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FINANCIAL LITERACY, FINANCIAL EDUCATION AND ECONOMIC OUTCOMES

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ABSTRACT

In this article we review the literature on financial literacy, financial education, and consumer financial outcomes. We consider how financial literacy is measured in the current literature, and examine how well the existing literature addresses whether financial education improves financial literacy or personal financial outcomes. We discuss the extent to which a competitive market provides incentives for firms to educate consumers or offer products that facilitate informed choice. We review the literature on alternative policies to improve financial outcomes, and compare the evidence to evidence on the efficacy and cost of financial education. Finally, we discuss directions for future research.

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"The future of our country depends upon making every individual, young and old, fully realize the obligations and responsibilities belonging to citizenship...The future of each individual rests in the individual, providing each is given a fair and proper education and training in the useful things of life…Habits of life are formed in youth…What we need in this country now…is to teach the growing generations to realize that thrift and economy, coupled with industry, are necessary now as they were in past generations."

--Theodore Vail, President of AT&T and first chairman of the Junior Achievement Bureau (1919, as quoted in Francomano, Lavitt and Lavitt, 1988)

"Just as it was not possible to live in an industrialized society without print literacy—the ability to read and write, so it is not possible to live in today's world without being financially literate… Financial literacy is an essential tool for anyone who wants to be able to succeed in today's society, make sound financial decisions, and—ultimately—be a good citizen."

--Annamaria Lusardi (2011)

1. INTRODUCTION

Can individuals effectively manage their personal financial affairs? Is there a role for public policy in helping consumers achieve better financial outcomes? And if so, what form should government intervention take? These questions are central to many current policy debates and reforms in the U.S. and around the world in the wake of the recent global financial crises.

In the U.S., concerns about poor financial decision making and weak consumer protections in consumer financial markets provided the impetus for the creation of the Consumer Financial Protection Bureau (CFPB) as part of the Dodd-Frank Wall Street Reform and Consumer Project Act which was signed into law by President Obama on July 21, 2010. This law gives the CFPB oversight of consumer financial products in a variety of markets, including checking and savings accounts, payday loans, credit cards, and mortgages (CFPB authority does not extend to investments such as stocks and mutual funds which are regulated by the SEC, or personal insurance products that are largely regulated at the state level). In addition to establishing its regulatory authority, the Dodd-Frank Act mandates that the CFPB establish "the Office of Financial Education, which shall develop a strategy to improve the financial literacy of consumers." It goes on to state that the Comptroller must study "effective methods, tools, and

strategies intended to educate and empower consumers about personal financial management" and make recommendations for the "development of programs that effectively improve financial education outcomes."[1]

In line with this second mandate for the CFPB, there has been much recent public discussion on financial literacy and the role of financial education as an antidote to limited individual financial capabilities. As the title suggests, this is a main focus of the current paper; however, it is important not to lose the forest for the trees in the debate on policy prescriptions. The market failure that calls for a policy response is not limited to financial literacy per se, but the full complement of conditions that lead to suboptimal consumer financial outcomes of which limited financial literacy is one contributing factor. Similarly, the policy tools for improving consumer financial outcomes include financial education but also encompass a wide variety of regulatory approaches. One of our aims in this paper is to place financial literacy and financial education in this broader context of both problems and solutions.

The sense of public urgency over the level of financial literacy in the population is, we believe, a reaction to a changing economic climate in which individuals now shoulder greater personal financial responsibility in the face of increasingly complicated financial products. For example, in the U.S. and elsewhere across the globe, individuals have been given greater control and responsibility over the investments funding their retirement (in both private retirement savings plan such as 401(k)s and in social security schemes with private accounts). Consumers confront ever more diverse options to obtain credit (credit cards, mortgages, home equity loans, payday loans, etc.) and a veritable alphabet soup of savings alternatives (CDs, HSAs, 401(k)s, IRAs, 529s, KEOUGHs, etc.). Can individuals successfully navigate this increasingly complicated financial terrain?

We begin by framing financial literacy within the context of standard models of consumer financial decision making. We then consider how to define and measure financial literacy, with an emphasis on the growing literature documenting the financial capabilities of individuals in the U.S. and other countries. We then survey the literature on the relationship between financial literacy and economic outcomes, including wealth accumulation, savings decisions, investment

[1] See Dodd-Frank Wall Street Reform and Consumer Protection Act. H.R. 4173. Title X - Bureau of Consumer Financial Protection 2010, Section 1013. <http://www.gpo.gov/fdsys/pkg/BILLS-111hr4173enr/pdf/BILLS-111hr4173enr.pdf , accessed September 13, 2012>

choices, and credit outcomes. We then assess the evidence on the impact of financial education on financial literacy and on economic outcomes. Next we evaluate the role of government in consumer financial markets: what problems do limited financial capabilities pose, and are market mechanisms likely to correct these problems? Finally, we suggest directions for future research on financial literacy, financial education, and other mechanisms for improving consumer financial outcomes.

2. WHAT IS FINANICAL LITERACY AND WHY IS IT IMPORTANT?

"Financial literacy" as a construct was first championed by the Jump$tart Coalition for Personal Financial Literacy in its inaugural 1997 study *Jump$tart Survey of Financial Literacy Among High School Students*. In this study, Jump$tart defined "financial literacy" as "the ability to use knowledge and skills to manage one's financial resources effectively for lifetime financial security." As operationalized in the academic literature, financial literacy has taken on a variety of meanings; it has been used to refer to knowledge of financial products (e.g., what is a stock vs. a bond; the difference between a fixed vs. an adjustable rate mortgage), knowledge of financial concepts (inflation, compounding, diversification, credit scores), having the mathematical skills or numeracy necessary for effective financial decision making, and being engaged in certain activities such as financial planning.

Although financial literacy as a construct is a fairly recent development, financial education as an antidote to poor financial decision making is not. In the U.S., policy initiatives to improve the quality of personal financial decision making through financial education extend back at least to the 1950s and 1960s when states began mandating inclusion of personal finance, economics, and other consumer education topics in the K-12 educational curriculum (Bernheim et al. 2001; citing Alexander 1979, Joint Council on Economic Education 1989, and National Coalition for Consumer Education 1990).[2] Private financial and economic education initiatives have an even longer history; the Junior Achievement organization had its genesis during World War I, and the Council for Economic Education goes back at least sixty years.[3]

[2] By 2011, economic education had been incorporated into the K-12 educational standards of every state except Rhode Island, and personal finance was a component of the K-12 educational standards in all states except Alaska, California, New Mexico, Rhode Island, and the District of Columbia (Council for Economic Education, 2011).

[3] See http://www.ja.org/about/about_history.shtml and http://www.councilforeconed.org/about/ .

Why are financial literacy and financial education as a tool to increase financial literacy potentially important? In answering these questions, it is useful to place financial literacy within the context of standard models of consumer financial decision making and market competition. We start with a simple two-period model of intertemporal choice in the face of uncertainty. A household decides between consumption and savings at time 0, given an initial time 0 budget, *y*, an expected real interest rate, *r*, and current and future expected prices, *p*, for goods consumed, *x*.

$$\begin{aligned} &\max E[U(c_0, c_1)] \\ &s.t.\ c_0 + s_0 \leq y \\ &c_1 \leq (1+r)s_0 \\ &c_t = \sum_{i=1}^{N} x_{it} p_{it} \end{aligned} \qquad (1)$$

Solving this simple model requires both numeracy (the ability to add, subtract, and multiply), and some degree of financial literacy (an understanding of interest rates, market risks, real versus nominal returns, prices and inflation).

Alternatively, consider a simple model of single-period profit maximization for a single-product firm competing on price in a differentiated products market:

$$\pi_j = \left(p_j - mc_j\right) D_j\left(x_j, p_j, x_{-j}, p_{-j}; \theta\right) - FC_j \qquad (2a)$$

The firm chooses price, *p*, to maximize profits given marginal costs, *mc,* its product characteristics, *x*, its competitors' prices and product characteristics, p_{-j} and x_{-j}, respectively, and the distribution of consumer preferences over price and product characteristics, θ. Doing so results in the familiar formula relating price mark-up over costs to the price elasticity of demand: prices are higher relative to costs in product markets in which demand is less sensitive to price.

$$\frac{p_j - mc_j}{p_j} = \frac{D_j}{\left(\frac{\partial D_j}{\partial p_j}\right) p_j} = \frac{1}{|\varepsilon_j|} \qquad (2b)$$

Competitive outcomes in this model rest on the assumption that individuals can and do make comparisons across products in terms of both product attributes and the prices paid for those attributes. This may be a relatively straightforward task for some products (e.g., breakfast cereal), but is a potentially tall order for products with multidimensional attributes and complicated and uncertain pricing (e.g., health care plans, cell phone plans, credit cards, or adjustable rate mortgages).

A lack of financial literacy is problematic if it renders individuals unable to optimize their own welfare, especially when the stakes are high, or to exert the type of competitive pressure necessary for market efficiency. This has obvious consequences for individual and social welfare. It also makes the standard models used to capture consumer behavior and shape economic policy less useful for these particular tasks.

Research has documented widespread and avoidable financial mistakes by consumers, some with non-trivial financial consequences. For example, in the U.S., Choi et al. (2011) examine contributions to 401(k) plans by employees over age 59 ½ who are eligible for an employer match, vested in their plan, and able to make immediate penalty-free withdrawals due to their age. They find that 36% of these employees either don't participate or contribute less than the amount that would garner the full employer match, essentially foregoing 1.6% of their annual pay in matching contributions; the cumulative losses over time for these individuals are likely to be much larger.

Duarte & Hastings (2011) and Hastings et al. (2012) show that many participants in the private account Social Security system in Mexico invest their account balances with dominated financial providers who charge high fees that are not offset by higher returns, contributing to high management fees in the system overall. Similarly, Choi et al. (2009) use a laboratory experiment that show that many investors, even those who are well educated, fail to choose a fee minimizing portfolio even in a context (the choice between four different S&P 500 Index Funds) in which fees are the only significant distinguishing characteristic of the investments and the dispersion in fees is large.

Campbell (2006) highlights several other of financial mistakes: low levels of stock market participation, inadequate diversification due to households' apparent preferences to invest in local firms and employer stock, individuals' tendencies to sell assets that have appreciated while holding on to assets whose value has declined even if future return prospects are the same (the

disposition effect first documented in Odean 1998), and failing to refinance fixed rate mortgages in a period of declining interest rates.

Other financial mistakes discussed in the literature include purchasing whole life insurance rather than a cheaper combination of term life insurance in conjunction with a savings account (Anagol et al. 2012); simultaneously holding high-interest credit card debt and low-interest checking account balances (Gross & Souleles 2002); holding taxable assets in taxable accounts and non-taxable or tax-preferred assets in tax-deferred accounts (Bergstresser & Poterba 2004, Barber & Odean 2003); paying down a mortgage faster than the amortization schedule requires while failing to contribute to a matched tax-deferred savings account (Amromin et al. 2007); and borrowing from a payday lender when cheaper sources of credit are available (Agarwal et al. 2009b).

Agarwal et al. (2009a) document the prevalence of several different financial mistakes ranging from suboptimal credit card use after making a balance transfer to an account with a low teaser rate, to paying unnecessarily high interest rates on a home equity loan or line of credit. They find that across many domains, sizeable fractions of consumers make avoidable financial mistakes. They also find that the frequency of financial mistakes varies with age, following a U-shaped pattern: financial mistakes decline with age until individuals reach their early 50s, then begin to increase. The declining pattern up to the early 50s is consistent with the acquisition of increased financial decision-making capital over time, either formally or through learning from experience (Agarwal et al. 2011); but the reversal at older ages highlights the natural limits that the aging process places on individuals' financial decision-making capabilities, however those capabilities are acquired.

The constellation of findings described above has been cited by some as prima facie evidence that individuals lack the requisite levels of financial literacy for effective financial decision making. On the other hand, Milton Friedman (1953) famously suggested that just as pool players need not be experts in physics to play pool well, individuals need not be financial experts if they can learn to behave optimally through trial and error. There is some evidence that such personal financial learning does occur. Agarwal et al. (2011) find that in credit card markets during the first three years after an account is opened, the fees paid by new card holders fall by 75% due to negative feedback: by paying a fee, consumers learn how to avoid triggering future fees. The role of experience is also evident in the answers to a University of Michigan Surveys of Consumers

question that asked about the most important way respondents' learned about personal finance. Half cited personal financial experience, more than twice the fraction who cited friends and family, and four to five times the fraction who credit formal financial education as their most important source of learning (Hilgert & Hogarth 2003).

Although experiential learning may be an important self-correcting mechanism in financial markets, many important financial decisions like saving and investing for retirement, choosing a mortgage, or investing in an education, are undertaken only infrequently and have delayed outcomes that are subject to large random shocks. Learning by doing may not be an effective substitute for limited financial knowledge in these circumstances (Campbell et al. 2010), and consumers may instead rely on whatever limited institutional knowledge and numeracy skills they have.

3. MEASURING FINANCIAL LITERACY

If financial literacy is an important ingredient in effective financial decision making, a natural question to ask is how financially literate are consumers? Are they well equipped to make consequential financial decisions? Or do they fall short? Efforts to measure financial literacy date back to at least the early 1990s when the Consumer Federation of America (1990; 1991; 1993; 1998) began conducting a series of "Consumer Knowledge" surveys among different populations which included questions on several personal finance topics: consumer credit, bank accounts, insurance, and major consumer expenditures areas such as housing, food and automobiles. The 1997 Jump$tart survey of high school students referenced above has been repeated biennially since 2000 and was expanded to include college students in 2008 (see Mandell 2009, for an analysis these surveys). Hilgert et al. (2003) analyze a set of "Financial IQ" questions included in the University of Michigan's monthly Surveys of Consumers in November and December 2001.

More recently, Lusardi & Mitchell (2006) added a set of financial literacy questions to the 2004 Health and Retirement Study (HRS, a survey of U.S. households aged 50 and older) that have, in the past decade, served as the foundational questions in several surveys designed to measure financial literacy in the U.S. and other countries. The three core questions in the original 2004 HRS financial literacy module were designed to assess understanding of three core

financial concepts: compound interest, real rates of return, and risk diversification (see Table 1). Because these questions are parsimonious and have been widely replicated and adapted, they have come to be known as the "Big Three."

These questions were incorporated into the 2009 National Financial Capability Study (NFCS) in the U.S., a large national survey of the financial capabilities of the adult population.[4] The NFCS asked two additional financial literacy questions which, together with the "Big Three," have collectively come to be known as the "Big Five." These two additional questions test knowledge about mortgage interest and bond prices. Table 1 lists the "Big Five" questions as asked with their potential answers (the correct answers are italicized).

Because the "Big Three" questions have been more widely adopted in other surveys, we focus here on the answers to these three questions, although we return to the "Big Five" later. The second and fourth columns of Table 2 report the percent of correct and "Don't know" responses to each of the "Big Three" questions for the 2004 HRS respondents and the 2009 NFCS respondents. Because the NFCS represents the entire adult population, we focus on those results here. Among respondents to the 2009 NFCS, 78% correctly answered the first question on interest rates and compounding, 65% correctly answered the second question on inflation and purchasing power, and 53% correctly answered the third question on risk diversification. Note that all three questions were multiple choice (rather than open-ended), so that guessing would yield a correct answer to the first two questions 33% of the time and to the last question 50% of the time. Only 39% of respondents correctly answered all three questions.

Clearly individuals who cannot answer the first or second questions will have a difficult time navigating financial decisions that involve an investment today and real rates of return over time; they are likely to have trouble making even the basic calculations assumed in a rational intertemporal decision-making framework. The inability to correctly answer the third question demonstrates ignorance about the benefits of diversification (reduced risk) and casts doubt on whether individuals can effectively manage their financial assets. With only 39% of the population able to answer these three fairly basic financial literacy questions correctly, we might be justifiably concerned about how many individuals make suboptimal financial decisions in everyday life and the types of marketplace distortions that could follow.

[4] The NFCS has three components, a national random-digit-dialed telephone survey, a state-by-state on-line survey, and a survey of U.S. military personnel and their spouses.

As noted earlier, dozens of surveys in addition to the NFCS have included the trio of questions discussed above from the 2004 HRS. In addition to the results for the 2004 HRS and the 2009 NFCS, Table 2 shows how respondents in several countries answered these same questions. The first six columns list comparative statistics for six developed economy surveys from the U.S., The Netherlands, Japan and Germany. The next three columns take data from the upper-middle income countries of Chile and Mexico. The last two columns report responses from the lower-income countries of India and Indonesia. Proficiency rates vary widely; in Germany, 53% of respondents correctly answer the three HRS financial literacy questions, whereas only 8% of respondents in Chile do so. In general, the level of financial literacy is highest in the developed countries and lowest in the lower-income countries. The responses to these questions in the 2004 and 2010 HRS suggest that financial literacy for HRS respondents has increased somewhat over time, perhaps from participating in the panel, or perhaps as a result of increased financial discussion surrounding the 2008 financial crisis. In Chile and Mexico, respondents have particularly low levels of financial literacy despite being responsible for managing the investment decisions for the balances accumulated in their privatized social security accounts. Chile also witnessed massive student protests over college loan debt in 2011, and yet only 16% of college entrants can correctly answer these three questions despite the fact that 22% of them are taking out student loans.[5]

Although the Lusardi and Mitchell "Big Three" questions from the 2004 HRS have quickly become an international standard in assessing financial literacy, there is remarkably little evidence on whether this set of survey questions is the best approach, or even a superior approach, to measuring financial literacy. The question of how best to assess the desired behavioral capabilities remains open, both in terms of establishing whether survey questions are best-suited for the task or which questions are most effective. Longer financial literacy survey batteries do exist, including the National Financial Capability Study (NFCS) which asks the "Big Five" financial literacy questions described above along with an extensive set of questions on individual financial behaviors. The biennial Jump$tart Coalition financial literacy surveys used to assess the financial literacy of high school and college students in the U.S. include more than fifty questions. Whether using additional survey questions (and how many more) better explains

[5] Based on author's calculations using TNE survey responses from 2012 linked to college loan taking data in Chile. See Hastings, Neilson and Zimmerman (in progress) for details on the survey and data.

individual behavior is unclear as little research has evaluated the relative efficacy of different measurements.

Table 3 lists the fraction of respondents correctly answering the "Big Three" and "Big Five" financial literacy questions in the 2009 NFCS for various demographic subgroups. There is a strong positive correlation between the performance on the "Big Three" and the "Big Five" questions (although part of this correlation is mechanical as the "Big Three" are a subset of the "Big Five"). Table 3 also lists three other self-assessed measures of financial capability (self-assessed overall financial knowledge, self-assessed mathematical knowledge and self-assessed capability at dealing with financial matters). These self-assessed measures are all highly correlated with each other, and fairly highly correlated with the performance-based measures of financial literacy in the first two columns. All of the measures of financial capability are also highly correlated with educational attainment, suggesting that traditional measures of education could also serve as proxies for financial literacy (we will discuss causality in Section 4).

In a survey of 18 different financial literacy studies, Hung et al. (2009) report that the predominant approach used to operationalize the concept of financial literacy is either the number, or the fraction, of correct answers on some sort of performance test (measures akin to those in columns 1 and 2 of Table 3). This approach was used in all of the studies they evaluated, although two adopted a more sophisticated methodology, using factor analysis to construct an index that assigned different weights to each question (Lusardi & Mitchell 2009, van Rooij et al. 2011).

In addition to evaluating how previous studies have operationalized the concept of financial literacy, Hung et al. (2009) also perform a construct validation of seven different financial literacy measures calculated from various question batteries administered to the same set of respondents in four different waves of the RAND American Life Panel. Their measures include three performance tests (one of which has three subtests) based on either 13, 23, or 70 questions, and one behavioral outcome (performance in a hypothetical financial decision-making task). They find that the measures based on the different performance tests are highly correlated with each other, and when the same questions are asked in multiple waves, the answers have high test-retest reliability. The outcomes of the performance tests are less highly correlated with outcomes in the decision-making task. They also find that the relationship between demographics and the different performance test based measures of financial literacy is similar, but that the relationship

between demographics and the outcomes in the decision-making task is much weaker. The different financial literacy measures are more variable in their predictive relationships for actual financial behaviors such as planning for retirement, saving, and wealth accumulation.

One unanswered question in this literature is whether test-based measures provide an accurate measure of actual financial capability. To our knowledge, no study has provided incentives for giving correct answers as a mechanism to encourage thoughtful answers that reflect actual knowledge; neither has any study allowed individuals to access other sources of information (e.g., the internet, or friends and family) in completing a performance test to assess whether individuals understand their limitations and can compensate for them by engaging other sources of expertise. If individuals have effective compensatory mechanisms, we may see discrepancies between performance test results and actual outcomes and behaviors in the field.

A second measure of financial literacy that has been operationalized in the literature is individuals' self-assessments of their financial knowledge or, alternatively, the level of confidence in their financial abilities. In the 18 studies evaluated by Hung et al. (2009) discussed above, one-third analyzed self-reported financial literacy in addition to a performance test-based measure. Two issues with such self-reporting warrant mention. First, individual self-reports and actual financial decisions do not always correlate strongly (Hastings & Mitchell 2011, Collins et. al. 2009). Second, consumers are often overly optimistic about how much they actually know (Agnew & Szykman 2005, OECD 2005). Even so, in general the literature finds that self-assessed financial capabilities and more objective measures of financial literacy are positively correlated (e.g., Lusardi & Mitchell 2009, Parker et al. 2012), and self-reported financial literacy or confidence often have independent predictive power for financial outcomes relative to more objective test-based measures of financial literacy. For example, Allgood & Walstad (2012) find that in the 2009 NFCS State-by-State survey, both self-assessed financial literacy and the fraction of correct answers on the "Big Five" financial literacy questions are predictive of financial behaviors in a variety of domains: credit cards (e.g., incurring interest charges or making only minimum payments), investments (e.g., holding stocks, bonds, mutual funds or other securities), loans (e.g., making late payments on a mortgage, comparison shopping for a mortgage or auto loan), insurance coverage, and financial counseling (e.g., seeking professional advice for a mortgage, loan, insurance, tax planning or debt counseling). Similarly, Parker et al. (2012) find that both self-reported financial confidence and a test-based measure of financial

literacy predict self-reported retirement planning and saving, and van Rooij et al. (2011) find that both self-perceived financial knowledge and a test-based measure of financial literacy predict stock market participation.

Although test-based and self-assessed measures of financial literacy are the norm in the literature, other approaches to measuring financial literacy may be worth considering. One alternative measurement strategy, limited by the requirement for robust administrative data, is to identify individuals exhibiting financially sophisticated behavior (e.g., capitalizing on matching contributions in an employer's savings plan, or consistently refinancing a mortgage when interest rates fall) and use these indicators to predict other outcomes. For example, Calvet et al. (2009) use administrative data from Sweden to construct an index of financial sophistication based on whether individuals succumb to three different types of financial "mistakes": under-diversification, inertia in risk taking, and the disposition effect in stock holding.

An outcomes-based approach like this may be fruitful for predicting future behavior, more so than the traditionally used measures of financial literacy (although Calvet et al. 2009 do not perform such an exercise in their analysis). If we are interested in understanding the abilities that improve financial outcomes, we should define successful measures as those that, when changed, produce improved financial behavior. Such a strategy will likely generate greater internal validity for predicting consumer decisions in specific areas (e.g., portfolio choice or retirement savings), although it will significantly increase the requirements for research relative to strategies that rely on more general indicators of financial literacy (e.g., the "Big Three").

4. WHAT IS THE RELATIONSHIP BETWEEN FINANCIAL EDUCATION, FINANCIAL LITERACY AND FINANCIAL OUTCOMES?

Consistent with the notion that financial literacy matters for financial optimization, a sizeable and growing literature has established a correlation between financial literacy and several different financial behaviors and outcomes. In one of the first studies in this vein, Hilgert et al. (2003) document a strong relationship between financial knowledge and the likelihood of engaging in a number of financial practices: paying bills on time, tracking expenses, budgeting, paying credit card bills in full each month, saving out of each paycheck, maintaining an emergency fund, diversifying investments, and setting financial goals. Subsequent research has

found that financial literacy is positively correlated with planning for retirement, savings and wealth accumulation (Ameriks et al. 2003, Lusardi 2004, Lusardi & Mitchell 2006; 2007, Stango & Zinman 2008, Hung et al. 2009, van Rooij et al. 2012). Financial literacy is predictive of investment behaviors including stock market participation (van Rooij, et al. 2011, Kimball & Shumway 2006, Christelis et al. 2006), choosing a low fee investment portfolio (Choi et al. 2011, Hastings 2012), and better diversification and more frequent stock trading (Graham et al. 2009). Finally, low financial literacy is associated with negative credit behaviors such as debt accumulation (Stango & Zinman 2008, Lusardi & Tufano 2009), high-cost borrowing (Lusardi & Tufano 2009), poor mortgage choice (Moore 2003), and mortgage delinquency and home foreclosure (Gerardi et al. 2010).

Other related research documents a relationship between either numeracy or more general cognitive abilities and financial outcomes. Although these concepts are distinct from financial literacy, they tend to be positively correlated: individuals with higher general cognitive abilities or greater facility with numbers and numerical calculations tend to have higher levels of financial literacy (Banks & Oldfield 2007, Gerardi et al. 2010). Numeracy and more general cognitive ability predict stockholding (Banks & Oldfield 2007, Christelis et al. 2010), wealth accumulation (Banks & Oldfield 2007), and portfolio allocation (Grinblatt et al. 2009).

Although this evidence might lead one to conclude that financial education should be an effective mechanism to improve financial outcomes, the causality in these relationships is inherently difficult to pin down. Does financial literacy lead to better economic outcomes? Or does being engaged in certain types of economic behaviors lead to greater financial literacy? Or does some underlying third factor (e.g., numerical ability, general intelligence, interest in financial matters, patience) contribute to both higher levels of financial literacy and better financial outcomes? To give a more concrete example, individuals with higher levels of financial literacy might better recognize the financial benefits and be more inclined to enroll in a savings plan offered by their employer. On the other hand, if an employer automatically enrolls employees in the firm's saving plan, the employees may acquire some level of financial literacy simply by virtue of their savings plan participation. The finding noted earlier that most individuals cite personal experience as the most important source of their financial learning (Hilgert et al. 2003) suggests that some element of reverse causality is likely. While this endogeneity does not rule out the possibility that financial literacy improves financial outcomes,

it does make interpreting the magnitudes of the effects estimated in the literature difficult to interpret as they are almost surely upwardly biased in magnitude.

In addition, unobserved factors such as predisposition for patience or forward-looking behavior could contribute to both increased financial literacy and better financial outcomes. Meier & Sprenger (2010) find that those who voluntarily participate in financial education opportunities are more future-oriented. Hastings & Mitchell (2011) find that those who display patience in a field-experiment task are also more likely to invest in health and opt to save additional amounts for retirement in their mandatory pension accounts. Other unobserved factors like personality (Borgans et al. 2008) or family background (Cunha & Heckman 2007, Cunha et al. 2010) could upwardly bias the observed relationship between financial education and financial behavior in non-experimental research.

Despite the challenges in pinning down causality, understanding causal mechanisms is necessary to make effective policy prescriptions. If the policy goal is increased financial literacy, then we need to know how individuals acquire financial literacy. How important is financial education? And how important is personal experience? And how do they interact? If, on the other hand, the goal is to improve financial outcomes for consumers, then we need to know if financial education improves financial outcomes (assuming it increases literacy) and we need to be able to weigh the cost effectiveness of financial education against other policy options that also impact financial outcomes.

What evidence is there that financial education actually increases financial literacy? The evidence is more limited and not as encouraging as one might expect. One empirical strategy has been to exploit cross sectional variation in the receipt of financial education. Studies using this approach have often found almost no relationship between financial education and individual performance on financial literacy tests. For example, Jump$tart (2006) and Mandell (2008) document surprisingly little correlation between high school students' financial knowledge levels and whether or not they have completed a financial education class. This empirical approach has obvious problems for making causal inferences: the students who take financial education courses in districts where such courses are voluntary are likely to be different from the students who choose not to take such courses, and the districts who make such courses mandatory for all students are likely to be different from the districts that have no such mandate. Nonetheless, the lack of any compelling evidence of a positive impact is surprising. Carpena et al. (2011) use a

more convincing empirical methodology to get at the impact of financial education on financial literacy and financial outcomes. They evaluate a relatively large randomized financial education intervention in India and find that while financial education does not improve financial decisions that require numeracy, it does improve financial product awareness and individuals' attitudes towards making financial decisions. There is definitely room in the literature for more research using credible empirical methodologies that examine whether, or in what contexts, financial education actually impacts financial literacy.

In the end, we are more interested in financial outcomes than financial knowledge per se. The literature on financial education and financial outcomes includes several studies with plausibly exogenous sources of variation in the receipt of financial education, ranging from small-scale field experiments to large-scale natural experiments. The evidence in these papers on whether financial education actually improves financial outcomes is best described as contradictory.

Several studies have looked toward natural experiments as a source of exogenous variation in who receives financial education. Skimmyhorn (2012) uses administrative data to evaluate the effects of a mandatory eight-hour financial literacy course rolled out by the U.S. military during 2007 and 2008 for all new Army enlisted personnel. Because the roll-out of the financial education program was staggered across different military bases, we can rule out time effects as a confounding factor in the results. He finds that soldiers who joined the Army just after the financial education course was implemented have participation rates in and average monthly contributions to the Federal Thrift Savings Plan (a 401(k)-like savings account) that are roughly double those of personnel who joined the Army just prior to the introduction of the financial education course. The effects are present throughout the savings distribution and persist for at least 2 years (the duration of the data). Using individually-matched credit data for a random subsample, he finds limited evidence of more widespread improved financial outcomes as measured by credit card balances, auto loan balances, unpaid debts, and adverse legal actions (foreclosures, liens, judgments and repossessions).

Bernheim et al. (2001) and Cole & Shastry (2012) examine another natural experiment which created variation in financial education exposure: the expansion over time and across states in high school financial education mandates. The first of these studies concludes that financial education mandates do have an impact on at least one measure of financial behavior: wealth accumulation. But Cole & Shastry (2012), using a different data source and a more flexible

empirical specification,[6] examine the same natural experiment and conclude that there is no effect of the state high school financial education mandates on wealth accumulation, but rather, that the state adoption of these mandates was correlated with economic growth which could have had an independent effect on savings and wealth accumulation.

In addition to examining natural experiments, researchers have also randomly assigned financial aid provision to evaluate the impact of financial education on financial outcomes. For example, Drexler et al. (2012) examine the impact of two different financial education programs targeted at micro-entrepreneurs in the Dominican Republic as part of a randomized controlled trial on the effects of financial education. Their sample of micro-entrepreneurs was randomized to be in either a control group or one of two treatment groups. Members of one treatment group participated in several sessions of more traditional, principles-based financial education; members of the other treatment group participated in several sessions of financial education oriented around simple financial management rules of thumb. The authors examine participants' use of several different financial management practices approximately one year after the financial education courses were completed. Relative to the control group, the authors find no difference in the financial behaviors of the treatment group who received the principles-based financial education; they do find statistically significant and economically meaningful improvements in the financial behavior of the treatment group who participated in the rule-of-thumb oriented financial education course. The results of this study suggest that *how* financial education is structured could matter in whether it has meaningful effects at the end of the day, and might help explain why many other studies have found much weaker links between financial education and economic outcomes.

Gartner & Todd (2005) evaluate a randomized credit education plan for first-year college students but find no statistically significant differences between the control and treatment groups in their credit balances or timeliness of payments. Servon & Kaestner (2008) used random variation in a financial literacy training and technology assistance program find virtually no differences between the control and treatment groups in a variety of financial behaviors (having investments, having a credit card, banking online, saving money, financial planning, timely bill payment and others), though they suspect that the program was implemented imperfectly. In a

[6] Cole and Shastry (2010) are able to replicate the qualitative results of Bernheim, Garrett and Maki (2001) when using the same empirical specification even though they use a different source of data.

small randomized field experiment, Collins (2010) evaluates a financial education program for low and moderate income families and finds improvements in self-reported knowledge and behaviors (increased savings and small improvements in credit scores twelve months later), but the sample studied suffers from non-random attrition. Finally, Choi et al. (2011) randomly assign some participants in a survey to an educational intervention designed to teach them about the value of the employer match in an employer sponsored savings plan. Using administrative data, they find statistically insignificant differences in future savings plan contributions between the treatment and the control group, even in the face of significant financial incentives for savings plan participation.

Additional non-experimental research using self-reported outcomes and potentially endogenous selection into financial education suggests a positive relationship between financial education and financial behavior. This positive relationship has been documented for credit counseling (Staten 2006), retirement seminars (Lusardi 2004, Bernheim & Garrett 2003), optional high school programs (Boyce & Danes 2004), more general financial literacy education (Lusardi & Mitchell 2007), and in the military (Bell et al. 2008; 2009).

Altogether, there remains substantial disagreement over the efficacy of financial education. While the most recent reviews and meta-analyses of the non-experimental evidence (Collins et al. 2009, Gale & Levine 2011) suggest that financial literacy can improve financial behavior, these reviews do not appear to fully discount non-experimental research and its limitations for causal inference. Of the few studies that exploit randomization or natural experiments, there is at best mixed evidence that financial education improves financial outcomes. The current literature is inadequate to draw conclusions about if and under what conditions financial education works. While there do not appear to be any negative effects of financial education other than increased expenditures, there are also almost no studies detailing the costs of financial education programs on small or large scales (Coussens 2006), and few that causally identify their benefits towards improved financial outcomes.

To inform policy discussion, this literature needs additional large-scale randomized interventions designed to effectively identify causal effects. Randomized interventions coupled with measures of financial literacy could address the question of how best to measure financial literacy while also providing credible assessments of the effect of financial education on financial literacy and economic outcomes. A starting point could be incorporating experimental

components into existing large scale surveys like the NFCS; for example, a subset of respondents could be randomized to participate in an on-line financial education course or to receive a take-home reference guide to making better financial decisions. Measuring financial literacy before and immediately after the short course would test if financial education improves various measures of financial literacy in the short-run. A subsequent follow-up survey linked to administrative data on financial outcomes (e.g., credit scores) would measure if short-run improvements in financial literacy last, and which measures of financial literacy, if any, are correlated with improved financial outcomes. Studies along these lines are needed to identify the causal effects of financial education on financial literacy and financial outcomes, identify the best measures of financial literacy, and inform policy makers about the costs and benefits of financial education as a means to improve financial outcomes.

5. WHAT IS THE ROLE OF PUBLIC POLICY IN IMPROVING INDIVIDUAL FINANCIAL OUTCOMES?

Given the current inconclusive evidence on the causal effects of financial education on either financial literacy or financial outcomes, there remains disagreement over whether financial education is the most appropriate policy tool for improving consumer financial outcomes. As expected, those who believe that financial education works favor more financial education (Lusardi & Mitchell 2007, Hogarth 2006, Martin 2007). Others, optimistic about the promise of financial education despite what they view as weak empirical evidence of positive effects, support more targeted and timely education with greater emphasis on experimental design and evaluation (Hathaway & Khatiwada 2008, Collins & O'Rourke 2010). Finally, some who do not believe the research demonstrates positive effects support other policy options (Willis 2008; 2009; 2011). In this section, we place financial education in the context of the broader research on alternative ways to improve financial outcomes.

5.1 Is There a Market Failure?

As economists, we start this section with the question of market failure: Is there a need for public policy in improving financial knowledge and financial outcomes, or can the market work efficiently without government intervention? If, like other forms of human capital, financial

knowledge is costly to accumulate, there may be an optimal level of financial literacy acquisition that varies across individuals based on the expected need for financial expertise and individual preference parameters (e.g., discount rates). Jappelli & Padula (2011) and Lusardi et al. (2012) both use the relationship between financial literacy and wealth as their point of departure in modeling the endogenous accumulation of financial literacy. In both papers, investments in financial literacy have both costs (time and monetary resources) and benefits (access to better investment opportunities) which may be correlated with household education or initial endowments. In the model of Jappelli & Padula (2011), the optimal stock of financial literacy increases with income, the discount factor (patience), the return to financial literacy, and the initial stock of financial literacy.[7] In the model of Lusardi et al. (2012), more educated households have higher earnings trajectories than those with less education and also have stronger savings motives due to the progressivity built into the social safety net. Because they save more, they value better financial management technologies more than those with lower incomes, and they rationally acquire a higher level of financial literacy.

These models suggest that differences in financial literacy acquisition may be individually rational. Consistent with this supposition, Hsu (2011) uses data from the Cognitive Economics Survey which includes measures of financial literacy for a set of husbands and their wives to examine the determination of financial literacy in married couples. She finds that wives have a lower average level of financial literacy than their husbands (cf. the gender differences in Table 3), which she posits arise from a rational division of household labor with men being more likely to manage household finances. Women, however, have longer life expectancies than their husbands and many will eventually need to assume financial management responsibilities. She finds that women actually acquire increased financial literacy as they approach widowhood, with the majority catching up to their husbands prior to being widowed.

More generally, limited financial knowledge may be a rational outcome if other entities—a spouse, an employer, a financial advisor—can help individuals compensate for their deficiencies by providing information, advice, or financial management. We don't expect individuals to be experts in all other domains of life—that is the essence of comparative advantage. Specialization in financial expertise may be efficient if it allows computational and educational investment to

[7] Financial literacy and savings are positively correlated in this model, although the relationship is not causal as both are endogenously determined.

be concentrated or aggregated in specialized individuals or entities that develop algorithms and methods to guide consumers through financial waters.

Although low levels of financial literacy acquisition may be individually rational in some models, limited financial knowledge may create externalities such as reduced competitive pressure in markets which leads to higher equilibrium prices (Hastings et al. 2012), higher social safety net usage, lower quality of civic participation, and negative impacts on neighborhoods (Campbell et al. 2011), children (Figlio et al. 2011) and families. Such externalities may imply a role for government in facilitating improved financial decision making through financial education or other mechanisms.

Individuals may also be subject to biases such as present-bias that lead to lower investments in financial knowledge today but which imply ex post regret in the future (sometimes referred to as an "internality"). Barr et al. (2009) note that in some contexts, firms have incentives to help consumers overcome their fallibilities. For example, if present bias leads consumers to save too little, financial institutions whose profits are tied to assets under management have incentives reduce consumer bias and encourage individuals to save more. In other contexts, however, firms may have incentives to exploit cognitive biases and limited financial literacy. For example, if consumers misunderstand how interest compounds and as a consequence borrow too much (Stango & Zinman 2009), financial institutions whose profits are tied to borrowing have little incentive to educate consumers in a way that would correct their misperceptions.

What evidence is there on whether markets help individuals compensate for their limited financial capabilities? Unfortunately, many firms exploit rather than offset consumer shortcomings. Ellison (2005) and Gabaix & Laibson (2006) develop models of add-on and hidden pricing to explain the ubiquitous pricing contracts observed in the banking, hotel, and retail internet sales industries. Both models have naïve and informed customers and show that for reasonable parameter values, firms do not have an incentive to debias naïve consumers even in a competitive market. This leads to equilibrium contracts with low advertised prices on a "salient" price and high hidden fees and add-ons which naïve customers pay and sophisticated customers take action to avoid.

Opaque and complicated fees are widespread, and several empirical papers link these fee structures to shortcomings in consumer optimization. Ausubel (1999) analyzes a large field experiment in which a credit card company randomized mail solicitations varying the interest

rate and duration of the credit card's introductory offer. He finds that individuals are overly responsive to the terms of the introductory offer and appear to underestimate their likelihood of holding balances past the introductory offer period with a low interest rate.[8] In a similar vein, Ponce (2008) evaluates a field experiment in Mexico in which a bank randomized the introductory teaser rate offered to prospective customers. He finds that a lower teaser rates leads to substantially higher levels of debt, even several months after the teaser rate expires, and that the higher debt results from lower payments rather than higher purchases or cash advances. Evaluating non-randomized offers to potential customers, he shows that banks do not randomly assign teaser rates but dynamically price discriminate by targeting offers to consumers who are more likely to permanently increase their balances.

Given that many firms are trying to actively obfuscate prices, it should not be surprising that there is little evidence that firms act to debias consumers through informative advertising or investments in financial education. In models of add-on prices, firms can hide prices or make them salient. Similarly, firms can invest in advertising that lowers price sensitivity, focusing consumer choice on non-price attributes, or in advertising that increases price competition by alerting customers to lower prices. In models of informative advertising, firms reduce information costs and expand the market by informing consumers of their price and location in product space. In contrast, in models of persuasive advertising, firms emphasize certain product characteristics and deemphasize others to change consumer's expressed preferences. For example a financial firm could advertise returns for the last year rather than management fees to convince investors that they should primarily evaluate past returns when choosing a fund manager. A financially literate consumer may be unmoved by this advertising strategy, but those who are less literate might be persuaded and end up paying higher management fees.

Hastings et al. (2012) use administrative data on advertising and fund manager choices for account holders in Mexico's privatized pension system. When the privatized system started, the government presumed that firms would compete on price (management fees) and engage in informative advertising to explain fees to consumers and win their accounts. Instead, firms invested heavily in sales force and marketing, and the authors find that heavier exposure to sales force (appropriately instrumented) resulted in lower price sensitivity and higher brand loyalty.

[8] See the Frontline documentary "The Card Game" about how teaser rate policies were developed in response to customer service calls in which consumers were persistently overconfident in their ability to repay their debt.

This in turn lowered demand elasticity (recall equation 2) and increased management fees in equilibrium.

Importantly, informative advertising itself may be a public good. For example, advertising that explains the value of savings to individuals can benefit both the firm that makes the investment and its competitors if it increases demand for savings products in general. On the other hand, persuasive advertising attempts to convince customers that one product is better than another so that the benefits accrue to the firm that is advertising. The market may underprovide informative advertising in equilibrium because of the inherent free rider problem. Hastings et al. (in progress) test this theory using a marketing field experiment with two large banks in the Philippines. They find evidence that if firms face advertising constraints, persuasive rather than informative advertising maximizes profits. This suggests a role for government to remedy underprovision of public goods. In particular, these results suggest that financial products firms would welcome a tax that would fund public financial education as it would expand the market (e.g., increase total savings) and commit each institution to contribute to the public good. Note in equilibrium this could change firms' incentives for add-on pricing as well by lowering the fraction of naïve customers in financial products markets (Gabaix & Laibson 2006).

Even if firms do not have incentives to facilitate efficient consumer outcomes, a competitive market may generate an intermediate sector providing advice and guidance. This sector could provide unbiased decision-making-assistance that would lower decision making costs and efficiently expand the market. However, classic principal-agent problems may make such an efficient intermediate market difficult to attain.

Two recent studies highlight the limits of the financial advice industry as incentive-compatible providers of guidance and counsel on financial products and financial decision making. Mullainathan et al. (2012) conduct an audit study of financial advisors in Boston, sending to them scripted investors who present needs that are either in line with or at odds with the financial advisor's personal interests (e.g., passively managed vs. actively managed funds). They find that many advisors act in their personal interests regardless of the client's actual needs and that they reinforce client biases (e.g., about the merits of employer stock) when it benefits them to do so. Similarly, Anagol et al. (2012) conduct an audit study of life insurance agents in India who are largely commission motivated. As in the previous study, scripted customers present themselves to the agents with differing amounts of financial and product knowledge.

They find that life insurance agents recommend products with higher commissions even if the product is suboptimal for the customer. They also find that agents are likely to cater to customer's beliefs, even if those beliefs are incorrect. Finally, instead of debiasing less literate consumers, agents are less likely to give correct advice if the customer presents with a low degree of financial sophistication. Together these studies suggest that with asymmetric information, there is both a principal agent problem and an incentive for advisors to compete by reinforcing biases rather than providing truthful recommendations (Gentzkow & Shapiro 2006; 2010, Che et al. 2011).

Overall, this section suggests that are several potential roles for government in improving financial outcomes for consumers. First, government can help solve the public goods problems which result in underinvestment in financial education. Second, government can regulate the disclosure of fees and pricing. And third, government can provide unbiased information and advice.

5.2 The Scope for Government Intervention

If there is a role for government intervention, what form should it take? We have already summarized the literature on financial education. Briefly, there is at best conflicting evidence that financial education leads to improved economic outcomes either through increasing financial literacy directly or otherwise. So while the logical public policy response to many observers is to increase public support for financial education, this option may not be an efficient use of public resources even if it will likely do no harm.[9] In some contexts, other policy responses such as regulation may be more cost effective.

One regulatory alternative is to design policies that address biases and reduce the decision making costs that consumers face in financial product markets (Thaler & Sunstein 2008). Because the financial literacy literature currently offers only limited models of behavior that give rise to the observed differences in financial literacy and economic outcomes, it is difficult to turn to this literature to design policies that address the underlying behaviors that lead to low levels of financial literacy and poor financial decision making. However, the literatures in behavioral economics and decision theory have developed several models that are relevant, and policies

[9] See the discussion in Section 4. There is also a large literature in the economics of education documenting the fact that large increases in real spending per pupil in the United States has led to no measurable increase in knowledge as measured by ability to answer questions on standardized tests.

from this literature that address behavioral biases like present bias and choice overload may provide templates for effective and efficient remedies.

Several papers in this vein have already had substantial policy influence. For example, Madrian & Shea (2001) and Beshears et al. (2008) examine the impact of default rules on retirement savings outcomes. They find that participation in employer-sponsored savings plans is substantially higher when the default outcome is savings plan participation (automatic enrollment) relative to when the default is non-participation. Beshears et al. ascribe this finding to three factors. First, automatic enrollment simplifies the decision about whether or not to participate in the savings plan by divorcing the participation decision from related choices about contribution rates and asset allocation. Second, automatic enrollment directly addresses problems of present bias which may result in well-intentioned savers procrastinating their savings plan enrollment indefinitely. Finally, the automatic enrollment default may service as an endorsement (implicit advice) that individuals should be saving. In related research, Thaler & Benartzi (2004) find that automatic contribution escalation leads to substantially higher savings plan contribution rates over a period of four years. These results collectively motivated the adoption of provisions in the Pension Protection Act of 2006 that encourage U.S. employers to adopt automatic enrollment and automatic contribution escalation in their savings plan.

Hastings and co-authors (Duarte & Hastings 2011, Hastings et al. 2012, Hastings, in progress) examine Mexico's experience in privatizing their social security system and draw lessons for policy design. Hastings et al. (2012) find that without regulation, advertising reduces investor sensitivity to financial management fees and increases investor focus on non-price attributes such as brand name and past returns. In simulations, they find that neutralizing the impact of advertising on preferences results in price-elastic demand. These results suggest that centralized information provision and regulation of both disclosure and advertising are important to ensure that individuals with limited financial capabilities have access to the information necessary for effective decision making and to minimize their confusion or persuasion by questionable advertising tactics.

In a related paper, Duarte & Hastings (2011) examine the impact of an information disclosure policy mandated in Mexico. In 2005 the government attempted to increase fee transparency in the privatized social security system by introducing a single fee index which collapsed multiple fees (loads and fees on assets under management) into one measure. Prior to

the policy, investor behavior was inelastic to either type of fee or, indeed, any measure of management costs. In contrast, after the policy, demand was very responsive to the fee index. Once investors had a simple way to assess 'price', they shifted their investments to the funds with a low index value. This example suggests that investors can be greatly helped by policies that simplify fee structures and either advertise fees or require that they are disclosed in an easy-to-understand way. This example also highlights the potential pitfalls of ill-conceived regulations. Although the policy shifted demand, it had little impact on overall management costs. This is because the index combined fees according to a formula and firms could game the index by lowering one fee while raising another. Not surprisingly, firms optimized accordingly (another example of obfuscated pricing as discussed earlier). The government eventually responded by restricting asset managers to charging only one kind of fee, obviating the need for a fee index.

Hastings (in progress) evaluates two field experiments as part of a household survey (the 2010 EERA referenced in Table 2) to further understand the impact of information and incentives on management fund choice by affiliates of Mexico's privatized social security system. Households in the survey were randomly assigned to receive simplified information on fund manager net returns (the official information required by the social security system at the time) presented as either a personalized projected account balance or as an annual percentage rate. In addition to that treatment, households were randomly assigned to receive a small immediate cash incentive for transferring assets to any fund manager that had a better net return (or a higher projected personal balance). While those with lower financial literacy scores are better able to rank the fund managers correctly when presented with information on balance projections instead of APRs (replicating prior results in Hastings & Tejeda-Ashton 2008, Hastings & Mitchell 2011), she finds no impact of this information on subsequent decisions to change fund managers. Rather, individuals who receive the small cash incentive are more likely to change fund managers (for the better) regardless of the type of information received. These preliminary results suggest that incentives that both address procrastination and that are tied to better behavior may be more effective than financial education as financial education does not carry with it any incentive to act. We note that these results are still short-run and preliminary as

they are based on a follow-up survey. Final results will depend on administrative records for switching which are not subject to problems inherent in self-reports.[10]

Campbell et al. (2011) lay out a useful framework for thinking about potential policy options to improve financial outcomes for consumers. They suggest that evaluating consumers along two dimensions, their preference heterogeneity and their level of financial sophistication (or, in the parlance of this paper, their financial literacy), may help narrow the set of appropriate policy levers for improving consumer financial outcomes. At one extreme, take the case of stored value cards, a product used by a large number of unsophisticated consumers and for which consumer preferences are relatively homogeneous. Campbell et al. propose that in this case, since everyone largely wants the same thing, consumers are probably best served through the application of strict rules. This is likely to be more efficient and cost effective than attempting to educate consumers in an environment in which firms are less stringently regulated. In contrast, if consumers are financially knowledgeable and have heterogeneous preferences other approaches may make more sense. Although Campbell et al. do not discuss financial education in this context, it would seem that financial education, to the extent that it impacts financial literacy and economic outcomes, is a tool that holds most promise in markets for products with some degree of preference heterogeneity and that require some degree of financial knowledge. At the other extreme, there are products like hedge funds that cater to individuals with tremendous preference heterogeneity and that require a sizeable amount of financial knowledge for effective use. The latter condition may seem like a perfect reason to justify financial education. We would counter, however, that in such a context it may be difficult for public policy to effectively intervene in providing the level of financial education that would be required. For products for which extensive expertise is required, it may be more efficient to restrict markets to those who can demonstrate the skills requisite for appropriate and effective use.

Overall, the literature suggests that there are many alternatives to financial education that can be used to improve financial outcomes for consumers: strict regulation, providing incentives for improved choice architecture, simplifying disclosure about product fees, terms, or characteristics, and providing incentives to take action. Although none of the studies that we reviewed here ran a

[10] If the preliminary results hold, this policy is a very inexpensive alternative to financial education. Hastings notes that the immediate return (net of the incentive) on each incentivized offer from resorting of individuals across fund managers, before allowing firms to drop prices in response, results in $30 USD in expectation. Aggregated over 30 million account holders, this is a large savings even before allowing for secondary competitive effects, and in equilibrium it is virtually costless to implement.

horse race between these other approaches and financial education, many of them show larger effects than can be ascribed to financial education in the existing literature. Expanding these studies to other relevant markets such as credit card regulation, payday loan regulation, mortgages, and car or appliance loans present important next steps in understanding how best to improve consumer financial outcomes.

6. DIRECTIONS FOR FUTURE RESEARCH

In this paper, we have evaluated the literature on financial literacy, financial education, and consumer financial outcomes. This literature consistently finds that many individuals perform poorly on test-based measures of financial literacy. These findings, coupled with a growing literature on consumers' financial mistakes and documenting a positive correlation between financial literacy and suboptimal financial outcomes, have driven policy interest in efforts to increase financial literacy through financial education. However, there is little consensus in the literature on the efficacy of financial education. The existing research is inadequate for drawing conclusions about if and under what conditions financial education works.

The directions for future research depend in part on the goal at hand. If the goal is to improve financial literacy, the directions for future research that follow hinge on financial literacy and the role of financial education in enhancing financial literacy.

One set of fundamental issues relate to capabilities. What are the basic financial competencies that individuals need? What financial decisions should we expect individuals to successfully make independently, and what decisions are best relegated to an expert? To draw an analogy, we don't expect individuals to be experts in all domains of life—that is the essence of comparative advantage. Most of us consult doctors when we are ill and mechanics when our cars are broken, but we are mostly able to care for a common cold and fill the car with gas and check our tire pressure independently. What level of financial literacy is necessary or desirable? And should certain financial transactions be predicated on demonstrating an adequate level of financial literacy, much like taking a driver's education course or passing a driver's education test is a prerequisite for getting a driver's license. If so, for what types of financial decisions would such a licensing approach make most sense?

Another set of open questions relate to measurement. How do we best measure financial literacy? Which measurement approaches work best at predicting financial outcomes? And what are the tradeoffs implicit in using different measures of financial literacy (e.g., how does the marginal cost compare to the marginal benefit of having a more effective measure?).

A third set of issues surrounds how individuals acquire financial literacy and the mechanisms that link financial literacy to financial outcomes. How important are skills like numeracy or general cognitive ability in determining financial literacy, and can those skills be taught? To the extent that financial literacy is acquired through experience, how do we limit the potential harm that consumers suffer in the process of learning by doing? Is financial education a substitute or a complement for personal experience?

We need much more causal research on financial education, particularly randomized controlled trials. Does financial education work, and if so, what types of financial education are most cost effective? Much of the literature on financial education focuses on traditional, classroom based courses. Is this the best way to deliver financial education? More generally, how does this approach compare with other alternatives? Is a course of a few hours length enough, or should we think more expansively about integrated approaches to financial education over the lifecycle? Or, on the other extreme, should financial education be episodic and narrowly focused to coincide with specific financial tasks? There are many other ways to deliver educational content that could improve financial decision making: internet-based instruction, podcasts, web sites, games, apps, printed material. How effective (and how cost effective) are these different delivery mechanisms, and are some better-suited to some groups of individuals or types of problems than others? Should the content of financial education initiatives be focused on teaching financial principles, or rules of thumb? In the randomized controlled trial of two different approaches to financial education for microenterprise owners in the Dominican Republic discussed earlier, Drexler et al. (2011) find that rule-of-thumb based financial education is more effective at improving financial practices than principles-based education. How robust is this finding? And to what extent can firms nullify rules-of-thumb through endogenous responses to consumer behavior (see Duarte & Hastings 2011)?

Even if we can develop effective mechanisms to deliver financial education, how do we induce the people who most need financial education to get it? School-based financial education programs have the advantage that, while in school, students are a captive audience. But schools

can only teach so much. Many of the financial decisions that individuals will face in their adult lives have little relevance to a 17-year-old high school student: purchasing life insurance, picking a fixed vs. an adjustable rate mortgage, choosing an asset allocation in a retirement savings account, whether to file for bankruptcy. How do we deliver financial education to adults before they make financial mistakes, or in ways that limit their financial mistakes, when we don't have a captive audience and financial education is only one of many things competing for time and attention?

Finally, what is the appropriate role of government in either directly providing or funding the private provision of financial education? If financial education is a public good (Hastings et al., in progress), would industry support a tax to finance publically-provided financial education? If so, what form would that take?

If instead of improving financial literacy our goal is to improve financial outcomes, then the directions for future research are slightly different. The overarching questions in this case center around the tools that are available to improve financial outcomes. This might include financial education, but it might also include better financial market regulation, different approaches to changing the institutional framework for individual and household financial decision making, or incentives for innovation to create products that improve financial outcomes.

With this broader frame, one important question on which we have little evidence is which tools are most cost effective at improving financial outcomes? For some outcomes, the most cost effective tool might be financial education, but for other outcomes, different approaches might work better. For example, financial education programs have had only modest success at increasing participation in and contributions to employer-sponsored savings plans; in contrast, automatic enrollment and automatic contribution escalation lead to dramatic increases in savings plan participation and contributions (Madrian & Shea 2001, Beshears et al. 2008, Thaler & Benartzi 2004). Moreover, automatic enrollment and contribution escalation are less expensive to implement than financial education programs. What approaches to changing financial behavior generate the biggest bang for the buck, and how does financial education compare to other levers that can be used to change outcomes?

Despite the contradictory evidence on the effectiveness of financial education, financial literacy is in short supply and increasing the financial capabilities of the population is a desirable and socially beneficial goal. We believe that well designed and well executed financial education

initiatives can have an effect. But to design cost effective financial education programs, we need better research on what does and does not work. We also should not lose sight of the larger goal—financial education is a tool, one of many, for improving financial outcomes. Financial education programs that don't improve financial outcomes can hardly be considered a success.

Unfortunately, we have little concrete evidence to provide answers. We have a pressing need for more and better research to inform the design of financial education interventions and to prioritize where financial education resources can be best spent. To achieve this, funding for financial education needs to be coupled with funding for evaluation, and the design and implementation of financial education interventions needs to be done in a way that facilitates rigorous evaluation.

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RELATED RESOURCES

The following datasets with financial literacy questions that are referenced in this article are currently publically available.

2004 U.S. Health and Retirement Survey:
http://hrsonline.isr.umich.edu/index.php?p=data

2010 U.S. Health and Retirement Survey:
http://hrsonline.isr.umich.edu/index.php?p=data

2009 Rand American Life Panel Wellbeing 64:
https://mmicdata.rand.org/alp/index.php?page=data&p=showsurvey&syid=64

2009 U.S. National Financial Capability Study:
http://www.finrafoundation.org/programs/p123306

2009 Chilean Social Protection Survey (EPS):
http://www.proteccionsocial.cl/index.asp

Table 1: Financial Literacy Questions in the 2004 Health and Retirement Study (HRS) and the 2009 National Financial Capability Study (NFCS)		
Concept	**Question**	**Answer options**
Interest rates and compounding	Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?	*More than $102* Exactly $102 Less than $102 Don't know Refused
Inflation	Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, would you be able to buy more than today, exactly the same as today, or less than today with the money in this account?	More than today Exactly the same as today *Less than today* Don't know Refused
Risk Diversification	Do you think that the following statement is true or false: buying a single company stock usually provides a safer return than a stock mutual fund?	True *False* Don't know Refused
Additional Financial Literacy Questions in the 2009 National Financial Capability Study (NFCS)		
Concept	**Question**	**Answer options**
Mortgages	A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage but the total interest over the life of the loan will be less.	*True* False Don't know Refused
Bond Pricing	If interest rates rise, what will typically happen to bond prices?	They will rise *They will fall* They will stay the same There is no relationship Don't know Refused

Note: The answer categorized as correct is italicized in the last column.

TABLE 2. Financial Literacy Around the World

Country (year)	Netherlands (2010)	USA (2004)	USA (2010)	USA (2009)	Japan (2010)	Germany (2009)	Chile (2009)	Chile (2012)	Mexico (2010)	Indonesia (2007)	India (2006)
Survey	DNB Household Survey+	Health and Retirement Survey*	Health and Retirement Survey*	National Financial Capability Study (NFCS)*	Survey of Living Preferences and Satisfication+	SAVE +	Social Protection Survey (EPS) *	National Student (TNE) Survey*	EERA*	Household Survey+	Household Survey+
Compound Interest											
Correct	85%	67%	69%	78%	71%	82%	47%	46%	45%	78%	59%
Don't know	9%	9%	5%	10%	13%	11%	32%	12%	2%	15%	30%
Inflation											
Correct	77%	75%	81%	65%	59%	78%	18%	43%	71%	61%	25%
Don't know	14%	10%	4%	19%	29%	17%	21%	36%	2%	16%	38%
Risk diversification											
Correct	52%	52%	63%	53%	40%	62%	41%	60%	47%	28%	31%
Don't know	33%	34%	19%	40%	56%	32%	33%	20%	1%	4%	6%
All questions correct	45%	34%	42%	39%	27%	53%	8%	16%	15%	X	X
Sample Description	Age 25+	Age 50+	Age 50+	Population Representative	Age 20-69	Population representative	Population representative	1st year college students	Age 16-60, formal sector employees	Village participants	Village participants
Sample size	1,665	1,269	1,296	28,146	5,268	1,059	14,243	4,257	7,871	3,360	1,496

Notes: Countries ranked by 2010-2011 International Monetary Fund GDP per capita. + denotes statistics directly drawn from publications: Netherlands: van Rooij et al. 2011. Financial literacy and retirement preparation in the Netherlands. J. Pension. Econ. 10(4): 527-545; Japan: Sekita. 2011. Financial literacy and retirement planning in Japan. J. Pension. Econ. 10(4): 637-656. Germany: Lusardi & Bucher-Koenen. 2011. Financial literacy and retirement planning in Germany. J. Pension. Econ. 10(4): 565-584. Cole et al. 2011. Prices or knowledge? What drives demand for financial services in emerging markets. J. Financ. 66(6): 1933-1967. *denotes author's calculations from raw data. X denotes missing information.

TABLE 3. Measures of Financial Literacy					
Individual Characteristics	Percent Correctly Answering the "Big 3" Financial Literacy Questions	Percent Correctly Answering the "Big 5" Financial Literacy Questions	Mean Level of Self-Assessed Overall Financial Knowledge (1-7 Scale)	Mean Level of Self-Assessed Mathematical Knowledge (1-7 Scale)	Mean Level of Self-Assessed Capability at Dealing with Financial Matters (1-7 Scale)
Gender					
Male	49%	21%	5.1	5.8	5.6
Female	29%	10%	4.8	5.4	5.6
Age					
18-24	22%	5%	4.6	5.4	5.1
25-34	32%	11%	6.1	6.3	6.3
35-44	38%	15%	5.9	6.2	6.3
45-54	43%	18%	5.9	6.5	6.4
55-64	48%	20%	5.9	6.4	6.6
65 or Older	49%	19%	5.3	5.7	6.0
Education Level					
Less than H.S. Graduate	12%	2%	4.3	4.8	4.9
H.S Graduate	23%	7%	4.7	5.3	5.4
Some College	40%	14%	4.9	5.6	5.6
College Graduate or Above	60%	29%	5.9	6.5	6.4
Household Income					
Less than $15K	21%	5%	4.4	5.2	5.0
$15K-$24K	26%	6%	4.7	5.3	5.4
$25K-$34K	30%	10%	4.8	5.4	5.5
$35K-$49K	36%	12%	4.9	5.6	5.6
$50K-$74K	45%	18%	5.1	5.7	5.7
$75K-$99K	55%	24%	5.2	5.8	5.8
$100K-$149K	60%	29%	5.3	5.9	5.9
More than $150K	66%	37%	5.6	6.0	6.0

Note: Authors' calculations from the 2009 NFCS State-by-State Survey (n=28,146). The top panel of Table 1 lists the "Big 3" questions in Column (1); the "Big 5" questions in Column (2) include the "Big 3" and the additional two questions from the bottom panel of Table 1. Columns (3) through (5) report the mean of the participants' self-assessments based on the following scale: 1=Strongly Disagree to 7= Strongly Agree.