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FUN AND GAMES

INVESTMENT GAMIFICATION AND IMPLICATIONS FOR CAPITAL MARKETS

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EXECUTIVE SUMMARY

The *Oxford English Dictionary* defines gamification as "the application of typical elements of game playing (e.g., points, competition with others, rules of play) to other areas of activity to encourage engagement with a product or service." Gamification—and the broader use of behavioural techniques—is used increasingly in a variety of settings, including education, health care, and financial services.

When used well, these techniques can be a powerful tool for engagement, literacy, and driving positive outcomes. In the financial services context, gamification can attract new audiences to investing. It attracts younger audiences, those at a stage of their lives where they can and should take investment risks. The increase in trading activity as a result of engagement improves liquidity and reduces transaction costs. However, these same techniques can also be leveraged by firms to drive excessive trading, induce trading in complex or high-risk products, or encourage other harmful behaviours, all at the expense of clients.

The set of digital engagement practices adopted by market intermediaries, many of which are considered under the umbrella term *gamification*, is varied.[1] They include such things as default game features—points, badges, and leader boards (PBLs)—and more sophisticated reward systems. They also include behavioural nudges, such as attractive app designs, attractive presentation of information and notifications, news stories based on trading activity, and encouraging investors to copy popular traders.

Gamification is accompanied by business model innovations that increase convenience—or reduce frictions—including zero-commission trading, fractionalisation of shares, increased ease of account opening and fund transfers, and lower investor due diligence requirements for complex derivatives and cryptocurrency trading. They are also supported by marketing, advertising, and distribution practices, including joining and referral bonuses (particularly free shares), evolving narratives in advertisements and promotional materials that amplify social status, and the use of social influencers.

Although gamification is commonly associated with brokerages, it is by no means exclusive to them. Also, not all gamification practices are designed to induce excessive or risky trading behaviours. We discuss some of the counterexamples in this report.

Gamification is an important driver of the rise of self-directed trading (SDT) by the new and growing class of retail investors since the COVID-19 pandemic, but social media is equally, if not more, important. Stock market investing has always been a social activity and has been likened to a beauty contest, where "we devote our intelligences to anticipating what average opinion expects the average opinion to be" (Keynes 1936, p. 156). With social media, it is easier than ever to infer the average opinion in real time, as evidenced by the success of such groups as WallStreetBets, or to be led by the opinion of the few, as the rise of social influencers attests.

> ***When used well, [gamification] can be a powerful tool for engagement, literacy, and driving positive outcomes.***

In our fifth biennial CFA Institute Investor Trust Study (Trust Study), published in 2022, we surveyed more than 3,500 retail and 976 institutional investors across 15 markets on their overall trust in financial services and explored the drivers of trust, investors' use of digital platforms, and their opinions on gamification and cryptocurrencies (select findings from the study are found in CFA Institute 2022a). We found that overall trust in financial services among retail investors is at an all-time high—60% of those surveyed had high or very high trust in financial services (86% for institutional investors)—and technology is a significant driver of this trust. In terms of demographics, younger investors are more likely to use digital trading platforms, trust digital nudges, and report that digital platforms increase their frequency of trading, compared to older investors. These findings have important implications for market integrity and investor outcomes.

Gamification and the rise of social validation–driven investing raise ethical concerns. At least some critics of gamification, such as Werbach and Hunter (2020), describe it as "high-fructose corn syrup of motivation" or "exploitationware" because it is addictive and may incentivize individuals to take actions that are against

[1]For simplicity, throughout this report, we will use the term *gamification* to signify both game features and broader behavioural nudges.

their interests (see, e.g., Bogost 2011). Investors' motivation for investing varies, but in many surveys, they cite building financial security, supporting the nurturing of families, and expressing their values through product choices as the top reasons for investing, with social status routinely being lower in the order of importance (see, e.g., Statman 2019, Chapter 2). Desires for high social status are common, even if they are not easy for individuals to admit, but overall, we can interpret these motivations as reliably reflecting investors' best intentions. If that is the case, gamification, which amplifies the importance of social status, may encourage investors to weight investment decisions toward emotional preferences (i.e., for social reward) at the expense of decisions weighted toward utilitarian motivations. In other words, gamification may nudge investors away from decisions focused on financial security and other intrinsic needs. As importantly, gamification can exacerbate many of the problematic biases that have been found in behavioural finance studies.

Furthermore, even if investors find gamification entertaining (in our Trust Study, nearly 20% of retail investor respondents reported entertainment/speculation as the primary reason for using their retail trading accounts) and are willing to accept the risks, there are concerns that gamification is used deceptively by providers, with nudges directed toward outcomes that are most profitable for the financial intermediary, without informing users in plain language of that fact.

In the case of social influencers, there could be clear conflicts of interest with respect to how these influencers are compensated that are not disclosed to users. Also, there are risks associated with fake accounts and social media messages driven by bots. While influencers who make questionable product recommendations are troubling, it is worse when they also overstate their number of followers, which is a metric that is purported to imply a greater level of credibility.

In addition to ethical and investor protection concerns, these trends have implications for market integrity. The share of trading by retail investors overall has risen, driven by both their increasing numbers and their trading behaviours (International Organization of Securities Commissions 2022). Emerging research suggests gamification features can increase trading in riskier, popular stocks and strategies (Chapkovski, Khapko, and Zoican 2021). The risks to market infrastructure were visible in early 2021, when the stress caused by trading on meme stocks caused prominent brokerages, such as Robinhood, to face bankruptcy. The recent crash in cryptomarkets has led many experts and investors to reassess the purported stability of algorithmic stable coins and potential contagion effects.

But there are hidden long-term risks as well. Retail investors' early experiences may have an impact on their risk appetite and attitudes toward stock markets, to the detriment of their financial health. For example, individuals who have lived through stock market crises are more likely to stay away from stock markets altogether or reduce their investments in stocks (Malmendier and Nagel 2011). The pandemic created a new class of investors for the first time, and some of these investors had better outcomes than others. The lucky ones might mistake their luck for skill and increase their risk taking, and the risk-taking effects may last for a long time. In contrast, for those who lost money, their risk aversion may linger too, to their own detriment.

Given these dynamics, regulators face difficult choices in how they respond. There are a variety of approaches under discussion. One popular approach by some regulators is to treat gamification and nudges as active recommendations, with associated responsibilities pertaining to, for example, enhanced due diligence and suitability requirements. Other approaches include a ban on or regulation of gamification techniques (sometimes referred to as "confetti regulation"), stepping up oversight of social media and enforcement of laws pertaining to social media, and licensing requirements for social influencers and cross-border firms offering cryptocurrencies, forex derivatives, and other complex derivatives. With respect to licensing requirements for social influencers, we believe that they should be agnostic to platforms, but regulators could make a distinction between general and personal advice, with a limited licensing requirement for the former.

We believe gamification and other trends are here to stay, and we need to develop the right set of approaches to maximize their benefits. As we discuss more fully in this paper, our recommended approach is three-pronged—comprising principles, conduct, and disclosures.

Summary of Recommendations

1. **App design should include features that allow for review and reflection by users.**

   For instance, requiring third-party authenticator apps for validating transactions in penny stocks and moving away from one-click transactions toward an order, review, and confirm process are possible ways to introduce a little friction without taking away investor choice to invest.

2. **Reward and feedback systems, if any, should focus on long-term investor outcomes and not be based on transactions or short-term outcomes.**

   The concern around confetti in trading apps is that transactions, rather than long-term outcomes, are rewarded with instant gratification, however superficial. We have seen other examples of leader boards and monetary rewards based on recent performance or even transaction volumes. Since we believe in the maxim "what gets measured gets managed," to drive investors to focus on long-term outcomes, we need to measure and report on long-term performance along with risk and calibrate reward systems accordingly.

3. **Research on equities and other asset classes must be based on reputable sources, such as recognized firms and other third-party knowledge.**

   Since trading is, at least partly, a social activity, there is an inclination for market intermediaries, copying from social platforms, to curate the news and information their users see, based on their social profiles, network, and prior transaction history. However, users should be nudged toward research about stocks and other asset classes from reputable sources.

4. **Market intermediaries are encouraged to provide point-of-transaction disclosures in plain English.**

   Since users are most attentive at the point of making a transaction, they are most likely to pay attention to risks involved in the transaction, including, for example, purchasing a penny stock or a stock that has high recent observed volatility.

5. **Disclosures must take into account the medium through which they are consumed.**

   A key insight here is that presenting very lengthy information on a screen in a vertical or portrait format causes readers to skim through the information. This suggests the necessity of having a design that is also optimized for mobile devices.

6. **There should be full transparency around remuneration to social influencers.**

   Regulators should require full transparency on the remuneration that financial institutions provide to influencers for their advertisement via social media. This disclosure can help investors distinguish clear product advertisements or placements—for which influencers are paid—from pure gossip.

7. **Investor education materials and other public communications must not mislead or downplay the risks and complexity inherent in investing.**

   The rise of self-directed trading has been accompanied by cheerleading by market intermediaries, platforms, and influencers, which have conflated self-directed trading with democratisation of investing. Not long ago, passive low-cost investing was hailed for democratising finance (Evans and Eley 2015). Unlike self-directed trading, retail investors in passive funds do not compete with institutional investors with superior information and do not face possible impact costs of algorithms and market makers taking the other side or poorer financial outcomes from excessive trading.

8. **Warning labels should be included for brokerage communications, including advertisements.**

   We propose that brokerage advertisements include a message that excessive trading may be injurious to financial health. Also, brokerages that derive revenues from payment for order flow driven by retail investor transactions must prominently mention that fact. A warning label may counteract the overly positive messaging that we see today and complement other measures.

9. **Licensing requirements for social influencers should distinguish between general and personal advice, with limited licensing requirements for the former.**

   There are various approaches being considered for licensing social influencers, as we discussed in the previous section. We believe licensing requirements should be agnostic to platforms, but regulators could make a distinction between general and personal advice, with a limited licensing requirement for the former.

1. INTRODUCTION

Gamification has permeated our lives over the last decade. From corporate training programs and e-commerce reward systems to more sophisticated applications in health care, gamification is used in a wide variety of settings.

We are not surprised, therefore, that gamification is increasingly used in financial services. Many financial firms offer simulation tools with virtual money, combined with reward systems and leader boards, to help beginners who are learning to invest. Further, some brokerages have gamified the experience of stock market trading. Together with the overall growth in retail investing, these developments have significant implications for capital markets.

In this report, we discuss the digital engagement practices of firms that are sometimes combined under the umbrella term *gamification*. While some readers will be familiar with many of them, we will supplement the popular practices with some of the practices we have observed elsewhere, outside the brokerage industry. We touch upon the influence of social media on stock markets across the world. We also discuss salient findings from our CFA Institute Investor Trust Study (Trust Study), which surveys investor use of trading apps and digital platforms (among other things), including investors' attitudes and opinions on behavioural nudges and motivations for trading. We address the ethical and investor protection issues related to gamification, as well as the potential systemic impact on capital markets. Finally, we propose measures that regulators, standard setters, and the industry could adopt to ensure these innovations are used wisely and any negative repercussions are managed.

The remainder of our report is structured as follows: In Section 2, we describe the theory behind gamification. In Section 3, we cover the varied gamification practices used by firms. In Section 4, we discuss the role of social media in stock market trading, with global examples. In Section 5, we document the findings from research studies on gamification and behavioural nudges, including the wider use of mobile apps and other trends. In Section 6, we discuss the ethical and investor protection concerns arising from gamification. In Section 7, we describe the varied regulatory responses to these concerns, and in Section 8, we make our own recommendations. We end with concluding remarks in Section 9.

2. THEORY: GAMIFICATION AND BEHAVIOURAL FINANCE

We begin with a brief look at the theory behind gamification and how gamification differs from behavioural nudges and traditional marketing techniques.

In simple terms, gamification is the practice of infusing game elements into nongame contexts to encourage engagement with a product or service.[2] Historically, such engagement meant more time on a platform, leading to better advertising revenues[3] or more direct sources of revenue.[4] But gamification has been incorporated into the widespread adoption of nudges to change individuals' behaviour.

Conventional understanding of saving and investing is that individuals save money and invest it to save for future expenses, such as large purchases, emergencies, retirement, and bequests. These insights have been formalized in the standard life-cycle theory first proposed by Franco Modigliani and Richard Brumberg in 1954. Describing this theory, Nobel Laureate Angus Deaton (2005) wrote, "By building up and running down assets, working people can make provision for their retirement, and more generally, tailor their consumption patterns to their needs at different ages, independently of their incomes at each age." The alternative, behavioural life-cycle theory, says that we spend and save not only to maximize utility but also to derive expressive and emotional benefits (for more details, see Statman 2019). For instance, many individuals derive emotional benefits from saving and consider it a virtue.

Standard life-cycle theory predicts that individuals can estimate their wealth accrued over a lifetime and spend "permanent income," roughly average income, each year even as their yearly income fluctuates. According to this view, individuals make rational decisions without the need for policy intervention.

[2]Refer to the *Oxford English Dictionary* definition in the executive summary of this report.
[3]FarmVille, a Facebook app developed by Zynga, is an example. For readers unfamiliar with FarmVille and the business model, a 2011 article by *Forbes* provides an excellent explanation: https://www.forbes.com/sites/erikkain/2012/02/01/betting-on-farmville-facebook-ipo-reveals-how-the-social-media-giant-makes-money/?sh=1b1d9e1a162f.
[4]Fortnite generated sales of over $5.8 billion in 2021 for Epic Games, even though the game is entirely free.

However, if in reality they find it difficult to match spending to "permanent income" and if left alone, individuals fail to adequately save and invest in an optimal manner, there might be room for successful interventions. So-called nudges are a way to make behavioural biases work for (as opposed to against) investors. Gamification can be a powerful tool for nudging individuals into saving more. Many budgeting and personal finance apps have been gamified, by adding giveaways when budgets are checked or money is invested. Some microsaving apps combine traditional nudges—such as automatically saving loose change or discounts—with gamification features, such as sweepstakes.[5]

Nudging and gamification influence individual behaviour in different ways. Nudges take advantage of our biases—for example, the extensive use of default options in product choices stems from our status quo bias—and gamification appeals to human motivation. One of the most influential theories behind gamification is the self-determination theory, which suggests that human beings are inherently proactive, with a strong desire for growth, but the external environment must support this (Deci and Ryan 2012). The theory suggests these needs fall into three categories—(1) competence or mastery, (2) relatedness or social connection, and (3) autonomy or the need to be in command of one's life. In the investment context, self-determination theory, which underpins gamification, may explain the rise and prevalence of self-directed trading. In one of the earliest works on adapting gameplay practices to work, Charles Coonradt (1984), in *The Game of Work*, outlines five reasons why hobbies are preferable to work—clearly defined goals, better scorekeeping, more frequent feedback, a higher degree of personal choice, and consistent coaching. These features are frequently found in gamification techniques. Ultimately, games—and gamification—tap into fun, and a well-designed game is, as one commentator put it, "a guided missile to the motivational heart of the human psyche" (Werbach and Hunter 2020, p. 10).

Gamification is frequently used in marketing but differs from traditional marketing techniques, such as advertising. Gamification influences behaviour, while advertising influences thoughts, attitudes, and beliefs. In advertising, the behaviour of the consumer can be interpreted as deriving from an instilled attitude toward the product. Gamification, in contrast, promises a more direct way of influencing behaviour (Schrape 2014).

In sum, gamification, nudges, and marketing techniques work together to increase engagement with firms' products and services.

In the next section, we examine a cross-section of gamification practices used by firms. For simplicity, we combine gamification and behavioural nudges under the umbrella term *gamification*, but we treat marketing techniques separately.

3. GAMIFICATION AND MARKETING PRACTICES USED BY FINANCIAL SERVICES FIRMS

In this section, we review some of the most commonly used gamification techniques, including aesthetics and presentation of information, leader boards and social aspects of trading, notifications, and practices that increase convenience. We also cover marketing and advertising practices.

User Experience (UX) Design, Aesthetics, and Presentation of Information

Intuitive app design and visually appealing presentation of information are inextricably linked with gamification. Interfaces of many trading apps are clean, with a modern colour palette, and punctuated with colourful confetti. Some of these features were perfected in the gambling world, where designers work with colour, light, animation, sound, and space (Schüll 2012, Chapter 2). For example, graphic engineers strive for pleasing tones, imagery, and animation—nothing that would jar a patron at play—while audio engineers create digitised soundtracks to simulate cascading coins, features found in some trading and other apps.[6] German regulator BaFin found that behavioural cues—aesthetic and auditory cues—were used excessively by some investment firms. These included motivation elements, such as cash bells ringing for successful sales and showers of sparks

[5]Jar, an Indian microsaving app, combines automatic saving, Indians' preference for buying gold, and gamification features. For more information, go to www.myjar.app/blog/what-is-jar-app.

[6]An Indian reward-based credit card payment app encourages users to play sweepstakes using credit card points in exchange for variable rewards. It uses extensive visual imagery and acoustics to keep users engaged.

for bonus shares. Apps also use dark patterns,[7] including the use of bright colours for buying and selling but grey or nearly invisible buttons for canceling orders (European Securities and Markets Authority 2022).

Trading apps that prominently display price charts with animations that generate excitement may encourage investors to chase trends, while those that display a combination of long-term performance, analyst reports, and price targets may curb those tendencies. On Robinhood, the price of bitcoin was rendered in an attractive shade of pink, and stocks with the most prominent price action—frequently, penny stocks—were featured prominently on the front interface (Werbach and Hunter 2020).

Leader Boards and Social Aspects of Trading

Trading apps facilitate the social utility of trading in many ways. For example, some of these trading apps allow users to record trading actions, such as via screenshots, which allows users to post them on social media, leading to commitment[8] and what we call "entrapment," as we discuss in the next section. This is contrary to the tack many other trading and banking apps take, where users are prohibited from taking screenshots or copying text in their apps for security reasons.[9]

Leader boards are a significant feature of many trading apps. Some showcase successful traders on their platform based on popularity (most copied) or most recent performance—typically, over the last month or over the past two years—and allow others to copy their trades, sometimes for a fee (we discuss copy trading in the next subsection).[10] A version of this is a broker-aggregator model, which allows users to link their trading account, "spy on the best traders," and receive an alert when these traders make a trade.[11] Other apps reward users with the most transactions with attractive cash prizes.[12]

Copy Trading

Copy trading allows investors to trade by automatically copying another investor's trades. The capital markets regulator in the United Kingdom, the Financial Conduct Authority (2016), classifies copy trading as "portfolio or investment management where no manual input is clear from the account holder."

Copy trading institutionalises imitation, which has been studied extensively in the financial literature. Informational cascades, a term for imitation, are a factor behind such things as bank runs, the success/failure of IPOs, and competition for takeovers (Bikhchandani, Hirshleifer, and Welch 1992). In a 1986 study, Robert Shiller and John Pound found evidence consistent with a herd mentality among institutional investors. Specifically, they determined that purchases of stocks with large price run-ups were motivated by the advice of others (other investors, newsletters), while purchases of stable stocks were driven by fundamental research (Shiller and Pound 1986).

In a financial market setting, where assets are volatile and it is extremely difficult to distinguish between luck and skill over short time periods, imitation could have stark implications. Over short horizons, a large excess return is typically an outcome of taking larger risks, regardless of whether it is backed by skill. Apesteguia, Oechssler, and Weidenholzer (2020) conducted a study in an experimental setting and found that merely learning about the success of others led to an increase in risk-seeking behaviour among participants. The study consisted of three parts. In the first part, the researchers noted the risk preferences of participants. The second part was composed of two blocks of investment decisions. In the first block, participants were asked to choose one asset among several, which evolved according to a Brownian motion with different risk–return characteristics. In the second block, participants were confronted with the same problem but with three components: the "baseline" setting, which was a repetition of the first block; an "info" setting, where participants were given information on the outcome of the investment

[7]Dark patterns are deceptive online interface designs that are used to trick people into making decisions that are in the interests of the online business but at the expense of the user. See Oxera (2021).
[8]In this context, commitment means locking individuals into following a plan of action that they might not want to engage on but that they know is good for them (Dubner and Levitt 2007).
[9]See the post "Android Can't Screenshot Big Problem" on Reddit at www.reddit.com/r/etrade/comments/l9suzx/android_cant_screenshot_big_problem/.
[10]See, for example, eToro's "Top Traders" webpage: www.etoro.com/discover/people/results?copyblock=false&period=LastTwoYears&popularinvestor&isfund=false&gainmin=0&gainmax=100&maxdailyriskscoremin=1&maxdailyriskscoremax=7&maxmonthlyriskscoremin=1&maxmonthlyriskscoremax=6&sort=-copiers&page=1&pagesize=20&preset=preset_one.
[11]https://kinfo.com.
[12]For example, easyMarkets: www.easymarkets.com/int/trading-competition-leaderboard/.

decisions and outcomes of the first block; and a "copy" setting, where participants could copy others, if they wished. In the third part of the experiment, the study asked participants their preferences on risk and their tendency to follow others.

Apesteguia et al. (2020) found that participants in the "info" setting shifted to riskier assets compared with the baseline. In addition, 35% of participants in the "copy" setting chose to copy someone in the list, and of these, 88% copied someone who had chosen the riskiest possible asset in the first block. Strikingly, participants who were *more* risk-averse based on their stated preferences tended to copy others and yet ended up taking higher levels of risk.

Notifications and Other Calls to Action (CTAs)

Trading apps may provide timely calls to action and may be beneficial if the information is value relevant. However, they may also encourage excessive trading.

Notifications that bring attention to the biggest movers of various financial instruments—positive or negative—can act as a powerful call to action. One study found that stocks with the highest Robinhood ownership had a higher increase in aggregate selling activity after a positive 5% daily price change (a threshold that triggers a notification)—and no significant difference in aggregate selling activity after a negative 5% daily price change—compared with stocks with low Robinhood ownership (Glaze 2022). The tendency to sell winners early and hold on to losers, called the "disposition effect," can lead to poor investor outcomes.

From a design perspective, in some apps the trade button is displayed prominently as a call to action even when investors search for stock information, whereas other apps may separate the "learning" and "trading" phases, and users cannot see the trade button as they search for stock information (Wang 2021).

Practices That Increase Convenience (or Reduce Frictions)

In this section, we discuss the behavioural effects of zero-commission trading, account opening and due diligence requirements, and fractional share trading.

Zero-Commission Trading

Zero-commission trading is part of a long-term trend toward lower trading costs across major markets but represents a paradigm shift from a behavioural perspective. In the United States, for example, Robinhood was at the forefront of zero-commission trading, but traditional discount brokerages followed suit and started offering it in late 2019. Retail trading at traditional brokerages increased significantly in the aftermath,[13] even before the pandemic brought in a new wave of first-time investors.

The significant increase in trading volumes as a result of zero-commission trading is the result of the zero-price effect. The zero-price effect is a phenomenon where the demand for a free good or service is significantly greater compared with a negligible but non-zero priced one. One explanation for the zero-price effect is the certainty offered by a zero price. Kahneman and Tversky's (1979) early work on utility shows that people overweight their preference for certainty relative to uncertain outcomes. In an oft-cited study on this topic, Shampanier, Mazar, and Ariely (2007) surveyed literature from various disciplines and conducted a series of supporting experiments, which gave rise to the term *zero-price effect*. Their empirical studies found that pricing an item at zero increases its inherent value for consumers, which accounts for the increased demand for it. They reasoned that this phenomenon is due to the affect heuristic, a mental shortcut that allows people to make decisions influenced by current emotions. In their words, choices "with no downside (no cost) invoke a more positive affective response, [and] consumers use this affective [response] as a decision-making cue" (Shampanier et al. 2007, p. 751).

In real-world settings, for example, people often prefer insurance policies that offer limited coverage with zero deductibles over comparable policies that offer maximal coverage but with higher deductibles, even if the latter have a greater expected value.[14] Research—and intuition—on free shipping suggests many people prefer it, even if they may pay for it in other ways, including higher prices (Frischmann, Hinz, and Skiera 2012).

There is significant research on whether traders pay for commission-free trading in the form of worse execution quality, and the evidence is mixed. CFA Institute performed a study on the execution quality of

[13]See Goepfert (2020). E*TRADE's Daily Average Revenue Trades (DARTs), partly a misnomer after commissions were made free, went up from around 250,000 to 450,000 in the four months following the decision to offer commission-free trading.
[14]Richard Thaler and Cass Sunstein (2021) discuss this deductible aversion extensively in their book *Nudge: The Final Edition*.

the UK market before and after the Financial Services Authority made the ban on payment for order flow (PFOF) arrangements explicit in 2012. It used a dataset of 50 stocks traded on the London Stock Exchange (25 large-cap and 25 small-cap stocks). The study showed that the explicit prohibition of PFOF had caused retail-sized order execution to become more competitive (in the form of a higher proportion of trades executing at the best quoted prices) and that the prohibition was positive for market integrity (Rosov 2016). This conclusion ties with similar evidence in at least the Dutch and Spanish markets and was cited by the European Securities and Markets Authority (2022) in its recent consultation on retail investor protection. However, such findings are not unanimous; some studies performed using US data did not find evidence for investor harm from PFOF arrangements. These mixed conclusions likely reflect differences in local market structures (see, e.g., Adams, Kasten, and Kelley 2021).

Even if the evidence of execution quality across markets is mixed, the harmful effect of excessive trading on the financial health of largely uninformed investors, at the expense of long-term wealth creation—driven in no small part by zero commissions—is clear.

Account Opening, Due Diligence Requirements, and Use

There has been much commentary around trading apps defaulting customers to margin accounts instead of cash accounts, with commentators calling for regulators to restrict this practice (Morningstar 2021). Similar practices can be seen in at least one other setting. For example, many banks offer overdraft facilities by default, and research commissioned by the UK Financial Conduct Authority (FCA) found that consumers saw overdrafts as entitlement and not as debt because firms often included overdrafts within the "funds available," positioning the debt as part of the consumer's balance (Jigsaw Research 2014; AFM 2016).

The bank overdraft default example also shows the limitations of regulatory responses around choice architecture. To protect consumers, US regulators introduced a provision whereby customers had to opt in to overdraft coverage. Banks, which opposed the change, responded by using a range of behavioural techniques to counter the default. For example, they introduced quick push buttons in ATMs for opting in and telephoned target customers directly. They used such social norms as "most of our customers have taken up overdraft coverage." They also framed overdraft products as "account protector," "courtesy pay," or "bounce protection" (Australian Securities and Investments Commission 2019).

In terms of convenience, default margin accounts are only the start. Firms may loosen due diligence requirements before approving customers to trade options and other complex strategies. In an extreme case, Robinhood relied on software bots that automatically approved requests that were flagged by its clearing firm and was penalised by FINRA in mid-2021 for doing so (Kelly 2021).

Ease of trading is another practice that increases convenience. Borrowing from e-commerce platforms, some trading apps allow users to purchase stocks in one click by entering the amount, rather than the traditional three-step process of placing an order, reviewing it, and confirming it. In India, some trading apps allow users to apply to an IPO by entering the desired number of lots in WhatsApp, a popular communication app, in the same way some Indian e-commerce platforms allow users to order groceries through WhatsApp.[15]

Case Study—Practices of an Indian Online Brokerage

A large Indian online brokerage leverages behavioural finance with a view toward investor protection. In noted psychologist Daniel Kahneman's parlance, most brokerages use behavioural science to activate System 1, or intuition, but this brokerage leverages it to activate System 2, or reflection.

For example, any transactions below a certain market cap, which mostly relate to penny stocks, need a two-level authentication process using third-party authenticator apps, which clients need to install first. This authentication process is designed to slow down the transaction and introduce frictions into decision making. In addition, borrowing the self-exclusion idea from casinos, the brokerage introduced a voluntary kill switch in the app that when activated by traders, excludes them from transacting for at least 24 hours. Lastly, the app provides just-in-time disclosures in simple words prior to the transaction confirmation for riskier stocks—the time when the trader pays the most attention.

[15]See, for example, Motilal Oswal's webpage titled "Open Demat Account and IPO Application on WhatsApp": www.motilaloswal.com/blog-details/motilal-oswal-allows-ipo-application-and-demat-account-opening-through-whatsapp/20472.

Fractional Shares

Fractional shares are an innovation that allows customers to invest small amounts in stocks that are priced in high denominations. To facilitate this practice, brokerages maintain a limited inventory of securities or purchase a share in the open market. Dividends and voting rights are apportioned pro rata for all shareholders. And customers who own fractional or whole shares are treated in a substantially similar way during corporate events such as stock splits.[16]

Fractional shares may lead to increased trading volumes. In an extreme case, they also led to a large dichotomy between reported and actual trading volumes—in other words, phantom volumes. A study that investigated the surge in reported volumes in Berkshire Hathaway's A-shares (BRK-A)—a share trades at one of the highest prices in stock markets, around $450,000—found that almost 80% of the volumes were phantom volumes, caused by a combination of Robinhood trading, fractional shares, and FINRA's round-up rule. In this instance, Robinhood allowed traders to invest as little as $1 in BRK-A stock. Each fractional trade was required to be reported separately to a FINRA trade-reporting facility. In an ideal case, the brokerage would report the fraction or round up to the nearest decimal. However, FINRA required brokerages to round up any fractional shares to the nearest whole share, resulting in a large dichotomy between reported and actual volumes in BRK-A. This situation also caused dislocations in the relationship between Berkshire's A- and B-shares, missed arbitrage opportunities for a confused market, and higher trading costs (Bartlett, McCrary, and O'Hara 2022).[17]

While Berkshire may have been an extreme case, another study examined the impact of fractional share trading on retail ownership and trading of high-priced stocks by using an event study that exploited the sequential introduction of fractional shares trading at four brokerages beginning in 2019 (Da, Fang, and Lin 2021). The study found that the impact is mixed. On the one hand, fractional share trading reduced fragmentation of the investor base among high-priced stocks, such as certain large technology stocks and Tesla, by making these stocks more broadly accessible to the investor base. Fractionalisation can also counteract nominal price illusion—the perception that low-price stocks are more likely to appreciate than high-price stocks—which partly explains the popularity of penny stocks among retail investors. On the other hand, by improving access to stocks that are prone to social media influence, fractional share trading could contribute to volatility by exacerbating momentum trading or herding. The study also found evidence of stronger reversals after stock split announcements in these stocks—evidence that firm insiders take advantage of the stock run-up due to fractional trading by uninformed investors to sell their own equity post-announcement (Da et al. 2021).

Outside the United States and other select markets, fractional trading is not the norm because of practical challenges around ownership. In the United States, for example, brokerages typically hold the shares of the customer in the name of the brokerage, but the client retains ownership rights ("street name"). However, in most markets, the shares are held in the name of the custodian or direct registration in dematerialised form. Therefore, the brokerage has to work with other intermediaries to offer fractional shares, which complicates the process.

Marketing and Advertising Practices

In this section, we cover some of the marketing practices that complement gamification techniques.

Free Shares

Free shares at signup and via referrals are the most popular method for adding users. Some trading apps have gamified the experience, with users randomly allotted a share from the brokerage inventory but only after they scratched off images that looked like a lottery ticket (Popper 2020).

Evolving Narratives in Advertisements

As we described in our theory of gamification, gamification influences behaviour, while advertising influences thoughts, attitudes, and beliefs. Therefore, advertising narratives complement and reinforce the desired attitudes among investors, and it is important to understand how the narratives in advertisements evolved over time to support gamification and self-directed trading.

Brokerage advertisements traditionally focused on the spectrum of services offered, research capabilities, customer service, and low commissions. A 1990s

[16]For a detailed description, see, for example, Robinhood's response to SEC comments on its S-1 filing: www.sec.gov/Archives/edgar/data/0001783879/000162827921000280/filename1.htm.

[17]FINRA reporting rules required Robinhood and DriveWealth (two of the largest brokers for fractional shares) to report each fractional trade for BRK-A—even if backed by only a dollar of real money—as a one-share trade of a roughly $500,000 stock.

advertisement of a discount brokerage claimed how it helps investors help themselves with up-to-date information on firms' earnings and 24/7 customer support.[18] Another described the features of a company's trading terminals.[19] One even warned investors about not jumping the gun on rapid stock market rises.[20]

Advertisements of newer discount brokerages emphasise access, freedom, and convenience. Robinhood advertisements feature a young and diverse clientele with the message that everyone is born an investor, which is supportive of self-directed trading.[21] Others emphasised zero commissions and joining rewards.[22] One compared the ease of trading favourably with riding an escalator.[23] These narratives are in line with the evolving business practices and target audience, and they aim to influence attitudes toward trading.

4. ROLE OF SOCIAL MEDIA IN STOCK MARKET TRADING

Stock market investing has always been a social activity. Benjamin Graham famously described stock markets as a voting machine over the short term and a weighing machine over the long term. Economist John Maynard Keynes likened stock markets to a beauty contest, where the value is based not on fundamentals or even on investor beliefs but on what investors believe to be the average opinion of the asset or even higher-order beliefs. Keynes (1936, p. 156) wrote,

> It is not a case of choosing those [faces] that, to the best of one's judgment, are really the prettiest, nor even those that average opinion genuinely thinks the prettiest. We have reached the third degree where we devote our intelligences to anticipating what average opinion expects the average opinion to be. And there are some, I believe, who practice the fourth, fifth and higher degrees.

We have already seen some evidence of this search for average opinion, such as in Robert Shiller and John Pound's 1986 study where institutional investors relied on the advice of others for purchases of stocks with high saliency. However, a more recent study found that it was uninformed investors who relied on investment-related internet postings when making investment decisions, but the information from those postings did not help them identify superior investment strategies (Ammann and Schaub 2020).

Social validation, therefore, is a feature of stock market investing, but social media amplifies it in two ways. First, social media allows opinions to percolate, diffusing information faster, across a larger set of investors, mediated by influencers. Social media forums, such as WallStreetBets,[24] allow users to post their opinions on salient stocks and coordinate their actions in real time.

Second, social media makes investment intentions transparent and creates a strong feedback cycle to follow through at the risk of others' judgment. Social media provides users with opportunities for validation and influence but also facilitates investment actions that may not be beneficial to users. To prevent misleading statements, particularly from influencers, some social media platforms require users to post screenshots of their trades as evidence to support their claims. These screenshots, in turn, become akin to a "commitment device." For example, during the GameStop mania in early 2021, WallStreetBets users convinced other users to hold on to meme stocks and posted screenshots, as evidence of their commitment, even as the share prices were falling (Harwell 2021). Commitment devices are a way to lock individuals into following a plan of action that they might not want to do but that they know is good for them (Dubner and Levitt 2007). These devices are used in many settings, such as piggy banks, public New Year's resolutions, and health apps that allow users to share their statistics with their social network; such devices are intended to help improve outcomes for the user.

However, a commitment device in a trading setting may be harmful. To commit to hold on to a stock at all costs directly conflicts with the concept of stop-loss, an important risk management technique. One study showed evidence of the disposition effect by traders providing financial advice in an online environment

[18]Charles Schwab commercial: https://www.youtube.com/watch?v=MeZM4wxD89U.
[19]ICICIdirect.com ad from 2012: www.youtube.com/watch?v=g2koXoJ7CCE.
[20]E*TRADE ad from the 1990s: www.youtube.com/watch?v=hm8_MFdFpeE.
[21]Robinhood Super Bowl commercial from February 2021: www.youtube.com/watch?v=QBbJMf0oxAU.
[22]Webull Singapore commercial from 2022: https://www.youtube.com/watch?v=yLYY_4sPPSY.
[23]Upstox commercial from 2021: www.youtube.com/watch?v=6LaAfUScKLw&feature=youtu.be.
[24]Similar groups are active in other parts of the world. In South Korea, users tried to take down short-selling hedge funds and failed in this quest (Jae-hyuk 2021). In India, Telegram is the favoured social media platform for day traders.

and suggested leader-traders are more susceptible to the disposition effect—a tendency to hold on to losers and sell winners quickly—than traders who are not being followed by other investors. This "bias may be explained by leaders feeling responsible to their followers, by a fear of losing followers when admitting a poor decision, or by an attempt … to manage their social image" (Pelster and Hofmann 2018, p. 75).

This last aspect, social image, is important. In the book *You and Your Profile: Identity after Authenticity*, philosophers Hans-Georg Moeller and Paul J. D'Ambrosio (2021) distinguish three forms of identity: (1) sincerity, or conformity to the roles we are born into and that are still practiced by traditional societies; (2) authenticity, which rejects conformity in favour of individualism and formed the backbone of much of the 20th century; and (3) "profilicity," where our identity is constantly curated and submitted for approval by others—primarily strangers. The need for social approval explains much of what are otherwise irrational actions on social media, such as the tendency to take high risks to stand out in the crowd and the tendency to hold on to large losses for fear of disapproval.

We have also seen the increasing trend of social media influencers advertising financial products. These celebrities have the capacity to reach out to millions of social media users and spread misleading information to potential investors. Influencers are often paid by financial entities to advertise their products on their social media channels. An AFM (2021) study on finfluencers found that "finfluencers make investing more accessible but do not always put the interests of their followers first," and some promote risky products. AFM also found that "[t]here are few finfluencers who post neutrally, and transparency is often lacking" (AFM 2021). Transparency in terms of compensation arrangements is critical because in some cases, influencers were even paid in shares or participated in funding rounds, which increased their "skin in the game" (Live Mint 2022).

Social media can also be a fertile ground for fraudsters peddling spurious stock tips and other scams.[25] But these are in the realm of traditional regulatory supervision and can be managed with better enforcement tools and other mechanisms.

In **Exhibit 1**, we summarise the practices we have discussed thus far, along with the possible behavioural explanations. In the next section, we present some findings around gamification and the use of behavioural nudges from our Trust Study.

5. GAMIFICATION: RESULTS FROM INVESTOR TRUST STUDY

In this section, we document some of the survey findings from our biennial Investor Trust Study. The survey data provide insights on retail investors' interests in and use of trading accounts and platforms, which inform our analysis of gamification.

CFA Institute has been actively researching evolving retail market trends over the past decade and their implications for investor trust and market integrity. In our fifth biennial Investor Trust Study (select findings from the study are found in CFA Institute 2022a), we surveyed more than 3,500 retail and 976 institutional investors across 15 markets on their overall trust in financial services, the drivers of trust, investors' use of digital platforms, and their opinions on gamification and cryptocurrencies.

We found that overall trust in financial services is at an all-time high—among retail investors, 60% expressed high or very high trust in financial services (86% for institutional investors)—and technology is a significant driver of this trust.[26]

We were not surprised to find in our survey that millennials lead the way in the use of retail trading accounts and apps. As shown in **Exhibit 2**, approximately two-thirds of investors under the age of 45 have trading accounts, compared to 54% of retail investors overall. Across age groups, one-fifth of the users self-reported entertainment/speculation as the primary reason for using a retail trading account, with the other four-fifths citing investing to meet long-term goals as the primary reason.

Individuals derive pleasure from trading, and a way to interpret the statistics is that most investors derive both pecuniary and nonpecuniary benefits. In at least 20% of the cases, the nonpecuniary benefits dominate pecuniary benefits.

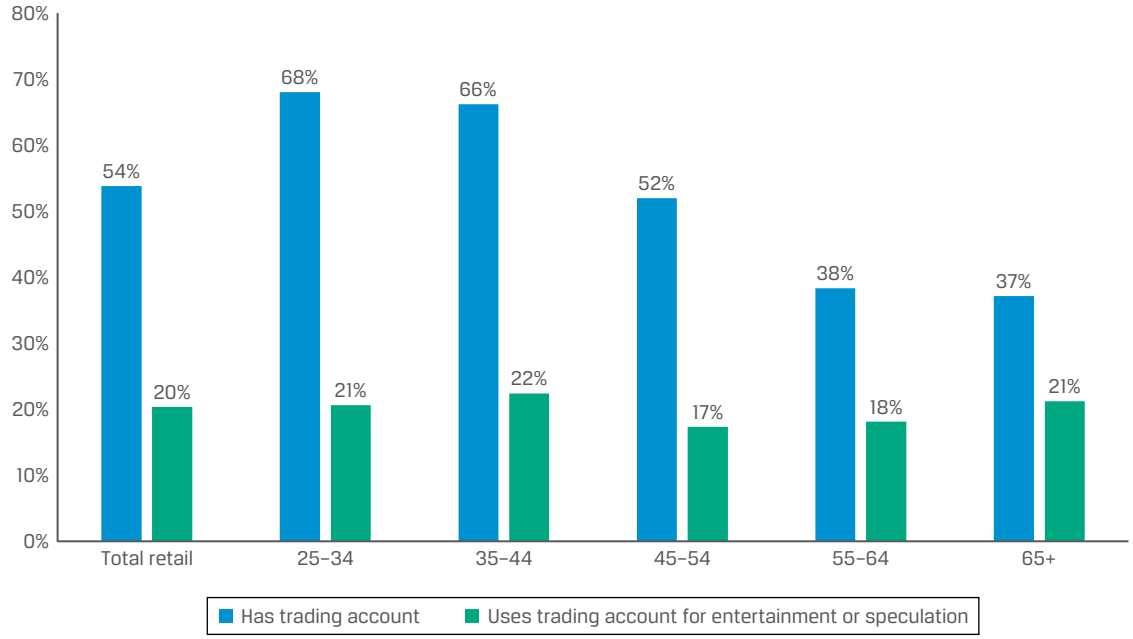
Gamification, as we have seen, has been used in a number of settings, both in and outside financial services. It has been so effective and has generated concern in a trading setting—compared with, say,

[25]For example, earlier this year, the Securities and Exchange Board of India (2022) fined five individuals for profiting from a frontrunning scam through their Telegram channel "bullrun2017."
[26]See CFA Institute (2022a) for further details.

EXHIBIT 1. SUMMARY OF PRACTICES OF MARKET INTERMEDIARIES AND POSSIBLE BEHAVIOURAL EXPLANATIONS

Number	Practice	Possible Behavioural Explanation	Comments
1	UX design	Anchoring, contrast effect	Order of presentation of information (top mover lists, for example) can influence decisions. Use of colours (bright versus grey) can increase contrast and influence decisions.
2	Copy trading/ leader boards	Imitation/herding, disposition effect	Imitation or herding is one of the first recognized and most powerful behavioural effects in finance. Disposition effect (holding on to losers) evidenced among leaders hoping to avoid reputation loss among followers.
3	Notifications around price moves	Disposition effect	Winners sold off more quickly than losers, based on notification on significant price moves.
4	Zero-commission trading	Zero-price effect	Pricing an item at zero appears to increase its intrinsic value.
5	Default margin account	Status quo bias	Tendency to stay in the default choice
6	Fractional share trading	Counteracts nominal price illusion	Belief that low-priced shares are more likely to appreciate than higher-priced shares
7	Posting trades in social media	Commitment device	Locking oneself to a plan of action—holding on to a losing trade—even if it is a poor choice from a risk management perspective

EXHIBIT 2. USE OF TRADING ACCOUNTS AND PRIMARY REASON FOR USE



Source: 2022 CFA Institute Investor Trust Study.

saving for retirement—because the underlying activity is pleasurable and thought of as a game itself, with its attendant features of quick feedback and uncertain outcomes.

In our Trust Study, we found no difference among age groups on the reasons to trade but found stark differences in the levels of trust in digital nudges—a full 92% of investors aged 25–34 trust digital nudges, compared with 33% of investors over 65 years old (see **Exhibit 3**). Three-quarters of those aged 25–34 also reported that the use of digital platforms and apps increased their frequency of trading, a topic we discuss more in the next section.

When asked whether digital platforms and tools enhance their understanding of investing, 87% of those aged 25–34 (compared with 36% of those aged 65 or older) responded yes. Younger investors are also far more trusting of information on complex financial products than older investors. These findings underscore the significance of digital platforms in increasing access to markets for new investors—broadening market participation—as well as their role as a primary source of investing information. However, precisely for this reason, the quality of information provided through trading platforms is worth scrutinising by investors. When it comes to delivering information, context matters. For example, we take less time to process information on screen than on paper, and a smaller screen size is correlated with lower reading time and more time spent scrolling for information (Chae and Kim 2004). Other research suggests we learn far less from watching a video on a small screen than on a large one. Therefore, while our survey captures perceptions about the ability to learn from retail trading platforms, users' experiences might diverge from actual learning outcomes (Maniar, Bennett, Hand, and Allan 2008).

Lastly, we asked our respondents whom they trust the most to provide investment advice. In response to this question, 65% of retail investors with an adviser cited their financial adviser. In comparison, only 5% of these investors said social media was their most trusted source of advice (9% for retail investors without an adviser).

We also found that online research is the dominant source of investment advice for those retail investors who do not have an adviser (32% of such investors cited online research as their most trusted source of advice). In comparison, 17% of retail investors without an adviser cited academic experts/books as their most trusted source of advice (second to online research).

The low level of reliance on social media as a primary source of advice among the surveyed retail investors is encouraging. It suggests that although social media influencers pose risks, only a small proportion of investors are likely to rely on such recommendations.

Also, the preference for online research over books/academia suggests the content of the former is timelier and more accessible (and likely mostly free). However, individuals relying on online research may struggle to discern between high-quality, value-relevant information and spurious or simply false information. Such risks are typically lower when relying on books (which undergo a review process) or academic expertise more generally.

EXHIBIT 3. 2022 CFA INSTITUTE INVESTOR TRUST STUDY: USE OF TRADING ACCOUNTS AND ATTITUDES TOWARD THEM

	Total Retail	25–34	35–44	45–54	55–64	65+
Has trading account	54%	68%	66%	52%	38%	37%
Trust in digital nudges	74%	92%	86%	72%	51%	33%
Retail trading tools/apps enhance understanding of investing	71%	87%	82%	66%	49%	36%
Trust completeness and accuracy of information about complex financial products	61%	80%	73%	55%	33%	25%
Retail trading tools/apps increase frequency of trading	57%	75%	73%	56%	28%	10%

Source: 2022 CFA Institute Investor Trust Study.

6. IMPLICATIONS OF GAMIFICATION

So far, we have discussed the theoretical underpinnings of gamification and reviewed the various gamification and related practices market intermediaries use, along with the behavioural biases they activate. In this section, we discuss the ethical, market, and corporate governance implications of gamification.

Ethical Implications

In recent years, many commentators have hailed increasing retail investor participation and self-directed trading, aided by gamification, as a democratisation of investing. We can point to the benefits of gamification in terms of learning about capital markets broadly—and various investment strategies specifically—through simulation platforms. Proponents of this democratisation of investing frame the outcome—increased trading—as a choice. "Let the people trade" is not only a slogan from people who profit from increased trading, but it also resonates with many investors who believe in free and unfettered capital markets. As we described in the introduction, gamification attracts younger audiences, those at a stage of their lives when they can and should take investment risks. We discuss three ethical concerns around gamification and offer our view on what constitutes ethical conduct.

Gamification May Circumvent User Choice

Gamification has its share of critics, many of whom doubt its aims and values. Ian Bogost (2011), video game designer, academic, and one of gamification's fiercest critics, termed it *exploitationware*, to associate it with better-known practices of software fraud and situate it in the larger set of pernicious practices in the high-tech marketplace. Several scholars, including Bogost, have claimed that gamification uses points, badges, and leader boards—the least important element of games—rather than its content: the story, information, and experience.

In the trading context, gamification elements, including the UX design, leader boards showcasing successful traders, and other techniques, are designed to attract user attention and immediate action that would lead to higher short-term revenues for the intermediaries rather than to engender thoughtful and deliberate decision making that would serve the investor over the long term. Others argue that the absence of useful content is how it is meant to be and that the goal of gamification is to support value creation by the users themselves, by offering them gamelike experiences (Huotari and Hamari 2012). Seen in this light, it is not clear how much true choice users have in a gamified trading environment.

Ethical Considerations around Nudging and Choice Architecture

Behavioural nudges and choice architecture divide opinion as well. First, supporters argue that nudges lead to socially beneficial outcomes at low cost (see, e.g., Benartzi, Beshears, Milkman, Sunstein, Thaler, Shankar, Tucker-Ray, Congdon, and Galing 2017). Second, supporters claim that nudges respect choice, given that nudges do not remove the less appealing alternatives, and they simply steer the user toward favoured choices. Finally, supporters claim that there is no neutral way of framing options and that some choice architecture is inevitable. As a result, the supporters of nudge theory argue that it is better to design reasonable default options for consumers rather than present choices that may lead to suboptimal outcomes (Sunstein 2015).

For detractors, most ethical concerns around behavioural nudges revolve around autonomy. In the previous example, critics may suggest that instead of behavioural nudges, governments and companies must make every effort to make individuals aware of the choices and educate them to make better decisions themselves. In the absence of such interventions, critics worry that nudging could be a tool for governments to exercise control over individuals' choices (Schmidt and Engelen 2020).

In the trading context, investors may be defaulted into a cash account or a margin account. They may be presented with a particular set of stocks based on recent performance versus long-term performance, risks, or any other attributes more suitable to them. And investors may receive notifications and other calls to action based on their recent trades or their profile. All these choices influence investor decisions in subtle and not-so-subtle ways. Supporters would argue for better design of choice architectures. Critics may suggest that instead of regulating choice architecture—which can interfere with individual autonomy—investment intermediaries, regulators, and advisers have an obligation to increase awareness about the choices and educate investors to make better ones.

Conflict-of-Interest Considerations around Gamification

Even if investors find gamification entertaining—and are willing to accept the risks—many remain concerned that providers act deceptively, with nudges directed toward outcomes that are the most profitable for the firms without informing users in plain language of that fact.

In the context of trading, the chief concern around payment for order flow, in the context of zero-commission trading, is opacity and the existence of conflicts of interest in order-routing decisions, even if some studies suggest that retail investors benefit from lower overall costs.[27]

Similarly, in the case of social influencers, there could be clear conflicts of interest with respect to compensation that are not disclosed to users. Also, there are risks associated with fictitious accounts and social media messages driven by bots. While it is problematic to have influencers make questionable product recommendations, it is worse when they also overstate their number of followers, which is a metric that implies a greater level of credibility.

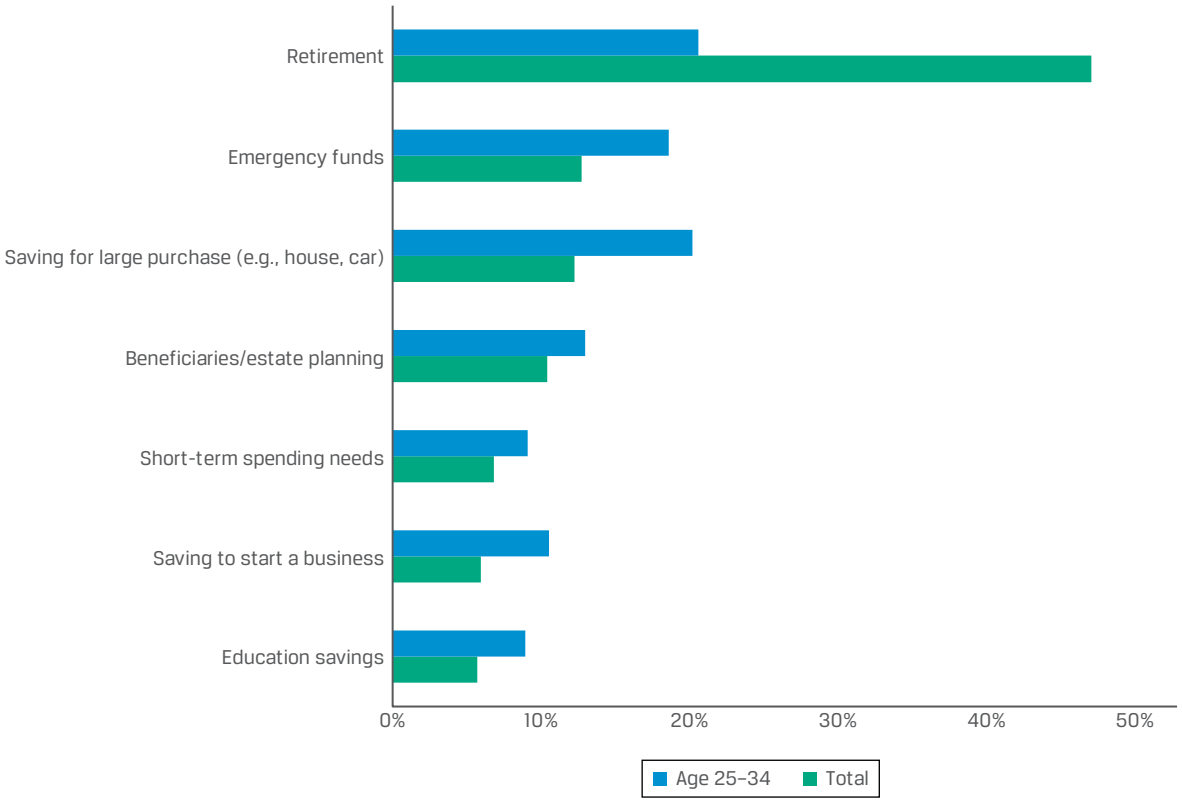
Ethical Conduct around Gamification

Despite these concerns, we believe that gamification and related activities are ethical if they do not create material harm for users and if they come with informed consent. In other words, these activities try to "influence choices in a way that will make choosers better off, *as judged by themselves*" (Thaler and Sunstein 2008, p. 5).

Investors' motivation for investing varies, but some reasons are consistently preferred over others. In our Trust Study, respondents ranked financial security needs (retirement, emergency funds) first, followed by saving for large purchases, such as a house, ahead of estate planning and short-term spending needs (see **Exhibit 4**).

Another survey that included behavioural reasons ranked financial security, nurturing family, and seeking to stay true to values as the top reasons for investing;

EXHIBIT 4. EARNING INVESTORS' TRUST: RESPONDENTS' TOP-RANKED INVESTMENT GOAL



Source: 2022 CFA Institute Investor Trust Study.

[27]Thaler and Sunstein (2021).

desire for social status came next to last, just above "other" (Statman 2019). A desire for high social status is common, even if it is not easy to admit, but overall, we can interpret these rankings as reliably reflecting investors' best intentions. In that case, gamification, which amplifies the need for social status and nudges investors away from financial security and other intentions, is problematic.

Informed consent—the second part of ethical conduct—is equally important to counteract the potential of gamification techniques to circumvent user choice. While disclosures alone will not resolve ethical concerns, we make some recommendations around taking a behavioural approach to disclosures later in this report.

Market Implications

In this section, we document studies that provide evidence of increased risk taking, discuss market infrastructure concerns arising from excessive trading, and outline potential long-term implications for investor behaviour.

Gamification Magnifies Risk Taking

We discussed how individual gamification techniques induce excessive trading, based on the behavioural biases we described as well as our own survey results. There is some evidence that gamification also magnifies risk taking. In a recent study (Chapkovski et al. 2021), researchers recruited 605 participants, most of them with self-directed trading experience, to trade a virtual asset on an experimental platform. The study found that gamification increased risk taking, particularly when trading high-volatility assets, and the effect was stronger for uninformed investors.

A part of the reason for this result could be the high trust in digital apps, in terms of providing complete and accurate information about complex financial products, especially among younger investors, as we have seen in our Trust Study. Part of the explanation could be the medium itself, the smartphone, which facilitates trading and thus contributes to risk taking. In another study, Kalda, Loos, Previtero, and Hackethal (2021) analysed the effect of smartphones on investor behaviour. The data came from over 15,000 bank clients who used mobile apps in the years 2010–2017 and comprised holdings, transactions, and, most importantly, the specific platform used for each trade (e.g., personal computer versus smartphone). The data allowed the researchers to test substitution effects by comparing trades carried out by the same investor in the same month across different platforms. The authors found that the probability of purchasing risky assets—ones with higher volatility and positive skewness—increased in smartphone trades compared with non-smartphone ones. Smartphone use also increased the probability of chasing past returns. Finally, the authors found that the smartphone effect was strong across asset classes and not limited to stocks that were featured prominently in the trading app. In other words, digital nudges did not influence this behaviour.

These findings suggest that gamification, the use of smartphones, and the underlying trading activity all potentially complement and reinforce each other.

Market Structure Issues

Gamified trading may increase systemic risks. As the SEC documented in its report on equity and option market conditions in early 2021, the extreme volatility in meme stocks resulted in heightened margin requirements to guard against increased risk of defaults (SEC 2021). The total margin requirements of nearly $26 billion across all clearing members resulted not only in trading restrictions but also in emergency capital raising of nearly $3 billion by Robinhood to stave off a cash crunch and potentially a contagion (Konrad, Haverstock, and Gara 2021). The SEC paper highlighted the risks arising from a combination of digital engagement practices (gamification) and the risk of increased trading caused by payment for order flow and suggested a shortening of the settlement cycle to mitigate the risks.

Impact of Personal and Early Experiences on Investor Behaviour

Research suggests that early economic experiences can have a lasting impact on a person's outlook. For instance, Malmendier and Nagel (2011) found that individuals who have lived through stock market crises are more likely to stay away from stock markets altogether or reduce their investments in stocks. They also found that these effects can last for several decades, even if they are weaker than more recent return experiences.

That early market experience could have a powerful influence on risk taking is true for investors in the same cohort. In 2020 in a well-publicised study, Indian researchers shed light on how new investors might misinterpret their success, using a natural experiment involving Indian IPOs. Indian IPOs that are oversubscribed by retail investors are allotted via a

lottery. The treatment group that receives an allotment and the control group that does not share similar characteristics and are separated only by chance. The study's key finding is that retail investors who were winners of the process—or allocated shares in successful Indian IPOs—mistook their good fortune as evidence of skill (Anagol, Balasubramaniam, and Ramadorai 2021). That is, the treatment group that randomly received allotments in IPOs that subsequently had a first-day pop had trading volume that was 7.2% higher than that of the control group (which did not receive an allotment). The difference in volumes faded over time but remained higher six months after the IPO (Anagol et al. 2021).[28]

The pandemic created a new class of investors, and as we described earlier, gamification techniques may be a key factor behind self-directed trading and amplified risk taking by investors. Some of these investors had better outcomes than others. The studies reviewed here show not only that the lucky ones might mistake their luck for skill and increase their risk taking but also that the risk-taking effects may last for a long time. For those who lost money, their risk aversion may linger too, to their own detriment.

Corporate Governance Implications

Historically, retail investors had little influence on corporate decisions and outcomes. In the United States, the United Kingdom, and Australia, this may be the result of large institutional shareownership. But even in markets where individual ownership is high, retail influence is low because of dispersion in ownership and apathy, as evidenced by low participation in annual general meetings and voting in proxy resolutions.

However, self-directed and coordinated trading in meme stocks, supported by gamification techniques and social media platforms, raises interesting implications for corporate governance. We discuss three implications—on shareholder activism, corporate engagement, and incentives for capital raising.

Shareholder Activism

Writing in the *Financial Analysts Journal*, William Goetzmann (2022) noted that "social media platforms have become, for millions—perhaps billions—a primary forum for personal engagement, alignment of opinion, and coordination of action. … The GameStop meme created a community that not only invested together but evidently developed and sustained a group narrative that was both combative and aspirational: One part David and Goliath the other, Jack and the Beanstalk."

He further posits that future "memocracies"—owned and governed by ideological social media communities—may emerge around other missions, such as social justice or environmental, social, and governance issues. Shareholders with a common passion for a particular purpose and coordinated social media campaigns could conceivably realign corporate strategy and behaviour in different and contradictory ways. While the shift from shareholder democracy to memocracy could reduce the agency problems associated with indirect owners (institutions), it could also shift power away from informed corporate governance to narrower concerns unrelated to shareholder value (Goetzmann 2022).

Corporate Engagement

As retail investors increasingly make their presence felt, corporate engagement may shift toward nontraditional social media channels to reach them. This change, on balance, may prove to be beneficial for shareowner rights over the long term. There are already examples of this shift happening. The CEO of a meme stock has been diligently cultivating his investors in social media, noting—correctly—that they are the owners of his company and he works for them (Provenzano 2021). The sponsors of special-purpose acquisition companies (SPACs), also popular among meme stock investors, regularly use social media to urge investors to vote on the combination.

Incentives for Capital Raising

Meme stock trading may result in share prices significantly different from their intrinsic values. This may shift the incentives for capital raising at the target firms, as well as the senior management (insider) incentive to cash out shares and options.

In an extreme case, in June 2020 the car rental company Hertz, a favourite meme stock among retail investors, attempted—and later aborted—a plan to raise capital after it filed for bankruptcy. In August 2022, a shareholder took a significant stake in Bed Bath & Beyond, another meme stock, and encouraged management to capitalise on the retailer's status as a meme stock to raise cash and reduce its debt.

[28]Note that the study (like many others) uses trading volume as a proxy for overconfidence.

There have been several instances where insiders have sold their shares after the run-up caused by meme stock trading. Since insiders have a better understanding of a company's business prospects than outside investors, these transactions, while legal, have corporate governance implications. There is a need to improve transparency around insider share sales, particularly at these companies.

7. REGULATORY RESPONSES

Gamification, social trading, and the related retail investor trends have raised a range of concerns among regulators. The responses contemplated by regulators or suggested by industry stakeholders can be broadly classified into six categories.

- Using existing regulations to tackle gamification
- Gamification as a form of investment recommendation
- Targeted regulations for gamification practices
- Disclosures
- Warnings, guidelines, and licensing requirements
- Market structure reforms, specifically around payment for order flow

Using Existing Regulations to Tackle Gamification

Some commentators have suggested that existing regulations are sufficient to handle issues arising from gamification. For example, predatory gamification might violate policies against churning, or overconsumption of trades not in the best interest of retail investors (Langvardt and Tierney 2022). Industry associations have argued that prevailing regulations covering communications (educational and advertising) to retail investors can be used to preserve the benefits of digital engagement practices and manage their associated conflicts (SIFMA 2021).

Gamification as a Form of Investment Recommendation

Some regulators are concerned that gamification blurs the line between solicited and unsolicited transactions from market intermediaries (Fleming 2021). The former is usually associated with enhanced suitability obligations. For example, under Regulation Best Interest in the United States, a broker recommendation (solicited transaction) comes with four component obligations—disclosure, care, conflicts of interest, and compliance (Fleming 2021). The European Securities and Markets Authority (2022) believes that when clients receive a notification, email, or other type of message nudging them to make a transaction in a specific financial instrument, "taking into account the personal circumstances of that client, this can be considered a recommendation. In this case, firms are required to request all necessary information from the client to perform a suitability assessment and use that information when providing investment recommendations" (European Securities and Markets Authority 2022).

Targeted Regulations for Gamification Practices

Regulating or banning some problematic gamification techniques is part of the regulatory debate, ever since the state of Massachusetts filed a complaint against Robinhood, "citing aggressive tactics to attract inexperienced investors, its use of gamification strategies to manipulate customers, and its failure to prevent frequent outages and disruptions on its trading platform" (Commonwealth of Massachusetts 2020). Dubbed as confetti regulation by some legal experts, it may involve a simple ban on dangerous features. Other approaches might involve regulating choice architecture; some commentators have called for cash defaults for brokerage accounts, instead of margin accounts, as we discussed earlier (see, e.g., Adams et al. 2021). More recently, an International Organization of Securities Commissions (2022) consultation paper asked respondents about the implications of self-directed trading and gamification and whether certain risky gamification techniques should be prohibited.

Disclosures

Disclosures are the most common response for managing a range of concerns, including the use of gamification, the role of social media influencers, conflicts of interest, and other business practices.

Many regulators also believe that merely providing disclosures is not a guarantee that investors will process that information effectively to make decisions. There may be several reasons for this—such as a lack of financial literacy, as well as framing and anchoring effects—and in some cases disclosures could even backfire and cause investor harm (Australian Securities and Investments Commission 2019). Disclosure effectiveness is especially a concern in the online medium, where it is easier to "click away" important

disclosures. We make suggestions on effective disclosures as part of our recommendations.

When Disclosures and Due Diligence Are Not Enough

The practice of an online Indian investment platform shows the downside of relying on disclosures and due diligence online. The platform offers investment strategies from various registered investment advisers to retail investors on a subscription basis. In theory, Indian rules require investment advisers to perform suitability tests for clients before suggesting the right portfolios.

In practice, the platform's home page (or home screen in the app) shows both the best-performing strategies over the short term and the most popular strategies among investors. Once investors select a product, they see its investment thesis, performance charts, and other information. After they see all the information and before they are taken to the payment screen for confirmation, the users are shown a due diligence quiz to ascertain suitability. If they pass the test, they can complete the payment and subscribe to the strategy. If they fail the test, they are given the option to retake the test or proceed anyway.

By changing the order of information (product before advice and suitability) and making it easier to retake the quiz or skip altogether, the firm easily meets the legal requirements but not the intent of the rules.

Warnings, Guidelines, and Licensing Requirements

In response to concerns that many younger investors are relying on social media platforms and influencers for investment recommendations that are frequently spurious and the fact that the providers of advice are often not registered, many regulators have issued warnings and stressed the need for licensing unregulated entities and influencers. The Australian Securities and Investments Commission (2022), the Australian securities regulator, has warned of enforcement actions, including jail time, for influencers who feature or promote financial products for misleading or deceptive representations or unlicensed advice or dealing. The Spanish securities market regulator, CNMV (2022), published a circular defining rules on content and format for promotional messages of crypto-asset campaigns, as well as mandatory procedures for notifying CNMV in the case of mass advertising campaigns, in order to supervise advertising, including on social media. Many other regulators have issued similar warnings or guidelines.

Market Structure Reforms

Regulators are considering market structure reforms, especially in the area of payment for order flow because it creates potential conflicts of interest, giving brokers incentives to encourage customers to trade more frequently to maximize the payments they receive from wholesalers. Currently, both EU and US regulators already require brokerages to clearly disclose the existence, nature, and amount of PFOF from third parties.[29] SEC chair Gary Gensler (2022), in a speech at the Piper Sandler Global Exchange Conference, suggested an order-by-order competition as an alternative to the current PFOF system, suggesting that retail investors are not necessarily getting the best price improvement in the absence of competition for order flow. In the same month, the European Parliament (2022) laid out plans to phase out payments for order flow as part of its amendments to MiFID II rules, joining other major markets, including the United Kingdom, Australia, and Canada, that have banned the practice.

8. RECOMMENDATIONS

In this section, we provide some recommendations on how regulators and the industry could approach gamification. Our recommendations span gamification and behavioural techniques, disclosures, and conduct.

Recommendation 1: App design should include features that allow for review and reflection by users.

Currently, the app design of many market intermediaries, such as brokerages and investment platforms, tends to encourage automatic, intuitive thinking (called "System 1 thinking" by Daniel Kahneman), rather than deliberate, slow, and effort-driven thinking

[29]See European Securities and Markets Authority (2021). In the United States, the Exchange Act requires that firms provide written notification to customers at or before completion of a transaction that the firm will receive PFOF and that the firm will furnish the source and nature of the compensation upon request. To see the rules, go to www.govinfo.gov/content/pkg/CFR-2021-title17-vol4/pdf/CFR-2021-title17-vol4-part240.pdf.

(System 2).[30] We urge interventions that help traders slow down and think about consequences. For instance, requiring third-party authenticator apps for validating transactions in penny stocks and moving away from one-click transactions toward an order, review, and confirm process are possible ways to introduce a little friction without taking away investor choice to invest.

A related recommendation is that trading and other investing apps should not highlight stocks, traders, and other asset classes exclusively on the basis of short-term past performance or place undue emphasis on these characteristics relative to other app features. Where prominent stocks or traders are highlighted, the presentation should not detract from the ability of the user to easily discover other securities, financial instruments, users, or products.

Many platforms display recent large market moves, traders who have large recent returns and could be copied, or performance of volatile assets, such as cryptocurrencies. The saliency of information and the easy ability to trade on it drive herding behaviour. For this reason, we believe that such information should not be in the home screen. Removing such information from the home page presentation introduces friction—for example, adding one or more extra layers of click-through to access market mover lists—and this friction helps induce System 2 thinking, which can be beneficial for investment decision making. Ultimately, there is a balance between ease and speed of access to markets and thoughtful investment decision making.

Recommendation 2: Reward and feedback systems, if any, should focus on long-term investor outcomes and not on transactions or short-term outcomes.

Confetti regulation is based on an underlying concern that transactions, rather than long-term outcomes, are rewarded with instant gratification, however superficial. We have seen other examples of leader boards and monetary rewards based on recent performance or even transaction volumes. Since we believe in the maxim "what gets measured gets managed," to drive investors to focus on long-term outcomes, we need to measure and report on long-term performance along with risk and calibrate reward systems accordingly.

Recommendation 3: Research about stocks and other asset classes must be based on reputable sources, such as recognized firms and other third-party knowledge providers.

Since trading is, at least partly, a social activity, there is an inclination for market intermediaries, copying from social platforms, to curate the news and information their users see based on their social profiles, network, and prior transaction history. However, users should be nudged toward research about stocks and other asset classes from reputable sources.

Recommendation 4: Market intermediaries are encouraged to provide point-of-transaction disclosures in plain English.

This is an area where behavioural science can be made to work beneficially for users. Since users are most attentive at the point of making a transaction, they are most likely to pay attention to risks involved in the transaction, including, for example, purchasing a penny stock or a stock that has high recent observed volatility. For example, many of the meme stocks have extremely poor business prospects, and some are trading even after the companies entered bankruptcy proceedings. A warning that investing in the latter could lead to a permanent loss of capital could be powerful.

Point-of-sale disclosures could also have more mundane applications. For example, many investors tend to sell their shares in SPACs in the open market, when it would be more beneficial to redeem them.[31] A suggestion to do so might be easier to implement and might greatly improve investor outcomes. This recommendation should be seen in conjunction with Recommendation 1 on app design to aid reflection and review.

Recommendation 5: Disclosures must take into account the medium through which they are consumed.

We have discussed how the medium, such as a smartphone, can impact investor behaviours, as well as how information is consumed differently across mediums. It follows that disclosures must be tailored to them. See the following box for more details on this recommendation.

[30]The concepts of System 1 and System 2 have been popularised by Daniel Kahneman (2011) in his book *Thinking, Fast and Slow*.
[31]The mechanics of the redemption process in SPACs are beyond the purview of this report.

CFA Institute Research on Behaviourally Informed Disclosures

CFA Institute has researched the topic of behaviourally informed disclosures and product governance over many years. In 2017, for example, we published "Designing a European Summary Prospectus Using Behavioural Insights" (CFA Institute 2017). Here, we reproduce a section of that report that speaks to the ability of retail investors to absorb product disclosures.

> There are three main issues to consider when taking a behavioural approach to disclosure requirements: design of the summary disclosure, engagement of consumers, and presentation of product information.
>
> For the disclosed information to be useful to investors, those investors must be engaged with the disclosure, which means the level of engagement is a first-order determinant of the success of the disclosure regime. Investor engagement, in turn, is largely dependent on the presentation of product information. In other words, the success of the disclosure regime is heavily dependent on the presentation of product information. The broad principles that should underlie the presentation of product information are outlined below:
>
> - *SIMPLICITY: An effort should be made to simplify the product disclosure, including the language used, as well as to limit its length.*
> - *SALIENCE: The most important information should be where investors focus their attention. For example, headings are more engaging than the body of text, as are highlighted boxes, graphical representation of information, images, the front pages of documents (rather than the overleaf pages), notices to the right of the page, and those printed in a different colour.*
> - *STANDARDISATION: The appearance and framing of disclosures should be standardised as far as possible to enable comparability across disclosures*
>
> A separate consideration relates to the medium through which disclosure is consumed: computer monitors and screens on portable devices. The key insight here is that presenting very lengthy information on a screen in a vertical or portrait format causes readers to skim through the information. This suggests the necessity of having a design that is also optimized for mobile devices.

Recommendation 6: There should be full transparency around remuneration to social influencers.

In our response to the IOSCO consultation paper on retail distribution and digitalisation, CFA Institute agreed with the IOSCO recommendation of requiring firm management to assume responsibility for the accuracy of the information provided to potential investors on behalf of the firm, including those provided by influencers (CFA Institute 2022b). We also supported the proposed requirement for firms to establish proper internal rules, policies, processes, and tools for their online marketing and distribution.

However, we said that regulators should require full transparency on the remuneration that financial institutions provide to influencers for their advertisement via social media. This disclosure can help investors distinguish clear product advertisements or placements, for which influencers are paid, from pure gossip.[32]

Recommendation 7: Investor education materials and other public communications must not mislead or downplay the risks and complexity inherent in investing.

The rise of self-directed trading is a result of a confluence of many factors, including the pandemic, the reduction in commissions around the world, and a long bull run in equities that resulted in positive trading outcomes, in at least absolute terms, for a large swathe of traders.

[32]A case in point is last year's ruling by the French Competition and Markets Authority, which charged the French influencer Nabilla Benattia-Vergara for providing misleading recommendations for a website specialising in bitcoin trading. She was sanctioned with a €20,000 fine for not disclosing that she was remunerated by the cryptocurrency platform and for publishing false and misleading information on the performance of some investments.

But it has been accompanied by cheerleading by market intermediaries, platforms, and influencers, which have conflated self-directed trading with democratisation of investing. Not long ago, passive, low-cost investing was hailed for democratising finance (Evans and Eley 2015). Unlike self-directed trading, retail investors in passive funds do not compete with institutional investors with superior information and do not face possible impact costs of algorithms and market makers taking the other side or poorer financial outcomes from excessive trading. Admittedly, they do not derive nonpecuniary benefits (entertainment) either. But investor education materials and public communications must not mislead investors about the upside from self-directed trading.

Recommendation 8: Warning label for brokerage communications, including advertisements.

Warning labels are used in a variety of settings. Mutual fund providers, for example, are required to mention that their products are subject to market, liquidity, and other risks, and cryptocurrencies increasingly carry warnings about the potential loss of capital.

We propose that brokerage advertisements include a message that excessive trading may be injurious to financial health.[33] Also, brokerages that derive revenues from PFOF driven by retail investor transactions must prominently mention that fact. Meta-studies on warning labels find that their effectiveness depends on circumstances—for example, social influence and exposure frequency are important, and labels showing safe use are more effective than ones showing moderation (Purmehdi, Legoux, Carrillat, and Senecal 2017). Even with these caveats, a warning label may counteract the overly positive messaging that we see today and complement other measures.

The warning could extend to trading. For example, gamification providers can show a prominent warning to traders placing an excessive number of trades. As we have described, such warnings would constitute a small friction and could activate System 2 thinking in cases of heightened risk.

Recommendation 9: Licensing requirements for social influencers should distinguish between general and personal advice.

There are various approaches being considered for licensing social influencers, as we discussed in the previous section. We believe licensing requirements should be agnostic to platforms, but regulators could make a distinction between general and personal advice, with a limited licensing requirement for the former. The limited licensing regime would support Recommendation 7, pertaining to investor education materials and public communications.

9. CONCLUSION

Joseph Schumpeter (1934) defined innovation as "a practical implementation of ideas that result in the introduction of new goods or services or improvement in offering goods or services." Indeed, innovation can translate into the application of ideas that have worked well in one context into another context.

We have seen numerous examples of innovation in capital markets, including deploying e-commerce strategies that provide for one-click purchases, reducing transaction costs to zero, and social media strategies that drive clicks and user engagement by sharing large wins and losses, as well as use of commitment devices and use of influencers to drive demand for investment products. The extreme example is gamification, a successful strategy perfected in many settings, from health care to financial services to the gambling industry. Gamification can have some negative consequences not only because it has proven effective in increasing volumes and risk taking but also because gamification of trading shares one trait with gambling: The underlying activity—with its attendant constant feedback and random outcomes—is pleasurable in ways not seen in other contexts. Although markets have calmed down since the days of GameStop mania in 2021, without intervention, we expect gamification and the other behavioural nudges to fuel future bouts of volatility and increase systemic risks.

Across industries, it is no surprise that innovation brings unintended consequences. But market participants will continue to innovate, and in the vast majority of cases, regulators will be a step behind. We argue that principles—as outlined here—combined with improved conduct and disclosures on the part of intermediaries, provide the best approach to manage the risks associated with gamification and enable users to benefit from its positive features.

[33]In India, mutual fund advertisements carry a warning that such investments are subject to market risks and that investors should read the scheme information documents carefully before investing.

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