Consumer finance / household finance: the definition and scope

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CONSUMER FINANCE / HOUSEHOLD FINANCE: THE DEFINITION AND SCOPE

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Abstract

Purpose – The purpose of this literature review paper is to define consumer finance, describe the scope of consumer finance and discuss its future research directions.

Design/methodology/approach – In this paper, consumer finance is used as a synonym of household finance. Consumers refer to individuals and families. After defining the term "consumer finance," we conducted a critical review of consumer finance as an interdisciplinary research field in terms of money managing, insuring, borrowing, and saving/investing. Future research directions are also discussed.

Findings – This paper discusses similarities and differences among several terms such as consumer finance, household finance, personal finance, family finance, and behavioral finance. The paper also reviewed key studies on consumer financial behavior around four key financial functions, money management, insurance, loan, and saving/investment and several non-traditional topics such as fintech and financial capability/literacy. The paper also introduced several datasets of consumer finance commonly used in the U.S. and China.

Originality/value – This paper clarified several similar terms related to consumer finance, sorted out the diverse literature of consumer finance in multiple disciplines such as economics, finance, and consumer science, which provide a foundation for generating more fruitful research in consumer finance in the future.

Keywords – Behavioral finance, Consumer finance, Family finance, Household finance, Personal finance

Paper type – Literature review

1. Introduction

Consumer finance, household finance, family finance, personal finance, behavioral finance. What are these and are they the same or different in the research literature? The short answer is that consumer finance can be viewed as a synonym of household finance. Conceptual differences between these two terms and other related terms will be discussed in section two. This paper attempts to discuss

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commonalities and differences among these terms and propose a definition of consumer finance. In addition, this paper will describe the scope of the literature of consumer finance and discuss future research directions. In the foreword of *Handbook of Consumer Finance Research*, Tufano (2016), as a business school dean and finance professor, argued that consumer finance as a research field is important from both theoretical and practical perspectives and more finance researchers in business schools should be paid more attention to it. This paper attempts to serve as a bridge to connect the literatures in economics, business, and consumer science.

2. Definition of Consumer Finance

Different writing conventions are used in different disciplines. For example, in the economic literature, households often refer to individuals and families. In the business and consumer science literature, consumers refer to individuals and families. In this paper, we use consumers to refer to individuals and families.

In the research literature, both consumer finance and household finance are commonly used. In this paper, the two terms are treated as the same concept. In general, economists usually use the term "household finance" and business and consumer science researchers usually use the term "consumer finance." Household finance is a concept proposed by John Campbell in his presidential address at American Finance Association (Campbell, 2006). Later, household finance as a subfield in finance has been seen in the literature and conferences (Guiso & Sodini, 2013; Tao & Xiao, 2016). It was also added as G5 in the Journal of Economic Literature codes by American Economic Association.

Consumer finance was first used in 1983 when the Survey of Consumer Finance started. In 2008, an edited book contributed by economists, business researchers, and consumer scientists, used consumer finance in its title (Xiao, 2008, 2016). Later, Peter Tufano published an overview article that summarized the consumer finance research (Tufano, 2009). Based on these scholars' backgrounds, they proposed these terms from different perspectives. Campbell is an economist and he viewed this topic from a public perspective. Tufano is a finance professor in business school and proposed this topic from a business perspective. Xiao is a consumer science professor and viewed this topic from a consumer perspective. Other terms are variations of these two terms. For example, behavioral finance is a variation of behavioral economics that focuses on basic research on human behaviors. Many studies on behavioral finance are about individual and family behaviors. Family finance and personal finance are variations of consumer finance from researchers in consumer science, which emphasize financial issues faced by families and individuals. In terms of research purposes, economists are interested in the social welfare that includes multiple interest groups such as businesses, consumers, governments, and other social organizations. Business school researchers are concerned about the interest of shareholders of businesses. Consumer science researchers are interested in the wellbeing of consumers that include individuals and families.

Scholars defined consumer/household finance in different ways. From an economic perspective, compared to production sector, the household sector is an important component in the economy. Campbell proposed that "household finance asks how households use financial instruments to attain

their objectives" (Campbell, 2006, p1553). In his presidential address, he discussed research issues related to investing and borrowing. He also discussed equilibrium in retail financial markets as an economist usually does. Since Campbell proposed the term "household finance" in 2006, household finance as a field is emerging in economics and finance (Guiso & Sodini, 2013; Tao & Xiao, 2016).

In the preface of the first edition of the *Handbook of Consumer Finance Research,* Xiao (2008) pointed out consumer financial issues include retirement and college savings and consumer borrowing, and the research purpose of consumer finance is to improve consumer financial wellbeing and quality of life.

Tufano defined consumer finance as "the study of how institutions provide goods and services to satisfy the financial functions of households, how consumers make financial decisions, and how government action affects the provision of financial services" (Tufano, 2009, p229). In this definition, three players are mentioned, institutions (mostly commercial companies), consumers, and governments. Further, Tufano specified financial functions needed by households that are moving funds, managing risk, advancing funds from the future to today, and advancing funds from today until a later date. These functions can be expressed concisely as paying, insuring, borrowing, and saving.

Wang, Liao, and Zhang (2010) proposed a broader definition for consumer finance. Based on their arguments, consumption is not only limited to the consumption of everyday life, but also includes the use or consumption of all resources for non-productive purposes. Finance includes not only financial problems faced by consumers themselves, but also by markets, institutions, and governments and consumption related financial technologies, products, services, laws, regulations, and policies.

Based on the above discussions, consumer finance is defined as a research field to study how financial institutions provide products and services to meet financial needs of consumers, how consumers make financial decisions, how government agencies regulate financial institutions and protect financial consumers, and how science and technology help optimize the efficiency of consumer finance markets and improve social welfare.

3. Scope of Consumer Finance

In terms of business practices, in the U.S., consumer finance originally refers to fringe banking where non-regulated institutions provide high cost loans such as pay day loans to consumers who need cash quickly but are excluded from mainstream financial services. In recent years, consumer finance covers all financial services needed by consumers (Xiao, 2008, 2016). In China, consumer finance originally refers to short term loans for consumption purposes, but in recent years, consumer finance covers not only short term but also long term loans such as mortgage; not only consumer borrowing but also saving/investing, insurance and payment services (Liao, 2011). Based on financial functions needed by consumers and specified by Tufano (2009), these functions include paying, insuring, borrowing, and saving. In this paper, paying is expanded to include general money management and is referred as money managing thereafter. In addition, consumer finance research topics are not limited to traditional financial functions and include many other topics such as relevant datasets, fintech, financial capability, demographics, family relations, and human developments (Xiao, 2008, 2016). These nontraditional topics are discussed in section 4.

3.1 Money Managing

Money managing refers to payment instrument choice and general money management behavior. Payment instrument is important in financial services. Because of the advance of technology, payment instrument becomes diverse among countries. For example, in developed countries such as the U.S., the popular payment instrument is a credit card but in developing countries such as China, mobile payment becomes popular. Payment instruments not only provide transaction convenience for consumers but also add other financial functions such as borrowing and saving when relevant fintech companies emerge. In China, through mobile payment, many consumers not only use it for purchase but also for borrowing and saving purposes.

In the U.S., staff researchers from Federal Reserve Banks report statuses and trends of consumer payment choices including findings of Survey of Consumer Payment Choice (e.g. Greene & Stavins, 2018) or the Diary of Consumer Payment Choice (e. g. Kumar, Maktabi, & O'Brien, 2018).

Researchers examine factors associated with consumer payment choices such as identify theft (Kahn & Liñares-zegarra, 2016), price discount (Briglevics & Shy, 2014; Stavins & Shy, 2015; Stavins, 2018), law change (Koulayev, Rysman, Schuh, & Stavins, 2016), data breach (Greene & Stavins, 2017), consumer security perception (Kahn, Liñares-Zegarra, & Stavins, 2017), and peer (van der Cruijsen & Knoben, 2018). Payment choice is also a contributing factor considered when other consumer behaviors are researched such as contributing to charity (Soetevent, 2011). Researchers also examine the effects of new payment tools on consumer payment choices such as mobile payment (Trütsch, 2016).

Consumer financial behaviors can be measured in both objective and subjective measures. Subjective measures are usually used in field studies. Researchers developed a series of questions and asked respondents to report their behaviors (e.g. Dew & Xiao, 2011). Objective measures are usually obtained from administrative data from corporate and government institutions. More and more researchers combine survey and administrative data for research purposes, such as a study about the effect of state mandated financial education on later debt behavior of young adults (Brown, Grigsby, Van Der Klaauw, Wen, & Zafar, 2016).

Researchers also examine relationships between various financial behaviors among consumers with income levels. Evidence shows that consumers with lower income are more likely to perform budgeting behavior and consumers with higher income are more likely to perform long term planning behavior (Xiao & O'Neill, 2018a, 2018b). Present-biased consumers are more likely to spend and less likely to save (Xiao & Porto, 2019b).

3.2 Insuring

Theoretically, Pareto optimal allocation of risks, famously known as the mutuality principle, governs the distribution of diversifiable and undiversifiable risks in the ideal world (Liu, Wu, and Yu, 2019). From the perspective of consumer finance, insuring refers to consumer demand for insurance products and welfare consequences of using insurance products. Consumers can buy many types of insurances. Jaspersen (2016) reviews 95 hypothetical surveys and experimental studies of insurance demand and finds that such studies have both been used to study general decision theories under risk and to examine specific aspects of insurance markets, in which a rather large variety of experimental methods has been used. In a review paper, Harrison and Ng (2019) argue that theories of the demand for, and

welfare evaluation of, insurance products are well developed but the empirical literature has not maintained this tight connection. In fact, much of the empirical literature illustrates the dangers of the modern passion with agnostic economics: avoiding theory at all costs to focus on "what works."

A casual search of the literature shows that most empirical studies examined consumer demands for health insurance and disability insurance. Some studies also examined welfare consequences of consumer use of these insurances. In addition, empirical research also examined advantageous selection, a concept opposite to adverse selection, both of which are closely related to insurance markets.

3.2.1. Demand for Health Insurance

Geruso and Layton (2017) review the theory and evidence concerning selection in competitive health insurance markets and discuss the common policy tools used to address the problems it creates. They first outline some important but often misunderstood differences between two types of conceptual frameworks that economists use to think through selection, the fixed contracts approach and the endogenous contracts approach. Then they discuss four commonly employed policy instruments that affect the extent and impact of selection: 1) premium rating regulation, including "community rating"; 2) consumer subsidies or penalties to influence the take-up of insurance; 3) risk adjustment, which is a policy that adjusts payments to private insurance companies based on the expected health care costs of enrollees; and 4) contract regulation, often involving rules for the minimum of what must be covered by the privately provided health insurance contract.

Pendzialek, Simic, and Stock (2016) present a systematic review of empirical studies on price elasticity of demand for health insurance. A total of 45 studies from countries such as the USA, Germany, the Netherlands, and Switzerland were found. Clear differences in price elasticity by countries are identified. While empirical studies show a range between -0.2 and -1.0 for optional primary health insurance in the US, higher price elasticities between -0.6 and -4.2 for Germany and around -2 for Switzerland are calculated for mandatory primary health insurance. Saltzman (2019) estimates demand for health insurance using consumer-level data from the California and Washington ACA exchanges and finds own-premium elasticities of -7.2 to -10.6 and insurance coverage elasticities of -1.1 to -1.2; and limited response to the mandate penalty amount, but significant response to the penalty's existence, suggesting consumers have a "taste for compliance."

Many factors are associated with health insurance demands. Sharpe (2016) provides an overview on consumer financial issues in health care in the U.S. Nayak, Krishnamoorthy, Bhattacharrya, and Pathak (2018) study the preferences of customers when purchasing a health insurance policy and provide a holistic view of what customers expect from the health insurance industry and what the industry is prepared to provide.

Socioeconomic conditions may affect demands for health insurance. Cheng and Lu (2019), using data from China, find changes in demographic conditions associated with the one-child policy, the urbanization process, an ageing population and an imbalanced dependency ratio are significantly related to the consumption of life and health insurance. Air pollution may affect health insurance demand. Chang, Huang, and Wang (2018) find that one standard deviation increase in daily air pollution leads to a 7.2% increase in the number of insurance contracts sold that day.

Laws may affect employee insurance choices. Trish and Herring (2018) evaluate the impact of limiting allowable rating variation on employer self‑insurance across industries with varied health risk. Using data from the Employer Health Benefits Survey, they find that lower risk employers subject to laws limiting allowable premium rating variation have a predicted probability of self‑insurance that is about 18 percentage points higher than otherwise‑similar higher risk employers.

Family formation may affect demand for health insurance. Doiron and Kettlewell (2020), using a unique panel of young Australian women, find that women purchase insurance in preparation for pregnancy but then transition out of insurance once they have finished family building.

Mother's work type may affect children's health insurance coverage. Lim (2019), using longitudinal data, find that mothers' nonstandard work is associated with a higher likelihood of children being uninsured or relying on public programs.

3.2.2. Demand for Disability Insurance

Information provision may increase disability insurance demand. Armour (2018) exploits a natural experiment in information provision on U.S. Disability Insurance (DI) applications: the Social Security statement, and finds that among those previously reporting a work limitation, biennial DI application rates approximately doubled.

Economic conditions may not affect consumer application for disability insurance. Jiménez-Martín, Mestres, and Castelló (2019) explore the relationship between economic conditions and disability insurance (DI) participation in Spain during the Great Recession. They show that DI applications are not responsive to the business cycle and that economic conditions have no effect on the composition of new DI awardees.

Early assessments of an individual's need for vocational rehabilitation may increase demand for disability insurance. Engstrom, Hagglund, and Johansson (2017) with data from the Swedish sickness insurance system find that one of the interventions increases the flow to disability benefits by 20%.

3.2.3. Insurance Product Choice and Welfare

Consumer suboptimal choice of insurance products may bear lifecycle welfare costs. Koijen, Van Nieuwerburgh, and Yogo (2016) have developed a pair of risk measures, health and mortality delta, for the universe of life and health insurance products. Their life-cycle model of insurance choice and data from the Health and Retirement Study show that for the median household aged 51 to 57, the lifetime welfare cost of market incompleteness and suboptimal choice is 3.2% of total wealth.

Life insurance payout may not affect spousal wellbeing. Harris and Yelowitz (2018), using the Health and Retirement Study, examine individuals whose spouses died during or soon after his or her peak earnings years and find that sizable lump‑sum life insurance payouts do not significantly influence spousal wellbeing.

Expansion of health insurance may decrease mortality. Andersen (2018) examine the effect of the 1973 expansions of Medicare coverage among individuals with end-stage renal disease (ESRD) on insurance

coverage, health care utilization, and mortality and find that the expansions have increased insurance coverage by 22 to 30 percentage points, increased physician visits by 25 to 35 percent, and decreased mortality due to kidney disease in the under 65 population by 0.5 to 1.0 deaths per 100,000.

Losing health insurance may not affect young adults' risky health behavior. D. Lee (2018), using the National Health Interview Survey data, finds that when young adults become 26 years old, they are 7 to 10 percentage points more likely to lose health insurance than young adults under the age of 26, but presence or absence of health insurance does not affect their smoking and drinking behaviors and their access to preventive care.

Health insurance coverage may reduce labor supply. Le, Groot, Tomini, and Tomini (2019) have conducted a review based mainly on the literature using the U.S. data and find that spousal coverage in the US is associated with reduced labor supply of secondary earners. They show initial evidence of labor supply distortion caused by Children's Health Insurance Program, Affordable Care Act and other public health insurance expansions, in which dependent young adults in the US who can access health insurance via their parents' employer have lower labor supply through fewer hours worked while keeping the same employment probability.

Health insurance coverage may provide financial protection for households. Mitra, Palmer, Pullaro, Mont, and Groce (2017) have conducted a systematic review of the impact of health insurance on children and their households in low- and middle-income countries where nine-tenths of the world's child population reside. They find nine out of ten studies reviewed provide consistent evidence that health insurance provides financial protection for the households.

Mother's insurance coverage may have positive impacts on neonatal outcomes. Kumar and Gonzalez (2018), using Mexico hospital‐based administrative data, find that children born to insured mothers weigh 108 g higher and have reduced probability of low birth weight by 7.5 percentage points.

Researchers examine welfare effects of the Affordable Care Act (ACA). ACA may encourage young adults' college enrollments. Lopoo, Cardon, and Raissian (2018), using data from the American Community Survey, find that the implementation of the Affordable Care Act mandate is associated with a 3–5 percent increase in college enrollment among women 23–25 years of age. ACA may improve family investment diversification. J. Lee (2018), using the Survey of Income and Program Participation data, finds that the dependent coverage mandate has significantly increased the share of stocks 2.5 percentage points for households having both parental employer-sponsored health insurance and dependent children aged 19 to 25 years. ACA may encourage reversals in retirement. Congdon-Hohman (2018) uses the longitudinal aspect of the Health and Retirement Study and finds that health insurance sources play a particularly predictive role for early retirees and those who were previously open to the idea of working in retirement. Rough estimates suggest that the ACA might reduce the number of reversals by between two and four percentage points, which would translate to 80,000 and 170,000 retirees annually. ACA may encourage the opioid use disorder treatment utilization. Meinhofer and Witman (2018), exploiting cross-state variation in effective dates of Medicaid expansions under the Affordable Care Act and find that aggregate opioid admissions to specialty treatment facilities increased 18% in expansion states, most of which involved outpatient medication-assisted treatment (MAT).

3.2.4. Advantageous Selection

The classical model of insurance demand proposed by Rothschild and Stiglitz (1976) asserts that individuals with higher expected claims buy more insurance than those with lower expected claims. This phenomenon is also called adverse selection since insurance providers hope all insurance buyers should have the same chance to incur insurance covered incidents so that insurance companies can be profitable. This model is continuously updated and enhanced (Stiglitz, Yun, and Kosenko, 2017). The adverse selection is confirmed by some insurance markets such as acute health insurance and annuity markets. However, as summarized by Cutler, Finkelstein, and McGarry (2008), some markets show either no selection or the opposite, advantageous selection; those with lower risk of insurance covered outcomes have higher insurance coverages. These include life insurance, long-term care, and Medicap markets. A Medigap policy is health insurance sold by a private insurer to fill "gaps" in coverage of the basic Medicare program (e.g. co-pays, prescription drugs). The Medicare program, as part of the social security system, provides limited health insurance for U.S. senior citizens.

Fang, Keane, and Silverman (2008) have documented advantageous selection in the Medigap insurance market and also explored its sources. They find that after controlling for health, Medigap holders spend more than medical care holders, which is considered as the evidence of advantageous selection. Sources of this advantageous selection include income, education, longevity expectations, and financial planning horizons, as well as cognitive ability.

Cutler et al. (2008) believe determinants of insurance products holding and expected insurance claims are not the same. They use risk tolerance, proxied by risky behavior variables, to explain the association between the aforementioned two factors. They find evidence to support both adverse selection and advantageous selection but for different markets. They suggest that policy makers may consider possibilities of both concepts when making policies for different insurance markets.

The concept of advantageous selection continues to receive support from recent research. Using a linked data set based on the Medicare Current Beneficiary Survey data for 2003–2004, Li and Trivedi (2016) conducted analyses using a Bayesian econometric framework and the presence of both adverse and advantageous selections in the supplemental insurance market. Corea (2017) shows that in some European insurance markets, the low risk profile agents buy more insurance, supporting the concept of advantageous selection.

Han and Lavetti (2017) show evidence that the introduction of Medicare Part D provides a mechanism for Massachusetts plans to increase selection, and that consumers have responded, increasing its market shares among beneficiaries taking drugs associated with the strongest advantageous selection incentives. Soika(2018) provides evidence of advantageous selection in the individual long-term disability insurance market and identify residential location as one source of advantageous selection.

Sloan, Robinson and Eldred (2018) examine automobile insurance policy choice using consumer behavior data and find a zero correlation between ex post accident risk and insurance coverage, reflecting advantageous selection in policy choice offset by moral hazard.

Briand and Lesueur (2019) show that the ex-ante moral hazard effect is, in reality, driven by (non-rational) individuals' preferences when the non-rationality assumption is considered. In addition, the prevention program encourages both self-protection effort and long-term care insurance purchase: advantageous selection.

Using a laboratory experiment, Ali, Mihm, Siga, and Tergiman (2019) investigate the degree to which individuals account for adverse and advantageous selection. They find subjects account for adverse selection to a greater degree than they account for advantageous selection. In addition, they find that a sizable fraction of subjects who do not behave according to predictions are in fact able to understand selection effects but do not apply that knowledge. These results suggest the coexistence of both adverse selection and advantageous selection.

3.3 Borrowing

Based on the traditional economic theory, consumers have an expected consumption level over the lifecycle. One major life goal is to smooth consumption. If income levels are unstable, borrowing should be used to smooth consumption. From this perspective, credit access is an indicator of financial wellbeing. The more sources to borrow, the better for consumers. However, borrowing cannot be overextended; if so, consumers will have heavy financial burdens and the worst case is financially insolvent and bankrupt. To measure debt related wellbeing, several financial ratios are used such as income to debt ratio (also called leverage rate) and income to debt payment ratio. Some ratios are used to measure debt related financial difficulties such as income to debt payment ratio over 40%, late in debt payment for 60 or more days, etc. (Bricker,Dettling, Henriques, Hsu, Jacobs, Moore, Pack, Sabelhaus, Thompson, and Windle, 2017). Different types of debts may have different meanings for consumers with different characteristics such as family structures (Xiao and Yao, 2020). Consumer loan defaults are associated with family lifecycle stages (Xiao and Yao, 2014).

Research on debt holding and subjective wellbeing is emerging. The general finding is that debt is negatively associated with happiness (Tay, Batz, Parrigon, and Kuykendall, 2017). Data from China also show similar results (Liu, Zhong, Zhang, and Li, 2020; Xiao, Zhang, and Li, 2019; Xiao, Yan, Bialowolski, and Porto, 2020). Research also shows that debt types and sources may have differential effects on happiness.

Debt can be divided into secured and non-secured debts. Mortgage is the major, secured debt type for many consumers in many countries. Consumers can also borrow from non-secured debts such as credit card, education, and high costly loans. The following are some topics regarding consumer borrowing behavior.

3.3.1 Choice of Optimal Mortgage Decision

Mortgage is the most important debt borrowed by households but its research from the household perspective is limited. Two types of mortgages are common among developed countries, fixed-rate mortgage (FRM) and adjustable-rate mortgage (ARM). The study by Campbell and Cocco (2003) is the first to examine choice of optimal mortgage decisions. Using a lifecycle model, they consider many factors such as inflation, uncertainty of real interest rate, borrowing constraints, labor income risk, possibility of moving, etc. Based on their analyses, choosing FRM, families are facing wealth risk. Even during the time with stable inflation, families need to pay high interests. Choosing ARM, families are facing income risk. During the time of high inflation, families need to pay for the interests and reduce consumption due to borrowing constraints. ARM exposes families in front of the change of real interest

rates while FRM may protect families from it. Using the U.S. data, they solve for a numeric solution. The results show that families that have high mortgage to income ratios, fluctuating labor incomes and risk aversion attitude will be affected more by income risk and should choose FRM. Conversely, if families are affected more by wealth risk, they should choose ARM. For families that are likely to move and with borrowing constraints, the optimal mortgage contract should be ARM. However, the interest rate difference between FRM and ARM could be used for the reference indicator. If the current rate difference is very small, the short term interest rate is very high and in the future it will decrease, families should choose FRM.

Koijen, Van Hemert, and Van Nieuwerburgh (2009) have constructed a two-period model to examine the rule of family choice of mortgage contracts. This model suggests that if the difference between ARM risk and FRM risk is smaller than long term bond risk premium, families should choose ARM. Otherwise they should choose FRM. Their empirical analyses show that long term bond risk premium can explain 80% of ARM shares. A later research (Badarinza, Campbell, and Ramadorai, 2018) has also confirmed this result. Using international comparison data, they find that under borrowing constraints, family decision on mortgage contract choice is not based on the spread between the FRM rate and the current ARM rate but the spread between FRM rate and the average rationally expected ARM rate over the next year. Considering country differences in mortgage contract systems, inflation environment and family risk taking attitudes, these models provide some explanations for heterogeneity of mortgage markets across countries.

3.3.2 Refinance Decision

Refinancing is a complicated decision that also affects family welfare. If holding an FRM contract without early payment penalty and interest rates are decreasing, refinancing is beneficial for families. However, many families respond slowly and sluggishly when opportunities come (Campbell, 2006). Research also shows some families have refinanced too early (Agarwal, Driscoll, and Laibson, 2000). "Too early" is defined as the refinance interest rate is lower than the best refinance interest rate difference's 75%. Based on this definition, at least one fourth of families are "too early refinancer".

What is the best refinance interest rate? Traditional mortgage advisors' rule of thumb is: present value of refinance saved interests>= cost of doing refinancing. But Agarwal, Driscoll, and Laibson (2013) argue that is not the optimal rule. The formula they use is: present value of refinance saved interests >= refinancing costs+ the difference between an old "in-the-money" refinancing option and a new "out-of-the-money" refinancing. Based on this definition, they conclude that the optimal refinance interest rate difference is negatively related with the current mortgage size and positively associated with moving and other external factors that result early full payment rate, fluctuation of mortgage interest rates, cost of refinancing, family marginal tax rate, etc. They estimate that for a family with $100,000 and $500,000 mortgage, the optimal refinancing interest rate difference should be 193 and 118 base points, respectively. For comparison, the rule of thumb's best interest difference is 76 and 33 base points. If interest rates decrease to a point lower than the optimal refinancing interest rate difference and families have not done refinancing, then this is the financial mistake made by families. Campbell (2006) shows characteristics of refinancing families that have higher education level, richer, higher home value, younger, and with smaller family size. Using Danish data, Andersen, Campbell, Nielsen, and Ramadorai (2015) have compared Woodhead (no response to refinancing opportunities) and cool-head (respond fully to refinancing opportunities) and find similar results to Campbell's.

3.3.3 Mortgage Default

Mortgage defaults have serious consequences at micro- and macro-economic levels. First, it will result in foreclosure, affecting family life badly and also precluding families from the financial services to lower future living standard. Second, it will generate negative externalities, lowering housing prices in local communities (Campbell, Giglio, and Pathak, 2011). Third, it will bring negative shocks to mortgage issuing financial institutions. These factors together will result in economic crises, and in turn more defaults, and the whole economy is in a vicious spiral.

Guiso, Sapienza, and Zingales (2013) assert that foreclosure involves both monetary costs (relocation, uncertain future interest rates) and non-monetary costs (reputation, psychological cost of engaging in unethical behavior). Social contagion is another factor. Determinants of default decisions are three: the size of the shortfall, the pecuniary and non-pecuniary costs of defaulting, and the option value of not defaulting today. They find when the shortfall value of a negative equity reaches $50,000, 8.9% of families will strategically default. When the value reaches $100,000, 23% of families will do so.

Campbell and Cocco (2015) have constructed a model to emphasize the importance of borrowing constraints in mortgage default. Their analyses show that the level of negative home equity that triggers default depends on the extent to which households are borrowing constrained. The stronger the borrowing constraints, the stronger the desire to remove the financial burden, the sooner the default behavior. When inflation and interest rates are high, ARM owners are likely to default. Otherwise, FRM owners are likely to do so.

3.3.4 Non-Secured Debt Borrowing Decision

3.3.4.1 Credit Card Debt

Using credit card debt may improve household welfare. However, researchers find that many families hold both large amount of credit card debts with high interest rates and liquid assets with low interest rates, which is called "credit card debt puzzle" by Telyukova (2013).

Lehnert and Maki (2007) explain that this kind of family may be on the verge of bankruptcy and credit card debt borrowing is a strategic behavior for preparing for bankruptcy. This view cannot explain why many families have both financial and nonfinancial assets. Bertaut, Haliassos, and Reiter (2009) propose another explanation, the hypothesis of control power. They argue that families use credit card debt to control themselves or their spouse' consumption, but this theory's explaining power is limited since families can use lowing credit card borrowing limits to achieve the same goal.

Telyukova (2013) propose a hypothesis of liquidity demand that has a stronger explaining power. She divides commodities to two categories, cash-only goods and cash-or-credit goods. In her model, families are facing two specific risks, income shock and uncertainty of liquidity expenditure. Based on her estimation, her model can explain 44-56% of household liquid asset. For a median family, the explaining power is 100%. For families with appropriate borrowing constraints, the explaining power is 100%. Her model suggests that the fundamental cause of credit card puzzle is the uncertainty of liquid expenditure. Half of household liquid assets are for precautionary purposes.

3.3.4.2 Payday Loan

This kind of loan usually has small size and short term, less than $1,000 with a term of 1-2 weeks. The fee is 10-20% of the loan size, and its annualized interest rates can be 260-1040%. In 2010, 12 million American families used payday loans.

Research finds its high interest rates hurt families a lot. Carrell and Zinman (2014) have examined payday loan using data collected among American Air Force personnel and find using payday loans can result in significant decreases of workers' performance and status and increases of undesirable behavior. This effect is stronger among those with no experience and low financial sophistication. Skiba and Tabacman (2019) have explored if payday loan users only use the loan to solve current cash flow difficulties, without considering the high interest burden. Their hypotheses are supported by loan level regulation administrative data. They find that using payday loans may make users more likely to file bankruptcy since this kind of loan has damaged family cash flow.

Why do families want to borrow payday loans? Agarwal, Skiba, and Tobacman (2009) find that 2/3 payday loan users at their first applying for payday loans, have credit card line of over $1,000, which is greater than a typical payday loan size $300. If borrowing from credit card, they may save some money. Also they find payday loan borrowers' credit card line decreased during the year. They conclude that inpatient and inappropriate financial management behavior and continuing income shocks may be the reason for families to borrow payday loans. Campbell (2016) argues that payday loan users are usually financially illiterate, cannot understand the connections between fees and annualized interest rates and underestimate borrowing costs, which belongs to financial decision mistakes. Bhutta, Skiba, and Tobacman (2015) agree that these families lack financial knowledge but do not think they are making financial decision mistakes. They find that almost 80% of payday loan applicants have no credit card lines; 90% of applicants have credit card line under $300. These facts show that payday loans are the last resort for people who need to borrow.

3.4. Saving/Investing

From an economic perspective, saving and investing are the same that is the difference between income and expenditure. For consumer saving behavior research, researchers studied saving motives (Xiao, 2015; Yao, Xiao, and Liao, 2015), risk tolerance (Grable, 2016), and retirement saving adequacy (Hanna, Kim, and Chen, 2016), etc. From the perspective of finance, consumer investing includes three aspects, participation in risky asset market, choice of investing portfolios, and asset allocation over the lifecycle.

3.4.1 Participation in risky asset market

Many households, even some of them are rich, do not participate in risky asset markets, which is called the "participation puzzle." Based on the standard economic theory, except for those who are extremely risk averse, most consumers should hold certain portions of risky assets in their investment portfolios. Research shows that several factors ignored by the standard economic theory may be important to understand the puzzle, which are fixed participation cost, background risk, habit, consumption commitment, and demographics.

Fixed participation cost refers to learn and gain basic knowledge about market rules and information to participate and related monetary and time costs. Opening an account also needs to pay a fee. These can be barriers for consumers especially those with lower net worth. Using the U.S. data, research shows that $50 one-time cost can explain half of the households' nonparticipation and $260 one-time cost can preclude three fourths households from participation (Vissing-Jørgensen, 2002).

Background risks include individual factors that cannot be removed through diversification such as human capital, housing asset, and family business. Human capital can result in labor income, a major income source for most consumers. But human capitals are hard to trade. Research shows that labor income is not related or weakly related with the return of stock markets. Then labor income is considered risk free asset, crowding out the household risk free asset and increasing demand for risky assets (Campbell and Viceira, 2002). Housing asset is the most important asset for most consumers but seldom used to trade for income or wealth shock. Research shows that young and poor consumers want to buy houses, so that they are less likely to buy stocks (Cocco, 2005). Chinese data shows that housing investment affects stock market participation (Wu and Qi, 2007). Renting or owning a house also affects stock market participation. Renters tend to buy more stocks and homeowners tend to buy fewer stocks (Yao and Zhang, 2005). Owning a family business may reduce the portion of stock investment if their business value is high in net worth (Heaton and Lucas, 2000).

Habit forming is not based on the current consumption level but on the average consumption level and it is exogenous. If the current consumption is close to the level of habit, consumers are less likely to invest in stocks (Campbell and Cochrane, 1999). Using data from Sweden twins, researchers estimate that present value of continuing habit, on average, accounts for one sixth of asset value and for the poorer, the value is higher, which is negatively associated with the ratio of household risky asset holding (Calvet and Sodini, 2014).

Consumption commitment refers to the situation where consumers spend on high transaction costed and seldom adjusted products such as housing and cars so that they are hard to respond to income shocks. Researchers find that when facing medium shocks such as unemployment, over 50% of American households will keep the spending level (Chetty and Szeidl, 2007). Buying a house will reduce stock investment because of consumption commitment (Chetty and Szeidl, 2017). To some degree, consumption commitment is similar to habit formation (ChettyandSzeidl, 2016).

Demographics such as age, gender, race, family structure, and education can affect consumer risk preference and risky market participation. Age is negatively and education is positively associated with stock market participation (Campbell, 2006). Swedish data shows that family size is negatively associated with risky market participation (Calvet, Campbell, and Sodini, 2007). The higher the financial sophistication measured by income, asset, and education, the higher the risky market participation (Calvet, Campbell, and Sodini, 2009). Chinese data shows that education and income are positively associated with stock investment but age is not (Wang and Tian, 2012; Yin, Song, and Wu, 2014), which is different from findings using data from developed countries.

3.4.2 Investment Portfolio Selection

One principle of standard investment theory is diversification in portfolios. In a portfolio without fully diversification, unsystematic risks exist that will not receive risk return from the financial market. However, many individual investors do not follow this principle and make following mistakes: very few households hold stocks; when they invest, they show home bias, local bias, and industry bias. Many of them hold more than needed shares of stocks of their own company (own-company bias, Lai and Xiao, 2011). Researchers attempt to understand this investing behavior from following aspects.

Investing mistakes. Using Swedish data of household investing portfolios, researchers find that over 50% of risks are from unsystematic risks that implies Swedish households are under-diversified in their investing portfolios (Calvet et al. 2009). Based on their estimation, for a median household, the loss in terms of Sharpe Ratio (a measure of base market portfolio) is one third. They also find that the lower level of financial sophistication of a household, the greater the loss of Sharpe Ratio.

Information. Asymmetric information may be a factor of under-diversification. Researchers assume that investors have limited information processing ability, they can only fully use information from local companies that result in local bias (Van Nieuwerburgh and Veldkamp, 2009). Familiarity is another possible factor since investors are more likely to purchase stocks they are familiar with. For individual investors, energy and time are limited, full information is hard to obtain, and attention is a scarce resource. They are more likely to notice attention-grabbing stocks that results in under-diversification (Barber and Odean, 2008).

Non-standard preference. Some investors view investment as consumption and invest based on their consumption tastes that may results in under-diversification (Fama and French, 2007). Using Finnish data, researchers find that consumption experience may affect investment behavior (Keloharju, Knüpfer, and Linnainmaa, 2012). Based on their research, investors are more likely to buy and less likely to sell stocks of companies they buy cars from often.

3.4.3 Strategic Asset Allocation

The standard investment theory predicts that there is an optimal risky asset portfolio. Suppose the optimal ratio of stock to bond shares is 4:1, then all investors, aggressive or conservative, should hold it. However, research shows that among conservative investors, the bond share is usually high and stock share is low. The situation is opposite in aggressive investors, which is called "asset allocation puzzle" (Canner, Mankiw, and Weil, 1997). To explain the puzzle, researchers propose that the investment horizon may be the key. Standard theory only considers a single period investment but in reality, investors consider a long term even the whole life cycle for investment (Campbell and Viceira, 2001). Long term investment among asset classes are called strategic asset allocation. Researchers attempt to address this issue from two aspects.

3.4.3.1 Time-Varying Investment Opportunity Set

To address the strategic asset allocation issue, Merton has proposed a two-asset optimal choice model (1969) and three-fund separation model (1973). However, Merton's theory is abstract and does not specify the hedge portfolio, so that it limits its applications in practice.

Campbell and Viceira (2001) extend Merton's theory and obtain a numeric solution of the intertemporal optimal asset allocation equation. Based on their theory, single-period asset allocation and multi-period asset allocation are totally different. When stocks, bonds and other classes of assets exist, the share of bonds to stocks will increase with the level of risk aversion. In their later study (Campbell and Viceira, 2002), based on the revised theoretical model and the U.S. data, they find that when inflation-indexed bonds exist, all risk averse investors' hedging demands for long term nominal bonds are negative. When relative risk aversion is greater than 1, investors' hedging demands for stocks are positive, suggesting multi-period stock allocation is higher than the single-period stock allocation. These findings suggest that from a long term, money market funds are no longer risk free assets; hedging demands result in heterogeneity of investor optimal asset allocation; investors prefer inflation-indexed bonds in asset allocation and treat it as risk free asset in a long term.

3.4.3.2. Lifecycle Model

For long term, labor income should be considered in the asset allocation model. Merton (1975) proposed a model suggesting that if labor income is positive, the ratio of risky asset allocation will decrease with the increase of age, the decrease of labor income net value, and its ratio to financial asset value. Campbell, Cocco, Gomes, and Maenhout (2001) consider a more general situation in which labor income is uncertain. They construct a theoretical model and use the US's Panel Study of Income Dynamics (PSID) data to solve for a numeric solution. They find that among most households, labor income and stock return rate are weakly correlated. For young households, even they face borrowing constraints and have huge human capital equivalent to holding large amounts of risk free bonds, they should invest all of their limited financial assets to risky markets. In the later stage of lifecycle, because of the decrease of human capital and increase of financial wealth, the attractiveness of risky assets is decreasing. Because different education levels and employment types face different labor market shocks, household optimal asset portfolios are heterogeneous. For example, self-employed and business owning families may face the larger income shocks, and they will hold less risky assets. In addition to risk attitude, time preference may also affect optimal asset portfolios. Present biased households may save less, then financial risk is not as important as income risk, then they may be more risk taking in investment.

Research using Swedish panel data shows that investors who are older, have more financial assets and real estate assets, have lower leverage rates, and have lower income and human capital risk are more likely to invest in value stocks. Those with their own businesses and higher education levels are more likely to invest in growth stocks. Women are more likely than men to invest in value stocks. During the lifecycle, along with the investing time, the increase of financial wealth, and the decrease of human capital, households will go through the value ladder, from investing growth stocks transition to value stocks. In general, 60% of the change is attributed to the increase of age, 20% the increase of financial wealth, and 20% the decrease of human capital (Betermier, Calvet, and Sodini, 2017). Research using Chinese data show mixed evidence. Some research asserts that the lifecycle investment effect is insignificant (Wu and Qi, 2007) but other research shows it is existing to some degree (Wu, Yi, and Zheng, 2010).

4. Other Relevant Topics

4.1 Relevant Datasets

In the U.S., the commonly used datasets in consumer finance are the Survey of Consumer Finance (SCF) (https://www.federalreserve.gov/econres/scfindex.htm), National Financial Capability Study (NFCS) (http://www.usfinancialcapability.org/), Panel Study of Income Dynamics (PSID) (https://psidonline.isr.umich.edu/), Health and Retirement Study (HRS) (http://hrsonline.isr.umich.edu/), and National Longitudinal Study of Youth (LSY) (https://www.bls.gov/nls/nlsy97.htm). SCF is a triennial survey sponsored by the U.S. Federal Reserve Board. Occasionally it also sponsors panel studies (Hanna, Kim, and Lindamood, 2018). NFCS is a triennial survey sponsored by the FINRA Investor Education Foundation and started in 2009. PSID is a long time panel study started in 1968, sponsored by several Federal agencies and administrated at the University of Michigan. Later its researchers surveyed children of the original respondents and formed two more panels, Child Development Supplement and Transition to Adulthood. HRS, sponsored by the National Institute of Health, is a biennial longitudinal panel study of over 26,000 Americans that is representative of the United States' population over the age of 50.NLSY is a panel study sponsored by the U.S. Department of Labor and surveyed a national sample of 12-16 year's old in 1996.

In China, the commonly used datasets include China Consumer Finance Survey, China Household Finance Survey, and China Family Panel Study (CFPS). China Consumer Finance Survey has been conducted by researchers at Tsinghua University since 2009 and later they cooperated with China Family Panel Study (CFPS), a longitudinal data set starting in 2010 conducted at Peking University (Xie and Hu, 2014). In 2014, CFPS researchers contributed a financial literacy module in the CFPS (Chu Wang, Xiao, and Zhang, 2017; Liao, Xiao, Zhang, and Zhou, 2017). China Household Finance Survey started in 2011 by researchers at Southwestern University of Economics and Finance and has been continuing every two years for collecting panel data ever since (Gan,Yin, Jia, Xu, Ma, and Zheng, 2014).

4.2 Fintech and Consumer Finance

Fintech is a buzzword in finance research recently. To encourage research in this emerging topic, *Review of Financial Studies* used a new approach, registered research, to encourage researchers to write on this emerging topic. They solicited paper proposals, conducted two paper discussing workshops, and finally published a special issue in 2019. The scope of Fintech starts from mobile payments, money transfers, peer-to-peer loans, and crowdfunding, spreading to the newer world of blockchain, cryptocurrencies, and robo-investing, as described by Goldstein,Jiang, and Karolyi (2019), guest editors of the RFS special issue. Among ten papers published in that special issue, four are about blockchain, four about financial service, and two about big data.

Big data or alternative data may bring new insights to consumer finance. Using data on patent filings from 2003 to 2017, Chen, Wu, and Yang (2019) apply machine learning to identify and classify innovations by their underlying technologies and find that most FinTech innovations yield substantial value to innovators, with blockchain being particularly valuable. For the overall financial sector, internet of things (IoT), robo-advising, and blockchain are the most valuable innovation types. Using alternative data such as consumer transactions and satellite images, Zhu (2019) shows two effects on investing

managers: managers reduce their opportunistic trading and investment efficiency increases, consistent with price informativeness improving managers' incentives to invest and divest efficiently.

Blockchains are distributed ledgers, operated within peer-to-peer networks. Researchers start to examine various aspects of blockchain in finance. Biais, Bisière, Bouvard, and Casamatta (2019) present the blockchain fork theorem where they model the proof-of-work blockchain protocol as a stochastic game and analyze the equilibrium strategies of rational, strategic miners. Chiu and Koeppl (2019) discuss benefits and costs of blockchain being applied in settlement for asset trading. Cong and He (2019) discuss how blockchain can be applied in smart contracts and what are implications for antitrust policies. Foley, Karlsen, and Putniņš (2019) document how cryptocurrencies finance illegal markets worldwide. Blockchains have potential to be applied in four functions in consumer finance that will change the market fundamentally.

FinTech has changed the lending industry. Using loan-level data on mortgage applications and originations, Fuster, Plosser, Schnabl, and Vickery (2019) show that FinTech lenders process mortgage applications 20% faster than other lenders, controlling for observable characteristics. FinTech lenders adjust supply more elastically than other lenders in response to exogenous mortgage demand shocks. In areas with more FinTech lending, borrowers refinance more, especially when it is in their interest, with no evidence that FinTech lenders target borrowers with low access to finance. Online peer to peer (P2P) lending has changed the traditional role of financial services and consumers have opportunities to play the role of either lenders or borrowers. Researchers have examined the overall impact of P2P lending, the impact on supply side and the impact on demand side, which are demonstrated by recent studies. Using a regulatory change as an exogenous shock to bank credit supply and American data, Tang (2019) finds that P2P lending is a substitute for bank lending in terms of serving infra-marginal bank borrowers yet complements bank lending with respect to small loans, which suggest that the credit expansion resulting from P2P lending likely occurs only among borrowers who already have access to bank credit. Han,Xiao, andSu (2019) use Chinese data to explore factors affecting consumer use of P2P borrowing and find that financing knowledge and risk attitude are two key factors associated with P2P borrowing. Chen, Jiang, and Liu (2018) use Chinese data to study whether there is gender difference in P2P loan investors evaluating loan performance and find that loans invested by female investors are more likely to default and have lower loan return in the future than loans invested by male investors. However, female investors perform similarly to male investors in abnormal default or abnormal loan return when investors have high levels of education or income or when investors work in finance or information technology industries. Using novel investor-level data, Vallee and Zeng (2019) find that sophisticated investors systematically outperform, and this outperformance shrinks when the platform reduces information provision to investors.

Robo-advising may help improve consumer wellbeing as demonstrated by research. D'Acunto, Prabhala, and Rossi (2019) study the introduction of a wealth-management robo-adviser that constructs portfolios tailored to investors' holdings and preferences and find that ex ante undiversified investors increase stock holdings and hold portfolios with less volatility and better returns, while already well-diversified investors hold fewer stocks, yet see some reduction in volatility, and trade more after adoption. Also, adopters exhibit declines in prominent behavioral biases, including the disposition, trend chasing, and rank effect.

Researchers have also discussed dark sides of fintech based financial innovation at both macro and micro level. At the macro level, financial innovation has positive net effect on economic growth: financial innovation is associated with higher growth in countries and industries with better growth

opportunities. The "dark" side of greater risk taking is that it significantly increases the banks' profit volatility, their fragility and their losses during a banking crisis based on a study with data from 32 countries (Beck, Chen, Lin, and Song, 2016).

Three dark sides of financial innovation are identified. First, the marketisation of financial assets is increasing and the benefits of marketisation are often oversold. Further, financial innovation could be used in predatory schemes or could be misused to further self-interested and anti-social motivations. Finally, financial innovation correlates with increased systemic risk for the financial and economic systems because of it causes more credit creation, more complexity, and more marketisation (Chiu, 2016). There seem to be many occasions where structured equity products are significantly overpriced in order to extract money from investors who do not fully understand the alternatives to what they were buying (Allen, 2012).

The negative effects of financial innovation are also categorized as (1) predatory schemes (2) abuse of financial innovation and (3) unintended consequences of financial innovation (Diaz-Rainey, and Ibikunle2012). Anecdotal examples of these dark sides of fintech based financial innovations can be seen in areas closely related to consumer wellbeing such as P2P lending/borrowing, robo-advising, and online investing.

4.3 Financial Literacy and Financial Capability

In the research literature, financial literacy and financial capability are used in the exchangeable way. Financial literacy originally refers to basic knowledge of finance needed for life. Later, the term refers to not only knowledge but also application of knowledge (Huston, 2010). Financial literacy also refers to consumer ability to make optimal financial decisions (Lusardi and Mitchell, 2014). Financial capability is defined in various ways by researchers. The broadest definition of financial capability refers to consumer financial knowledge, habit, status and access (Lin, Bumcrot, Ulicny, Lusardi, Mottola, Kieffer, and Walsh, 2016). Social work researchers consider financial capability not only includes individual ability (knowledge and behavior) but also environment (if environments provide access to financial resources) (Johnson and Sherraden, 2007). Consumer science researchers define financial capability as consumer ability to apply appropriate knowledge and perform desirable financial behavior to achieve financial wellbeing (Xiao, Chen, and Chen, 2014).

Research on consumer financial literacy and capability is driven by both theoretical and practical factors. The traditional economic theory assumes consumers are rational agents who are fully informed and able to make optimal decisions over a long time period (Modigliani, 1986; Friedman, 1957). However, numerous research studies show that consumers do not behave as the standard economic theory describes, who are irrational with many behavioral biases that are not predicted by the standard economic theory. The movement of increasing consumer financial literacy and capability is to move consumers from behavioral agents to rational agents in some way (Campbell, 2016). Practically, socioeconomic environments require more individual responsibilities for consumers to ensure their current and future economic securities. For example, in the U.S., the Social Security system is insecure, more companies changed from traditional defined benefit retirement pensions to defined contribution retirement plans, which require their workers to take care of their long term savings for retirements. The increasing credit markets and innovations driven by information technologies provide consumers

newer and diverse financial products in credit markets, which requires consumers to have better control of their impatience and avoid being trapped by heavy debts.

Driven by the movement of promoting consumer financial capability, many countries proposed national strategies to provide financial literacy education to consumers. In the U.S., many states start to mandate financial education in high schools (Walstad, Urban, Asarta, Breitbach, Bosshardt, Heath, O'Neill, Wagner, and Xiao, 2017). Research on financial education has two important questions to answer: whether or not to offer financial education and if financial education is effective. Some scholars argue that many financial products in marketplaces are complex and ordinary consumers cannot understand and then purchase them appropriately. Thus, governments should allocate more resources to regulation instead of consumer education (Willis, 2011). Some studies show that financial education has little effect on financial behavior (Fernandes, Lynch, and Netemeyer, 2014). However, later studies show state mandates of high school financial education have positive effects on borrowing behaviors of these students in young adulthood (Brown et al., 2016) and exposures of financial education in high school, college, and workplace are positively associated with financial capability and financial wellbeing (Xiao and O'Neill, 2016; Xiao and Porto, 2017). Consumers received financial education are more likely to seek insurance advice (Xiao and Porto, 2010a) and financial counseling (Porto and Xiao, 2019).

Besides financial literacy/capability, other relevant concepts are also proposed. Ståhl, Karlsson, Sandqvist, Hensing, Brouwer, Friberg, and MacEachen (2019) propose a concept, social insurance literacy, which concerns how well people understand the different procedures and regulations in social insurance systems, and how well systems communicate with clients in order to help them understand the system. Based on reviewing five related concepts, they defined social insurance literacy as the extent to which individuals can obtain, understand and act on information in a social insurance system, related to the comprehensibility of the information provided by the system.

4.4 Other Topics in Consumer Finance

Other topics in consumer finance include demographics, human development, and family relations. Financial issues of special populations such as children, youth, young adults, older adults, women, low income families, business owning families, racial or ethnic minorities (e.g. black, Hispanic, Asian Americans), military families, and workers have various needs and demands in financial products and services that need to be given attention by researchers and policy makers. In terms of human development, topics such as financial socialization (how children learn financial knowledge, perform desirable financial behaviors, and gain financial capability), financial literacy education (to increase human capital in financial management), financial development (how young adults transition from financially dependence on parents to financial independence) are studied (Shim, Xiao, Barber, and Lyons, 2009; Shim, Barber, Card, Xiao, and Serido2011; Xiao, Tang, and Shim, 2009; Xiao, Tang, Serido, and Shim, 2011). In terms of family relationships, how money management and financial behaviors affect parent-children relationships, and marriage formation, quality, and conflicts or vise versa, are studied. Reviews of research on these topics can be found in Xiao (2008, 2016). In addition, cultural and country differences in consumer financial behavior are also examined (Xiao and Fan, 2002; Fan and Xiao, Yao, Xiao, and Liao).

5. Conclusions

This overview paper uses consumer finance as a synonym of household finance. This paper proposes a broad definition of consumer finance. In terms of contents, consumer finance is similar to household finance, but covers more nontraditional financial topics. Household finance is commonly used by researchers in economics and finance. Consumer finance is usually used by researchers in business and consumer science.

This paper also presents the scope of consumer finance. Based on the framework outlined by Tufano (2009), we divide consumer finance research topics to four categories, consumer money managing behavior, insuring behavior, borrowing behavior, and saving/investing behavior. In addition, several relevant topics are also discussed such as relevant datasets in consumer finance, fintech and consumer finance, financial literacy and financial capability, and other topics in consumer finance.

Limitations of consumer finance research include the lack of theories, limited research on certain topics, and lack of diverse research methods. Even though theories in saving/investing are well developed and even widely recognized such as authors of several prominent investment theories received Nobel prizes, we still need theories on certain topics such as how to explain consumer borrowing behavior, insuring behavior, and payment choice behavior. Secondly, compared to rich literature in investing behavior research, we need more research in other aspects of consumer finance, such as consumer use of money management, insure, and loan products. Finally, most studies in consumer finance have used survey data. More start to use data from experiments and administrative sources. Studies using data from internet and other big data sources are still limited and appropriate analytic approaches are needed to examine these unique data.

Based on this critical review of the literature in consumer finance, we hope more research can be inspired and conducted in following directions: 1) More theoretical research can be conducted to better understand consumer money management, insuring, and borrowing behavior and their associations with consumer wellbeing. 2) More empirical research can be conducted to link consumer investing behavior with financial wellbeing. For example, under what circumstances, consumers should or should not participate in risky financial markets and do institutional backgrounds matter. Also, new issues faced by consumers need to be studied. For example, how to develop new mechanisms for encouraging investment advisors and robo-advisors to provide high quality decumulation services to their customers, because neither of the two prevailing compensation approaches – assets under management and commissions – provides sufficient incentive at present, and consumers are poorly equipped to evaluate the quality of decumulation services on their own (Baker and Dellaert, 2019). 3) More research can be conducted to examine the relationship between fintech and various consumer financial topics since fintech has changed the overall ecological environment of consumer finance in many ways. Many terms may be redefined to address new issues resulted from the development of fintech. Both bright and dark sides of fintech on welfare need to be researched to provide comprehensive information for government and business policy makers and individual consumers. 4) More research can be conducted on how to increase consumer financial knowledge and encourage them to perform desirable behaviors to achieve financial wellbeing. 5) More interdisciplinary research can be conducted to examine

associations between consumer financial topics and other noneconomic topics such as human development, family relations, cultural comparisons, and demographic trends. 6) More new analytic approaches appropriate for big data such as data collected from internet and other sources at large scales can be used. For example, studies using textual analyses for consumer finance research topics can be encouraged (Huang, Wu, and Yu, 2020).

Consumer finance is an emerging field that has many exciting and important research topics. More researchers from various disciplines, especially those in finance, can explore this field and produce more interesting results to benefit consumers, industries, and economies worldwide.

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