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What Shapes Consumer Choice and Financial Products? A Review

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Abstract

Central to the field of consumer finance is that consumers make financial decisions that do not always coincide with the financial decisions ideally depicted in optimal economic models. In this review, we discuss developments in the field of household finance, focusing on how consumers make suboptimal financial decisions across different types of settings and factors that affect their decisions. Rather than conducting a comprehensive survey, we focus specifically on consumer choice in the context of research on credit card borrowing, housing and mortgage debts, investment and savings decisions, and spending and consumption. We also discuss financial product design and marketing, as well as the regulatory landscape of lenders of consumer financial products. We present five future research directions and considerations for researchers and policymakers.

1. INTRODUCTION

Only in the past decade has the field of consumer finance gained much attention. One notable impetus was John Campbell's presidential address to the American Finance Association in 2006. Campbell (2006) contended that a well-functioning financial market depends on households' effective financial decisions and behaviors in the market, and he offered powerful motivations to further develop research in the field of household finance. Shortly thereafter, the housing meltdown and financial crisis in 2008 generated contentious debate about the role of consumer financial decisions and the role of intermediaries of consumer financial products in causing both the crisis and suboptimal consumer welfare outcomes in general. In response to market failures, policymakers implemented policies [e.g., the Home Affordable Modification Program in 2009, the Credit Card Accountability Responsibility and Disclosure (CARD) Act in 2009, and the Dodd–Frank Act in 2010] to protect consumers and regulate lenders, providing applied microeconomists with natural experiments to study the impact of policies related to the consumer credit market on lender and household behavior. Technological advancements that allow for more efficient collection, storage, and processing of large amounts of consumer credit data now allow applied microeconomists to develop more rigorous empirical analyses. As a result, there has been a growing body of empirical research to better understand consumer and lender choice and behavior, as well as the levers that drive them.

Central to the field of consumer finance is that consumers make financial decisions that do not always coincide with the financial decisions ideally depicted in neoclassical economic models of optimal consumer choice or behavior (Campbell 2006). Researchers are uncovering the challenges that a household faces when making financial decisions and managing its finances, the limitations in cognitive ability and behavioral biases that hinder optimal decision-making, the impact of financial service providers' business models and business decisions, and the extent to which regulators can influence and safeguard consumer behavior. Small deviations from optimal decision-making at the consumer level can have potentially important aggregate implications (e.g., Gabaix & Laibson 2006; for a similar result on firms, see Akerlof & Yellen 1985), especially given that the value at stake is high (as of Q1 2016, US households owed about $12.25 trillion in debt; see FRBNY 2016) and that these financial decisions affect most households (Zinman 2014). Moreover, Agarwal et al. (2009) show that consumers make mistakes across many domains of financial products, and such mistakes are likely to be correlated. Thus, together they can add up to be economically costly to consumers.

In this review, we discuss developments in the field of household finance, focusing on how consumers make suboptimal financial decisions across different types of settings and factors that affect these suboptimal decisions. Rather than conducting a comprehensive survey, we focus specifically on consumer choice in the context of research on credit card borrowing, housing and mortgage debts, investment and savings decisions, and spending and consumption. We also discuss financial product design and marketing, as well as the regulatory landscape of lenders of consumer financial products. We review major contributions and identify open research questions.

2. CONSUMER CHOICE INEFFICIENCIES AND SUBOPTIMAL FINANCIAL BEHAVIOR

Following Shefrin & Thaler (1988), who provide a behaviorally realistic treatment of household financial saving and consumption saving decisions, there has been continuous growth in academic research studying factors that affect consumer financial decision-making and related behavioral biases in household finance. Whereas Shefrin & Thaler (1988) present a theory of the role of

costly self-control, mental accounting, and framing, many researchers are documenting specific evidence of how consumer financial decisions are inefficient and the factors that affect these suboptimal choices in various important settings. Below we survey the literature on consumer decisions to borrow in the credit card and mortgage markets, to invest and save for retirement, and to spend and consume.

2.1. Credit Card Contract Choice and Borrowing

Shui & Ausubel (2004) study credit card contract choice using a 1995 large-scale randomized experiment with 600,000 consumers facing the choice between six different credit card offers with different introductory interest rates and durations. The authors document two important behaviors: (*a*) Consumers prefer an introductory offer with a lower interest rate and a shorter duration to one with a higher interest rate and a longer duration, even though they would benefit more from choosing the latter; and (*b*) consumers are reluctant to switch and many consumers who have switched before fail to switch again. Shui & Ausubel (2004) argue that this behavior is puzzling because consumers would actually pay lower interest rate costs, ex post, under the longer introductory offer. [In related research, DellaVigna & Malmendier (2004) find that consumers systematically choose suboptimal membership plans at health clubs. Miravete (2003) finds consumers' choices of telephone billing plans to be closer to optimal.] One limitation of the study of Shui & Ausubel is the use of aggregate credit and saving outcomes, which makes the link between borrowing and present bias indirect and does not allow for evaluation of individual behavior.

Meier & Sprenger (2010) overcome the limitation of aggregate data by combining directly elicited time preference measures with administrative data on credit card borrowing. They measure individual discount factors using an incentivized-choice experiment with a sample of about 600 low-to-moderate-income individuals at two Volunteer Income Tax Assistance centers in Boston over the period 2006–2007. Their results show that present-biased individuals are 15% more likely to have credit card debts. Conditional on borrowing, they borrow 25% more (measured by outstanding balances on revolving accounts from the credit reports) than dynamically consistent individuals. The correlation is robust after controlling for income, credit constraints, and sociodemographic characteristics. The study faces some concerns about external validity, given that the data cover a small sample of low-income consumers in Boston.

Also overcoming the aggregate data limitation, Agarwal et al. (2015b) document consumer mistakes in choosing a credit card contract using individual-level data from a unique experiment in which a bank offers consumers in the United States a choice between two credit card contracts (one with an annual fee but a lower interest rate and one with no annual fee but a higher interest rate). Whereas, on average, consumers choose a credit card contract that minimizes their net costs, the authors document that about 40% of consumers choose the ex post suboptimal credit card contract, with some households incurring hundreds of dollars of avoidable interest charges. The probability of choosing the suboptimal contract, however, declines with the dollar magnitude of the potential error, and consumers with larger errors are more likely to subsequently switch to the optimal contract. Using a merged dataset of payday loan borrowing and credit card history at the individual level, Agarwal, Skiba & Tobacman (2009) find that most consumers borrowed on payday loans despite having substantial unused liquidity on their credit cards. This is highly inefficient, given that the cost of payday loan borrowing is substantially larger relative to the cost of credit card borrowing; the annual percentage rate on a payday loan is usually more than 100%.

With respect to credit card borrowing, Ausubel (1991) documents that consumers are overly sensitive to promotional teaser interest rates generally offered by credit card lenders, but are

insensitive to the go-to, post-teaser interest rates, which result in credit card interest rates being sticky. Ausubel (1991) further finds that consumers are overly sensitive to such rates possibly because consumers underestimate their future credit card borrowing at the higher, post-teaser interest rates. Gross & Souleles (2002b) are also among the first researchers to document another credit card debt puzzle: US households tend to hold significant credit card debt and sizable liquid assets simultaneously, which is irrational or suboptimal according to the traditional economic model, as returns on liquid assets are typically lower than the interest charged on credit card debt. Bertaut, Haliassos & Reiter (2009) use data from the Survey of Consumer Finance to confirm that the credit card debt puzzle is a persistent behavioral phenomenon. In a similar spirit, Zinman (2009) concludes that credit card debt revolvers borrow high and lend low. He estimates that 27–30% of US households with credit cards lose $10 per month by not using demand deposits to pay down credit card debt. In a more recent study, Stango & Zinman (2016) find that there is a huge dispersion in borrowing costs in the United States across individuals and that this is caused by two factors: Annual percentage rate (APR) offers vary widely across lenders, and borrowers vary in shopping intensity. Stango & Zinman show that the difference in APRs paid by shoppers versus nonshoppers could be as large as the difference in APRs paid by borrowers in the best versus worst credit score deciles.

US households owe about $712 billion in credit card debt as of Q1 2016 (FRBNY 2016). Wang & Keys (2014) document that 29% of credit card account holders' monthly repayments are at or near the required minimum payment. In terms of repaying credit card debt, Kuchler (2015) uses daily balances and transactions of bank accounts and credit cards of consumers who signed up online with a financial management service to study how consumers stick to their plan to reduce their debt balance each month. For each committed/planned dollar of debt paydown, consumers reduced their debt by only 25–30 cents on average. Agarwal et al. (2015d) study the effect of a nudging disclosure requirement in the CARD Act of 2009, which requires credit card lenders to disclose information about the interest savings that could be achieved if the credit card holders were to pay off balances in 36 months rather than making minimum payments. They detect only a 0.4-percentage-point increase in the share of accounts making the 36-month payment value and no evidence of a change in overall payments. Similarly, Wang & Keys (2014) find that fewer than 1% of credit card account holders adopt the 36-month repayment plan amount disclosed in the CARD Act.

Using panel data of credit card account repayment behavior, Gross & Souleles (2002a) document an increase in credit card borrowers' willingness to default on their debt because of a reduction in the costs of defaulting, which include social, informational, and legal costs. Andersson et al. (2013) also document changes in the pecking order of consumer default behavior. Specifically, consumers were eight times more likely to prioritize payments on mortgage debt over credit card payments before the 2008 financial crisis. In contrast, the same consumers were just as likely to default on mortgage debt as on credit card debt during the crisis. One of the main factors contributing to the change in pecking order behavior could be strategic default behavior resulting from large levels of negative equity during the housing meltdown (see, for example, Campbell & Cocco 2015).

2.2. Mortgage Finance

In the area of mortgage financing, forward-looking behavior and cost minimization have been offered as possible explanations for consumers' choice of mortgage form. The decision between a fixed-rate mortgage (FRM) and an adjustable-rate mortgage (ARM) depends on expected future costs and is related to the borrower's expectation about whether these are likely to be higher or

lower in the future. For example, if borrowers expect that future inflation is likely to be high, they are more likely to choose an FRM. Kuchler & Zafar (2015) also provide evidence of how personal experience shapes expectations in housing and labor markets. Individuals who have experienced more volatile price changes are likely to perceive future house price changes to be more uncertain, and individuals experiencing unemployment are likely to be more pessimistic about nationwide unemployment.

Campbell & Cocco (2003, 2015) model household mortgage choice and mortgage default decision under borrowing constraints and find that households care more about the current interest costs than about the lifetime costs of the loan. This suggests that the spread between FRM and ARM rates should be the primary determinant of the choice between an FRM versus an ARM product. Using a nine-country panel and instrumental variables methods to examine how near-term one-year rational expectations of future movements in ARM rates affect mortgage choice, Badarinza, Campbell & Ramadorai (2017) find that the current spread between FRM and ARM rates as well as near-term rational expectations of ARM rates affect mortgage choice, whereas longer-term three-year rational forecasts have a weaker effect. This suggests that households are concerned with current interest costs as well as interest costs over the life of the loan.

One important feature of the US mortgage market is the fact that mortgage borrowers can generally refinance their mortgage in order to reduce the mortgage balance, extract the equity in their home, and/or reduce their interest rate. Agarwal & Mazumder (2013) derive a closed-form optimal refinance solution and find that the interest rate differential for an optimal refinance typically ranges from 100 to 200 basis points. Researchers have also documented inefficiencies in making this refinancing decision with respect to rate and timing. For example, Agarwal, Rosen & Yao (2016) find that about 59% of borrowers refinance suboptimally. More specifically, they estimate that about 52% of borrowers choose a suboptimal rate, 17% of borrowers wait too long to refinance, and about 10% make both rate and timing mistakes. Keys, Pope & Pope (2016) quantify the cost of this inefficiency. In their random sample of outstanding US mortgages in December 2010, about 20% of financially unconstrained households for whom refinancing was optimal had not done so. This is equivalent to forgone savings of about $160 per month over the remaining life of each loan, or a total discounted present value of $11,500 in forgone savings per borrower.

During the housing meltdown of 2008, households experienced large levels of negative equity. The literature on mortgage default emphasizes the important role of home equity in inducing a homeowner to default on a mortgage (e.g., Deng, Quigley & Van Order 2000; Elul et al. 2010; Campbell & Cocco 2015). Whereas many argue that negative equity in houses induced strategic default behavior during the crisis of 2008, Bhutta, Dokko & Shan (2010) document that, of the households that purchased their home at the peak of the housing bubble in 2006, about 80% default on their mortgage because of a combination of income shocks and negative equity. In addition, the authors find that many of these households, despite having little financial incentive to keep paying their mortgage, as they bought their homes during the height of the bubble and put little money toward their down payments, keep paying their mortgage. The median borrower stops paying mortgage when housing equity falls to −62%.

2.3. Investment and Retirement Decisions

In investment decisions, Korniotis & Kumar (2013) show that the apparent inefficiencies are concentrated portfolios, excessive trading, and preference for local stocks. They point out, though, that all three instances of portfolio distortions could arise either from an informational advantage, which means the investor is smart, or from psychological biases. By contrast, Malmendier & Nagel (2016) as well as Botsch & Malmendier (2015) show empirically that lifetime experiences are a

determinant of differences in expectations and affect financial decision-making. Households that experienced good stock returns during their lifetimes invest more of their wealth in stocks, whereas households that experienced good bond returns during their lifetimes invest more in bonds.

In retirement decisions, the inefficiency is in failing to maximize benefit from retirement plans and accounts. Choi, Laibson & Madrian (2011) analyze the 401(k) investment choices of employees at seven companies and find that employees older than 59½ were contributing less than the employer matching contribution threshold despite being vested in their match and being able to make penalty-free 401(k) withdrawals for any reason. This means that, on average, 36% of match-eligible employees over the age of 59½ forgo arbitrage profits that average 1.6% of their annual pay, or $507. More interestingly, Choi, Laibson & Madrian find that a survey educating employees about the free lunch they are forgoing raised contribution rates by only a statistically insignificant 0.67% of income among those completing the survey. The tax inefficiency of asset allocations of households investing in taxable and tax-deferred accounts (TDAs) is another puzzle. Whereas theory, for example in the work of Dammon, Spatt & Zhang (2004) and Shoven & Sialm (2004), suggests that savers should locate higher-tax assets such as bonds in their TDAs while keeping low-tax assets (equities) in taxable accounts, observed portfolios show otherwise and are not tax efficient. Amromin (2003) explains this puzzle with precautionary portfolio choice; i.e., borrowing-constrained households forgo tax efficiency for allocations that provide more liquidity in bad income states. His empirical analysis suggests that the choice between holding a tax-efficient portfolio and accepting a degree of portfolio tax inefficiency is related to the presence and intensity of precautionary motives.

The extent to which individuals optimize their savings to take advantage of tax-deferred accounts is also actively researched. Researchers in the United States are empirically assessing the extent to which tax-preferred savings individual retirement accounts (IRAs) such as 401(k) and Roth 401(k) can increase the amount of private saving. They investigate the causal relationship by exploiting the variation in (*a*) initiation of topping up in tax-subsidized savings accounts (Attanasio & DeLeire 1994), (*b*) policy on eligibility (Gale & Scholz 1994), (*c*) balance of tax-subsidized savings accounts (Venti & Wise 1987, 1988), and (*d*) eligibility (Benjamin 2003, Gelber 2011) to see whether there is significant change in taxable savings or total wealth.[1] Recent developments in behavioral economics show that automatic enrollment significantly increases saving within retirement accounts (Choi et al. 2001, Madrian & Shea 2001, Thaler & Benartzi 2004). Recent work by Beshears et al. (2017) analyzes administrative data from 11 US firms that introduced a Roth IRA retirement plan between 2006 and 2010. They find no significant reduction in total 401(k) contribution rates following the introduction of the Roth IRA (deferred tax benefit), which implies that take-home pay declines and total retirement saving increases following the introduction of the Roth IRA. The authors analyze additional survey data and attribute their finding to employee confusion or inattention to the tax properties of the Roth IRA and behavior bias of partition dependence, rather than employees making an active, calculated decision. Arnberg & Barslund (2014) study the crowding-out effect of Danish mandatory pension schemes for renters. They find that for every euro paid to mandatory pension accounts there is a reduction of 0–30 cents in other private savings depending on age. They attribute the low crowding-out effect on private savings to liquidity constraints. By contrast, Chetty et al. (2014), using rich panel data on all private savings, find that retirement savings policy in Denmark does not effectively increase

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[1]Conclusions from these empirical studies are mixed, as they are based on different econometrical assumptions. There are two major concerns. The first is low-quality and infrequent data, and the second is the unobserved heterogeneity in the disposition to save between the treatment and control groups, which can bias the estimated effects on private saving.

private saving, given that 85% of individuals are passive savers who are unresponsive to subsidies, whereas the other 15% of individuals are active savers who respond to tax subsidies by shifting assets across accounts. The authors conclude that there are substantial crowding-out effects and that automatic contributions are more effective in increasing saving rates than tax-subsidized savings policy.

2.4. Spending and Consumption Decisions

Researchers are focusing efforts to better understand factors that stimulate household consumption. The secular decline in the US personal savings rate, which began in the 1980s, coincides roughly with a secular increase in the dissemination and use of credit cards. One conjecture is that increased access to and use of credit cards have stimulated consumer spending. Several early studies (Hirschman 1979, Feinberg 1986, Prelec & Simester 2001), using surveys and experiments, provide support for this conjecture. Similarly, in the area of mortgage debt, access to better loan terms appears to stimulate consumption. Brady, Canner & Maki (2000), Canner, Dynan & Passmore (2002), and Greenspan & Kennedy (2008) find that homeowners who refinanced their mortgages on more favorable terms, supported by rising home values in the 1990s to mid-2000s, spent more. Greenspan & Kennedy (2008) estimate the sources and uses of equity extracted from homes and find that the amount of equity extracted that was used for personal consumption expenditure rose from $26.3 billion in 1991 to $182.7 billion in 2005, or from about 10% of free cash resulting from equity extraction to about 13%.

Some studies take a completely different direction and look at the behavioral effects of payment mechanisms and the action of paying per se. Soman (2001) argues that certain mediums of payment, such as cash and check, affect consumers' future spending behaviors through two mechanisms: (*a*) rehearsal, which causes consumers to more accurately recall past expenses, and (*b*) immediacy (an immediate depletion of wealth). Both mechanisms make consumers more averse to spending. The use of credit cards, however, does not bring such a negative impact on spending and therefore leads to a greater propensity to spend. In a subsequent field study, Soman (2003) collected receipts from shoppers at the exit of a large supermarket and found that the positive effect of credit card use on spending was mainly on the purchase of flexible items (an expense that may vary depending on price and quantity available), but not on inflexible goods (which are needed irrespective of changes in price and other factors). Another explanation is the payment transparency hypothesis; i.e., credit cards and other payment tools are different in the transparency or vividness with which individuals can feel the outflow of money, with cash being the most transparent mode of payment; the more transparent the payment outflow, the greater the aversion to spending or the higher the pain of paying (Prelec & Loewenstein 1998). Similarly, Raghubir & Srivastava (2008) find the same effect in an experimental study in which they asked participants to estimate the budget for a hypothetical Thanksgiving party, where the specified payment medium was cash or credit card. They find that when credit card was the payment medium, participants' estimates of the total costs for the party were significantly higher. Interestingly, when participants were instructed to consider the costs of each item individually and add them up, there was no difference between costs using cash and credit card.

Taking a different approach, behavioral economists exploit natural experiments to understand whether income shocks and other stimuli affect consumption spending and in what ways. Agarwal, Liu & Souleles (2007) estimate how consumers responded to federal income tax rebates in 2001 in terms of monthly responses of credit card payments, spending, and debt. They find that consumers initially increased their credit card payments, i.e., paid down debt, but soon afterward increased their spending. Spending increased most for consumers who were most likely to be liquidity

constrained, whereas debt declined most for unconstrained consumers. In a more recent study, Agarwal & Qian (2014) study consumption behavior after an exogenous unanticipated income shock: a one-time cash payment to Singaporeans announced in February 2011 and paid out at the end of April 2011. Estimating the announcement and disbursement effects, they find that consumption rose significantly after the fiscal policy announcement, with consumers spending SGD0.80 on average for every SGD1 received during the subsequent 10 months. They also find a strong announcement effect, i.e., 19% of the response occurred via credit cards within the first 2 months of the announcement. Interestingly, consumers switched to using debit cards after disbursement before finally increasing spending on credit cards in later months. Consumers with low liquid assets or with low credit card limits experienced stronger consumption responses.

Whereas unexpected income shocks from national policy are one good source of natural experiments, another set of studies draw on changes in day-to-day living to understand how predictable income streams that households expect affect their spending behavior. Empirical evidence shows that even anticipated income shocks cause changes in household spending behavior. Parker (2015) estimates the propensity of households to spend in response to the arrival of predictable, lump-sum payments, using households in the Nielsen Consumer Panel, which received $25 million in federal stimulus payments that were distributed randomly across weeks. He finds the propensity to spend to be a persistent household trait. It is unrelated to expectation errors, almost unrelated to crude measures of procrastination and self-control, moderately related to sophistication and planning, and highly related to impatience. By contrast, Stephens (2008) estimates the consumption response to predictable increases in discretionary income following the final payment of a vehicle loan and finds that a 10% increase in discretionary income leads to a 2–3% increase in non-durable consumption. This may be a result of borrowing constraints. In an earlier paper, Stephens (2006) examines consumption in response to paycheck arrival. Contrary to the basic rational expectations life-cycle/permanent income hypothesis, which predicts that household consumption should not respond to anticipated paycheck arrival because a regular paycheck does not provide new information, he finds household consumption to be excessively sensitive to paycheck receipt. The finding cannot be explained by any underlying monthly expenditure fluctuations common to all households, whereas liquidity constraints measured by wealth and age can account for the excess sensitivity.

3. FACTORS THAT AFFECT CONSUMER SUBOPTIMAL FINANCIAL CHOICE AND BEHAVIOR

Poor financial decisions have a material impact on households' lifetime welfare, and some households clearly make better decisions than others. Small deviations from optimal decision-making at the consumer level might still potentially have important aggregate implications (e.g., Gabaix & Laibson 2006). Therefore, understanding why consumers behave suboptimally has important policy implications, as suboptimal choices and biases can dampen economic growth and increase the costs for social security systems. The main drivers explaining consumer choice inefficiencies are cognitive limitations, lack of financial literacy, time preference, self-control and incentives, psychological biases, and social networks.

3.1. Cognitive Limitations and Financial Literacy

One strand of the literature on suboptimal consumer financial decision focuses on the role of cognitive limitations, either from innate characteristics (Agarwal & Mazumder 2013) or aging (Agarwal et al. 2009). Agarwal & Mazumder (2013) explicitly link cognitive abilities to financial mistakes.

Specifically, they study the effect of cognitive abilities on two consumer financial decisions where suboptimal behavior is well defined: (*a*) the optimal use of credit cards for convenience transactions when transactions are fully paid for within the grace period, and after a balance transfer from an existing account to a new card, and (*b*) a financial mistake that involves recognizing the APR for the value of their home during a home equity loan application. Agarwal & Mazumder use a direct measure of cognitive abilities—the Armed Forces Qualifying Test—to show that consumers with higher math scores are substantially less likely to make financial mistakes. Other studies by Agarwal et al. (2009) and Korniotis & Kumar (2011) explore the effects of aging and experience on financial decision-making and find that the adverse effects of aging dominate the positive effects of experience. To understand the effect of aging on financial decision-making, Agarwal et al. (2009) study life-cycle patterns in financial mistakes using a proprietary database that measures 10 different types of credit behavior. These mistakes include the suboptimal use of credit card balance transfer offers, the misestimation of the value of one's home, and excess interest rates and fee payments. They find that middle-aged adults make fewer financial mistakes than younger or older adults, which implies a U-shaped pattern with the cost-minimizing age occurring around age 53. Korniotis & Kumar (2011) document that whereas older and more experienced investors have greater knowledge about investment, they do not effectively apply their knowledge and skills as a result of cognitive deterioration.

Attention and a bias to action is another explanation for better financial decision-making. Andersen et al. (2015) studied inattention and inertia in Danish households and found that younger, better-educated, and higher-income households have less inertia and less inattention. Financial wealth and housing wealth appear to have opposite effects—there is least inertia and inattention among households whose housing wealth is high relative to their financial wealth. In the authors' mixture model of household refinancing types, household characteristics affect both inattention (a low proportion of rational refinancers) and residual inertia (a low probability that fully inattentive households refinance). They found that the two attributes are positively correlated, with cross-sectional correlation of 0.62.

Another explanation for why consumers make financial mistakes is that they lack sufficient knowledge about financial concepts and instruments to make informed financial decisions (Agarwal et al. 2010). Gerardi, Goette & Meier (2013) find a robust relationship between numerical ability and mortgage default, after controlling for a broad set of sociodemographic variables that are not driven by other aspects of cognitive ability. They find that whereas numerical ability does not impact the choice of mortgage contract, but affects the incidence of mortgage default, individuals with limited numerical ability default on their mortgage as a result of behavior unrelated to the initial choice of mortgage. The good news is that there is some evidence showing that financial decision-making does improve with experience. For example, Agarwal, Rosen & Yao (2016) show evidence that borrowers learn from their refinancing experiences and make fewer mistakes on their second refinancing.

Other research shows that many consumers are ill prepared to meet their financial goals (Agarwal et al. 2010); take out payday loans at astronomical interest rates when cheaper forms of credit are available (Agarwal, Skiba & Tobacman 2009); choose suboptimal credit contracts (Agarwal et al. 2015b); fail to optimally refinance mortgages (Agarwal, Driscoll & Laibson 2013); and fail to plan for retirement, reaching it with little or no savings (Lusardi, Mitchell & Curto 2009).

Some research focuses on the importance of improving consumers' financial literacy. Hilgert, Hogarth & Beverly (2003) explore the connection between financial knowledge and behavior using consumer survey data. They find that those who have more financial knowledge are more likely to engage in recommended financial practices. They conclude that financial education,

when combined with skill-building and audience-targeted motivational strategies, may help drive desired behavioral changes in the way that consumers manage their finances. Agarwal et al. (2010) also find substantially lower default rates among graduates of a long-term voluntary counseling program targeting low- to moderate-income households. They attribute the results to two factors. First, the program requires prospective borrowers to acquire budgeting and credit management skills. Second, aggressive post-purchase counseling is targeted at early delinquency—counselors identify and target households on the basis of soft information picked up during the program. Moreover, Fernandes, Lynch & Netemeyer (2014) conduct a meta-analysis of the relationship of financial literacy and of financial education to financial behaviors in 168 papers covering 201 prior studies, and find that interventions to improve financial literacy explain only 0.1% of the variance in financial behaviors studied, and their effects decay over time. Even large interventions with many hours of instruction have negligible effects 20 months after the time of intervention, and the partial effects of financial literacy diminish dramatically with controls for psychological traits omitted in prior studies. They suggest that just-in-time financial education tied to specific behaviors it intends to help would be more effective than financial education that is not elaborated or acted upon soon afterward.

3.2. Time Preferences, Self-Control, and Incentives

A second strand of research tries to explain inefficient consumer choices in relation to time preferences, self-control, and incentives. Present bias, in which a decision-maker places more emphasis on the present than the future, has been documented in the literature. Present-biased preferences can be seen as a result of the interplay between two separate decision-making systems: the affective system, which values immediate gratification and sharply discounts all future periods, and the deliberative system, which makes long-term plans and displays higher discount factors. Laibson (1997) develops a theoretical framework showing how present bias can drive credit card borrowing and can constrain future choices. Laibson, Repetto & Tobacman (2003) present a model of hyperbolic discounting to explain the coexistence of credit card debt and accumulation of assets for retirement. The accumulation of illiquid assets coexists with revolving credit card debts because hyperbolic consumers act patiently with respect to long-term objectives and impatiently with short-term objectives. On this basis, they propose that credit card borrowing is intended for short-term consumption smoothing, whereas accumulation of illiquid assets is an instrument of self-control.

Empirical support of present bias includes the work of Shui & Ausubel (2004), who, as stated earlier, find that consumers prefer an introductory offer with a lower interest rate and a shorter duration to one with a higher interest rate and a longer duration, even though they would benefit more from choosing the latter, and that consumers are reluctant to switch and many consumers who have switched before fail to switch again. These findings suggest time inconsistency in consumer behavior, which can be explained with hyperbolic preferences. By means of a unique field study using an incentivized choice experiment and administrative credit card borrowing data, Meier & Sprenger (2010) find that present-biased individuals are more likely to hold credit card debt. Findings by Kuchler (2015), which indicate that a consumer's decision to pay down debt is affected by his or her level of impatience, highlight the importance of present bias in consumer decisions.

Other papers, such as those of Bertaut, Haliassos & Reiter (2009) and Telyukova (2013), identify a set of motives related to self-control. Bertaut, Haliassos & Reiter (2009) show the coexistence of credit card debt with substantial accumulation of assets for retirement in the context of a self-checking motive using the "accountant shopper" model, in which an individual or household has two separate selves, an "accountant" and a "shopper," who act contemporaneously to handle different decisions. The accountant handles bill payment and long-term financial planning, whereas

the shopper determines consumption expenditures based on the credit available. When the shopper exhibits self-control problems, the accountant intervenes to control the shopper by limiting the unused credit available. This explanation, however, has limitations; it is idealistic to think that the accountant would consistently act to check the shopper in a rational manner. The household puzzle itself is a reflection of this limitation; it has been shown that households lose an average of $374 per year, or 1.5% of total annual after-tax income. Telyukova (2013) offers a precautionary motive and highlights the importance of liquidity: Households are not using money in the bank to pay off accumulated credit card debt because they anticipate needing that money in situations where credit cards cannot be used. As a result, households consume both cash goods and credit card goods concurrently.

In their study, Agarwal et al. (2015b) find that the probability of choosing a suboptimal contract declines with the dollar magnitude of the potential error, and consumers with larger errors were more incentivized to subsequently switch to the optimal contract. Lehnert & Maki (2007) offer strategic default as another motive. They study consumer bankruptcy behavior and find that states with higher levels of statutory exemptions—below which debtors are permitted to keep their assets while debts are forgiven—face higher consumer bankruptcy rates and contain households that are more likely to simultaneously hold low-return liquid assets and owe high-cost unsecured debt. They also find that the credit card debt puzzle is more prevalent in the United States where exemption levels are higher, and this supports their hypothesis. This, however, provides a plausible motive for only a limited group of consumers, as most people are unlikely to file for bankruptcy.

3.3. Psychological Bias

A third strand of literature identifies and assesses the role of psychological biases—among others, perceived control (Perry & Morris 2005), optimism (Puri & Robinson 2007), disposition (Odean 1998), narrow framing (Kumar & Lim 2008), and propensity to gamble (Kumar 2009)—as well as the extent to which smartness is a determinant of psychological biases (Korniotis & Kumar 2013).

One key factor that influences propensity to save, to budget, and to control spending is perceived control. Perry & Morris (2005) examine the relationship between consumer financial knowledge, income, and locus of control on financial behavior. They find that consumers who perceive that they have higher levels of control over outcomes, as well as better knowledge and financial resources, are more likely to save, budget, and control spending. Optimism, which is correlated with positive beliefs about future economic conditions and related to numerous work and life choices, is also a key influencing factor, with a moderate amount of optimism being beneficial. Puri & Robinson (2007) develop a novel measure of optimism by comparing self-reported life expectancy in the Survey of Consumer Finance with that implied by statistics. They find that moderate optimists display reasonable financial behavior, whereas extreme optimists display financial behavior that is generally not considered prudent.

Kumar (2009) identifies the propensity to gamble, finding that greater expenditure in lotteries is associated with greater investment in lottery-type stocks. Similarly, state lotteries and lottery-type stocks are also likely to attract very similar socioeconomic clienteles.

Although we know that psychological biases exist to varying extents in different people, it is also important to understand what drives this variation. Korniotis & Kumar (2013) develop an empirical model of smartness that can identify skilled investors ex ante using only their demographic characteristics. They then investigate the role of psychological mechanisms and information allocation on some commonly known stock market puzzles, namely portfolio concentration, excessive trading, and preference for local stocks. They find that smartness is a determinant of various psychological biases, i.e., smart investors have fewer psychological biases, and therefore perform

better. But what factors determine smartness? Korniotis & Kumar (2013) find that superior information is the key factor behind the performance of smart investors, even when their decisions are contrary to standard economic reasoning. Zhang (2006) also showed that higher information uncertainty, resulting from poor information and high volatility of a firm's fundamentals, increases behavioral biases and investors' underreaction to new public information.

3.4. Social Networks

The literature on information accessed and transmitted highlights the role of social networks and peer pressure on financial decision-making. Hong, Kubik & Stein (2004) investigate how social interaction influences stock market participation and conclude that more social consumers, for example those who have reported interacting with neighbors and attending church, are more likely to invest. Hong, Kubik & Stein (2005) also find that a mutual fund manager is more likely to buy or sell a particular stock if other managers in the same city are buying or selling the same stock, even after controlling for local preferences. They explain this effect using an epidemic model in which investors spread information to one another by word of mouth.

Similarly, Bailey et al. (2016) use data from Facebook to show that social interactions with friends can influence housing market expectations and investment behavior. Specifically, they show that individuals whose geographically distant friends experienced larger recent house price gains are more optimistic about property investments in their own local housing markets and are actually more likely to invest in the housing market. Duflo & Saez (2003) conduct a field experiment and find not only that individuals who received a financial incentive to participate in a fair providing information on TDA retirement plans were more likely to enroll in the plan, but also that their colleagues were more likely to enroll; this is evidence of spill-over effects based on social interactions. Yet when Grinblatt & Keloharju (2001) analyze the relationship between stockholding and spatial proximity, language, and culture, they find that the influence of distance, language, and culture is less prominent among the most investment-savvy investors than among households and less savvy investors.

4. FINANCIAL PRODUCT DESIGN AND MARKETING

The design of financial products and the way they are marketed are also important factors that influence consumer choice; the behavioral literature has ample studies on the effects of frames on choice (Tversky & Kahneman 1986). Shefrin & Statman (1993) also suggest that some investors prefer one financial product over another because of the way identical cash flows are framed. They study the role of prospect theory, hedonic framing, behavioral life-cycle theory, and cognitive errors in the design of financial products and suggest that a behavioral framework can offer insights into many other features of security design such as designation of mutual funds as "growth" and "income" funds, design of lotteries to have a particular combination of prices, and design of stocks to have prices within a trading range. Gabaix & Laibson (2006) study information shrouding in an economy with some myopic (or less informed) consumers. They find that, in equilibrium, optimizing firms exploit myopic consumers by shrouding costly add-ons, whereas sophisticated customers are able to exploit these marketing schemes. Gabaix & Laibson also show that the practice continues because it is not possible to profitably drive away the business of the sophisticated or the myopic.

There is also evidence that the way mortgages are marketed to consumers has important implications. Using a controlled experiment in a large US commercial bank when loan officers were incentivized to prospect for loans, Agarwal & Ben-David (2014) find that loan sizes, volume, and defaults increased despite the fact that there was no change to the bank's credit standards. They

find that loan officers placed greater weight on hard information and approved many applications that would otherwise have been rejected, preferring to convince existing applicants to borrow larger amounts than source new applications. This resulted in a higher default rate and the loss of predictive power of the bank's credit model. Gurun, Matvos & Seru (2016) study the relationship between advertising subprime lenders and the nature of mortgages obtained by consumers, measuring the relative expensiveness of a given mortgage, i.e., the excess rate after accounting for a broad set of borrower, contract, and regional characteristics. They find a strong positive relationship between the intensity of local advertising and the expensiveness of mortgages extended by lenders in a given region, with the strongest relationship applying to advertising through newspapers, the most heavily used advertising channel. They also found that advertising is most effective when targeted at groups that are likely to be less informed about mortgages such as the poor, the less educated, and minorities. Their findings support the persuasive view, i.e., that advertising in the subprime mortgage market was used to steer consumers into expensive choices, rather than the informative view, i.e., that advertising helps consumers to find cheaper products.

In addition, consumers face a number of challenges: the complexity of financial products, information asymmetry, and, perhaps, less-than-scrupulous practices on the part of providers. Examples include excessive fees, high interest rates, prepayment penalties, and clauses barring borrowers from seeking judicial redress for predatory behavior by lenders (Engel & McCoy 2001). Bostic et al. (2012) find evidence that antipredatory lending laws, holding all else constant, changed the type of mortgage products that lenders offered in the market. Specifically, the introduction of state antipredatory lending laws induced lenders to substitute between mortgage products; in locations where such laws were introduced, they reduced mortgage products that have prepayment penalties, adjustable-rate and hybrid-rate mortgages, balloon payments, interest-only loans, and low- and no-documentation loans, and at the same time increased teaser rates, which extend the period during which borrowers have low monthly mortgage payments. Agarwal, Driscoll & Laibson (2013) provide explicit evidence of systematic mortgage lending abuse, in which customers with good credit quality are steered toward more expensive, predatory subprime mortgage terms. Moreover, Agarwal et al. (2014) present evidence that predatory lending practices contributed to the higher mortgage default rates among subprime borrowers, raising them by about a third and aggravating the subprime crisis. Although it is hard to disagree that mortgages with abusive terms are costly to borrowers and taxpayers, the extent of these practices is hard to quantify.

In addition, Agarwal & Ben-David (2014) present evidence that when a large US commercial bank incentivized loan officers to prospect for new business, the unintended consequences were a dramatic loss of critical soft information, larger loans, poorer credit quality, and higher default rates; i.e., the change in the bank's business model unintentionally led to riskier lending at consumers' expense. In the area of credit cards, complexity stems from the great variety of rates and fees that cater to diverse consumer risk profiles and preferences. The innovations that gave less credit-worthy consumers access to credit cards have also made it more difficult for them to fully understand the true cost of credit, therefore making it more challenging for them to select credit cards and manage their use (Canner & Elliehausen 2013).

How, then, can we design financial products for the benefit of consumers? Specifically on the topic of mortgage debt, Campbell (2013) studies cross-country variation in mortgage market structure and draws insights from urban economics, asset pricing, behavioral finance, financial intermediation, and macroeconomics to improve on mortgage market design, especially in the United States. Campbell finds that three types of behavioral heterogeneity impact mortgage lenders' incentives and mortgage innovations: moving propensity, financial sophistication, and present-biased preferences. Campbell also concluded that although it may be possible for economists to recommend an ideal mortgage system by solving the dynamic contracting problem, the design of

mortgage markets must proceed in a more ad hoc and flexible way, learning from international experience and integrating insights from different fields.

5. REGULATION

Although the financial crisis has triggered a surge of interest in regulating consumer financial products, researchers are still debating both sides of the regulatory coin, for example, in the studies of Campbell et al. (2011) and Posner & Weyl (2013). Proponents of regulation argue that consumer financial markets have become increasingly unfair. Firms take advantage of consumers' behavioral biases—such as myopia, present bias, and inattention—to earn large profits, especially from unsophisticated and poor consumers (Agarwal et al. 2015c). Such proponents suggest that regulation and additional information can protect less sophisticated consumers and reduce aggregate borrowing costs. Banks also have the least incentive to lend to consumers who are most in need of credit (Agarwal et al. 2015c). Critics, however, are skeptical about the effectiveness of consumer financial regulations. Whereas limits on hidden fees, for example, can shift surplus from more sophisticated to less sophisticated consumers (Gabaix & Laibson 2006), there is less evidence that regulators can bring about an across-the-board reduction in consumer costs. Such critics suggest that regulators may just be playing a game of regulatory whack-a-mole, where efforts to limit certain fees will simply lead firms to offset reduced revenue with higher prices on other product dimensions, as well as to restrict the supply of credit. Even proponents of regulating late fees, such as Barr, Mullainathan & Shafir (2009, p. 50), are worried that "the reduced revenue stream to lenders from these fees would mean that other rates and fees would be adjusted to compensate."

Campbell (2016) frames the regulation discussion in the context of tension between laissez-faire advocates and interventionists. Household finance is the focus of interventionist attention for several reasons: (*a*) Individuals have to make increasingly difficult financial decisions with bigger consequences; (*b*) higher education is becoming more expensive and posing a challenge in countries where it is not publicly provided; (*c*) rising home prices are stressing traditional systems for financing homeownership; (*d*) improving information technology is facilitating the development of more complex and confusing products; and (*e*) behavioral economics has opened the eyes of academics to financial behaviors that were not carefully examined before, showing that many households are not up to the challenge of managing their finances. Also, household mistakes may not be purely idiosyncratic and can be correlated across households; this creates endogenous risk and is therefore a factor that needs to be managed by the financial system.

The vital questions are as follows: How effective has regulation been so far? What types of regulations work? How do we improve upon the way we regulate to balance the needs of consumers and other stakeholders? How do we make use of behavioral elements to make regulation more effective? Agarwal et al. (2015c) analyze the effectiveness of consumer financial regulation by considering the CARD Act of 2009. They estimate that regulatory limits on credit card fees reduced overall borrowing costs by an annualized 1.6% of average daily balances, with savings of more than 5.3% for consumers with FICO scores below 660, and no evidence of an offsetting increase in interest charges or a reduction in the volume of credit. This means that the CARD Act saved consumers an estimated $11.9 billion per year. Agarwal et al. (2015d) further provide a framework to help regulators understand the implications of regulating hidden fees by estimating firms' pass-through of cost shocks and the salience of the regulated hidden fee. They show that the framework predicts the degree of offset from the CARD Act in an ex ante analysis. In terms of interventions, Agarwal et al. (2015d) also analyze a nudge that disclosed the interest savings from paying off balances in 36 months rather than making minimum payments and detected a small increase in the share of accounts making the 36-month payment value, but no evidence of a change in overall payments.

The results of another study show the nature and degree of substitutability between debit and credit, which have implications for antitrust regulators. Zinman (2009) models consumer choice at the point of sales and finds that consumers who revolve debt or face a binding credit limit constraint are substantially less likely to incur credit card charges and substantially more likely to use a debit card, conditional on several proxies for transaction demand and tastes. Zinman also finds that debit use increases with credit limit constraints and decreases with credit card possession, and that debit is becoming a stronger substitute for credit over time. Heidhues & Kőszegi (2010) study how requiring credit contracts to have a linear structure and prohibiting large penalties for deferring small amounts of repayment can raise welfare. They analyze contract choices, loan repayment behavior, and welfare in a model of a competitive credit market when borrowers have a taste for immediate gratification. This is consistent with many credit cards and subprime mortgages, where terms are such that most nonsophisticated borrowers overborrow and pay penalties to back-load repayment, causing welfare loss.

More generally, Agarwal et al. (2009) analyze nine regulatory strategies with a view to helping individuals avoid financial mistakes, especially those resulting from cognitive decline: laissez-faire, disclosure, nudges, financial "drivers' licenses," advance directives, fiduciaries, asset safe harbors, and ex post and ex ante regulatory oversight. They also ask what the appropriate regulatory response should be. They argue that if the market for third-party advice and fiduciary services functioned well, the market equilibrium would have three phases. (*a*) Early in life, each individual would write a plan for his or her future consumption and investment, contingent on major events (including cognitive decline beyond a specified threshold). (*b*) In the second phase, cognitive testing and observation would monitor the individual for the onset of significant cognitive decline. (*c*) Finally, when the prespecified threshold is crossed, the individual's plan would be enforced by a fiduciary, or the individual's assets would be placed in a financial instrument with a state-contingent payout scheme. The market already provides financial products with this feature, for example annuities that eliminate complex asset deaccumulation decisions. The authors argue, however, that an unregulated market solution may not work well and that government intervention is probably needed. The ideal form of intervention is yet unclear, and more empirical analyses and field experiments are needed to identify the regulatory response that best balances the marginal costs against the potential benefits. Campbell et al. (2011) argue that regulation must be tailored to specific problems to be beneficial and must be accompanied by research to measure the effectiveness of the interventions. This is especially the case for consumer financial regulation on market failure and limited consumer rationality in financial decision-making. They illustrate the need for, and the limits of, regulation through three case studies: mortgage markets, payday lending, and financial retirement consumption.

Yet another strand of literature explores the ability of government to induce change and finds this avenue to be limited. Agarwal et al. (2015a) examine the ability of the government to influence debt renegotiation by evaluating the effects of the 2009 Home Affordable Modification Program, which provided intermediaries with sizable financial incentives to renegotiate mortgages. They find that the program generated an increase in renegotiation intensity within the program while adversely affecting negotiations performed outside the program. The overall impact of the program is likely to be limited—it was estimated to reach just one-third of the targeted 3–4 million households—with a few large servicers responding at half the rate of others. This is likely because of servicer-specific factors, for example pre-existing organizational capabilities. These findings suggest that the government's ability to quickly induce changes in servicer behavior through financial incentives is limited and highlight significant barriers to the effectiveness of such policies.

What, then, is the main challenge for economists in the area of consumer financial regulation? Campbell (2016, p. 25) succinctly states that "beyond the easy cases where behaviorally biased

households can be 'nudged' to avoid mistakes with minimal effects on rational households, financial regulators face a difficult trade-off between the benefits of regulation to households that make mistakes, and the costs of regulation to other financial market participants. The task for economists is to confront this trade-off explicitly, bringing to bear the highest quality evidence that modern applied microeconomics can make available."

6. CONCLUSION

In this article, we reviewed the developments in research on factors that influence consumer choice and financial products within the field of household finance. Specifically, we looked at consumer behavior and biases, financial literacy and education, and financial product design and marketing, and we outlined the key research questions to explore further. Here we highlight five future research directions and considerations for policymakers.

First, how widespread and important are losses resulting from poor financial decision-making? What fraction of aggregate wealth, and of the wealth of older adults, is lost because of poor choices? What are the costs? We believe that the studies so far have examined only the tip of the iceberg; the bulk of mistakes that are being made probably lie elsewhere, including decisions regarding annuities, structured financial products, real estate investment pools, and other complex and/or retirement-related concerns.

Second, although we have found that there are many consumer behaviors and biases, both rational and irrational, their relative effects are still unclear. In particular, do we know which effects are dominant? Is it possible to come up with a general model of consumer financial behavior? Can this be a useful reference to guide financial product design and regulation, much like how Apple shapes our smartphone usage habits and Starbucks shapes our coffee drinking culture?

Third, policy research so far has focused on interventions and their effects on consumer welfare, as well as on how to improve consumer financial literacy. Perhaps attention should also be given to studying the incentives of financial services providers. Rather than rely on a "stick" approach, can we create conditions for a sustainable win-win for consumer and provider?

Fourth, policy researchers also face fascinating challenges in deriving optimal contracts, policy responses, and enforcement (Zinman 2014) because of inherent behavioral complexity, information asymmetry, and enforcement idiosyncrasy. What new methodologies and further research do we need to improve on current consumer financial policies?

Finally, as adoption of financial technology (fintech) grows in consumer finance, consumers will decide how to use these new technologies, and regulators will need to decide how to react to these new developments. As these technologies become entrenched and coexist with traditional financial services, how will consumer behavior and market dynamics change? There will be the need to re-examine how each of the levers—consumer behavior and biases, financial literacy and education, financial product design, and marketing and regulation—has adapted or needs to be adapted.

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Contents

Indexes

Errata

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