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An Assessment of Financial Literacy and Behavioural Biases of Retail Investors

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ABSTRACT

The last decade has seen a dramatic increase in retail involvement in equity markets, thanks to cheap online brokerage, smartphone apps and social media. During the same time, there has been a lot of research to indicate that a lot of individual investors trade excessively, maintain undiversified portfolios and sit on top of losing trades. This narrative review brings together the existing literature on financial literacy and behavioural biases of retail investors. It looks at (a) what financial literacy is and how it is defined and measured, (b) the documented biases in retail investment behaviour, (c) how financial literacy affects these biases, and (d) what is known about educational and structural interventions. Current evidence indicates that financial literacy is positively related to market participation, diversification and portfolio performance, but financial literacy is not enough to overcome biases like overconfidence, the disposition effect, or attention-driven trading. People can perceive knowledge differently to what is known and this difference in perceived knowledge can produce harmful behaviour. Research findings about financial education are mixed, but more promising in recent meta-analysis studies. Digital trading environments have brought new biases, and a purely educational approach is not enough. The review recommends that policy should be based on a mix of targeted education, improved choice architecture and product-suitability regulation.

KEYWORDS:

Financial literacy, behavioural finance, overconfidence, disposition effect, retail investors and financial education

1. INTRODUCTION

In classical finance theory, investors are assumed to be rational and to diversify efficiently, and to engage in transactions only when the expected benefit of the transaction is greater than the cost. This assumption, however, has been recently put under strain by the following five decades of empirical research, particularly on the part of individual investors. Retails investors, unlike institutions, usually invest their own funds and are usually less educated and have a strong emotional attachment to results. They make choices that impact their own health, as well as the stability of the market, price discovery, and the inclusiveness of capital markets (Barber & Odean, 2013). There are two body of literature that grew independently to identify the performance of retail investors. The first is related to financial literacy, the knowledge and skills required to make informed financial decisions and considers a lack in this capability as a cause of poor outcomes (Lusardi & Mitchell, 2014). The second, behavioural finance, argues that even the most well-informed of individuals systematically fail to act rationally, due to the limitations of their cognition, heuristics, and emotions (Barberis & Thaler, 2003; Kahneman & Tversky, 1979). These accounts are often viewed as competing explanations, but are better viewed as interacting. There are biases that can be diminished, others not affected, and a few overconfident, because of knowledge. The question has become more pressing. The retail investors is an important group in many emerging markets such as India where for the first time they have joined the stock market and derivatives trading in large numbers using apps. Notably, regulatory analysis of individual derivatives traders has found that a significant majority of traders made a net loss during the respective periods (Securities and Exchange Board of India, 2024). These results highlight the real-world implications of the role of knowledge and bias in investor results. This paper reviews the contemporary evidence.

2. CONCEPTUAL FOUNDATIONS

2.1 FINANCIAL LITERACY

In general, financial literacy is defined as understanding and utilizing financial concepts to make good financial decisions. Lusardi and Mitchell (2014) suggest it should be regarded as a form of human capital, which is built at a cost and provides returns as improved financial outcomes. Most of the measures take a short battery approach and focus on numeracy questions related to interest rates, inflation, and diversification of risk, known as the "Big Three" questions" (Lusardi & Mitchell, 2011). These have been rolled out in dozens of countries for cross-national comparisons. The outcome is dismal. According to Klapper et al. (2015), based on the S&P Global FinLit Survey, only one-third of adults around the world had basic financial literacy, and rates are significantly lower in many emerging economies, including India. In the developed world, there is a significant number of respondents who do not get the concept of diversification of risk or the impact of inflation on purchasing power (Lusardi & Mitchell, 2011). Studies have indicated such information is probably an understatement of the knowledge required to make a direct equity investment, which requires a wider array of skills such as reading financial statements, understanding fees and risk. One important difference, highlighted in later research, between actual and perceived financial literacy is the issue of income level. Allgood and Walstad (2016) found that financial behaviour was also predicted by objective knowledge and self-assessed knowledge, indicating that people may act on the basis of an incorrect assumption about their own level of knowledge. Parker et al. (2012) also reported that older adults who are approaching retirement had an inappropriate level of confidence in financial knowledge. To the review to follow this distinction is central.

2.2 BEHAVIOURAL BIASES

Behavioural finance identifies systematic deviations from rational choice, which can be classified in three families (Barberis & Thaler, 2003; Hirshleifer, 2001):

Heuristic-driven biases (mental shortcuts) including representativeness (Tversky & Kahneman, 1974), availability and anchoring. These lead these lead investors to extrapolate past returns, overvalue "good news" and pay excessive attention to arbitrary reference points.

Prospect-theoretical biases (due to the way gains and losses are assessed against a reference point). Prospect theory predicts that losses have a greater impact than similar gains and that people are risk-seeking in the domain of losses (Kahneman & Tversky, 1979). It is a fundamental cause of the disposition effect, which describes people's tendency to sell winners prematurely, and hold onto losing investments for too long (Shefrin & Statman, 1985), and of myopic loss aversion, which results from frequent portfolio rebalancing making risky securities less appealing (Benartzi & Thaler, 1995).

Overconfidence and self-attribution biases: the investor overestimates the accuracy of his information and his skill, and gives wrong explanations of success and failure (Gervais & Odean, 2001; Glaser & Weber, 2007).

It is helpful to have an integrating frame, as provided by Kahneman (2011): Intuitive, rapid processing systems are what most of these errors are from, while deliberate reasoning systems can correct them, but are taxing and often disengaged. The question that should be tackled in the review of the correlation between literacy and bias is whether financial knowledge enhances deliberate correction of intuitive errors.

3. REVIEW APPROACH

This paper is a narrative review not systematic review/meta-analysis. It is based mainly on peer-reviewed articles in finance and economics journals, and on significant handbook chapters and meta-analyses. Studies that relied on large administrative or brokerage dataset, natural experiments, randomised evaluations, or nationally representative surveys were prioritised to have greater relevance to the external context of the study, and better identification than small convenience samples. Selective review. It focuses on the canonical results, and recent research on digital trading.

4. EVIDENCE

4.1 FINANCIAL LITERACY, PARTICIPATION, AND PORTFOLIO QUALITY

The commonality across the literature is that financial literacy is a predictor of risky asset market involvement. Based on data from the Dutch household survey, van Rooij et al. (2011) showed that people with low literacy levels were significantly less likely to own stocks, and that this effect remained when they controlled for wealth, education, and risk attitudes. This they took to mean that those who were less literate were discouraged from participating because of the expense of obtaining information. Literacy is correlated with retirement planning, saving for retirement, and more sophisticated portfolio options, according to Lusardi and Mitchell (2014) who studied a broad range of existing research. Portfolio quality is also associated with participants' literacy. Households without literacy, who were also less likely to seek advice, had less well-diversified portfolios, while literate households, or those who sought advice, had more well-diversified portfolios, according to von Gaudecker (2015). In a sample from Portugal, Abreu and Mendes (2010) presented that investors with higher knowledge had more diversified portfolios. In fact, investment errors such as under diversification and inertia are found to be more frequent among less wealthy and less educated households and have measurable social costs, as evidenced in Sweden (Calvet et al., 2007). Lusardi et al. (2017) created a life cycle model where a lack of financial knowledge is a large factor in wealth inequality, which made financial literacy one of the main factors to economic inequality.

The evidence is less robust but consistent in emerging markets. A study on households in India by Sivaramakrishnan et al. (2017) concluded that financial literacy and attitude were related to the stock market participation. Using cross-country comparisons, it can be argued that a combination of low baseline literacy and fast market growth leads inexperienced investors to be exposed to complex products. One of the main points to take into account is causality. Most of these studies are observational and literacy is correlated with unobserved characteristics (e.g., patience, cognitive ability, wealth of the family). For example, Grinblatt et al. (2012) in their study found that, using Finnish data, the ability itself is what determines better diversification and performance, rather than literacy. This warning should temper generalisations about the cross-sectional effects on literacy.

4.2 DOCUMENTED BIASES IN RETAIL TRADING

4.2.1. Overconfidence and excessive trading:

Barber and Odean (2000) found that a large discount brokerage firm experienced a drag on net returns of about six and a half percent per year, driven largely by poor trading timing and transaction costs, due to the excessive trading of households. In a companion study, it was found that men traded much more than women, and consequently had lower net returns, consistent with the gender difference in overconfidence (Barber & Odean, 2001). Subsequent studies in Taiwan revealed that as a group, individual investors suffer significant losses from investing in the stock market, and there is a small share of investors who make a consistent profit (Barber et al., 2009). Theoretically, the effect of overconfidence can be maintained: Gervais and Odean (2001) show that overconfidence can be maintained even after learning, specifically among novice traders who experience initial wealth gains. Grinblatt and Keloharju (2009) discovered that both overconfidence and sensation seeking are positively associated with increased trading frequency among Finnish investors.

4.2.2. The disposition effect:

Odean (1998) investigated retail brokerage accounts and observed that investors were significantly more likely to sell a winning than a losing investment whenever they made a decision to sell even if the portfolio was rebalanced or for tax reasons. The finding has been confirmed in markets and among investors of different types (Barber & Odean, 2013). The disposition effect is important because it represents a high cost, high risk flip-flop of information that was previously known and understood: winners sold tend to continue to do well, while losers sold continue to do poorly.

4.2.3. Naive diversification and inertia:

Benartzi and Thaler (2001) found that defined contribution plan participants tend to allocate the same amount of money into each fund available on the plan menu, which means that the risk of the portfolio is determined by what is on the menu. In an experiment, Choi et al. (2010) found that even well-educated participants frequently do not choose the lowest fee index fund when the only difference is the fee, suggesting fee neglect is a widespread problem. Calvet et al. (2009) reported that many families make passive rebalancing decisions, and only partially correct for drift in portfolio weights.

4.2.4. Attention and lottery preferences:

Barber and Odean (2008) found that individual investors buy attention-elicitation stocks, such as those with high volume, high returns, or news, and that they are less likely to sell stocks that were previously held. Kumar (2009) discovered that investors who are similar to gamblers would prefer lottery stocks. With the advent of apps, these patterns are getting new significance.

4.3. Is there evidence that Literacy Minimizes Bias?

There is some evidence for partial and conditional weakening. There are a number of studies that suggest that sophistication reduces but doesn't eliminate behavioural mistakes. Dhar and Zhu (2006) showed that the disposition effect is less strong for investors who are more affluent and have professional jobs, indicating that greater sophistication diminishes the bias. Feng and Seasholes (2005) have investigated Chinese brokerage accounts, and their findings indicate that sophistication and trading experience did not remove reluctance to realize losses, but that gains and losses were linked. In keeping with learning, Seru et al. (2010) found that investors adjust their beliefs about their skills through trading, and that losers tend to sell off or reduce the number of trades they make. List (2003) gave field evidence of how some of these anomalies abate when traders have experience in the market, such as the endowment effect. All of these findings indicate that experience and sophistication are beneficial and that the positive impact works both via a knowledge and a feedback mechanism. Simultaneously, there is credible evidence that there can be knowledge along with, and indeed reinforcing, biases. This is the most crucial one - self-assuredness in the knowledge.

Allgood and Walstad (2016) found that the relationship between perceived literacy and behaviour was separate from objective literacy. When the small learning initially raises the individual's perceived competence level more than it increases actual competence, investors may engage in more trading, the fixation of stocks, or they may refuse advice. In a field experiment where Bhattacharya et al. (2012) randomly assigned unbiased advice to customers of a German brokerage, they discovered that very few of the clients who were asked for unbiased advice actually accepted it, and that those who did tended to be relatively well diversified and experienced investors, whereas investors most in need of correction were least likely to seek it. This trend implies that literacy and confidence in advice go hand in hand, and that investors with low literacy and high confidence are hard to find. The age factor is also at play. However, Agarwal et al. (2009) reported that the quality of financial decisions was best in middle age and decreased with age, despite the fact that older people may be confident in their decisions. The ability, experience, and confidence thus travel different paths throughout the life cycle, making it difficult to make simple connections between literacy and outcomes. Overall, the literature is consistent with a sophisticated stance. Good investment behaviour is dependent on literacy but this is not enough. It is more likely to correct errors from ignorance, i.e., lack of diversification or lack of knowledge about fees, than errors from psychology, i.e., loss aversion or overconfidence. There are biases that can be exacerbated when there is partial knowledge and thus a higher level of confidence.

4.4. Financial Education and Its Effectiveness:

Literacy is a major problem and financial education is a popular policy lever; however, evidence in favour of financial education has been challenged. Fernandes et al. (2014) conducted a meta-analysis of the effects of financial education and found that only a small amount of variance in financial behaviours was accounted for by interventions and that the effects were short-lived, being more effective for the education that was delivered immediately before the decision was made. Education to address imbalances is a myth, according to Willis (2011) because knowledge learnt in advance is not applied or forgotten, and the population in need is least likely to be educated. Hastings et al. (2013) also analysed the evidence and found that the links between literacy and outcomes are well established, but that the causal part played by educational programmes is more difficult to demonstrate. Recent studies are more optimistic. Kaiser et al. (2022) meta-analysed dozens of RCTs with very large numbers of participants, and found that financial education also

has meaningful effects on knowledge but also on downstream behaviours, which are similar in size to those of other well-evaluated interventions in economics. Some of the earlier scepticism, their analysis suggests, is due to having less robust research designs. There is also some evidence from the field in developing contexts that targeted and practical training has an impact on behaviour, though this varies according to the training content, delivery and the target audience (Cole et al., 2011).

However, as Cole et al (2011) point out in India and Indonesia, the instrument that is most effective will depend on the context, with subsidies proving a more effective instrument to encourage uptake of bank accounts, but education proving more effective for certain sub-groups. Reliable reconciliation of these results appears to be in the design. Short, timely, targeted and simple education is more likely to be effective than general frontloaded education. Although detailed financial knowledge transfer is desirable, it may not be as effective as "rules of thumb" and "commitment devices" due to the cognitive burden of acquiring and retaining nuances of financial information (Lusardi & Mitchell, 2014).

5. DISCUSSION

5.1 INTEGRATING THE EVIDENCE

The findings lead to three conclusions. First, financial literacy is strongly positively correlated with participation and diversification and high financial literacy levels are rare globally (Lusardi & Mitchell, 2014; van Rooij et al., 2011; Klapper et al., 2015). Second, behavioural biases are ubiquitous, economically significant and only partially driven by sophistication (Barber & Odean, 2000; Feng & Seasholes, 2005; Odean, 1998). Third, the link between knowledge and bias is non-symmetric, knowledge facilitates most against errors of ignorance, but least against errors of impulse, and the self-assurance that comes with partial knowledge can lead to costly behaviour (Allgood & Walstad, 2016; Gervais & Odean, 2001). These findings can be usefully broken down into capability failures and motivation and attention failures. The changes in the decision environment work better when there is an attention failure or a lack of motivation, like chasing salient stocks, refusing to take losses, or trading for excitement. There is a distinction that helps to explain why financial education programmes can have at best a modest average effect, since this effect is limited to only a portion of failures, while many costly behaviours are not.

5.2 IMPLICATIONS FOR PRACTICE AND POLICY

The review provides an underpinning for a multi-layered approach for educators and regulators. First, it should be targeted and timed to decisions, and should emphasize concepts that are relevant to retail investing, such as diversification, costs, risk-return trade-offs, and the characteristics of leveraged products (Fernandes et al., 2014; Kaiser et al., 2022). Second, it is important that education makes it clear what makes the scale 'tick' – to ensure that confidence is linked to competence. Investors' learning from their experience in trading indicates that a straightforward and honest reporting of investors' performance, net of costs, could help investors learn faster (Seru et al., 2010). Third, the structure of choice is important. The use of default options, low-cost diversified funds and restrictions on the complexity of the products offered to less sophisticated investors limit the need for individual vigilance (Benartzi and Thaler, 2001; Choi, et al., 2010). Fourth, and in light of the evidence found on digital platforms, regulators may want to review interface design and marketing tactics that promote high frequency trading, and consider the implementation of suitability requirements for high-risk products (Barber et al.,2022, Kalda et al.,2021). The lessons for investors are clear: cheap, diversified investments, infrequent sales and pre-determined rules with little flexibility to make decisions in the heat of the moment or under pressure. While advisory relationships can be effective, the evidence on the ground indicates that advice is not reaching the people who need it the most – which is why proactive outreach may be warranted (Bhattacharya et al., 2012).

5.3 LIMITATIONS OF THE EVIDENCE

The following are intended as qualifications to these conclusions. First, a lot of the underlying evidence is based on a handful of markets, typically the United States and Northern Europe, and on specific samples of brokers, which might not reflect the retail market as a whole. The number of emerging markets indicators is increasing, and they are not as well developed as in the U.S. Secondly, identification of causes is not easy. The relationship between literacy and cognitive ability and between literacy and wealth and family background is not straightforward; and self-selection into education and advice makes inference difficult. Third, measures of literacy usually use general

numeracy items that may not assess the knowledge required for complicated investing, and measures of bias rely on inference from trading patterns, not on observation of beliefs. Fourthly, the rapidly evolving digital landscape can make the latest findings quickly outdated. Last, this is a narrative review, which means that it has selection effects associated with the literature it includes.

5.4 RECOMMENDATIONS FOR FUTURE RESEARCH

Future research should focus on (a) randomized studies of educational and interface innovation in emerging markets where retail participation is increasing rapidly, (b) direct measures of beliefs and confidence rather than measures derived from trades, (c) studies that track new investors over market cycles to better understand how the experiences of gains and losses influence subsequent risk taking behaviour (Malmendier & Nagel, 2011), and (d) research into how social media, algorithmic recommendations, and gamification features affect retail behaviour, including the use of generative AI tools for investment advice. It would be particularly useful if work could be done that tied together literacy, confidence and bias in the same dataset so that there could be direct tests of the asymmetric interaction here proposed.

6. CONCLUSION

The studies reviewed here show that the elements of financial literacy and behavioural biases are complementary in predicting retail investor outcomes. Low literacy rates reduce participation in the market or lack of diversification among many households, while financial literacy is linked to financial portfolio performance. But overconfidence, the disposition effect and trading on the basis of what is now in the centre of your gaze are not limited to more basic investors, and good at a game sometimes means more at a game than being good at it. In recent years, meta-analytic research showed that financial education can have an impact on knowledge and behaviour when it is well designed; yet, the digitalization of retail trading has set the stage for increased psychological vulnerabilities. Good practices for improving the welfare of retail investors hence should include targeted education, feedback for improving calibration, thoughtful choice architecture and regulatory focus on product design and marketing.

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