
A Behavioral-Pattern Driven Framework for Research on Financial Consumer Protection*

Man Cho[†]

ABSTRACT

This study attempts to advance the argument that targeting specific behavioral patterns serves as a value-adding complement to the rule- and principle-based consumer protection policies in financial markets. To that end, two particular optimization frameworks are specified to elaborate a set of suboptimal behavioral patterns that one can expect from demand- and supply-sides of the financial service sector: (1) a two-period (working age vs. retirement) intertemporal utility maximization framework for financial consumers; and (2) a profit (or net operating income per-period) maximization framework for financial intermediaries. Based on the models specified, a set of behavioral patterns to be tamed is identified and elaborated, and the research and policy agenda to nudge the consumers as well as the intermediaries to improve each behavioral pattern are discussed.

Keywords: Financial consumer protection, behavioral economics, and financial technologies (FinTech)

I. Introduction

Protecting consumers' rights and interests in the financial markets is a highly multi-dimensional policy issue and, as such, calls for interdisciplinary research that covers a wide range of relevant issues. In essence, it boils down to inducing two desired behavioral outcomes: informed and sound decisions by consumers in choosing financial products, and fair and ethical treatment of consumers by financial institutions (FIs) and their employees, despite the fact that their primary incentive is in profit making. The question is, how to do it effectively (i.e., to derive those outcomes)? Since the recent financial crisis ignited by the subprime mortgage debacle, a number of policy initiatives has been suggested and implemented, both at the national level (e.g., the Dodd-Frank Act of Wall Street Reform and Financial Consumer Protection in the U.S.) and at the multi-lateral level (e.g.,

World Bank, 2012; UNCTAD, 2015; FinCoNet, 2016; OECD, 2022).

It is fair to say that those suggested policy regimes for financial consumer protection (henceforth, FCP) are largely rule- or principle-based. For example, the World Bank (2012) proposes 39 rules, termed as "good practices," under the four themes of: (1) information provision (to financial consumers), (2) financial literacy and capability, (3) sales practices, and (4) conflict resolution mechanism. In a similar vein, G20/OECD jointly published ten high-level principles of FCP in 2012, which was recently revised (as discussed by OECD, 2022), by adding two new principles and three cross-cutting themes. Given this as a backdrop, this study attempts to advance the argument that targeting specific behavioral patterns serves as a value-adding complement to those rule- and principle-based consumer protection policies. That is, understanding the typical optimization processes of consumers as well as intermediaries

* This is an invited paper. An earlier version of the paper was presented at the 2024 Global Forum for Financial Consumers (GFFC) held at Cornell University on August 8–9, 2024.

[†] Emeritus Professor, KDI School of Public Policy and Management, South Korea

along with expected behavioral outcomes that deviate from them (i.e., suboptimal behaviors), and reflecting them in designing and implementing a FCP policy regime, would deliver a more effective outcome in deriving the afore-mentioned two behavioral outcomes.

To that end, two particular optimization frameworks are specified to elaborate a set of suboptimal behavioral patterns that one can expect from both the demand-side and supply-side of financing markets: (1) a two-period (working age vs. retirement) intertemporal utility maximization framework for financial consumers; and (2) a profit (or net operating income (NOI) per-period) maximization framework for financial intermediaries. Using the models as a base, eight specific behavioral patterns to be tamed are identified, for each of which the research and policy agenda to nudge the consumers and the intermediaries is discussed.

As eloquently put it by Shiller (2012), the core societal role of finance is to fulfill two functions (which he characterizes as “the science of goal architect”): namely, developing demand-driven financial products to enable households, firms, and governments to achieve what they intend to do so; and, managing underlying financial risks of those products in an efficient fashion. In this context, one can construe the essence of the FCP policy as in developing and selling the ‘right’ product to the ‘right’ customer (i.e., adequate and affordable product) and, in so doing, putting consumers’ interests first over the intermediaries’ (i.e., the fiduciary duty). But problems arise on both the demand-side and supply-side, requiring various nudging mechanisms to induce their behavioral patterns toward optimality. That is, the intermediaries can be abusive and predatory in trading financial products to raise their profit, a moral hazard problem that often exploits the lack of product information on the part of customers; and, the consumers tend to fall prey to biases, such as overconfidence, procrastination, and the influence of irrelevant information, as demonstrated by a burgeoning literature in

behavioral economics (e.g., Reuben et al., 2007; Thaler & Sunstein, 2008; WDR, 2015).

As another layer of complexity, the ongoing expansion of FinTech innovations (i.e., those platform/data/AI based alternative financial services) poses a challenge in implementing a welfare-enhancing FCP policy regime. These tech-based alternative services bring both benefits and costs to financial consumers, by offering faster, cheaper, and more convenient services on the one hand but by increasing the incidence of financial fraud and crimes on the other hand as surveyed by Cho (2025). In this rapidly changing environment, intermediaries and consumers alike must deal with a bigger challenge, i.e., delivering the demand-driven products through a safe business channel (by the former) and making financially and digitally savvy decisions (by the latter). The current study aims to contribute to identifying the research and policy agenda involved with this dynamic environment.

The rest of the manuscript consists of the following four sections: surveying the FCP policy regimes along with involved analytical and operational issues (Section II); discussing the two optimization frameworks, to identify and elaborate the suboptimal behavioral patterns to be tamed (Section III); discussing the research and policy agenda to target the suboptimal behavioral patterns identified (Section IV); and, providing concluding remarks (Section V).

II. The Current Regime of FCP Policies

The current FCP policy regimes are generally reliant on a set of rules and high-level principles, commonly termed as “good practices.” For example, the World Bank (2012) suggested 39 desired rules under four themes and the G20/OECD promulgated ten principles in 2012, such as (proper) legal, regulatory, supervisory framework, disclosure and transparency, protection of consumer data and privacy, and so on.³ Later, the OECD (2022) revised the list by

³ Those ten principles include: (1) legal, regulatory, supervisory framework; (2) role, powers, and capabilities of oversight bodies;

(3) equitable and fair treatment of consumers; (4) disclosure and transparency; (5) financial education and awareness; (6)

adding two new principles (access and inclusion, and quality financial products) with three cross-cutting themes (digitalization, sustainable finance, and financial well-being).

As another example, the Korean Congress passed the Financial Consumer Protection (FCP) Act in 2020, which identified six principles that financial service providers of all types (deposit, lending, investment, and insurance products) should abide by.⁴ The law combines some (not all) of the FCP rules in the sector-specific laws and attempts to apply “the same-function-same-regulation” principle: that is, service providers who engage in the same type of business activity should be regulated under the same set of rules and requirements. That approach represents a departure from the previous sector-specific regulations in Korea.

The rules and principles in the above policy regimes generally represent “soft,” rather than rigid, requirements, i.e., a guidance of desired policy FCP practices (Huh, 2020). As such, one can encounter a series of challenges when actually implementing them, some of which are discussed below.

First, financial consumers are heterogeneous with respect to various dimensions (in terms of lifecycle, endowment, financial literacy, and so on), which should be properly reflected in implementing FCP policies. Take the suitability principle in Table 1 as an example, which stipulates that “financial companies shall consider consumers’ personal assets and investment experience or the purpose of the contract before recommending or advising a sale of financial products” (Huh, 2020). To implement that, a service provider has to properly profile consumers with respect to each of these dimensions, and, additionally, has to assess the extent of the product’s appropriateness by linking its risk-return characteristics to the consumers.’

As another example, the principle of the duty-to-explain requires a financial company to explain product details and other relevant information to the consumer, mainly to avoid an incomplete sale that can put the service provider legally liable if and when the principle is proven to be violated. However, consumers are highly variant in understanding product details, particularly if they are complicated (e.g., arcane investment and insurance products with complex risk-return attributes), and, hence, a proper implementation of the principle poses a challenge to the service provider as to how to design content and format of product information to make it more understandable by different consumer groups.

Second, even if sufficient information is provided in an understandable format, consumers are often not deliberate enough to use that to make a rational (or welfare-maximizing) decision (e.g., Reuben et al., 2007; Thaler & Sunstein, 2008; WDR, 2015). There are ample examples of such suboptimal decisions (e.g., those herd behaviors in the high-volatility investment sector such as cryptocurrencies, and the over-borrowing and over-consumption in some of the new lending sectors such as BNPL and P2P platforms).⁵

Third, the on-going expansion of FinTech innovations also poses a challenge for implementing the FCP-related rules and principles. Those new breeds of the tech-driven service providers are generally under-regulated in the first place, and are generally subject to a bespoke regulation (CCAF, 2020). For example, BigTechs, which are originally non-financial business entities, are rapidly spreading the tech-driven services in virtually all segments (payment, lending, investment, and insurance) in multiple countries, for which it is in an early stage for regulators to elaborate to come up with a proper regulatory regime (Cornelli et al., 2021).

responsible business conduct of financial services providers and authorized agents; (7) protection of consumer assets against fraud and misuse; (8) protection of consumer data and privacy; (9) complaints handling and redress; and, (10) competition.

⁴ Those principles include: (1) Suitability Rule; (2) Appropriateness Principle; (3) Duty to Explain; (4) Prohibition of

Unfair Business Activities; (5) Prohibition of Unfair Recommendation Activities; (6) Fair and Clear Advertising.

⁵ See Cho (2025) for a survey of the welfare implications of these new investment and lending products.

The advancement of FinTech innovations represent both gains and losses for financial consumers. In the positive side, the technologies offer more innovative products, reduce the cost of transacting them, and also increase the convenience. In addition, the availability of the BigData and Machine Learning (ML) based analytical capabilities that have been introduced during the last decade will be particularly useful for the intermediaries to enable their operations (e.g., consumer profiling, product development, and risk management). That is the data-trainable ML algorithms popularized from around 2012 (with the introduction of AlexNet used for face and object recognition) experienced another discrete leap since 2017 with a series of vastly-enhanced AI capabilities (i.e., ChatGPT and other Generative AI systems), which will offer great amount of online data as well as superior predictive powers for finance research (OECD, 2023). However, the rise of the tech-driven services also poses a challenge in terms of combating financial frauds and crimes such as identity theft, voice phishing, and other forms of consumer-targeting crimes. Hence, in designing a welfare-enhancing FCP policy regime, both positive and negative aspects of tech-driven alternative services should be factored in.

One premise adopted in this study is that targeting specific suboptimal behaviors, both on the demand-side and the supply-side of the financial services sector, will be a value-adding complement to the rule- and principle-based FCP policy regimes, by making them more effective in deriving the two desired behavioral outcomes – sound and informed decisions by the consumers, and fair and ethical treatment of consumers by FIs. In order to derive those behavioral patterns to be tamed, the next section elaborates how two transaction parties in financial markets—consumers and intermediaries—make their decisions within their respective (and simplified) optimization frameworks.

III. Optimization Framework

A. Consumers' Optimization Problem

A representative financial consumer maximizes a two-period intertemporal utility function

subject to a budget constraint, in order to smooth marginal utilities of consumption in both periods divided between working age and retirement age. Equations (1) and (2) show the setup, which follows the model put forth by Lusardi et al. (2017). Two choice variables are the second period consumption, a , which represents the saving in the first period, s , multiplied by an expected return factor on saving, R (hence, $a = R \cdot s$). R being one of the choice variables implies that the consumer makes a deliberate decision on financial products with varying risk-return profiles, both for borrowing and for investing.

$$\max_{a,R} u(c) + \beta u(a) \quad (1)$$

$$\text{s.t. } y - c - a/R = 0 \quad (2)$$

In the equations, c and β represent consumption in the first period and a discount factor (between the two periods), respectively. And it is assumed that the consumer earns labor income, y , only in the first period.

As demonstrated by Lusardi et al. (2017), the optimal consumption for the second period as a ratio to income (a^*/y) increases with y , but decreases with β and R . And, further, by solving a dynamic constrained utility maximization problem through a Bellman equation, the authors show that the more financially-literate (as indexed by three education levels – less than high school, high school, and college) the consumer, the better (or more welfare-enhancing) allocation of financial resource over the two periods is achieved. Wealth inequality increases across consumer groups as a result, with 30~40% of the inequality being accounted for by differences in financial knowledge.

Given this setup, three key decisions to be made on the demand-side are:

- Consumption-saving decision (between working age vs. retirement): How much to consume now (c) vs. future (a , hence $R \cdot s$)? As a related issue, what impact would a pension system in a given country have on that decision?

- Product choice decision, for investment: Where to put the saving to maximize a risk-adjusted return on s (if $s > 0$, i.e., the liquidity-surplus consumers), among a possible set of alternative assets (e.g., stock, bond, real estate, derivatives, and crypto-assets)?
- Product choice decision, for borrowing: Through what product(s) to borrow to finance the current consumption, c (if $s < 0$, by liquidity-deficit consumers⁶), among a possible set of loan products (differentiated by lending rates and other loan characteristics)?

One important argument advanced in the literature is that financial literacy (FL) matters in making all the above decisions. Being defined as consumer's knowledge of and ability to use fundamental financial concepts in their economic decision-making, those with a high level of FL tend to own loan products with more favorable conditions (Disney & Gathergood, 2011; Gathergood & Weber, 2017; Lusardi & Tufano, 2015; Agarwal & Yao, 2017), to have better outcomes from investment portfolios (Calvet et al., 2009; Agnew & Szykman, 2005; Bianchi, 2018), and to be better prepared for retirement (Lusardi & Mitchell, 2008). In consequence, as the argument goes, they can enhance their financial wellbeing, i.e., the state of an individual's financial situation in which they feel secure, satisfied, and confident about their present and future financial circumstances. In Korea as well, a number of studies document similar results in that the level of FL shows a positive and statistically significant impact on saving, investment, consumption, and preparation for retirement (Choi & Cho, 2011; Na & Choi, 2013; Lee & Jung, 2013; Yang, 2018). Furthermore, with a better understanding of financial markets and institutions, those with a high level of FL are also likely to be able to discern financial fraud better. (Anderson, 2016; Andreou & Philip, 2018; Engels et al., 2020; Li et al., 2021).

In a real-world setting, financial consumers face a series of uncertainties that make it difficult to make the above decisions in an optimal (welfare-maximizing) fashion. Four such uncertainty factors are sketched below – two from the setup in the above (the income, y , and the expected return, R) and two additional conditions (the borrowing constraint, and life expectancy). In particular, a consumer group (indexed by i) at time t has to deal with the following as additional conditions in their maximization process:

$$y_{i,t} = \mu(\Phi_{i,t}) + \varepsilon_{y,i,t} \quad (3)$$

$$R_{i,t} = r_t^f + RP(\theta_{i,t}, \Phi_{i,t}) + \varepsilon_{R,i,t} \quad (4)$$

$$L_{i,t} \leq L_{i,t}^{max}(U_{i,t}) \text{ (iff } s < 0) \quad (5)$$

$$m_{i,t}^e = E_{i,t}[\tilde{T}] \text{ } (\tilde{T} \leq \bar{T}) \quad (6)$$

As to the income (equation (3)), one has to deal with its uncertainty during the working age, whose intertemporal process can be divided into two components – (1) a serially-correlated part, $\mu(\Phi_{i,t})$, which is influenced by a broadly-defined human capital ($\Phi_{i,t}$ that reflects such factors as education level, career experience, and degree of financial literacy), and a stochastic part, $\varepsilon_{y,i,t}$. The expected return on saving (equation (4)), R , on the other hand, consists of three elements – (1) a risk-free rate, r_{t+1}^f ; (2) a risk premium to compensate the extent of investment risk borne by certain asset class(es), $RP(\theta_{i,t}, \Phi_{i,t})$, which also reflects the human capital (assuming it is correlated with the level of savviness in choosing alternative assets) and the extent of risk-aversion; and, (3) a stochastic term, $\varepsilon_{R,i,t}$. Measurement of RP should incorporate its usual determinants, i.e., mean-variance of return to holding a particular asset,

⁶ In a theoretical sense, the liquidity deficit consumer (i.e., those with $s < 0$) is not exactly in scope of the model laid out. For simplicity, I will assume that that group of consumers will decide

between choosing suboptimal current consumption vs. achieving that through borrowing.

correlation across different asset classes, and other market- and product-driven risks (e.g., economy-wide systematic risks as well as product- or intermediary-driven idiosyncratic risks).

The borrowing constraint (equation (5)) limits the type and amount of leverage for those with liquidity deficit to finance their current consumption, c_t , for both durable and non-durable goods and services. In a simplistic fashion, it is specified as the maximum loan amount that consumer i at time t can obtain, $L_{i,t}^{max}(U_{i,t})$, which is determined by a set of underwriting criteria (in particular, caps on LTV, DTL, and consumer credit score). Those lending conditions also vary over time, as shown by the cyclical lending patterns of certain intermediaries. Finally, life expectancy is another uncertainty factor for a consumer to deal with, which is simply shown as the maximum age expected at time t , $E_t[\tilde{T}]$.⁷

Heterogeneity among financial consumers is another important factor to be considered in analyzing demand-side decisions. As demonstrated in the FL literature, they can be differentiated with respect to the level of financial knowledge and ability (e.g., the education levels as employed by Lusardi and Mitchell (2023)). In addition, consumers are different in terms of how risk averse they are (which affects the choice of R , as discussed in the above), what lifecycle stage they are in, and how much endowment they have (i.e., y and s in equation (2)). All these factors should be considered in assessing consumer behavior and decision as to how optimal they are.

Finally, there is a burgeoning volume of studies in the realm of behavioral finance which indicates that financial consumers are far from being rational and deliberate in making their consumption and product-choice decisions. Instead, they tend to think automatically (i.e., considering what automatically comes to their mind rather than deliberately assessing a broad set of relevant factors), to be present-time biased (i.e., overweighting the present time, or shifting

good experiences, e.g., consumption, toward the present and bad experiences, e.g., saving, toward the future), and to be influenced by the way that financial products and tools are presented to them (i.e., framing effects) (Kahneman, 2003; Evans, 2008; WDR, 2015). The key implication from this line of research is that it is necessary to institute an effective nudge or offer a paternalistic guide to financial consumers to help them make more sound and informed decisions.

B. Intermediaries' Optimization Problem

A representative financial intermediary maximizes net operating income (NOI) per period (equation (7)), subject to a quality-adjusted production function (equation (8)). Two choice variables in the process are the level of production factors (labor and capital) used, κ_t , and a production-related technology, δ_t . NOI, in turn, consists of two components – the total quantity of service provided, Q_t , and the excess return from each dollar of intermediation service provided, EY_t (as specified in equation (9)):

$$\max_{\kappa_t, \delta_t} Q_t \cdot EY_t \quad (7)$$

$$\text{s.t. } Q_t = A(\delta_t) \cdot \kappa_t^\gamma \quad (8)$$

$$EY_t = r_t^c - r_t^f - RP_t(\delta_t) - G\&A_t(\delta_t) \quad (9)$$

The production function (equation (8)) contains two elements - the quality component that is influenced by the technology chosen, $A(\delta_t)$, and the amount of production factors used, κ_t . δ_t can be interpreted as the DPA (Data/Platform/AI) technologies adopted at time t that govern internal and external business processes (e.g., B2B and B2C systems for client services through, data-driven automated internal processes for fraud detection and regulatory compliance, and BD·ML-driven risk measurement and management practices). The excess yield (EY in equation (9)) is shown as the difference between the (average) interest rate charged, r_t^c , minus three cost items – risk-free

⁷ This follows Lusardi et al. (2017), which assumes that consumer starts working at 25 (i.e., $t=0$ at 25) and lives until 100 ($t=T$ at 100), which should be less than the assumed maximum ($\tilde{T} \leq T$) (or 100

years). And the mortality risk is applied in both periods (as shown by the probability of survival at each age from 25 to 100).

rate (as a cost of capital), r_t^f , risk spread to compensate the amount of risk taken in the intermediation process, RP_t , and general and administrative costs, $G\&A_t$.⁸

As competition in the marketplace intensifies, EY for individual intermediary declines (theoretically, it goes to zero in a perfectly competitive market). However, financial markets are generally viewed as inefficient (informationally at least), and, as such, the level of EY is non-zero and is dependent upon how well an intermediary identifies and targets source of inefficiency in offering its service. In that context, the intermediary can employ two alternative strategies to maximize its objective function

$$NOI_t = Q_t \cdot EY_t.$$

The first strategy is to maximize the business volume, i.e., Q_t . Under this, the intermediary can apply DPA technology to efficiently categorize consumers in terms of their preferences, based on which it can develop and offer better-targeted (or more incentive compatible) financial products to retain or expand customers. In the context of BD·ML technology, how well it can do depends on accumulated data and institutional knowledge, as some of the theoretical papers on the topic of data economy argue.⁹ To illustrate, Farboodi and Veldkemp (2021) models a firm's data-driven technology choice as a recursive process over time in which it attempts to converge to the optimal technology,¹⁰ and shows that the larger the accumulated and usable data, the smaller the dispersion (or the more accuracy) in the process of that search.

The second strategy is to minimize the cost, $G\&A$ in equation (9), by utilizing the BD·ML technologies to institute more efficient, usually more automated, internal and external processes. Here again, accumulated data and institutional

knowledge play an important role. For example, the intermediary can offer a mobile platform-based service to its customers, a robo-advisor based investment consultation, an alternative data based credit evaluation, an automated internal process for regulatory compliance as well as for fraud detection, and so on. One particular issue to note in this context is the possibility of intentionally inflated $G\&A$ items by the intermediary, as a way to increase its operational revenue. One such example (which will be discussed in the later section) is a hidden cost as a part of the intermediation fee that depends on frequency of trading in managing an investment portfolio).

Under both strategies, how underlying financial risks are measured and managed (as reflected by RP) represents a key determinant (as it influences EY and NOI) of the success of the strategy taken. It is often casually stated that financial risk should be managed 'efficiently,' but efficiency in this context generally means a fulfillment of two principles: namely, RP should be enough to cover cost of risk-taking (the principle of cost recovery); and, it should also ensure sustainability of the intermediation service over both normal and stress economic scenarios.

At a given point in time, actual measurement of RP involves a forward-looking projection (for time $t+k$) on expected amount of financial loss evaluated at current time (time t). As such, it will also entail a stochastic components:

$$RP_{j,t} = E_t[Loss_{j,t+m}] + \varepsilon_{RP,j,t} \quad (10)$$

In reality, three classes of financial risk represent a key concern of the intermediary:— credit (or business counterparty) risk, interest rate risk (both upside and downside), and liquidity risk. As the first one is more relevant to financial consumers, this study focuses on that. Its actual measurement usually involves a two-step process: first, the borrower and product

⁸ See Cho (2008) for a similar specification of EY in the context of the residential mortgage finance business.

⁹ Here again, GenAI can allow for customer segmentation at the individual level, allowing brokerage firms and other investment advisors enhance their robo-advice with differentiated recommendations produced in a fast, efficient and customised manner, and delivered in a human-like conversational manner tailored to each client. (OECD (2023))

¹⁰ In particular, the optimal technology is specified as $\alpha_{j,t} + \varepsilon_{\alpha,j,t}$, which entails two elements – the persistent component, $\alpha_{j,t}$, and the transient component, $\varepsilon_{\alpha,j,t}$ that are not separately observable; And the technology choice is shown as $\delta_{j,t} = \alpha_{j,t} + \varepsilon_{\alpha,j,t} + v_{\delta,j,t}$. Hence, the process of finding an optimal technology boils down to sequentially minimizing the two stochastic terms ($\varepsilon_{\alpha,j,t}$ and $v_{\delta,j,t}$) by utilizing available data and analytics.

driven (i.e., idiosyncratic) risk factors are assessed based mostly on past data, which is often summarized as a credit score; and, second, those differentiated risk levels of the counterparties are projected to future scenarios of key economic variables (e.g., through a Monte Carlo simulation) to form a distribution of the estimates of credit events to occur.¹¹ In real world financial intermediation, the heuristic measures from a credit scoring system, focusing mostly on the first step, are utilized, and a BD·ML-driven technology can help enhance the model fit as well as the efficiency in measuring and managing underlying credit risk.

Given the above discussion, the key supply-side decisions are as follows:

- Product design and sale decision: What repayment schedules (in case of lending products), and what risk-return profiles (in case of investment products) to institute, to intermediate them to financial consumers? What levels of complexity, transparency, and explainability to be considered at the time of selling the products to consumers? What type of robo-advisor service to provide, and how to update and validate the system if it is offered?
- Risk measurement and management decision: What BD·ML technologies to adopt in efficiently measuring and managing borrowers' credit risk (i.e., RP)? What mechanisms to put in place to that end, i.e., risk-avoidance (via underwriting), risk-pricing (via charging RP), and risk-transfer (via risk-sharing)? How to incrementally expand financial inclusion for marginal consumer groups (e.g., thin filers) through a more efficient risk management practice?
- Process automation decision: What DPA technologies to utilize for automating internal and external business processes,

for data collection and sharing, regulatory compliance, fraud detection, and so on?

Two more dimensions of complexity should be considered on the supply side. First, financial intermediation is in general heavily regulated, and the intermediary should comply with the two regimes of financial regulation – prudential regulations (to ensure safety and soundness of its operation), and business conduct regulation (to ensure fair and ethical treatment of financial consumers). Second, the intermediaries are also heterogeneous, due to which different types can employ different business strategies or can face different regulatory regimes. Specifically, SmallTechs (startups and SMEs who are traditionally not financial service providers); BigTechs (large, often global, IT firms who offer various financial services); and existing FIs (traditional intermediaries such as banks and non-bank FIs) are all important in this sector.

C. Market Outcomes (Behavioral Patterns)

Given the dynamic and stochastic factors involved, deriving the general equilibrium conditions (and performing comparative static analyses) out of the optimization frameworks discussed would be highly complicated and likely to yield intractable, outcomes. The approach taken in this section is to identify a set of anticipated market outcomes in terms of specific behavioral patterns to be tamed on both the demand- and supply-side, which can be termed as 'suboptimal market outcomes' that should be targeted in designing a welfare-enhancing FCP policy regime. Specially, the following eight behavioral patterns will be elaborated and used for subsequent discussion.

1. Over-consumption and under-saving (demand-side)

One behavioral pattern of financial consumers discussed is present-time bias, i.e., the tendency of consume-now-save-later, which can result in over-consumption in the current time period but under-saving for future by many. Given this, one

¹¹ In terms of theoretical backdrop to this process, Merton (1974) offers an option-theoretic default model, termed 'the distance-to-default framework' (i.e., if and when collateral or asset value goes below outstanding loan amount, borrower is incentivized to

exercise a put option by giving up and transferring the asset to the lender). The reduced-form model as another theoretical construct for measuring the credit risk. (Saunders & Allen, 2010).

question to pose is, through what nudging mechanism(s) can one help them make more rational long-term personal planning on the consumption-saving decision? As the FL literature argues, a well-designed and well-targeted financial education program, differentiated for those in different lifecycle stages and endowment levels would be helpful. However, such a program should have a clear objective and target, e.g., improving this particular behavioral pattern and effectively nudging consumers to be able to change their behavior toward establishing and executing an optimal long-term planning. Such program will have to cover relevant financial concepts to this end (e.g., time value of money, compounding, financial risk and reward, financial markets and institutions, pension system, and so on), but, more importantly, should entail a pedagogical mechanism to induce behavioral change to make their decisions more rational and welfare-enhancing. As a research issue, the effectiveness of such a program, particularly for the second part of its objective (i.e., stimulating behavioral change) should also be assessed in a sound empirical framework (e.g., a randomized controlled trial).¹²

2. Over-leverage and sub-optimal choice of loan products (demand-side)

While digitalized financial services deliver a number of benefits to consumers, those means of easy-lending and easy-payment also inflict a social cost in the form of over-leverage (hence, over-consumption) for some consumers. This is a complex issue because the debt is used not only for more consumption but also for more investment and, hence, can lead to a welfare loss for those levered investors if and when asset prices (e.g., for stock, real estate, and cryptocurrencies) experience a downturn. To make things more complex, expanding financial inclusion for marginal borrowers through the new and alternative intermediaries is often

viewed as positive and welfare-enhancing for consumers.

Given all this, what would be the right device to help consumers avoid the negative outcomes of digital finance, and will financial education be such a device to help consumers make more rational decisions on how much (and what type of) leverage to utilize? Here again, a well-designed and well-targeted financial education program could be useful. But a more effective means would be an in-time, independent (to the intermediaries), and interactive counseling and advice service for consumers at the time of decision-making. One possibility to be considered to that end is to utilize a ChatGPT-like system as a consumers' AI agent for that purpose. In developing such a system there would be a number of issues to think through (e.g., who should be the sponsor, what data and AI algorithm can be developed and utilized, how consumers can access the system, and so on).

3. Excessive risk-taking and suboptimal choice of investment products (demand-side)

A strong asset price boom usually works as a stimulus in forming a herd behavior among investors (those with liquidity surplus), by raising their forward-looking expectations of the return to holding a particular asset (i.e., R). There are ample examples over time for such consumer behavior, including the housing price booms in the U.S. and some other countries before the global financial crisis, and the explosive price upturns of Bitcoin and other cryptocurrencies globally in the recent years. In addition, during an asset market boom, the frequency of fraudulent financial intermediation (e.g., a Ponzi investment scheme) tends to increase as well to attract investors. The question is, how to nudge those consumers with liquidity surplus to move away from excessive risk-taking and to make more rational decisions on how much, and on what products, to invest in (as an alternative to safer assets such as bank deposit or stocks of

¹² The Financial Literacy Map (FLM) in Korea: Objective ~ To help develop contents of FE by assessing current states and designing policy directions; Based on the similar FL capability measurement frameworks (OECD INFE, US, UK, JP, among others); Six financial topics of interest: (1) Household financial management; (2) Asset management; (3) Credit management; (4)

Risk management; (5) Use of financial services; (6) Lifetime financial planning; Five life stages: (1) Primary school; (2) Middle & high school; (3) College; (4) Adult; (5) Retired; Separate FLMs for special groups (e.g., disadvantaged, multi-culture households, refugees (from NK), credit-impaired)

large established firms)? One thing that should be clearly communicated to financial consumers is that, first, fundamentally they are responsible for the outcomes of their investment decisions, and second, (as some pundits put it) they have to realize that it is very hard to make money. Financial education programs with clear targeting and objective (of taming this particular behavior of investors to make more rational investment decisions) would be useful.

4. Profit-making prioritized over fiduciary duty (supply-side)

Financial intermediation is designed to pursue two inherently competing goals – profit-making and fulfilling the fiduciary duty for their clients. Enforcement of the fiduciary duty relies on various means including regulatory oversight, licensing and registration, disclosure requirements, client complaints and arbitration, and even civil lawsuits. A question to pose is, are these mechanisms sufficient to make intermediaries actually put consumers' interests first, and, if not, what additional remedial measures should be designed? After the recent financial crisis, the importance of business ethics is emphasized, and training programs in that regard for financial professionals of different levels (employees for customer services, managers, and executives) were implemented in the U.S., UK, and other countries. That would be a necessary, but probably not a sufficient, remedial action, and the research community along with the financial services industry and policymakers will have to cooperate to produce more realistic and effective ways to induce intermediaries to follow the principle.

One argument advanced in the media is that finance professionals should have a mandatory oath similar to the Hippocratic Oath sworn by medical doctors under the premise that money is as important as health for many, a point to digest in designing a whole schema of FCP policies.¹³ As shown in the footnote below, some items of

the Hippocratic Oath appear to be fairly directly applicable to the financial services sector.

5. Moral hazard in product design and sale (supply-side)

More often than not, financial products are designed to maximize the return to the intermediaries at the cost of consumers' welfare. Predatory lending practices in the subprime mortgage market and the listing of fraudulent coins in the crypto-asset market represent good examples of such behavior. Some products also entail hidden costs as a part of the contract (e.g., some of the variable annuity life insurance products have been fined by regulators for inadequate disclosure and excessive brokerage fees). The question is what to do about it, both before and after such products are sold. Preventing 'incomplete sale' is essentially a policy direction to protect consumers from such products, for which information provision (on the product sold), offering a cooling-off period, establishing a conflict resolution mechanism, and regulatory oversight (in terms of consumer complaints, ombudsman, and internal processes of relevancy) are all geared to prevent trading of such products. However, given the biases and suboptimal decisions discussed above, those measures may not be sufficient. It is also the research community's role to assess how effective the usual FCP measures are in protecting consumers from those products designed and sold that increase the profit at the cost of consumers' financial losses, and what alternatives should be considered to target this particular supply-side behavioral pattern.

6. Inefficient risk management (supply-side)

The profit maximization framework in the above represents a short-term view, in that it does not reflect the long-term consequences of risk-taking to the intermediary. As witnessed frequently, financial institutions sell high-risk products to increase their business volume, hence raising

¹³ The typical elements of the Hippocratic Oath are as follow: (1) Commitment to the patient's (consumer's) well-being and confidentiality; (2) A promise to do no harm (*primum non nocere*); (3) A pledge to practice medicine (financial) ethically and with integrity; (4) Respect for patients' autonomy and dignity; (5) A commitment to lifelong learning and the advancement of medical

(financial) knowledge; (6) A vow to not engage in euthanasia or abortion, though modern interpretations may vary; (7) A pledge to work collaboratively with colleagues for the betterment of patients (consumers); (8) A commitment to uphold the highest standards of professionalism and accountability.

their per-period (or annual) revenue, but financial losses caused by the sale of those products can result in later years. As an alternative, one can employ a framework in which the intermediary maximizes the value of its operation, and in that way, one can reflect not only the per-period cashflow but also the long-term consequence of risk-taking and capital investment done in a given time period. In the viewpoint of financial consumers, a welfare loss can be inflicted from this short-term business strategy, caused essentially by an inefficient risk management practice, usually being realized through pro-cyclical operations by the intermediaries (under-shooting business risk and, hence, lowering RP during an asset market boom, but over-shooting the risk, and abruptly raising RP, during a bust). This behavioral pattern is mainly a target of prudential regulation (e.g., the Basel III risk-based capital requirements), but has important implications for FCP as well.

Managing financial risk is inherently an incomplete science, in that it is essentially an attempt to project a risk event that would happen in future, based on data collected from past behavior of business counterparties (e.g., financial consumers). Nonetheless, there are generally-accepted finance theories and empirical models that are well-established for the two key financial risks – credit risk and interest rate risks – and intermediaries are expected to reflect them in their risk measurement and management practices. In particular, by collecting data and applying appropriate models, they make their practices more evidence-based, in all three modes of risk management - underwriting, pricing, and risk-sharing (with third party). If a product has a long history of performance it will be more feasible to make the practices more risk-based by collecting and utilizing past performance data. The main issue to be considered in the context of FCP is how to convey and communicate product-driven financial risk – in terms of both its extent and type – to customers. In that vein, a risk-rating system for financial products can be considered, from which a summary measure of embedded risk is given and explained to consumers in plain and understandable language (as BaFin in

Germany requires intermediaries to do (Elsen, 2021). In addition, intermediaries should also be required to employ a sound internal monitoring system of systematic (or market-wide) risk factors, which usually involves a simulation of possible future scenarios of key economic variables and a set of early-warning indicators. To this end, one can consider instituting BD-ML-based analytics that can utilize both conventional and non-conventional data.

7. Suboptimal technology choice (supply-side)

Intermediaries can enhance the efficiency of their internal and external business processes by institution-appropriate DPA technologies for front-, middle-, and back-office functions. However, doing so involves capital expenditure (often quite large in amount) as well as a number of tradeoffs. For example, developing an online B2C system to automate interaction with consumers would incur a significant initial cost but a large efficiency gain for both intermediaries and consumers as the marginal cost of serving one more customer will be virtually zero. Also, internal KYC processes to automatically detect illegal transactions (e.g., money laundering, and terrorist funding) will also benefit from the investment in the DPA technologies. The question is, how to incentivize intermediaries to make a welfare-enhancing decision on this issue for both them and for their clients? The decision would be more difficult for existing FIs that have legacy technologies and systems, posing a higher internal friction to deal with. One such vehicle would be more competition in the marketplace, which is often termed as the ‘catfish’ effect posed by BigTechs and other alternative service providers. The former also have an edge in general in terms of collecting and utilizing consumer data. From a regulatory point of view, it should be emphasized and communicated (to all intermediaries) that having a proper investment in DPA technologies can deliver long-term cost savings as well as more efficient and convenient service delivery to their customers, and that developing multi-dimensional capabilities is important to realizing such benefits at an organizational level (i.e., having BDAC in the

personnel, infrastructure, and governance dimensions).

8. Inadequate responses to financial frauds and criminal transactions (both sides)

As financial services become more DPA-based, the frequency of financial frauds (e.g., theft of private data, voice phishing, ponzi investment schemes) and illegal transactions also increases, as reported by a number of studies. Protecting consumers from those illegal activities requires appropriate measures from both demand- and supply-side of financial markets. Nonetheless, properly dealing with those activities goes beyond the financial service sector, and is in fact a society-level task for which the financial services sector and criminal investigation authorities should join forces.

IV. Research Agenda (to be pursued)

Based on the prior discussions, a matrix is developed to link those suboptimal behavioral patterns identified to possible policy remedies to tame each of them, as laid out in the Appendix. Using that as a base, a research agenda along with related policy remedies is discussed in this section.

A. On over-borrowing, over-consumption, and under-saving

In terms of personal financial planning, consumers are in general present-time biased (spending too much now but saving too little for future), the tendency of which is reportedly exacerbated in some of the tech-driven alternative services such as P2P lending, mobile payment, and BNPL service. One realized outcome of such behavior is the un- or under-prepared retirement, which poses a serious social problem in countries like Korea where a rapid phase of population aging is undergoing and the public and private pension systems are relatively under-developed.¹⁴ My conjecture is that we do not know much about how much those FinTech-driven services affect the long-term personal financial planning by financial consumers, and

how such effects vary across different countries. In order to offer more theoretical and empirical evidence in that regard, careful research should be conducted on cohort-specific consumer decision patterns on borrowing, consumption, and saving in a dynamic setting, possibly in an international comparative setting.

B. On excessive risk-taking (by investors)

When the price of a particular asset price surges in a sustained time period, we repeatedly observe herding behavior among financial consumers: excessive risk-taking by putting money on the surging assets and a financial loss at the time of price busting. Typical market outcomes during such asset price boom-bust cycles include a rise of levered investment by borrowing, and an increasing incidence of fraudulent or abusive intermediation practices.¹⁵ Question to pose is, what would be an effective FCP policy regime to deal with this particular behavioral pattern?

As one possible solution, one can consider utilizing a ChatGPT-like LLM (Large Language Model) based support system that interacts with customer-support staff as well as consumers. On this topic, Brynjolfsson et al. (2023) provides promising empirical evidence that shows the positive outcomes of such a system in the form of increased productivity among the call center employees along with heightened levels of satisfaction among their consumers after the implementation of the LLM-based support system. In general, the further utilization of BigData and Machine Learning (BD-ML) can enhance predictive powers in various internal and external processes that intermediaries manage; As an example, a BD-ML based analytics can improve the performance of the algorithms employed in a robo-advisor system (i.e., those for consumer client assessment, asset allocation, and portfolio rebalancing), which can be extended to have a more effective consumer education and counseling.

C. On financial education and financial literacy

In many cases, financial education programs for consumers are designed as supply-driven, rather

¹⁴ See Cho et al. (2022) for an international comparison of the pension systems.

¹⁵ Examples include predatory lending in the subprime mortgage sector, fraudulent crypto-asset dealers such as FTX, sellers of Terra-Luna, and operators of gambling sites targeting youth.

than conveying adequate and timely information to enable them to make a better decision. As a remedy, this study argues that those programs should target specific behavioral patterns to be tamed (e.g., over-borrowing, excessive risk-taking, and under-saving), in addition to the usual dimensions for which programs should be differentiated (e.g., lifecycle stages, endowment levels, and extents of financial literacy). In the perspective of long-term personal planning, I view that those programs should engrave several key messages in the minds of consumers, to nudge them to make to make more welfare-enhancing decisions, e.g., ‘too much leverage is dangerous and can ruin one’s long-term financial safety,’ and ‘it is very hard to make money.’ In addition, more empirical evidence on the effectiveness of financial education programs of variant forms should be compiled, based on a RCT or other sound measurement framework. Comparative studies on financial education vs. alternatives (e.g., use of independent financial advisors) in terms of deriving the desired behavioral outcomes would also be warranted.

D. On prioritizing profit-making over fiduciary duty (supply-side)

A moral hazard driven behavior is often observed on the part of intermediaries, such that they develop and sell financial products to put their own interests over those of financial consumers.¹⁶ The usual FCP policy to deal with this problem is business ethics training that targets different levels of employees in the financial service sector (e.g., front-office employees, middle-managers, and executives). How to design effective training of this sort appears to be a new research area for which we do not know much. Another potentially worthwhile path for research is to study whether a mandatory “Hippocratic Oath” would be effective if adopted.

E. On inefficient risk management practices (supply-side)

The recent global financial crisis represents a case of repeated risk management failures

caused by pro-cyclical lending on the supply side and herd behavior on the demand-side. Going forward, alternative data and analytics-driven research is needed to improve risk measurement and related decision making. In particular, one can utilize a more predictive model in measuring the effects of both idiosyncratic risk drivers (driven by products or demanders) and systematic risk factors (driven by market-wide variables). For example, in forecasting an economic variable, the nowcasting method that utilizes non-structured data (e.g., up-to-date news articles) is drawing more attention; and such techniques as ‘embeddings’ and ‘text classifications’ to find underlying patterns from complex and high-dimension data are utilized in the finance research, to develop hypotheses and formulate explanatory variables in designing a research related to credit-scoring and other risk-profiling tests (Gabaix et al., 2023; Girotra et al., 2023).¹⁷

F. On inadequate response to financial frauds and abuses

As a dark side of the FinTech innovations, financial frauds of various kinds have been on the rise (e.g., voice or messenger phishing, pharming, smishing, and hacking), which are often backed by a large, tech-savvy, and international crime organization. As such, a coordinated effort to combat those fraudsters among financial market participants (regulators, intermediaries, and consumers) as well as law-enforcement authorities of multiple countries is very much warranted. On the part of the intermediaries, further utilization of alternative data and analytics can be deployed for their middle- or back-office functions to detect illegal or fraudulent transactions (e.g., an automated algorithm to detect AML & ATF transactions based BD·ML). And a mechanism for periodic monitoring of the problematic cases, similar to The SAR (Suspected Activity Report) required by CFPB, will also be useful. Finally, collecting and disseminating actual cases of financial fraud occurred in different countries will be useful in

¹⁶ Recent examples include the delisted or fraudulent cryptocurrency sellers in Korea and other countries, the hidden costs in some life insurance products (e.g., some of the Variable Maturity

Life Insurance products), and the Ponzi-like Private Equity Fund products.

¹⁷ See Eisfelt & Schubert (2024) for a survey of recent studies on the use of AI for finance research.

producing policy remedies to be employed (see Cho, 2025).

V. Summary and Conclusion

This study argues that targeting specific behavioral patterns, both on the demand-side and supply-side of financial markets, will serve as a value-adding complement to existing policy regimes for financial consumer protection. To that end, the optimization frameworks for both supply and demand, and a set of suboptimal behavioral patterns to be tamed, are identified and elaborated. In so doing, the paper advocates the libertarian paternalistic view of behavioral economics, i.e., combining the freedom of choice with guidance that helps the consumers make better decisions. The various research issues discussed in the prior section is just a small sample, and the author hopes to see a further collaboration in the global research community like the IAFICO network in coming years.

One particular area emphasized in this study is the role of rapidly evolving technologies. As a case in point, an in-time, independent (from the intermediaries), and interactive advisory mechanism supported by an LLM system would dramatically increase the effectiveness of consumers' learning and decision-making on product choice (for borrowers and investors alike). Such system can access vast amounts of online and product-specific information, can interact with the consumers to deliver them in a more understandable fashion, and, hence, can derive a more effective behavioral outcome for them. It appears that the technology for such system tailored to FCP is already there; Question is who's going to pay, for its development, maintenance, and subscription, along with other operational and regulatory issues involved, which represents another topic to be thought through in future.

As an industry-wide issue, competition can lead to a more efficient operation on the part of the intermediaries, which can result in a reduction in unnecessary intermediation cost (i.e., lowering G&A in equation (9)). Entering the market by those alternative service providers,

in particular by BigTechs, can exert a catfish effect to make the existing intermediaries (banks, non-bank FIs, and security dealers) by pushing them to be more efficient in their operations. However, the increased market power by BigTechs, not only in terms of data and AI related technologies but also in terms of the capability to steer consumers toward their products and services, is a policy challenge to be tackled. The essence of this debate appears to be in balancing two directions of social welfare enhancement - a fair completion by creating a leveled playing field (among the three types of intermediaries) and innovations in financial services (through FinTech-related technologies).

References

- Agarwal, S., Ben-David, I., & Yao, V. (2017). Systematic Mistakes in the Mortgage Market and Lack of Financial Sophistication. *Journal of Financial Economics*, 123(1), 42-58.
- Agnew, J.R. & Szykman, L.R. (2005). Asset Allocation and Information Overload: The influence of information display, asset choice, and investor experience. *The Journal of Behavioral Finance*, 6(2), 57-70.
- Anderson, K.B. (2016). Mass-market Consumer Fraud: Who is most susceptible to becoming a victim? *FTC Bureau of Economics*, (332).
- Andreou, P.C. & Philip, D. (2018). Financial Knowledge among University Students and Implications for Personal Debt and Fraudulent Investments. *Cyprus Economic Policy Review*, 12(2), 3-23.
- Bianchi, M. (2018). Financial Literacy and Portfolio Dynamics. *The Journal of Finance*, 73(2), 831-859.
- Brynjolfsson, E., Li, D. & Raymond, L. (2023). Generative AI at Work. *NBER Working Paper* 31161.
- Calvet, L.E., Campbell, J.Y., & Sodini, P. (2009). Measuring the Financial Sophistication of Households. *American Economic Review*, 99(2), 393-398.
- Cho, M. (2025). Three Waves of the FinTech Innovations and Their Implications to Financial Frauds and Anomalies. *The*

- International Review of Financial Consumers 9(2), 1-14.
- Cho, M., Nicolini, G. & Lee, H. (2022). The National Pension Systems and Financial Consumers: An international comparative perspective on the key linkages. in Lee, Nicolini, & Cho, eds. International Comparison of Pension Systems: An investigation from consumers' viewpoint. IAFICO·Springer.
- Cho, M (2008). 180 Years' Evolution of the US Mortgage Banking system: Lessons for emerging mortgage markets. International Real Estate Review, 10(1),171-212.
- Cho, M. & Park, S. (2021). Financial Consumer Protection in the Era of Digital Transformation: A critical survey of literature and policy practices. KDIS Working Paper, May.
- Choi, H.J. & Choi, H.J. (2011). Research on the Effects of Financial Education and Financial Transaction Experience on College Students' Financial Literacy. Journal of Consumer Studies, 22(4), 55-75. (in Korean)
- Cornelli, G., Frost, J., Gambacorta, L., Rau, R., Wardrop, R. & Ziegler, T. (2020). Fintech and Big Tech Credit: A new database, BIS Working Papers No 887.
- Disney, R. & Gathergood, J. (2013). Financial Literacy and Consumer Credit Portfolios. Journal of Banking & Finance, 37(7), 2246-2254.
- Eisfeldt, A. & Schubert, G. (2024). AI and Finance. NBER Working Paper 33076.
- Elsen, R. (2021). FCP Act Investor Protection: BaFin. Presentation material.
- Engels, C., Kumar, K., & Philip, D. (2020). Financial Literacy and Fraud Detection. The European Journal of Finance, 26(4-5), 420-442.
- Evans, J.S.B.T. (2008). Dual-Processing Accounts of Reasoning, Judgment, and Social Cognition. Annual Review of Psychology 59 (January), 255–78.
- FinCoNet. (2016). Guidance to Supervisors on the setting of Standards in the field of Sales Incentives and Responsible Lending. FinCoNet/Guidance, December.
- Gabaix, X., Koijen, R., Richmond, R. & Yogo, M. (2023). Asset Embeddings. Available at SSRN 4507511.
- Gathergood, J. & Weber, J. (2017). Financial Literacy, Present Bias and Alternative Mortgage Products. Journal of Banking & Finance, 78, 58-83.
- Girotra, K., Meincke, L., Terwiesch, C. & Ulrich, K. (2023). Ideas are Dimes a Dozen: Large Language Models for Idea Generation in Innovation. Available at SSRN 4526071.
- Huh, Y.K. (2020). South Korean Legislators Pass a New Financial Consumer Protection Law. mimeo.
- Kahneman, D. (2003). Maps of Bounded Rationality: Psychology for behavioral economics. American Economic Review, 93(5), 1449-1475.
- Lee, C.H., & Jung, H.J. (2013). Research on Determinants to the Subscription and Preference toward Personal Pension. Finance Research, 27(4), 25-51.
- Li, J., Wu, Y., & Xiao, J.J. (2020). The Impact of Digital Finance on Household Consumption: Evidence from China. Economic Modelling, 86, 317-326.
- Lusardi, A. & Mitchell, O.S. (2023). The Importance of Financial Literacy: opening a new field. Journal of Economic Perspectives, 37(4), 137–154.
- Lusardi, A., Michaud, P. & Mitchell, O.S. (2017). Optimal Financial Knowledge and Wealth Inequality. Journal of Political Economy 125 (2), 431–77.
- Lusardi, A. & Tufano, P. (2015). Debt Literacy, Financial Experiences, and Overindebtedness. Journal of Pension Economics & Finance, 14(4), 332-368.
- Na, H.R. & Choi, H.J. (2013). Research on Effects of Self-Control on Preparation of Retirement. Financial Planning Review, 6(1), 27-60. (in Korean)
- Organization of Economic Cooperation and Development (OECD). (2023). Generative Artificial Intelligence in Finance. OECD Artificial Intelligence Papers No. 9, December.
- Organization of Economic Cooperation and Development (OECD). (2022). G20/OECD High-Level Principles on Financial Consumer Protection. OECD.
- Reuben, E., Sapienza, P. & Zingales, L. (2007). Procrastination and Impatience. Working

- Paper 13713, National Bureau of Economic Research, Cambridge, MA.
- Saunders, A. & Allen, L. (2010). Credit Risk: Measurement In and Out of the Financial Crisis. John Wiley & Sons.
- Shiller, R. (2012). Finance and the Good Society. Princeton University Press.
- Thaler, R.H. & Sunstein, C.R. (2008.)Nudge: Improving Decisions about Health, Wealth, and Happiness. New Haven, CT: Yale University Press.
- The World Bank. (2012). Good Practices for Financial Consumer Protection. The World Bank, June 2012.
- World Development Report (WDR). (2015). Mind, Society, and Behavior. The World Bank Group.
- Yang, H.K. (2018). Financial Literacy and Financial Activity: Focusing on internal characteristics of financial consumers. Financial Planning Review, 11(3), 29-55. (in Korean)

<i>Received/</i>	2024.11.26
<i>Revised/</i>	2024.12.30
<i>Accepted/</i>	2025.04.23

Appendix

Table A1. Behavioral patterns to be tamed on the demand-side

Behavior	Examples	Policy Remedies
(1). Over-consumption & under-saving	• Present time bias (i.e., too much consumption now but under-saving for the future) • Under-prepared for retirement	• Well-targeted financial education (FE) programs with a clear objective, tailored to remedy this behavioral pattern for different consumer groups (differentiated by lifecycle stages, endowment levels, and other factors)
(2). Over-leverage & unsound product choice	• Easy borrowing under platform-based lending, leading to over-borrowing • Over-leverage caused by predatory lending products (e.g., subprime mortgage contracts)	• Well-targeted FE programs as above • In-time, independent, and interactive counseling or advice programs (a GenAI-based interactive system to be considered) • Sound and incremental expansion of financial inclusion for marginal borrowers
(3). Excessive risk-taking & unsound product choice	• Herd behavior caused by a strong and sustained asset price upturn	• Well-targeted FE programs as above, elaborating why “it is very hard to make money!” • A GenAI-based investment consultation system (e.g., a robo-advisor operated by an independent entity) • Information sharing (i.e., collecting and disseminating real-world cases on outcomes of the herd investment behavior and the fraudulent intermediaries)

Source: the author

Table A2. Behavioral patterns to be tamed on the supply-side

Behavior	Examples	Policy Remedies
(1). Profit-making over the fiduciary duty	Putting intermediaries' interests (i.e., profit-making) over those of financial consumers	- Business ethics training programs targeting different levels of employees in the financial service sector - A mandatory oath like the Hippocratic Oath by medical doctors
(2). Moral hazard in product design and sale	Developing and selling predatory or fraudulent financial products	- Regulatory requirements to prevent 'incomplete sale' (by providing appropriate information in an appropriate format, by offering a cooling-off period, by establishing an efficient and affordable conflict resolution mechanism, among others) - Regulatory oversight of intermediaries
(3). Inefficient risk management practices	- Volume maximization strategy, to increase current profit at the cost of long-term financial loss - Cyclical risk measurement and management practices	- Prudential regulations to institute a long-term view in the intermediaries' operation and help prevent pro-cyclical risk management practices - Require sound risk measurement and management practices following accepted finance theories and empirical models in assessing the systematic and idiosyncratic risk factors; A BD·ML-based analytics to be considered - Risk-rating of financial products to be conveyed to consumers (done by intermediary, validated by regulator, and released to consumers in a plain language; the BaFin case as an example)
(4). Suboptimal technology choice & utilization	- Under-utilization and under-investment in DPA technologies for front-office functions - Under-utilization of DPA technologies for middle- or back-office functions	- Level the playing field in terms of data, market infrastructure, and other dimensions of competition among the intermediary types - Regulatory sandbox to promote innovations among financial intermediaries - Equip intermediaries with the BDAC in all three dimensions of personnel, infrastructure, and governance
(5). Inadequate responses to financial frauds & crimes (demand-side, supply-side, and regulators)	Organized financial crimes seriously affecting consumers' welfare (e.g., voice or messenger phishing, pharming, smishing, and hacking)	- Mechanism to coordinate the combat against crime organizations that are behind the financial frauds - The SAR (Suspected Activity Report) requirement by CFPB - Information dissemination on cases of financial frauds occurring in different countries, and on policy remedies employed

Source: the author