

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 ideal financial decisions ideally depicted in optimal economic models [Campbell, 2006]. 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 more specifically on consumer choice in context of research in credit card borrowing, housing and mortgage debts, investments and savings decisions, as well as spending and consumption. We also discuss financial product design and marketing; and regulatory landscape of lenders of consumer financial products. We also discuss five future research directions and considerations for researchers and policy makers.

Key words: household finance, consumer finance, consumer behavior, consumer bias, consumer choice, consumer credit, choice inefficiencies, cognitive ability, financial literacy, financial education, consumer financial regulation, financial product design, financial product marketing, mortgage debt, credit card, personal investments, financial products

1 Introduction

The field of consumer finance has only gained much attention over the past decade. 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 household's effective financial decisions and behaviors in the market, and 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 debates about the role of consumer financial decisions and the role of financial intermediaries of consumer financial products in causing the financial crisis. In response to market failures, policymakers subsequently implemented policies (e.g., Home Affordable Modification Program in 2009, Credit Card Accountability Responsibility and Disclosure Act (CARD Act) in 2009, Dodd-Frank Act in 2010) to protect consumers and regulate lenders, providing applied micro-economists with natural experiments to study the impact of policy related to the consumer credit market on lender and household behavior. Further allowing applied micro-economists to develop more rigorous empirical analysis is the technological advancements that allow for more efficient collection, storage and processing of large administrative consumer credit data. 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 their finances, the limitations in cognitive ability and behavioral biases that hinder optimal decision making, the impact of the 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 might still potentially have important aggregate implications (e.g.,

[Gabaix and Laibson, 2006]; or analogously for firms, [Akerlof and Yellen, 1985]), especially given that the value at stake is high (as of 2016 Q1, US households owe about USD12.25 trillion in debt¹ or approximately 78 percent of US GDP²) and these financial decisions affect most households [Zinman, 2014]. Moreover, [Agarwal et al., 2009a] 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 more specifically on consumer choice in the context of research in credit card borrowing, housing and mortgage debts, investments and savings decisions, as well as spending and consumption. We also discuss financial product design and marketing; and regulatory landscape of lenders of consumer financial products. We review major contributions and identify open interest research questions that have yet to be answered.

2 Consumer choice inefficiencies and suboptimal financial behavior

Following [Shefrin and Thaler, 1988], who provide a behaviorally realistic treatment of household financial- as well as consumption-saving decisions, there has been a continuous growth in academic research studying factors that affect consumer financial decision making and related behavioral biases in household finance. While [Shefrin and Thaler, 1988] present a theory on 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, as well as to spend and consume.

2.1 Credit card contract choice and borrowing

In choosing credit card contracts, [Shui and 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: (1) consumers prefer an introductory offer with a lower interest rate and shorter duration to one with a higher interest rate with a longer duration, even though they would benefit more from choosing the latter; and (2) consumers are reluctant to switch and many consumers who have switched before fail to switch again. [Shui and Ausubel, 2004] argue that this behavior is puzzling because consumers would actually pay lower interest rate costs, ex post, under the longer introductory offer.³ One limitation of this study is the use of aggregate credit and saving outcomes, which makes the link between borrowing and present bias indirect since examination of aggregates data does not allow for evaluation of individual behavior.

[Meier and 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 Assistances in Boston over the period 2006 - 2007. Their results show that present-biased individuals are 15 percent more likely to have credit card debts. Conditional on borrowing, they borrow 25 percent (measured by outstanding balances on revolving accounts from the credit reports) more than dynamically consistent individuals. The correlation is robust after controlling for income, credit constraints and socio-demographic characteristics. The study faces some concerns about external validity given that the data covers a small sample of low-income consumers in Boston.

¹Quarterly Report on Household Debt and Credit, May 2016, Federal Reserve Bank of New York

²Bank for International Settlements

³DellaVigna and Malmendier (2002) find that consumers systematically choose sub-optimal membership plans at health clubs. Miravete (2003) finds consumers' choices of telephone billing plans to be closer to optimal.

Also overcoming the aggregate data limitation, [Agarwal et al., 2015b] document consumer mistakes in choosing a credit card contract using individual-level data based on unique experiment in which a bank offers consumers in the US 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). While on average consumers choose a credit contract that minimizes their net costs, the authors document that about 40 percent of consumers choose the ex post sub-optimal credit contract, with some households incurring hundreds of dollars of avoidable interest charges. The probability of choosing the sub-optimal contract, however, declines with the dollar magnitude of the potential error and consumers with larger errors were 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 et al., 2009b] 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 percent.

With respect to credit card borrowing, [Ausubel, 1991] document that consumers are overly sensitive to teaser 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 examines the promotional "teaser" interest rates and concludes 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 and Souleles, 2002a] are also among the first researchers to document another "credit card debt puzzle" – that 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 since returns on liquid assets are typically lower than the interest charged on credit card debt. [Bertaut et al., 2009] use the Survey of Consumer Finance (SCF) data to confirm that the credit card debt puzzle is a persistent behavioral phenomenon. In similar spirit, [Zinman, 2009] conclude that credit card debt revolvers borrow high and lend low. He estimates that 27-30 percent of US households with credit cards lose USD10 per month by not using demand deposits to pay down credit card debt. In a more recent study, [Stango and Zinman, 2016] finds that there is a huge dispersion in borrowing costs in the US across individuals, and this is due to two factors: the annual percentage rate (APR) offers vary widely across lenders, and that borrowers also vary in shopping intensity. They show that the difference in APRs paid by shoppers versus non-shoppers could be as different as those paid by borrowers in the best versus worst credit score deciles.

In borrowing on credit card, US households owe about USD712 Billion in credit card debt as of Q1 2016⁴. [Wang and Keys, 2014] document that 29 percent of credit card account holders' monthly repayment is at or near the required minimum payment. In terms of repaying back credit card debt, [Kuchler, 2015] uses daily balance and transactions of bank accounts and credit cards of consumer who signed up online with a financial management service to study how consumers stick to their plan to reduce their debt balance per month. For each committed/planned dollar of debt pay-down, 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 by 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 points increase in the share of accounts making the 36-month payment value but no evidence of a change in overall payments. Similarly, [Wang and Keys, 2014] find that less than 1 percent of credit card account holders adopt the 36-month repayment plan amount disclosed in the CARD Act.

Using a panel data of credit card account repayment behavior, [Gross and Souleles, 2002b] 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 similar 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

⁴Federal Reserve Bank of New York

change in the pecking order behavior could be due to strategic default behavior due to large levels of negative equity during the housing meltdown (see, for example, [Campbell and 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 adjustable-rate mortgage (ARM), which depends on expected future costs, 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 a fixed-rate mortgage. [Kuchler and 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 and Cocco, 2003] and [Campbell and Cocco, 2015] model a household mortgage choice model 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 et al., 2015] find that the current spread between FRM and ARM rates as well as near term rational expectations of ARM rates affect mortgage choice, while 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 to reduce their interest rate. In deriving a closed-form optimal refinance solution, [Agarwal and Mazumder, 2013] finds that the interest rate differential for an optimal refinance typically ranges from 100 to 200 basis points. In making this decision, researchers document inefficiencies in refinancing with respect to rate and timing. [Agarwal et al., 2016] find that the majority of borrowers refinance sub-optimally. They estimate that about 59 percent of borrowers refinance sub-optimally. More specifically, about 52 percent of the borrowers chose a sub-optimal rate, 17 percent of the borrowers waited too long to refinance, and about 10 percent make both rate and timing mistakes. [Keys and Pope, 2016] quantify the cost of this inefficiency. In their random sample of outstanding US mortgages in December 2010, about 20 percent of financially unconstrained households for whom refinancing was optimal had not done so. This is equivalent to foregone savings of about USD160 per month over the remaining life of each loan or a total discounted present-value of USD11,500 in foregone savings per borrower.

During the 2008 housing meltdown, households experienced large levels of negative equity. The literature on mortgage default emphasize important role of home equity in inducing a homeowner to default on his mortgage (e.g., [Deng et al., 2000]; [Elul et al., 2010]; [Campbell and Cocco, 2015]). While many argue that the negative equity in the house induced strategic default behavior during the 2008 crisis, [Bhutta et al., 2010] document that, of the households who purchased their home at the peak of housing bubble in 2006, about 80 percent default on their mortgage due to a combination of income shocks and negative equity. In addition, the authors find despite having little financial incentive to keep paying their mortgage, as they bought their home during the height of the bubble and put little money towards the down payment, many of these households keep paying their mortgage. The median borrower stops paying his mortgage when housing equity falls to -62 percent.

2.3 Investment and retirement decisions

In investment decisions, [Korniotis and 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 be due to either an informational advantage, which

means the investor is smart, or psychological biases. On the other hand, [Malmendier and Nagel, 2016] as well as [Botsch and Malmendier, 2015] show empirically that lifetime experiences is a determinant of differences in expectations and affect financial decision-making. Households who experienced good stock returns during their lifetimes invest more of their wealth in stocks, while households who experienced good bond returns during their lifetimes invest more in bonds.

In retirement decisions, the inefficiency is in failing to maximize benefit from their retirement plans and accounts. [Choi et al., 2011] analyze the 401(k) investment choices of employees at seven companies and found that employees older than $59\frac{1}{2}$ 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 percent of match-eligible employees over age $59\frac{1}{2}$ forgo arbitrage profits that average 1.6 percent of their annual pay, or \$507. More interestingly, they found that a survey educating employees about the free lunch they are forgoing raised contribution rates by only a statistically insignificant 0.67 percent 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. While theory, for example [Dammon et al., 2004] and [Shoven and Sialm, 2004], suggests that savers should locate higher-tax assets such as bonds in their tax-deferred retirement accounts (TDAs) while keeping low-tax assets (equities) in taxable accounts, observed portfolios shows 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. Their empirical analysis suggests that the choice of whether to hold a tax-efficient portfolio and the degree of portfolio tax inefficiency are 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 US are empirically assessing the extent to which tax-preferred saving individual retirement accounts (IRAs) accounts 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 initiation of topping up in the tax subsidized saving accounts [Attanasio and DeLeire, 1994], policy on eligibility [Gale and Scholz, 1994], balance on the tax-subsidized saving accounts ([Venti and Wise, 1987] and [Venti and Wise, 1988]), or eligibility ([Benjamin, 2003] and [Gelber, 2011]) to see whether there is significant change in taxable savings or total wealth.⁵ Recent developments in behavior economics show that automatic enrollment significantly increases saving within retirement accounts ([Madrian and Shea, 2001]; [Choi et al., 2001]; [Thaler and Benartzi, 2004]). Recent work by [Beshears et al., 2015] analyze administrative data from 11 U.S. firms that introduced a Roth IRA retirement plan between 2006 and 2010. They find no significant reduction in the 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 savings increases following the introduction of the Roth. The authors analyze additional survey data and attribute their finding to employee confusion or inattention about the tax properties of the Roth and behavior bias of partition dependence, rather than employee making an active calculated decision. [Arnberg and Barslund, 2014] study the crowd-out effect of Danish mandatory pension schemes for the renters. They find that for every Euro paid to the mandatory pension accounts, there is 0 to 30 cents reduction in other private savings depending on age. They attribute the low crowding-out effect on private savings to liquidity constraints. On the other hand, [Chetty et al., 2014], using a rich panel data on all private savings, find that retirement savings policy in Denmark does not effectively increase private savings given that 85 percent of individuals are passive savers who are unresponsive to subsidies, while the other 15 percent of individuals are active savers who respond to tax subsidies by shifting assets across accounts. The authors conclude that there are substantial crowd-out effects and that automatic contributions are more effective in increasing saving rates than the tax-subsidized savings policy.

⁵Conclusions from these empirical studies are mixed since they are based on different econometrics assumptions. There are two major concerns: (1) low quality and infrequent data, and (2) the unobserved heterogeneity in the disposition to save between the treatment and control group, which can bias the estimated effects on private savings.

2.4 Spending and consumption decisions

Researchers are focusing efforts to better understand factors that stimulate household consumption. The secular decline in 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 card have stimulated consumer spending. Several early studies, using surveys and experiments, also provide support including [Hirschman, 1979], [Feinberg, 1986], and [Prelec and Simester, 2001]. Similarly, in the area of mortgage debt, access to better loan terms appears to stimulate consumption. [Brady et al., 2000], [Canner et al., 2002] and [Greenspan and Kennedy, 2008] found that homeowners who refinanced their mortgages on more favorable terms, coupled with rising home values in the 1990s to mid-2000s, also spent more. [Greenspan and Kennedy, 2008] estimated the sources and uses of equity extracted from homes and found that the amount of equity extracted used for personal consumption expenditure rose from USD 26.3 billion in 1991 to USD 182.7 billion in 2005, or from about 10 percent of free cash resulting from equity extraction to about 13 percent.

Some studies take a completely different direction and look at the behavioral of payment mechanisms and the action of paying per se. [Soman, 2001] argues that the medium of payment, such as cash and check, affect consumer's future spending behaviors through two mechanisms: (1) rehearsal which causes consumers to recall past expenses more accurately, and (2) immediacy or an immediate depletion of wealth, both of which will make consumers more averse to spending. The use of credit cards, however, does not bring such negative impact on spending and therefore leads to less aversion to spending. In a subsequent field study, [Soman, 2003] collected receipts from shoppers at the exit of a large supermarket store and found that the positive effect of credit card use on spending was mainly on the purchase of flexible items (an expense which 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, and of which cash is 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 and Loewenstein, 1998]. Similarly, [Raghubir and Srivastava, 2008] find the same effect in an experimental study where 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 estimates of the total cost of the party were significantly higher when credit card was the payment medium. Interestingly, when participants were instructed to consider the cost of each item individually and add them up, there was no difference between costs from using cash and credit card.

Taking a different approach, behavioral economists exploit natural experiments to understand how income shocks and other stimulus affect consumption spending and in what ways. [Agarwal et al., 2007] estimate how consumers responded to the 2001 Federal income tax rebates in terms of monthly response of credit card payments, spending and debt. They find that consumers initially increased their credit card payments, i.e., pay down debt, but soon afterwards increased their spending. Spending increased most for consumers who were most likely to be liquidity constrained, while debt declined most for unconstrained consumers. In a more recent study, [Agarwal and Qian, 2014] study consumption behavior after an exogenous unanticipated income shock - a one-time cash payment to Singaporeans announced on 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 \$0.80 on average for every \$1 received during the subsequent 10 months. They also find a strong announcement effect, i.e., 19 percent of the response occurs during the first two-month of the announcement period via credit cards. 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 limit experienced stronger consumption responses.

While unexpected income shocks from national policy are a good source of natural experiments, another set of studies draw on the changes within day-to-day living to understand how predictable income streams that households expect affect their spending behavior. Empirical evidence shows that even anticipated incomes shock cause changes in household spending behavior. [Parker, 2015]

estimate the propensity of households spending in response to the arrival of predictable, lump-sum payments using households in the Nielsen Consumer Panel who received USD25 million in Federal stimulus payments that were distributed randomly across weeks. He finds that the propensity to spend is 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. On the other hand, [Stephens, 2008] estimates the consumption response to predictable increases in discretionary income following the final payment of a vehicle loan and find that a 10 percent increase in discretionary income leads to 2-3 percent increase in nondurable consumption. This may be due to 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 since 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, while liquidity constraints measured by wealth and age can account for the excess sensitivity results.

3 Factors that affect consumer suboptimal financial choice and behavior

Poor financial decisions have 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 and Laibson, 2006]. Therefore, understanding why consumers behave sub-optimally has important policy implications, since sub-optimal 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; financial literacy; time preference; self-control and incentives; psychological bias; 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 and Mazumder, 2013] or ageing [Agarwal et al., 2009a]. [Agarwal and 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 – (1) 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 (2) a financial mistake that involves recognizing the APR for the value of their home during a home equity loan application. They 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., 2009a] and [Korniotis and 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., 2009a] study lifecycle patterns in financial mistakes using a proprietary database that measures ten different types of credit behavior. These mistakes include the suboptimal use of credit card balance transfer offers, the mis-estimation 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, while implies a U-shaped pattern with the cost-minimizing age occurring around age 53. [Korniotis and Kumar, 2011] document that while 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 their 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 mistake is that they lack sufficient knowledge about financial concepts and instruments to make informed financial decisions [Agarwal et al., 2010]. [Gerardi et al., 2013] find a robust relationship between numerical ability and mortgage default, after controlling for a broad set of sociodemographic variables which are not driven by other aspects of cognitive ability. They find that while numerical ability does not impact the choice of mortgage contract, but affects incidence of mortgage default - individuals with limited numerical ability default on their mortgage due to 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 et al., 2016] show evidence that borrowers learn from their refinancing experiences and make fewer mistakes on their second refinancing.

Other research show 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 et al., 2009b], choose sub-optimal credit contracts [Agarwal et al., 2015b], fail to optimally refinance mortgages [Agarwal et al., 2013], and fail to plan for retirement, reaching it with little or no savings [Lusardi et al., 2009].

Another strand of research focuses on the importance of improving a consumers' financial literacy. [Hilgert et al., 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 the desired behavioral changes in the way 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, the aggressive post-purchase counseling that targeted early delinquency – counselors identify and target households based on soft information picked up during the program. Moreover, [Fernandes et al., 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 percent 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 that 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 afterwards.

3.2 Time preferences, self-control and incentives

The second strand of research tries to explain why consumer choices are inefficient relate to time preferences, self-control and incentives. Present bias, where a decision-maker places more emphasis on the present than in the future, has also 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-run plans and displays higher discount factors. [Laibson, 1997] develops a theoretical framework showing how present bias can drive credit card borrowing and can constrained future choices. [Laibson et al., 2003] present a model of hyperbolic discounting to explain the co-existence of credit card debt and accumulation of assets for retirement. The accumulation of illiquid assets co-exists with revolving credit card debts because hyperbolic consumers act patiently with respect to longer-run objectives and impatiently with short-run objectives. Based on this, they propose that credit card borrowing is intended for short-term consumption smoothing, while accumulation of illiquid assets is an instrument of self-control.

Empirical support of present bias includes [Shui and Ausubel, 2004] who as stated earlier finds that consumers prefer an introductory offer with a lower interest rate and shorter duration to one with a higher interest rate with 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. Using a unique field study on incentivized choice experiment and administrative credit card borrowing data, [Meier and Sprenger, 2010] find that present-biased individuals are more likely to hold a credit card debt. Finding by [Kuchler, 2015] indicate that the level of impatience affects a consumer's decision to pay-down debt highlights the importance of present bias in consumer decisions.

Other papers such as [Bertaut et al., 2009], [Telyukova, 2013] identify a set of motives related to self-control. [Bertaut et al., 2009] show the co-existence of credit card debt with substantial accumulation of assets for retirement in the context of self-checking motive using the “accountant-shopper” model where an individual or household have 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 while the shopper determines consumption expenditures based on the credit available to him. 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 percent of the 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] also find that the probability of choosing the suboptimal contract declines with the dollar magnitude of the potential error, and consumers with larger errors were more incentivised to subsequently switch to the optimal contract. [Lehnert and Maki, 2007] offer strategic default as another motive. They study consumer bankruptcy behavior and find that states with higher level of statutory exemptions – below which debtors are permitted to keep their assets while debts are forgiven – face higher consumer bankruptcy rates and 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 U.S. where exemption levels are higher, and this supports their hypothesis. This, however, provides a plausible motive for only a limited group of consumers since 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 – perceived control [Perry and Morris, 2005], optimism [Puri and Robinson, 2007], disposition [Odean, 1998], narrow framing [Kumar and Lim, 2008], propensity to gamble [Kumar, 2009] among others, as well as the extent to which smartness is a determinant of psychological biases [Korniotis and Kumar, 2013].

One key factor that influences propensity to save, to budget and to control spending is *perceived control*. [Perry and Morris, 2005] examine the relationship between consumer financial knowledge, income and locus of control on financial behavior. They find that consumers who perceived they have higher levels of control over outcomes as well as 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, albeit in moderate amounts. [Puri and 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 were found to display reasonable financial behavior while extreme optimists displayed financial habits and behavior that are generally not considered to be prudent.

[Kumar, 2009] identifies the propensity to gamble. The author finds that greater expenditure in lotteries are associated with greater investment in lottery-type stocks. Similarly, state lotteries and lottery-type stocks are also likely to attract very similar socioeconomic clienteles.

While we know that psychological biases exist to various extents in different people, it is important to also understand what drives this variation. [Korniotis and 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 less psychological biases, and therefore perform better. But what factors determine smartness? [Korniotis and 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 under-reaction 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 et al., 2004] investigate how social interaction influence 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 et al., 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 where 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 and Saez, 2003] conduct a field experiment and found that not only 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, their colleagues were also more likely to enroll – evidence of spill-over effects based on social interactions. Yet, when [Grinblatt and Keloharju, 2001] analyze the relationship between spatial proximity, language and culture and stock-holding, and 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 how 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 and Kahneman, 1986]. [Shefrin and Statman, 1993] also suggest that some investors prefer one financial product over another because of the way identical cash flows are framed. They studied the role of prospect theory, hedonic framing, behavioral life cycle theory and cognitive errors in the design of financial products, and suggested 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 particular combination of prices and design of stocks to have prices within a “trading range”. [Gabaix and 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 high priced add-ons, while sophisticated customers were able to exploit these marketing schemes. They 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 have important implications. Using a controlled experiment in a large US commercial bank when loan officers were incentivized to prospect for loans, [Agarwal and Ben-David, 2014] find that loan sizes, volume and default 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, and preferred 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 et al., 2016] study the relationship between advertising sub-prime lenders and the nature of mortgages obtained by consumers and measured 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 expensiveness of mortgage extended by lenders in a given region, with the strongest being 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, less educated and minorities. Their findings support the "persuasive view" that advertising in the sub-prime mortgage market was used to steer consumers into expensive choices, rather than the "informative view" of advertising posits that advertising helps consumers to find cheaper products.

In addition, consumers also face a number of challenges - the complexity of financial products, information asymmetry and perhaps less 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 and McCoy, 2001]. [Bostic et al., 2012] find evidence that anti-predatory lending laws, holding all else constant, changed the type of mortgage products lenders offer in the market. Specifically, the introduction of state anti-predatory lending laws induced lenders to substitute between mortgage products. Specifically, the laws reduced mortgage products that have prepayment penalties, adjustable rate, hybrid rate, balloon payment, interest only, and low and no documentation loans in locations in which an anti-predatory lending law was introduced, and at the same time increased teaser rates in order to extend the period during which borrowers would have low monthly mortgage payments. [Agarwal et al., 2013] provide explicit evidence of systematic mortgage lending abuse such that good credit quality customers are steered towards more expensive predatory sub-prime mortgage terms. Moreover, [Agarwal et al., 2014] present evidence that predatory lending practices contributed to the higher mortgage default rates among sub-prime borrowers, raising them by about a third, and aggravating the sub-prime crisis. While 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 and Ben-David, 2014] also presents evidence that when a large US commercial bank incentivised 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, the complexity stems from the great variety of rates and fees to cater to diverse consumer risk profiles and preferences. The innovation 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 and therefore more challenging to select and manage the use of credit cards [Canner and Elliehausen, 2013].

How then can we design financial products for the benefit of consumers? Specifically on 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 US. The paper finds that three types of behavioral heterogeneity impact mortgage lenders' incentives and mortgage innovations: moving propensity, financial sophistication and present-biased preferences. The paper also concluded that while it may be possible for economists to recommend an ideal mortgage system by solving the dynamic contracting problem, mortgage market design must proceed in a more ad hoc and flexible way, learning from international experience and integrating insights from different fields.

5 Regulation

While 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 and 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]. They 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. While limits on hidden fees, for example, can shift surplus from more sophisticated to less sophisticated consumers [Gabaix and Laibson, 2006], there is less evidence that regulators can bring about an across-the-board reduction in consumer costs. They suggest that regulators may just be playing a game of regulatory whac-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 et al., 2009], 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] framed the regulation discussion in the context of the tension between the *laissez faire* and the interventionists. Household finance is the focus of interventionist attention for several reasons: (1) individuals have to make increasingly difficult financial decisions with bigger consequences, (2) higher education is becoming more expensive and posing a challenge in countries where it is not publicly provided, (3) rising home prices are stressing traditional systems for financing homeownership, (4) improving information technology is facilitating the development of more complex and confusing products, and (5) behavioral economics has opened the eyes of academics to financial behaviors that were not carefully examined before, and 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, which create endogenous risk and therefore needs to be managed by the financial system.

The real questions though are: How effective has regulation been so far? What types of regulation work? How do we improve upon the way we regulate to balance the needs of consumers and other stakeholders alike? How do we make use of behavioral elements to make regulation more effective? [Agarwal et al., 2015c] analyzed the effectiveness of consumer financial regulation by considering the 2009 Credit Card Accountability Responsibility and Disclosure (CARD) Act. They estimated that regulatory limits on credit card fees reduced overall borrowing costs by an annualized 1.6 percent of average daily balances, with savings of more than 5.3 percent 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 USD11.9 billion per year. [Agarwal et al., 2015d] further provided a framework to help regulators understand implications of regulating hidden fees by estimating firms' pass-through of cost shocks and salience of the regulated hidden fee. They show that the framework predicted the degree of offset from the CARD Act in an ex-ante analysis. In terms of interventions, [Agarwal et al., 2015d] also analysed 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 has implications for antitrust regulators. [Zinman, 2009] modeled consumer choice at the point of sales and found 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. The paper also found 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 and Kőszegi, 2010] studied how requiring credit contracts to have a linear structure and prohibiting large penalties for deferring small amounts of repayment can raise welfare. They analyzed 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 sub-prime mortgages where terms are such that most non-sophisticated borrowers over borrow and pay the penalties to back load repayment, causing welfare loss.

More generally, [Agarwal et al., 2009a] analysed nine regulatory strategies that can help individuals avoid financial mistakes, especially due to cognitive decline, such as: laissez-faire, disclosure, nudges, financial “drivers’ licenses”, advance directives, fiduciaries, asset safe harbors and ex post and ex ante regulatory oversight. They also asked what the appropriate regulatory response should be. They believed that if the market for third-party advice and fiduciary services functioned well, the market equilibrium should have three phases, including: (1) Early in life, when each individual would write a plan for his or her future consumption and investment, contingent on major events (including cognitive decline); (2) In the second phase, cognitive testing and observation would monitor the individual for onset of significant cognitive decline; (3) Finally, when this pre-specified 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 which eliminate complex asset de-accumulation decisions. They believed however that an unregulated market solution may not work well and 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] argued that regulation must be tailored to specific problems to be beneficial and must be accompanied by research to measure 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 limits of, regulation through three case studies – of mortgage markets, payday lending and financial retirement consumption.

Yet another strand of literature explored the ability of government to induce change and find this avenue to be limited. [Agarwal et al., 2015a] examined the ability of the government to influence debt renegotiation by evaluating the effects of the 2009 Home Affordable Modification Program that provided intermediaries with sizable financial incentives to renegotiate mortgages. They found 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 due to servicer specific factors, for example pre-existing organizational capabilities. These findings suggested that the government’s ability to quickly induce changes in servicer behavior through financial incentives is limited and highlights significant barriers to the effectiveness of such policies.

What is the main challenge for economists then in the area of consumer financial regulation? [Campbell, 2016] succinctly states “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* [emphasis added]. The task for economists is to confront this trade-off explicitly, bring to bear the highest quality evidence that modern applied microeconomics can make available”.

6 Conclusion

In this paper, we reviewed the developments 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, financial product design and marketing, regulation and consumer fintech and highlight the key research questions to explore further. In this respect, we outline five future research directions and considerations for policy makers.

First, how widespread and important are losses due to 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 are just looking at 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, while we have found that there are many consumer behaviors and biases, both rational and irrational, at play, the relative effects are still unclear? Particularly, do we know which the dominant effects are? 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 the interventions and their effects on consumer welfare, as well as how to improve consumer financial literacy. Perhaps attention should also be given to studying financial services providers' incentives. Rather than rely on a "stick" approach, can we create the 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] due to 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 fintech grows in consumer finance, consumers will decide how to use these new technologies while regulators will need to decide how to react to these new developments. As these technologies become entrenched and co-exist 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 – have adapted or need to be adapted.

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