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Analysis of Behavioural Factors Influencing Investment Decisions: A Literature Review

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Abstract

Purpose of the article: The aim of the article is a critical analysis of the views of various authors who have linked their research activities to the topic of behavioural finance, behavioural biases, and risk perceptions in financial markets.
Methodology/methods: Qualitative data were aggregated through the method of a systematic review with limits set. A total of 23 papers and publications were located and reviewed. In the paper, the author used logical methods of secondary research such as analysis and synthesis, *i.e.* the division of the object of research into individual elements and, conversely, the monitoring of connections between individual components (Hendl, 2005).
Scientific aim: The scientific benefit is a detailed comprehensive overview of biases that can affect investors' behaviour and risk perception, and a demonstration of risk understanding approaches. The report can serve as a basis for further research and scientific work. Each topic is given the perspective of different authors, which supports the objectivity of the conclusions.
Findings: Based on a literature review by multiple authors, the author defined the main behavioural biases. Some of the authors categorise or classify individual biases according to whether they are based on feelings or facts, or according to whether they are heuristics, *i.e.* mental abbreviations for solving a problem, or cognitive bias, which may be the result of erroneous heuristics. Furthermore, the author found that investor's demographic characteristics, such as age, marital status or education, have a direct impact on his behaviour. The concept of risk can be understood as a state of ignorance of the decision maker, as a variance of possible outcomes, as a danger of negative deviation or as a danger of wrong decision. The perception of risk can be divided to "Risk capacity" – ability to take a risk, and "Risk appetite" – the amount of risk an investor is willing to take in order to gain a reward.
Conclusions: The author conducted research of secondary sources, such as of publications and scientific articles dealing with issues of behavioural finance and risk perception. The connection between major behavioural biases and risk perception, and the connection between socio-demographic characteristics and the level of influence of individual investor behavioural biases have been described. All the factors have been found to affect individual investors' perceptions of information to the extent that some individuals perceive the same information differently when making decisions based solely on financial disclosure and make different decisions based on that.

Keywords: behavioural finance, prejudice, bias, behavioural cognitive bias, emotional bias

JEL Classification: D91, G15, G41

Introduction

Investing can be defined as the placement of money or funds with the prospect of obtaining additional money or funds. However, it can also be defined as a liability of a certain amount of funds for one or more assets to be held for a certain period of time (Salge *et al.*, 2015; Linnenluecke *et al.*, 2016).

Investment decisions are strongly influenced by emotional and psychological factors such as fear, greed or overconfidence. Metawa *et al.* (2019) state that the traditional literature assumes that investors' decisions are made on the basis of rational expectations of gradually acquiring new information and maximising returns at a given level of risk. However, the authors point out the limited ability of fundamental and technical analysis in determining the fair value of securities and the resulting discipline of behavioural finance, which explains changes in securities prices and the influence of emotions and behavioural factors on investors' decisions. The research carried out by the authors suggests that age, gender and level of education significantly influence not only investment decisions, but also sentiment, exaggeration/inadequacy of the reaction and level of self-confidence. Research also shows that with the experience gained, investors often overlook the influence of emotions on sentiment, herd behaviour and other behavioural factors. According to the authors, these factors may encourage investors to accept excessive risks, which may result in excessive market volatility.

Pompian (2017) differentiates between cognitive and emotional biases. The author states that cognitive errors, resulting from faulty reasoning, can be corrected by modifying clients' thinking, whereas emotional biases result from the way people feel, which is hard to change. When assessing risk appetite and risk capacity, financial advisors should understand which biases should be moderated and to which the advisor should adapt depending on the client's wealth.

Although Zahera, Bansal (2018) have recognized specific biases identified in previous literature, these biases are supplemented only by basic descriptions without further elaboration. This research demonstrates that risk appetite and capacity as well as individual characteristics of investors are interconnected and have to be taken into account when doing an empirical research among retail investors and their behaviour.

Methodology

A systematic review has been used for synthesizing of qualitative data. Databases (ScienceDirect, SAGE and other) were searched using Primo and Google Scholar search engines. The keywords "behavioural factors finance" were used with a combination of operators in order to broaden the results. The first limits set were:

- Articles and publications published in 2015 and newer; and
- Focus on investing and financial markets.

The search queries were refined with additional query strings "bias" and "risk". These terms were taken from the keywords of the first relevant peer-reviewed articles identified. After reviewing the sources, the following questions were answered:

- Are there enough sources on this topic no older than 6 years?
- How is bias and risk described in the context of behavioural finance?
- Does an investor's demographic profile influence their decision making?

After the initial analysis of the qualitative data, it was decided to remove the lower limit on the publication date of the source, as more recent sources were too narrowly focused and did not provide a foundational perspective on the topic of behavioural finance, which is pivotal to this aggregated introductory literature review.

1. Bias

Investors may be prone to irrational decisions even if they have complete information about pricing conditions, company prospects and investment laws. According to Zahera, Bansal (2018), this is because they are affected by both potential and emotional outcomes. They may be influenced by the views of their colleagues, friends, family or even competitors. The authors mention several biases in investor behaviour:

- Overconfidence – the investor is very optimistic about the results of their trading and assumes that their information is sufficient for investment decisions. The investor combines high market performance with his own performance, as a result of which he overlooks other factors, which can cause enormous damage.
- Disposition effect – according to Zahera, Bansal (2018) described by Shefrin and Statman in 1985 – investors tend to sell successful assets too soon to realise profits, while loss-making shares hold longer to delay losses. The final decisions of investors are thus not based on perceived losses, but on profits.
- Herding effect – identified by Kahneman and Tversky in 1979 – investors tend to follow other investors' decisions because they rely on collective information rather than private information.
- Mental accounting – described by Thaler in 1985 – the theory that investors divide investments into different portfolios based on mental categories, where each portfolio has a purpose and their investment policy differs accordingly. Investors thus choose portfolios that are not profitable yet satisfy their emotions.
- Confirmation bias – described by Dickens in 1978 – people make an early impression and then rely on it, thus adapting other newly acquired information to their current opinion. This results in an irrational decision, as investors ignore further information.
- Hindsight bias – bias described by Fischhoff and Beyth in 1975 – the investor believes that they can create a relationship between the cause and effect of a certain event, although the connection may not exist here, leading to irrational decisions.
- House money effect – described by Thaler and Johnson in 1990 – it draws attention to the fact that players who make high profits become less averse to losses and are more willing to take risks. According to the authors, the opposite is also true.
- Endowment effect – first described by Kahneman in 1990 – people prefer what they hold today and do not want to change their position. As a result, they overlook even the most profitable investment opportunities, which keeps the price of these assets low. Money / opportunities thus remain on the market and suffer from investor ignorance. People attach more value to things as soon as they acquire them, typical examples being things with a symbolic, remembrance or emotional meaning (Kahneman *et al.*, 1990).
- Loss aversion – bias by Benartzi and Thaler in 1995 – people react differently to certain losses and certain gains. If they face certain profits, they are willing to risk less than if there is a chance of loss. They thus value loss certainty more than loss uncertainty.
- Framing – if the information is given positively, investors avoid the risk of securing profits. However, if the same information is provided in a negative framework, they are prepared to take the risk to avoid losses. The same information can be provided in two ways, which allows investors to change their views. This bias was described by Tversky and Kahneman in 1981.
- Home bias – investors feel they have affiliation with domestic companies, forcing them to invest in them even if the return is lower than for international companies. This bias was described by French and Poterba in 1991.

- Self-attribution bias – according to Bem (1967, quoted in: Zahera, Bansal, 2018) – people attribute success to their own hard work and intelligence, while blaming the actions of others or other external factors for failure.
- Conservatism bias – Edwards (1982, quoted in: Zahera, Bansal, 2018) – states that people stick to their own beliefs and predictions; they are unable to accept additional information that could be useful to them.
- Regret aversion – first described by Loomes and Dugden in 1982 – If one regrets one's decision, it has a great influence on future decisions. They are either motivated to take more risks or, on the contrary, they are reluctant to avoid taking disappointments / regrets in the future.
- Recency – Investors' decisions are based on current events (*e.g.* the latest news), so older but still useful information is neglected.
- Anchoring – investors make their decisions on the basis of the initial information they receive, and then make further decisions on that earlier information as well.
- Representativeness – considering and assessing the properties of an event / object based on similar other events / objects.
- Cognitive dissonance – in psychology, attitudes, emotions, beliefs or values are referred to as cognitions. If an investor trusts something and then finds out that he was wrong, he tries to alleviate negative feelings by ignoring the truth and rationalising their own decisions. For example, he may continue to invest in a security or fund that he already owns, even after it has fallen, although he should properly evaluate the new purchase objectively and independently of his current positions (Pompian, 2017, p. 12).
- Sunk cost fallacy – it is committed by an individual who continues to act because of previously invested resources (time, money, or effort) (Arkes, Blumer, 1985). If the costs outweigh the benefits of such conduct, the additional costs incurred are held in a different mental account than those associated with the original transaction (Thaler, 1999).

Pompian (2017, p. 9) divides biases into several categories. The broadest categories include cognitive biases (how people think) and emotional biases (how people feel). Cognitive errors result from mistaken thinking, *i.e.* memory and information processing errors. On the contrary, emotional biases lead to thinking influenced by feelings.

Cognitive biases can be further divided into belief-perseverance and information-processing biases. Belief-perseverance mainly affects individuals who, despite their knowledge of a different state, insist on their beliefs. A practical example consists in the persistent belief that sugar consumption causes hyperactivity in children, although many studies have shown (Wolraich *et al.*, 1995, as cited in Pompian, 2017, p. 9) that sugar does not affect children's behaviour. Examples of such biases are cognitive dissonance, conservatism, confirmation, representativeness, illusion of control, and hindsight.

Information-processing biases affect individuals who incorrectly process information. An example of this is anchoring, in which an individual unfolds their expectations based on initial information/numbers. The author cites as an example the question "How many people does Canada have?" With the addition that he does not know if it is more or less than 30 million. The respondent would probably anchor their estimate on this number, rather than make their own, independent estimate. This category includes anchoring and adjustment, mental accounting, framing, availability, self-attribution, outcome and recency (Pompian, 2017, p. 9).

Emotional biases are based on feelings rather than facts, as these can overwhelm thinking in times of stress. This group includes loss aversion, overconfidence, self-control, status quo, endowment, regret aversion, and affinity.

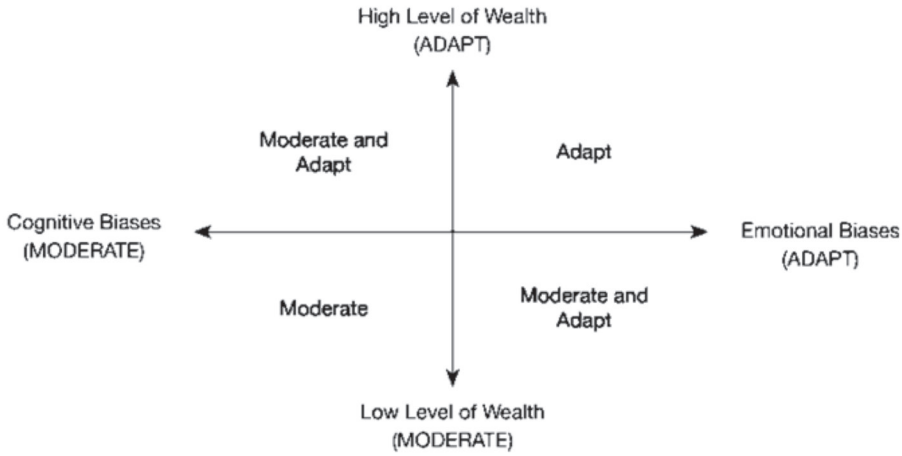

Figure 1. Type of bias and level of wealth. Source: Pompian, 2017, p. 9.

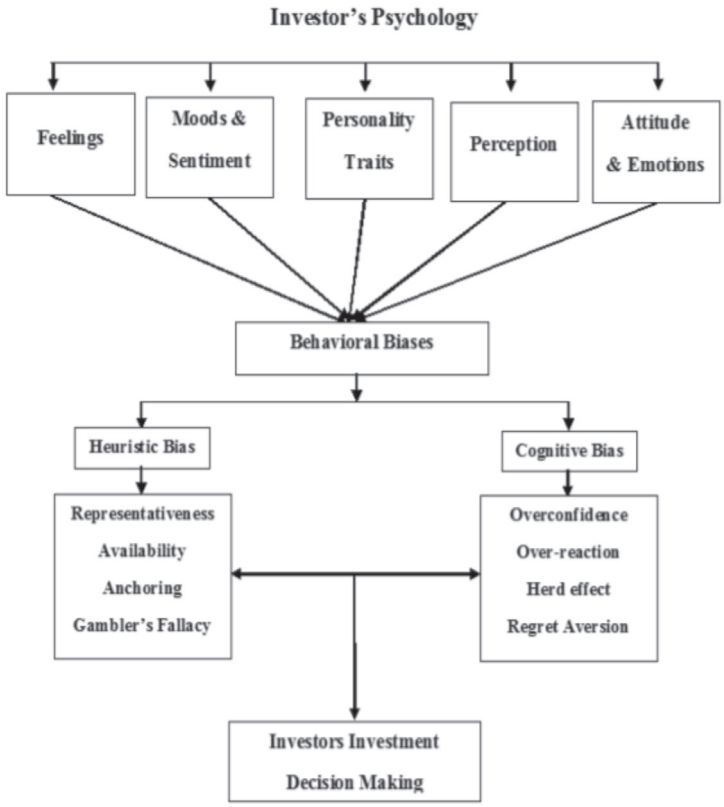

Figure 2. Psychological approach to Investment Decision making. Source: Boda, Sunitha, 2018, p. 5.

The author states that distinguishing between cognitive and emotional biases is important in assessing risk tolerance. Financial advisors often have to adapt to client behaviour caused by emotional biases because it is difficult to change how people feel. Conversely, with cognitive biases, it is possible to adjust clients' thinking and behaviour. Figure 1 shows a framework for the practical application of behavioural finance to different types of biases and investors / customers.

In addition to cognitive ones, Boda, Sunitha (2018, p. 5) also identify heuristic biases, which include representativeness, availability, anchoring, conservatism, regret aversion, and mental accounting (Figure 2). The concept of heuristics is interpreted as acceptable rules for reducing the amount of cognitive resources needed to solve a problem.

2. Investor characteristics

Cronqvist, Siegel (2014) state that investors' behaviour substantially differs due to specific individual experiences and investors' demographic profile:

- Gender – various researchers found that male investors are more prone to overconfidence than female (Barber, Odean, 2001; Bhandari, Deaves, 2006). On the other hand, Eagly, Carli (1981) state that females are more prone to herding bias then males are.
- Age – Prosad *et al.* (2015) found that age, profession and experience have a stronger association with behavioural biases than other examined factors. This is further supported by Tekçe *et al.* (2016), who emphasize that as age and wealth increases, overconfidence and familiarity biases decrease.
- Marital status – Ates *et al.* (2016) argue that married investors have a lower level of overoptimism, overconfidence, and loss aversion, unlike unmarried investors.
- Education – Goo *et al.* (2010) and Deaves *et al.* (2010) acknowledge that investors with more education have lower disposition effect, however, overconfidence increases in this case.
- Annual income – Dhar, Zhu (2006) find that investors in low-income group are more confident and exhibit a greater disposition effect than higher-income group. This is disputed by Lin (2011), who claims that income has no significant relation with overconfidence, herding bias, or disposition effect.
- Experience – Glaser *et al.* (2004) and Ates *et al.* (2016) agree that more experienced investors demonstrate significantly higher levels of overconfidence, self-attribution and anchoring biases. Dhar, Zhu (2006) add that professional investors have low disposition bias.

Takeda *et al.* (2013) and Fernandes *et al.* (2014) explain that high investment literacy is associated with lower level of overconfidence; however, the authors emphasise that the effect of improvement in financial literacy on the financial behaviour of investors is weak and more research in this area is needed.

3. Risk

Every decision-making, whether managerial, consumer, investment, or otherwise, requires consideration of uncertainty, *i.e.* risk. This uncertainty is caused by uncertain phenomena such as research and development results or future demand for a new product. The longer the time horizon of decision-making, the higher the uncertainty and at the same time the reliability of the prediction decreases (Beranová, 2007).

Beranová (2007) states that risk can be understood in different ways:

1. As a state of ignorance of the decision-maker – risk is understood as "the probability assigned to a certain future state of the environment" (Beranová, 2007,

p. 78). The author divides decision-making processes into three groups:
   a. Decision-making in time of certainty;
   b. Risk decision-making;
   c. Decision making under a state of uncertainty.
2. As a variance of possible outcomes – it takes into account not only undesirable but also desirable deviations from the goal. It considers both losses and gains. This is referred to as speculative risk.
3. As a danger of a negative deviation – the possibility that a certain decision will actually achieve the results achieved than planned.
4. As a danger of a wrong decision – it considers the consequences that any decision can have.

Pompian (2017, p. 10) mentions several aspects of risk. Risk capacity is the ability to take a risk, whereas risk appetite is the amount of risk an investor is willing to take in order to gain a reward. It varies depending on the expected return. Investors with a high-risk appetite focus on potentially high returns and are willing to accept a higher risk and loss potential. Conversely, investors with a low-risk appetite focus on stability and capital preservation, so they are risk averse.

The author distinguishes between known and unknown risks. Known risk can be described as "normal", *i.e.* risk that is easily understood and quantified using historical data (one to two deviations from the normal distribution of returns). Unknown, abnormal risks, such as the financial crisis of 2008–2009, deviate from portfolio yield models. For a comprehensive picture of risk tolerance, when deciding on risk appetite (how much risk to accept) and risk capacity (how much loss can be tolerated without jeopardizing financial objectives), it is also necessary to consider the probable response not only to normal risks but especially to unknown risks.

Keynes (1937, as cited in Pflueger *et al.*, 2020) states that financial markets play an important role in shaping economic fluctuations. During the cycles of economic boom and bust, a negative fundamental shock causes perceptions of risk to rise. During this time, investors value the safety of bonds and the cost of capital for risky firm is higher. Research conducted by Pflueger *et al.* (2020) showed that investors' expectations of risk fall on the heels of positive macroeconomic news.

Linciano *et al.* (2018) found that socio-demographic variables, financial knowledge, personal traits (self-assessed risk tolerance), impulsivity and behavioural biases play an important role in the perception of risk. The authors emphasise that some individuals perceive information in the opposite way compared to others when investing through informational disclosure. Men perceive higher risk when provided with visual templates than when receiving a verbal description. The opposite is true for women.

3.1 Prospect theory

It is a behavioural model that shows that people are averse to losses because they dislike losses more than equivalent profits. They

Table 1. Biased weighting of probabilities and loss aversion.

	Gains	Losses
High probability	95% chance to win $10,000	95% chance to lose $10,000
(Certainty Effect)	Fear of disappointment	Hope to avoid loss
	RISK-AVERSE	RISK-SEEKING
Low probability	5% chance to win $10,000	5% chance to lose $10,000
	Hope of large gain	Fear of large loss
	RISK-SEEKING	RISK-AVERSE

Source: Kahneman, Tversky, 1979; Kahneman, 2011.

are thus more willing to take risks to avoid losing. An example of skewed weighting of probabilities for alternatives involving risk and uncertainty is given in (Table 1) (Kahneman, Tversky, 1979; Kahneman, 2011).

The concept of loss aversion is also related to prospect theory; Schindler, Pfattheicher (2016) also state that people are willing to risk more (or behave dishonestly) to avert loss than to gain a return, because the pain of loss is psychologically up to twice as powerful as the pleasure of yield. This concept was used to explain the endowment effect and sunk cost fallacy.

4. Results

Although an investor may identify themselves in one or more of the biases recognised by Zahera, Bansal (2018) in Chapter 1, the authors do not further elaborate on the reasons for these prejudices. At the same time, investor behaviour is greatly influenced by the individual characteristics of individual investors and their capacity and appetite for risk. This research demonstrated that for future empirical research among retail investors, it is essential that not only the respondent's own commitment to specific prejudices is taken into account, but that respondents must also be asked questions or practical examples of risk perception and their individual characteristics (gender, age, marital status, education, annual income, and experience). Each prejudice can then be categorised according to these parameters and then the correlation between the characteristics of prejudices and individual respondents can be compared, whether there is a positive correlation between these characteristics or whether the selection of specific relevant biases is only a subjective perception of each respondent.

5. Discussions

Behavioural finance is an important part of investor behaviour in financial markets. History shows that markets behave cyclically (Pompian, 2017, p. 9), so if some investors panicked their positions during the global financial crisis in 2008–2009, they still regret it. Although the situation in the financial markets (apart from the Covid-19 pandemic effect) has been good in recent years, it may change drastically, so a correct diagnosis of irrational behaviour is important to mitigate the impact of losses.

Some investor behaviour may be unknowingly influenced by personal opinions and previous experiences to the extent that even intelligent investors may deviate from logical thinking. These influences are described by the authors (Pompian, 2017; Zahera, Bansal, 2018; Kahneman, Tversky in 1979; and others) as behavioural biases. Pompian (2017) distinguishes between cognitive and emotional biases and determines whether these biases can be moderated by an individual investor or must be adapted to them. Cognitive biases include anchoring and adjustment, mental accounting, framing, availability, self-attribution, outcome and recency. On the contrary, among the emotional biases, the authors include loss aversion, overconfidence, self-control, status quo, endowment, regret aversion, and affinity.

Risk can be perceived as a state of ignorance of the decision-maker, dispersion of possible results, danger of negative deviation or danger of a wrong decision (Beranová, 2007). Pompian (2017, p. 10) divides perception of risk into two categories, namely risk capacity and risk appetite. On the one hand, risk capacity is the ability to take a risk, whereas risk appetite means the amount of risk an investor is willing to take in order to be rewarded.

6. Conclusion

The author conducted a systematic review of qualitative data in the form of publications and scientific articles dealing with issues

of behavioural finance and risk perception. This work will serve as a theoretical basis for further research. The author aggregated secondary data, from which the main behavioural biases and their connection with the risk perception of individual investors were identified. Furthermore, the connection between socio-demographic characteristics and their influence on the level of influence by behavioural biases was described. All of these factors have been found to affect individual investors' perceptions of information to the extent that some individuals perceive the same information differently when making decisions based solely on financial disclosure and make different decisions based on that.

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