Yes | Yes |
| Tract×Gender×Race FE | Yes | Yes | Yes | Yes |
| Family Size FE | No | Yes | No | Yes |
| Homeowner FE | No | Yes | No | Yes |
| Observations | 118689 | 118689 | 118689 | 118689 |
| R-squared | 0.074 | 0.074 | 0.085 | 0.086 |

## Table 6. Other Non-Financial Crimes

This table reports the effect of a financial literacy intervention on the probability of being charged with a crime unrelated to finance. The dependent variables of interest are *Murder*, *Assault*, *Drugs*, *Vandalism*, and *Larceny*, which correspond to indicator variables equal to 100 if the individual has been charged with the respective crime. The explanatory variable of interest is *Financial Literacy*, an indicator variable equal to one if an individual is required to take a financial literacy course to meet the requirements of graduating the Virginia high school system. The unit of observation is the individual. The bandwidth in the specification is 16 months on either side of the threshold, which we calculate as the optimal bandwidth. The linear controls include the running variable, *Month of Birth*, and *Month of Birth* $\times$ *Financial Literacy*. Standard errors are clustered at the level of the running variable. The t-statistics are denoted in parenthesis. Statistical significance is indicated by ***, **, and * at the 1%, 5%, and 10% level, respectively. See Table 1 for sample descriptive characteristics.

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Murder | Assault | Drugs | Vandalism | Larceny |
| Financial Literacy | -0.000 | 0.071 | -0.112 | 0.002 | -0.036 |
| | (-0.025) | (1.220) | (-0.321) | (0.227) | (-0.196) |
| Linear Controls | Yes | Yes | Yes | Yes | Yes |
| Tract×Gender×Race FE | Yes | Yes | Yes | Yes | Yes |
| Family Size FE | Yes | Yes | Yes | Yes | Yes |
| Homeowner FE | Yes | Yes | Yes | Yes | Yes |
| Observations | 118689 | 118689 | 118689 | 118689 | 118689 |
| R-squared | 0.070 | 0.074 | 0.108 | 0.030 | 0.092 |

## Table 7. Heterogeneity by Income Level

This table reports the effect of a financial literacy intervention by income level on the probability of being charged with a financial crime. The dependent variable is *Financial Crime*, an indicator variable equal to 100 if an individual is charged with a financial crime such as financial fraud, embezzlement, forgery, or counterfeiting. *Financial Literacy* is an indicator variable equal to one if an individual is required to take a financial literacy course to meet the requirements of graduating the Virginia high school system. *Low Income* is an indicator equal to one if an individual lives in a Census block group in the lowest quartile of income in Virginia. The unit of observation is the individual. The bandwidth in the specification is 16 months on either side of the threshold, which we calculate as the optimal bandwidth. The linear controls include the running variable, *Month of Birth*, and *Month of Birth* × *Financial Literacy*. Standard errors are clustered at the level of the running variable. The t-statistics are denoted in parenthesis. Statistical significance is indicated by ***, **, and * at the 1%, 5%, and 10% level, respectively. See Table 1 for sample descriptive characteristics.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| DV: Financial Crime | | | | |
| Financial Literacy × Low Income | -0.300** | -0.295** | -0.343** | -0.307* |
| | (-2.276) | (-2.236) | (-2.419) | (-1.799) |
| Low Income | 0.814*** | 0.570*** | 0.480*** | 0.373** |
| | (7.525) | (3.937) | (3.278) | (2.278) |
| Financial Literacy | -0.070 | -0.067 | -0.048 | -0.048 |
| | (-0.910) | (-0.864) | (-0.618) | (-0.494) |
| Linear Controls | Yes | Yes | Yes | Yes |
| Tract×Gender×Race FE | No | No | No | Yes |
| Tract FE | No | Yes | Yes | No |
| Gender FE | No | No | Yes | No |
| Race FE | No | No | Yes | No |
| Family Size FE | No | No | Yes | Yes |
| Homeowner FE | No | No | Yes | Yes |
| Observations | 99276 | 99275 | 87632 | 85589 |
| R-squared | 0.001 | 0.017 | 0.021 | 0.095 |

# Table 8. Financial Decision-Making

This table reports the effect of a financial literacy intervention on financial decision making. The dependent variable in columns 1 and 2 is *Credit Card DTI*, which is defined as the ratio of credit card debt to income. The dependent variable in columns 3 and 4 is *Investments*, which is defined as the ratio of stock and bond investments to total assets. The dependent variable in columns 5 and 6 is *Savings Account*, which is defined as a dummy variable equal to one if an individual maintains a savings account. The explanatory variable of interest is *Financial Literacy*, an indicator variable equal to one if an individual is required to take a financial literacy course to meet the requirements of graduating the Virginia high school system. The unit of observation is the individual-year. The bandwidth in the specification is 48 months on either side of the threshold. The linear controls include the running variable, *Month of Birth*, and *Month of Birth* $\times$ *Financial Literacy*. Standard errors are clustered at the level of the running variable. The t-statistics are denoted in parenthesis. Statistical significance is indicated by ***, **, and * at the 1%, 5%, and 10% level, respectively. See Table 1 for sample descriptive characteristics.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Credit Card DTI | Credit Card DTI | Investments | Investments | Savings Account | Savings Account |
| Financial Literacy | -0.029* | -0.030* | 0.138** | 0.138** | 0.322** | 0.328** |
| | (-1.691) | (-1.719) | (2.233) | (2.293) | (2.292) | (2.354) |
| Linear Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Income and Wealth | No | Yes | No | Yes | No | Yes |
| Gender | Yes | Yes | Yes | Yes | Yes | Yes |
| Race | Yes | Yes | Yes | Yes | Yes | Yes |
| US Citizen | Yes | Yes | Yes | Yes | Yes | Yes |
| Family Size | Yes | Yes | Yes | Yes | Yes | Yes |
| Employed | Yes | Yes | Yes | Yes | Yes | Yes |
| Education | Yes | Yes | Yes | Yes | Yes | Yes |
| Year | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 176 | 176 | 208 | 208 | 214 | 214 |
| R-squared | 0.273 | 0.283 | 0.169 | 0.211 | 0.212 | 0.219 |

Internet Appendix to:

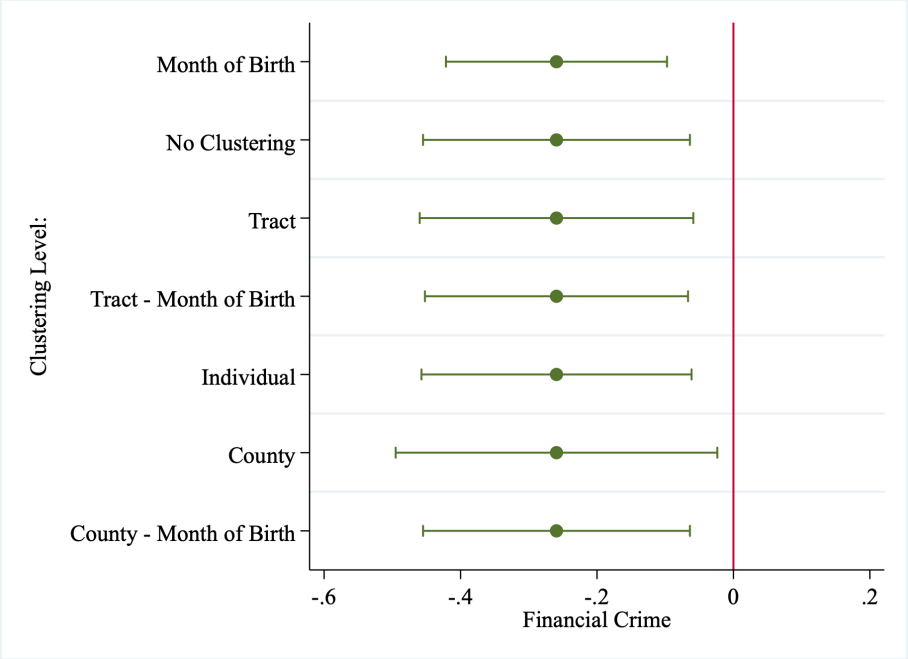
# Financial Literacy and Financial Crime: A Regression Discontinuity Approach

FOR ONLINE PUBLICATION

# IA.1 Supplemental Material

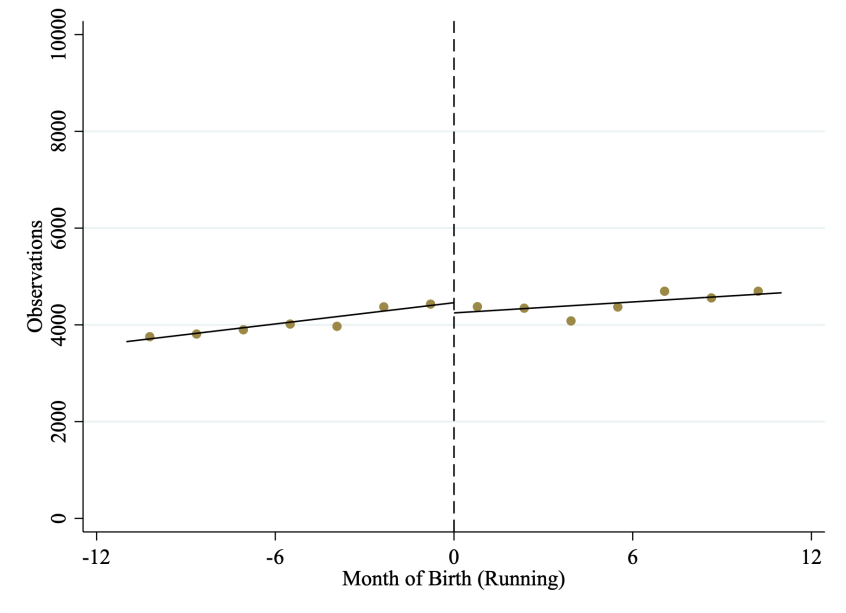
## Figure IA.1. Clustering Levels

This figure reports the coefficient estimates and 95% confidence intervals for *Financial Literacy* with various levels of clustered standard errors and corresponding to the full specification used in Table 2, column 4.



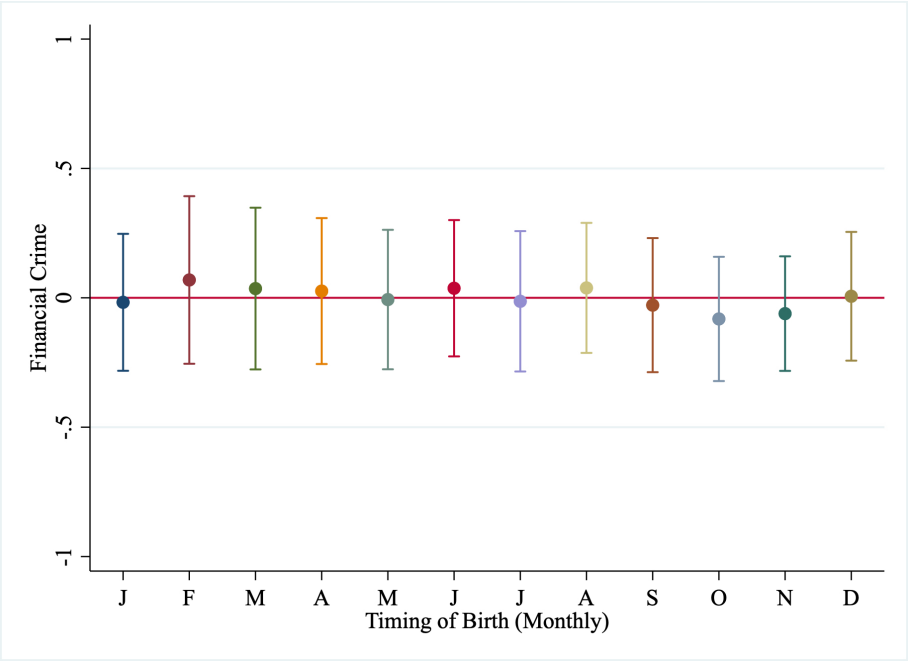
## Figure IA.2. Density

This figure reports the density of observations around the assignment threshold. The x-axis presents the running variable, month of birth, which assigns individuals into treatment or control cohorts. For positive values above the threshold, individuals receive mandatory financial education. For negative values below the threshold, individuals do not receive financial education. The y-axis reports the number of observations per birth-month. The black lines represent the fitted values of a first-degree polynomial.



## Figure IA.3. Seasonality in Birth Outcomes

This figure reports tests for the effect of being born in a particular month on the probability of committing financial crime. The coefficients correspond to dummy variables for being born in a particular month. The outcome variable is *Financial Crime*, an indicator variable equal to 100 if an individual is charged with a financial crime, such as financial fraud, embezzlement, forgery, or counterfeiting. The vertical bars correspond to 95% confidence intervals.



## Table IA.1. Age and Crime

This table illustrates the explanatory power of age on the propensity to commit financial crime. The dependent variable of interest is *Financial Crime*, an indicator variable equal to 100 if an individual is charged with a financial crime such as financial fraud, embezzlement, forgery, or counterfeiting. *Age (Months)* is defined as an individual's monthly age. This variable is empirically identical to *Month of Birth*, except higher values indicate older ages. The treatment variable is *Financial Literacy*, an indicator variable equal to one if an individual is required to take a financial literacy course to meet the requirements of graduating the Virginia high school system. The unit of observation is the individual. The bandwidth in the specification is 16 months on either side of the threshold, which we calculate as the optimal bandwidth. Standard errors are clustered at the level of the running variable. The t-statistics are denoted in parenthesis. Statistical significance is indicated by ***, **, and * at the 1%, 5%, and 10% level, respectively. See Table 1 for sample descriptive characteristics.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| DV: Financial Crime | | | | |
| Age (Months) | 0.008*** | -0.004 | 0.008*** | -0.005 |
| | (3.783) | (-0.542) | (2.857) | (-0.891) |
| Financial Literacy | | -0.228*** | | -0.259*** |
| | | (-2.798) | | (-3.260) |
| Financial Literacy×Age (Months) | | 0.002 | | 0.003 |
| | | (0.238) | | (0.320) |
| Tract×Gender×Race FE | No | Yes | Yes | Yes |
| Family Size FE | No | Yes | Yes | Yes |
| Homeowner FE | No | Yes | Yes | Yes |
| Observations | 138892 | 138892 | 118689 | 118689 |
| R-squared | 0.000 | 0.000 | 0.083 | 0.083 |

## Table IA.2. FINRA Survey Data and Questions

This table reports the summary statistics of the FINRA survey data, as well as the tested financial literacy questions. We constrain the sample to individuals in the state of Virginia following the passage of the mandatory requirement. This gives a total sample size of 1,514 Virginia residents. *Financial Literacy Score* is a 0-6 score of correct finance questions from the survey. *Virginia Personal Finance Course* is an indicator equal to one for whether an individual reports taking a financial literacy course in high school. *College Educated* is a dummy variable equal to one for whether an individual completes a bachelor's or postgraduate degree. *Household Income > $50,000* is an indicator equal to one if the reported income is greater than $50,000. Panel B reports the tested financial literacy questions in the NCFS surveys.

### Panel A. Summary Statistics

| | Mean | SD | 25th | Median | 75th |
|---|---|---|---|---|---|
| Financial Literacy Score | 2.994 | 1.721 | 2 | 3 | 4 |
| Virginia Personal Finance Course | 0.139 | 0.346 | 0 | 0 | 0 |
| College Educated | 0.398 | 0.490 | 0 | 0 | 1 |
| Household Income >$50,000 | 0.583 | 0.493 | 0 | 0 | 1 |

### Panel B. Survey Questions

| |
|---|
| 1. Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow? |
| 2. Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account? |
| 3. If interest rates rise, what will typically happen to bond prices? |
| 4. Suppose you owe $1,000 on a loan and the interest rate you are charged is 20% per year compounded annually. If you didn't pay anything off, at this interest rate, how many years would it take for the amount you owe to double? |
| 5. A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage, but the total interest paid over the life of the loan will be less. (T/F) |
| 6. Buying a single company's stock usually provides a safer return than a stock mutual fund. (T/F) |

## Table IA.3. Alternative Definition of Financial Crime: Inc. Bad Checks

This table reports the effect of a financial literacy intervention on the probability of being charged with a financial crime, including bad checks. The dependent variable in columns 1–4 is *Financial Crime (With BC)*, which an indicator variable equal to 100 if an individual is charged with a financial crime, including bad checks, financial fraud, embezzlement, forgery, or counterfeiting. The dependent variable in column 5 is *Bad Checks*, which is an indicator variable equal to 100 if an individual is charged with bad or worthless check-related crimes. The explanatory variable of interest is *Financial Literacy*, an indicator variable equal to one if an individual is required to take a financial literacy course to meet the requirements of graduating the Virginia high school system. The unit of observation is the individual. The bandwidth in the specification is 16 months on either side of the threshold, which we calculate as the optimal bandwidth. The linear controls include the running variable, *Month of Birth*, and *Month of Birth* × *Financial Literacy*. Standard errors are clustered at the level of the running variable. The t-statistics are denoted in parenthesis. Statistical significance is indicated by ***, **, and * at the 1%, 5%, and 10% level, respectively. See Table 1 for sample descriptive characteristics.

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | With BC | With BC | With BC | With BC | Bad Checks |
| Financial Literacy | -0.251*** | -0.261*** | -0.269*** | -0.273*** | -0.009 |
| | (-2.839) | (-3.094) | (-3.226) | (-3.040) | (-0.363) |
| Linear Controls | Yes | Yes | Yes | Yes | Yes |
| Tract×Gender×Race FE | Yes | Yes | Yes | Yes | Yes |
| Family Size FE | Yes | Yes | Yes | Yes | Yes |
| Homeowner FE | Yes | Yes | Yes | Yes | Yes |
| Observations | 138892 | 137083 | 120868 | 118689 | 118689 |
| R-squared | 0.000 | 0.015 | 0.019 | 0.081 | 0.050 |

## Table IA.4. Alternative Definition of Financial Crime: Inc. Bribery

This table reports the effect of a financial literacy intervention on the probability of being charged with a financial crime, including bribery. The dependent variable in columns 1–4 is *Financial Crime (With Bribery)*, which an indicator variable equal to 100 if an individual is charged with a financial crime, including bribery, financial fraud, embezzlement, forgery, or counterfeiting. The dependent variable in column 5 is *Bribery*, an indicator variable equal to 100 if an individual is charged with bribery. The explanatory variable of interest is *Financial Literacy*, an indicator variable equal to one if an individual is required to take a financial literacy course to meet the requirements of graduating the Virginia high school system. The unit of observation is the individual. The bandwidth in the specification is 16 months on either side of the threshold, which we calculate as the optimal bandwidth. The linear controls include the running variable, *Month of Birth*, and *Month of Birth* × *Financial Literacy*. Standard errors are clustered at the level of the running variable. The t-statistics are denoted in parenthesis. Statistical significance is indicated by ***, **, and * at the 1%, 5%, and 10% level, respectively. See Table 1 for sample descriptive characteristics.

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | With Brib. | With Brib. | With Brib. | With Brib. | Bribery |
| Financial Literacy | -0.227*** | -0.236*** | -0.250*** | -0.258*** | 0.001 |
| | (-2.792) | (-3.001) | (-3.465) | (-3.249) | (0.581) |
| Linear Controls | Yes | Yes | Yes | Yes | Yes |
| Tract×Gender×Race FE | Yes | Yes | Yes | Yes | Yes |
| Family Size FE | Yes | Yes | Yes | Yes | Yes |
| Homeowner FE | Yes | Yes | Yes | Yes | Yes |
| Observations | 138892 | 137083 | 120868 | 118689 | 118689 |
| R-squared | 0.000 | 0.015 | 0.019 | 0.083 | 0.250 |

## Table IA.5. Discontinuities in Individual Characteristics

This table reports discontinuities in a series of individual-level characteristics around the assignment threshold. The dependent variables of interest are dummy variables for race, gender, homeownership, and family size. The explanatory variable of interest is *Financial Literacy*, an indicator variable equal to one if an individual is required to take a financial literacy course to meet the requirements of graduating the Virginia high school system. The unit of observation is the individual. The bandwidth in the specification is 16 months on either side of the threshold, which we calculate as the optimal bandwidth. The linear controls include the running variable, *Month of Birth*, and *Month of Birth* × *Financial Literacy*. Standard errors are clustered at the level of the running variable. The t-statistics are denoted in parenthesis. Statistical significance is indicated by ***, **, and * at the 1%, 5%, and 10% level, respectively. See Table 1 for sample descriptive characteristics.

| | (1) White | (2) Black | (3) Hispanic | (4) Asian | (5) Male | (6) Homeowner | (7) Family Size |
|---|---|---|---|---|---|---|---|
| Financial Literacy | -0.005 | 0.003 | 0.004 | 0.000 | -0.004 | 0.001 | -0.014 |
| | (-0.947) | (0.678) | (1.227) | (0.026) | (-0.960) | (0.310) | (-0.994) |
| Linear Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Tract×Gender×Race FE | No | No | No | No | No | No | No |
| Family Size FE | No | No | No | No | No | No | No |
| Homeowner FE | No | No | No | No | No | No | No |
| Observations | 138892 | 138892 | 138892 | 138892 | 138892 | 138892 | 138892 |
| R-squared | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.002 | 0.001 |

## Table IA.6. Determinants of Financial Crime

This table reports the relation between individual characteristics and the probability of being charged with a financial crime. The dependent variable of interest is *Financial Crime*, an indicator variable equal to 100 if an individual is charged with a financial crime, such as financial fraud, embezzlement, forgery, or counterfeiting. The explanatory variables are personal demographic or local economic variables. The unit of observation is the individual. Standard errors are clustered at the level of the running variable. The t-statistics are denoted in parenthesis. Statistical significance is indicated by ***, **, and * at the 1%, 5%, and 10% level, respectively. See Table 1 for sample descriptive characteristics.

| | (1) | (2) |
|---|---|---|
| DV: Financial Crime | | |
| Male | 0.175*** | 0.212*** |
| | (7.265) | (7.141) |
| White | 0.012 | -0.023 |
| | (0.495) | (-0.775) |
| Black | 1.402*** | 1.286*** |
| | (15.685) | (14.903) |
| Hispanic | 0.089** | 0.040 |
| | (2.434) | (0.892) |
| Asian | -0.064 | -0.012 |
| | (-1.415) | (-0.222) |
| Age | 0.135*** | 0.144*** |
| | (37.092) | (34.611) |
| Homeowner | | -0.646*** |
| | | (-12.355) |
| Income (BG) | | -0.034*** |
| | | (-11.542) |
| Constant | -2.813*** | -2.604*** |
| | (-30.967) | (-26.706) |
| Observations | 604348 | 433311 |
| R-squared | 0.008 | 0.009 |

## Table IA.7. Individual Balance Sheet Information

This table reports summary statistics of variables related to financial decision-making. Data is sourced from the US Census Survey of Income and Program Participation (SIPP). The sample includes individuals who graduated high school in Virgina and are between the ages of 18 and 29.

| | Mean | SD | 25th | Median | 75th |
|---|---|---|---|---|---|
| Credit Card DTI | 0.019 | 0.053 | 0 | 0 | 0.009 |
| Investments | 0.070 | 0.193 | 0 | 0 | 0 |
| Savings Account | 0.637 | 0.482 | 0 | 1 | 1 |
| Net Worth (‘000) | 10.115 | 52.051 | 0 | 1.271 | 6.330 |
| Income (‘000) | 3.638 | 6.151 | 0.410 | 2.363 | 5.214 |

## Table IA.8. Financial Decision-Making: Income

This table reports the effect of a financial literacy intervention on income. The dependent variable of interest is *ln(1+Income)*, defined as the log-transformed annual income of the respondent. The explanatory variable of interest is *Financial Literacy*, an indicator variable equal to one if an individual is required to take a financial literacy course to meet the requirements of graduating the Virginia high school system. The unit of observation is the individual-year. The bandwidth in the specification is 48 months on either side of the threshold. The linear controls include the running variable, *Month of Birth*, and *Month of Birth* × *Financial Literacy*. Standard errors are clustered at the level of the running variable. The t-statistics are denoted in parenthesis. Statistical significance is indicated by ***, **, and * at the 1%, 5%, and 10% level, respectively. See Table 1 for sample descriptive characteristics.

| | (1) | (2) |
|---|---|---|
| | ln(1+Income) | ln(1+Income) |
| Financial Literacy | -0.346 | -0.272 |
| | (-0.306) | (-0.303) |
| Linear Controls | Yes | Yes |
| Income and Wealth | No | Yes |
| Gender | No | Yes |
| Race | No | Yes |
| US Citizen | No | Yes |
| Family Size | No | Yes |
| Employed | No | Yes |
| Education | No | Yes |
| Year | No | Yes |
| Observations | 215 | 214 |
| R-squared | 0.053 | 0.468 |

## Table IA.9. Reported Financial Crimes

This table examines the relation between the proportion of local residents who have taken the financial literacy course and the number of reported financial crimes. The dependent variable of interest is *Financial Crimes*, which is the total number of reported financial criminal incidents in a county-year. The explanatory variable of interest is *Treated (%)*, which is the time-varying proportion of a county population with a mandatory financial literacy training. The observation level is the county-year. We source data on county-level financial crimes from the Data Analysis and Reporting Team (DART) of the Virginia Department of State Police. We estimate the model using PPML. County-level covariates are included where indicated. Standard errors are clustered at the county-year level. The t-statistics are denoted in parenthesis. Statistical significance is indicated by ***, **, and * at the 1%, 5%, and 10% level, respectively. See Table 1 for sample descriptive characteristics.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Financial Crimes | Financial Crimes | Financial Crimes | Financial Crimes |
| Treated (%) | -7.216*** | -8.030*** | -14.713*** | -16.429*** |
| | (-3.163) | (-3.021) | (-6.152) | (-6.383) |
| Under 25 (%) | | | -2.590*** | 1.000 |
| | | | (-3.043) | (0.865) |
| Over 65 (%) | | | -22.781*** | -16.462*** |
| | | | (-16.394) | (-10.437) |
| Total Population ('000) | | | 0.026*** | 0.023*** |
| | | | (26.296) | (23.885) |
| Unemployment Rate | | | | -0.064** |
| | | | | (-2.008) |
| House Price Index | | | | 0.001*** |
| | | | | (7.612) |
| Constant | 5.105*** | 5.566*** | 9.245*** | 7.019*** |
| | (90.949) | (101.348) | (21.594) | (13.426) |
| CBSA × Year | No | Yes | Yes | Yes |
| Year | Yes | No | No | No |
| Observations | 1524 | 996 | 996 | 992 |
| Pseudo R2 | 0.007 | 0.154 | 0.692 | 0.713 |

## Table IA.10. Occupational and Industrial Selection

This table reports the effect of a financial literacy intervention on educational and occupational selection. The dependent variable in column 1 is *Manager*, defined as a dummy variable equal to one if the respondent is in a managerial occupation. The dependent variable in column 2 is *Financial Occupation*, defined as a dummy variable equal to one if the respondent is in a financial occupation, regardless of industry. The dependent variable in column 3 is *Financial Industry*, defined as a dummy variable equal to one if the respondent is in the financial industry. The dependent variable in column 4 is *Business Owner*, defined as a dummy variable equal to one if the respondent owns their own business. The explanatory variable of interest is *Financial Literacy*, an indicator variable equal to one if an individual is required to take a financial literacy course to meet the requirements of graduating the Virginia high school system. The unit of observation is the individual-year. The bandwidth in the specification is 48 months on either side of the threshold. The linear controls include the running variable, *Month of Birth*, and *Month of Birth* $\times$ *Financial Literacy*. Standard errors are clustered at the level of the running variable. The t-statistics are denoted in parenthesis. Statistical significance is indicated by ***, **, and * at the 1%, 5%, and 10% level, respectively. See Table 1 for sample descriptive characteristics.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Manager | Finance Occupation | Finance Industry | Business Owner |
| Financial Literacy | -0.099 | -0.007 | 0.053 | -0.005 |
| | (-1.587) | (-0.109) | (1.513) | (-0.374) |
| Linear Controls | Yes | Yes | Yes | Yes |
| Income and Wealth | No | Yes | No | Yes |
| Gender | Yes | Yes | Yes | Yes |
| Race | Yes | Yes | Yes | Yes |
| US Citizen | Yes | Yes | Yes | Yes |
| Family Size | Yes | Yes | Yes | Yes |
| Employed | Yes | Yes | Yes | Yes |
| Education | Yes | Yes | Yes | Yes |
| Year | Yes | Yes | Yes | Yes |
| Observations | 215 | 214 | 214 | 214 |
| R-squared | 0.190 | 0.178 | 0.075 | 0.076 |

## Table IA.11. Educational Selection

This table reports the effect of a financial literacy intervention on educational and occupational selection. The dependent variable in column 1 is *College*, defined as a dummy variable equal to one if the respondent earned a college degree. The dependent variable in column 2 is *Post Graduate*, defined as a dummy variable equal to one if the respondent earned a post-graduate degree. The dependent variable in column 3 is *Professional*, defined as a dummy variable equal to one if the respondent earned a professional or doctorate degree. The explanatory variable of interest is *Financial Literacy*, an indicator variable equal to one if an individual is required to take a financial literacy course to meet the requirements of graduating the Virginia high school system. The unit of observation is the individual-year. The bandwidth in the specification is 48 months on either side of the threshold. The linear controls include the running variable, *Month of Birth*, and *Month of Birth* × *Financial Literacy*. Standard errors are clustered at the level of the running variable. The t-statistics are denoted in parenthesis. Statistical significance is indicated by ***, **, and * at the 1%, 5%, and 10% level, respectively. See Table 1 for sample descriptive characteristics.

| | (1) | (2) | (3) |
|---|---|---|---|
| | College | Post Graduate | Professional |
| Financial Literacy | -0.026 | -0.036 | -0.019 |
| | (-0.228) | (-0.626) | (-1.053) |
| Linear Controls | Yes | Yes | Yes |
| Income and Wealth | Yes | Yes | Yes |
| Gender | Yes | Yes | Yes |
| Race | Yes | Yes | Yes |
| US Citizen | Yes | Yes | Yes |
| Family Size | Yes | Yes | Yes |
| Employed | Yes | Yes | Yes |
| Year | Yes | Yes | Yes |
| Observations | 215 | 215 | 215 |
| R-squared | 0.122 | 0.331 | 0.091 |

## Table IA.12. Geographic Migration

This table reports the effect of a financial literacy intervention on educational and occupational selection. The dependent variable in column 1 is *Virginia Native*, defined as a dummy variable equal to one if the respondent was born in the state of Virginia. The dependent variable in column 2 is *Mover*, defined as a dummy variable equal to one if the respondent moved from their birth county at any point in time. The explanatory variable of interest is *Financial Literacy*, an indicator variable equal to one if an individual is required to take a financial literacy course to meet the requirements of graduating the Virginia high school system. The unit of observation is the individual-year. The bandwidth in the specification is 48 months on either side of the threshold. The linear controls include the running variable, *Month of Birth*, and *Month of Birth* $\times$ *Financial Literacy*. Standard errors are clustered at the level of the running variable. The t-statistics are denoted in parenthesis. Statistical significance is indicated by ***, **, and * at the 1%, 5%, and 10% level, respectively. See Table 1 for sample descriptive characteristics.

| | (1) | (2) |
|---|---|---|
| | Virginia Native | Mover |
| Financial Literacy | 0.077 | -0.023 |
| | (0.599) | (-1.118) |
| Linear Controls | Yes | Yes |
| Income and Wealth | Yes | Yes |
| Gender | Yes | Yes |
| Race | Yes | Yes |
| US Citizen | Yes | Yes |
| Family Size | Yes | Yes |
| Employed | Yes | Yes |
| Education | Yes | Yes |
| Year | Yes | Yes |
| Observations | 214 | 214 |
| R-squared | 0.251 | 0.162 |

## Table IA.13. Within-Family Sibling Comparison

This table reports the effect of a financial literacy intervention within families on the probability of being charged with a financial crime. The dependent variable of interest is *Financial Crime*, an indicator variable equal to 100 if an individual is charged with a financial crime, such as financial fraud, embezzlement, forgery, or counterfeiting. The explanatory variable of interest is *Financial Literacy*, an indicator variable equal to one if an individual is required to take a financial literacy course to meet the requirements of graduating the Virginia high school system. The unit of observation is the individual. Standard errors are clustered at the level of the running variable. The t-statistics are denoted in parenthesis. Statistical significance is indicated by ***, **, and * at the 1%, 5%, and 10% level, respectively. See Table 1 for sample descriptive characteristics.

| | (1) | (2) |
|---|---|---|
| DV: Financial Crime | | |
| Financial Literacy | -0.367** | -0.355** |
| | (-4.13) | (-3.94) |
| Family×Gender FE | Yes | Yes |
| Homeowner FE | No | Yes |
| Observations | 80482 | 80482 |
| R-squared | 0.505 | 0.505 |

## IA.2 Virginia Financial Literacy Requirements

This section reports documentation containing an overview of the learning objectives of the *Economics and Personal Finance* course as mandated by the state of Virginia. This material is public, provided by the state of Virginia for the benefit of its citizens. The material relates to several key aspects of this study. The documentation follows.

# *Economics and Personal Finance*
# *Standards of Learning*
**October 17, 2019**

Students need a strong, interdisciplinary foundation in economics and personal finance to function effectively as consumers, workers, savers, investors, entrepreneurs, and active citizens. The *Standards of Learning for Economics and Personal Finance* present economic concepts that help students interpret the daily news, understand the interdependence of the world's economies, and anticipate how events will impact their lives. The understanding of how economies and markets operate and how the United States' economy is interconnected with the global economy prepares students to be more productive participants in the workplace. On a personal level, students learn that their own human capital (knowledge and skills) is their most valuable resource and that investing in education and training improves the likelihood of their future economic success.

The *Standards of Learning for Economics and Personal Finance* also help students develop economic reasoning skills needed to analyze and solve real-world problems, entertain multiple perspectives, and make informed personal and collective decisions. The topics of economics and personal finance teach that resources are limited; thus, people must make choices that may include substitutions or alternatives. Students practice using a set of economic reasoning tools to critically think about and analyze choices of all types, including those related to personal finance. For example, students learn the benefits of compound interest over time and that poor money management can lead to difficulty in obtaining credit. Students practice weighing costs and benefits of options when making choices about such things as postsecondary training and education, careers, insurance, housing, investments, savings, automobiles and health care. Students practice these skills as they extend their understanding of the essential knowledge defined by the *Standards of Learning for Economics and Personal Finance*.

EPF.1 The student will demonstrate knowledge and integration of basic economic concepts and structures by

a) describing how consumers, businesses, and government decision makers face scarcity of resources and must make trade-offs and incur opportunity costs;
b) explaining that choices often have long-term, unintended consequences;
c) describing how effective decision making requires a comparison of the additional costs (marginal costs) and additional benefits (marginal benefits), using a cost-benefit analysis chart and PACED decision-making grid (i.e., state the problem; list alternatives; identify the criteria; evaluate the alternatives based on the criteria; make a decision) for economic and personal finance decisions;
d) describing the factors of production;
e) comparing the characteristics and applications of market, command, traditional, and mixed economies; and
f) identifying Adam Smith and describing the characteristics of a market economy.

EPF.2 The student will demonstrate knowledge of the role of producers and consumers in a market economy by

a) describing how consumers, producers, workers, savers, investors, and citizens respond to incentives;
b) explaining how businesses respond to consumer sovereignty;
c) identifying the role of entrepreneurs;
d) comparing the costs and benefits of different forms of business organization, including sole proprietorship, partnership, corporation, franchise, and cooperative;
e) describing how costs and revenues affect profit and supply;
f) describing how increased productivity affects costs of production and standards of living;
g) examining how investment in human capital, capital goods, and technology can improve productivity;
h) describing the effects of competition on producers, sellers, and consumers;
i) explaining why monopolies or collusion among sellers reduces competition and raises prices; and
j) illustrating the circular flow of economic activity.

EPF.3 The student will demonstrate knowledge of the price system by
a) analyzing the laws of supply and demand and the determinants of each;
b) explaining how the interaction of supply and demand determines equilibrium price and wages;
c) describing the elasticity of supply and demand; and
d) examining the purposes and implications of price ceilings and price floors.

EPF.4 The student will demonstrate knowledge of the many factors that affect income by
a) examining the market value of a worker's education, skills, training, knowledge, and credentials;
b) identifying the impact of human capital on production costs;
c) explaining the relationship between a person's own human capital and the resulting income potential;
d) performing an analysis of expenses and financial aid required for continuing education to expand human capital; and
e) describing how changes in supply and demand for goods and services affect income.

EPF.5 The student will demonstrate knowledge of a nation's economic goals, including full employment, stable prices, and economic growth by
a) distinguishing among economic indicators, for example, gross domestic product (GDP), consumer price index (CPI), and unemployment rate;
b) analyzing the causes and effects of unemployment, inflation, and reduced economic growth;
c) describing the fluctuations of the business cycle and how economic indicators change throughout the business cycle; and
d) describing strategies for achieving national economic goals.

EPF.6 The student will demonstrate knowledge of the nation's financial system by

a) comparing the role of money and currency;
b) explaining the roles and types of financial markets and financial institutions;
c) describing the purpose, structure, and function of the Federal Reserve System, including the role of monetary policy;
d) identifying the tools of monetary policy (e.g., Fed funds rate);
e) comparing the U.S. monetary system with the international monetary system; and
f) explaining how certain historical events have influenced the banking system and other financial institutions.

EPF.7 The student will demonstrate knowledge of how fiscal policy influences employment, output, and prices by
a) describing government's role in stabilizing the economy through congressional spending and tax policy;
b) describing sources of government revenue; and
c) explaining balanced budget, deficit, and national debt.

EPF.8 The student will demonstrate knowledge of the role of government in a market economy by
a) identifying goods and services provided by government to benefit society;
b) identifying the role government plays in providing a legal structure to protect property rights and enforce contracts;
c) providing examples of government regulation of the market; and
d) explaining that governments redistribute wealth.

EPF.9 The student will demonstrate knowledge of the global economy by
a) explaining that when parties trade voluntarily, all benefit;
b) distinguishing between absolute and comparative advantage;
c) distinguishing between trade deficit and trade surplus;
d) explaining exchange rates and the impact of the strength of the dollar on economic decisions;
e) describing the costs and benefits of trade barriers;
f) describing the effects of international trade agreements and the World Trade Organization; and
g) explaining growing economic interdependence.

EPF.10 The student will develop consumer skills by
a) examining basic economic concepts (such as scarcity and opportunity cost) and their relation to product prices and consumer spending;
b) describing common types of contracts and the implications of each;
c) demonstrating comparison-shopping skills;
d) examining the importance of maintaining a system for personal financial records;
e) examining the impact of advertising and marketing on consumer demand and decision making in the global marketplace;
f) accessing reliable financial information from a variety of sources;
g) explaining consumer rights, responsibilities, remedies, and the importance of consumer vigilance; and

h) examining precautions for protecting identity and other personal information.

EPF.11 The student will demonstrate knowledge of planning for living and leisure expenses by

a) comparing the costs and benefits of purchasing vs. leasing a vehicle;
b) calculating the total costs of owning and operating a vehicle;
c) comparing the costs and benefits of renting vs. purchasing a residence;
d) describing the process of renting a residence;
e) describing the process of purchasing a residence;
f) calculating the cost of utilities, services, maintenance, and other residential expenses; and
g) evaluating discretionary spending decisions.

EPF.12 The student will demonstrate knowledge of banking transactions by

a) evaluating services and related costs associated with personal banking;
b) differentiating among types of electronic monetary transactions;
c) preparing all forms necessary for opening and maintaining a checking and a savings account;
d) reconciling bank statements;
e) comparing costs and benefits of online and traditional banking; and
f) examining how financial institutions affect personal financial planning.

EPF.13 The student will demonstrate knowledge of credit and loan functions by

a) evaluating the various methods of financing a purchase;
b) analyzing credit card features and their impact on personal financial planning;
c) identifying qualifications needed to obtain credit and the information needed to complete a credit application;
d) examining basic provisions of credit and loan laws;
e) comparing terms and conditions of various sources of consumer credit;
f) identifying strategies for effective debt management, including sources of assistance;
g) explaining the ways to build and maintain a good credit rating and the ramifications of an individual's credit score;
h) comparing the costs and conditions of secured and unsecured loans;
i) comparing the types of voluntary and involuntary bankruptcy and the implications of each; and
j) comparing amortization schedules for a loan based on principal, time, annual percentage rate (APR), and different credit ratings.

EPF.14 The student will demonstrate knowledge of the role of insurance in risk management by

a) identifying different ways to manage risk;
b) evaluating insurance as a risk management strategy;
c) distinguishing among the types, costs, and benefits of insurance coverage, including identity theft, automobile, life, property, and health; and
d) examining potential ramifications of lifestyle choices on premiums,

insurability, and employability.

EPF.15 The student will demonstrate knowledge of income earning, taxes, and reporting by

a) differentiating among sources of income;
b) calculating gross and net pay;
c) investigating employee benefits and incentives (e.g., pretax savings opportunities);
d) describing the types and purposes of local, state, and federal taxes and the way each is levied and used;
e) exploring how tax structures affect individuals of different income levels;
f) computing local taxes on products and services;
g) explaining the content and purpose of a standard W-2 form;
h) completing standard employment tax forms; and
i) describing information relevant to the completion of state and federal income tax forms.

EPF.16 The student will demonstrate knowledge of personal financial planning by

a) identifying short-term and long-term personal financial goals;
b) identifying anticipated and unanticipated income and expenses;
c) defining terminology associated with inheritance and estate planning;
d) examining components and purposes of a personal net worth statement;
e) developing a personal budget;
f) investigating the effects of government actions and economic conditions on personal financial planning; and
g) explaining how economics influences a personal financial plan.

EPF.17 The student will demonstrate knowledge of investment and savings planning by

a) comparing the impact of simple interest vs. compound interest on savings;
b) comparing various options for investment and savings;
c) examining the fundamental workings of Social Security and the system's effects on retirement planning;
d) comparing various options for long-term planning (e.g., Virginia529 Plan, retirement plans); and
e) describing how the stock market works.

EPF.18 The student will demonstrate knowledge of financing postsecondary education by

a) identifying costs and benefits of postsecondary education;
b) identifying sources of postsecondary education funding;
c) identifying the purpose of the Free Application for Federal Student Aid (FAFSA) in determining eligibility for grants, scholarships, and loans and the essential information needed to complete it;
d) describing types of aid which do not require repayment, including federal, state, and institutional grants;
e) describing types of scholarships and identifying scholarship scams;
f) examining types of student loans, including federal and private, and understanding the associated risks;
g) examining the requirements to remain eligible for financial aid;

h) explaining repayment requirements and options for student loans, including income-appropriate repayment plans and options for loan forgiveness, cancellation, and discharge;
i) describing the options for borrowers struggling to make payments and the consequences of failure to repay student loans;
j) describing benefits, eligibility requirements, and tax implications of state- sponsored tax-advantage-qualified tuition plans as investment options for postsecondary education (e.g., Virginia529 Plan);
k) identifying the multiple pathways to postsecondary education and career preparedness;
l) identifying parts of a financial award letter;
m) identifying the student loan default rates of postsecondary institutions in Virginia;
n) describing appropriate income levels needed to support student loan borrowing.