



BEHAVIOURAL FINANCE: A THEORETICAL PERSPECTIVE

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Abstract

Previous theoretical and empirical research in finance were carried out without regard to the human behaviour in financial decision making. However, the intuitive judgement of the investors revealed some shortcomings of such financial decisions, and that the psychology of the investors is very important in financial decisions. This study is carried out to discuss the current state of the literature on behavioural finance with a view to further provide a clear understanding of the subject. This study draws from previous write-ups on the subject and conclude that behavioural finance is important in assisisting the alerting and counteracting the investors' tendencies to bias.

Keywords: Behavioural Finance; Human Behaviour; Financial Decisions; Financial Market.

1. INTRODUCTION

The financial crisis of 2008 has raised debate on the shortcomings of the traditional financial theories. The traditional financial theory is based on the assumption that individual behave rationally, have homogeneous expectation, and ignores biases in human beahviour. Over the years, alternative views have been raised in questioning the traditional financial theory. Some of the gaps highlighted in traditional finance include for example; the disregard for behavioural and ethical considerations in financial decison making. The behavioural finance approach extends the focus of traditional finance approach. Hence, the effects of investors and market practitioners behaviours on financial decision making began to be analysed.

Kourtidis, Sevic and Chatzoglou (2011) argue that there is a necessity to understand the psychology of market participants in order to provide an explanation of market abnormalities, such as asset price bubbles and crashes, and comprehend the efficiency of the financial markets. This would seem to suggest it is difficult to fully understand and research the global financial market without reference to the behavioural finance theory (Fakhry, 2016). In addition, as pointed by Kourtidis *et al.* (2011), the obvious existence of irrational market participants making random transactions in the market can only be adequately explained by taking account of behavioural factors. Barberis and Thaler (2003), state that the impact on the price from these irrational market participants can be long-lived and substantial. Hence, these two issues (i.e. the psychology and the long-lived impact of irrational market participants) form the building blocks of behavioural finance (Barberis & Thaler, 2003).

Behavioural finance seeks to study the influence of psychology on the behaviour of investors or financial practitioners and its role or effects in financial decision making. Presumably, it focused on the fact that investors are sometimes irrational and bias. In addition, financial practitioners and by extension investors' behavioural errors lead to wrong decisions and disasters in the stock market. According to Statman (2014), behavioural finance is finance with normal people in it. Standard finance, in contrast, is finance with rational people in it. Normal people are not irrational



and they are mostly intelligent and usually normal smart. But sometimes they are normal stupid, swayed by cognitive errors such as hindsight and overconfidence, and misleading emotions such as exaggerated fear or unrealistic hope (Statman, 2014). In addition, behavioural finance makes it possible to propose more realistic hypotheses to understand financial behaviour. Each behavioural trait explains a phenomenon observed in the market (Kamoune & Ibenrissoul, 2022).

Statman (2014) assert that standard finance is built on four foundation blocks, that is i. People are rational, ii. Markets are efficient, iii. People should design portfolios by the rules of mean-variance portfolio theory and do so, and, iv. Expected returns of investments are described by standard asset pricing theory, where differences in expected returns are determined only by differences in risk.

Behavioral finance offers an alternative foundation block for each of the foundation blocks of standard finance. According to behavioral finance: One, people are normal. Two, markets are not efficient, even if they are difficult to beat. Three, people design portfolios by the rules of behavioral portfolio theory. Four, expected returns of investments are described by behavioral asset pricing theory, where differences in expected returns are determined by more than differences in risk (Statman, 2014).

Behavioural finance is a relatively new school of thought that deals with the influence of psychology on the behaviour of financial practitioners and its subsequent impact on stock markets (Sewell, 2010). It signifies the role of psychological biases and their specific behavioural outcome in decision making. Behavioural experts have identified the role of psychological biases like overconfidence (De Bondt, 2002), self attribution bias (Daniel & Subrahmanyam, 1998) and herd behaviour (Cooper, Dimitrov & Rau, 2001) in fuelling such anomalies. This makes behavioural finance an extremely relevant topic in today's times. This study seeks to explore the issues in behavioural finance to further provide a better understanding of the subject.

2. LITERATURE REVIEW AND THEORY

This section attempts to review literature and theory relating to this research work.

2.1 Emergence of Behavioural Finance

The traditional financial theories were well constructed to make calculated financial decisions. However, they were unable to explain the disruptions in stock markets. These disruptions or anomalies emerged time to time in the form of stock market bubbles, market overreaction or under reaction and momentum and reversals. Hence, in this paradigm, behavioural finance started evolving which tried to provide behavioural explanations to such anomalies (Kapoor and Prosad, 2017). The path-breaking work in behavioural finance is credited to Kahneman and Tversky (1979). Kahneman and Tversky (1979) introduced the concept of prospect theory for analysis of decision making under risk which formed the foundation of behavioural finance. Accordingly, Kahneman and Tversky (1979) used the value function in the prospect theory to replace the utility function in the expected utility theory. This function estimates the "value" that individuals attach to their gains or losses. The function explains that some gains or losses are felt with greater intensity than others.



According to Kapoor and Prosad (2017), at times, the pain of a loss is greater than the happiness of an equivalent amount of gain. This is known as *loss aversion* as losses looms larger than gains. Accordingly, there are three major propositions of the prospect theory: The first proponent states that individuals do not have a uniform risk attitude. This makes the value function ‘S’ shaped i.e. concave for gains and convex for losses. The second proponent suggests that individuals estimate the value of the prospect with the help of a reference point. This reference point is generally their status quo or their current level of wealth which decides their gain or loss in a prospect. The third proponent advocates that losses loom larger than gains (loss aversion). It is a tendency of individuals where their urge to avoid losses is much greater than seeking gains. Prospect theory is considered to be the seminal work in behavioural finance and it forms the underlying basis of biases like loss aversion, framing and the disposition effect (Kapoor & Prosad, 2017).

Another model developed by Shefrin and Statman (1994) is called the Behavioural Asset Pricing Model (BAPM). The BAPM model explains the market interaction of two groups of traders i.e. the informational traders and the noise traders. Shefrin and Statman (1994) also develop an alternative to Markowitz portfolio theory, named as the behavioural portfolio theory (BPT). In the Markowitz model, the investors build a mean variance portfolio thereby trying to optimize their risk-return tradeoff. In contrast, the BPT takes into account the behavioural investors that construct their portfolios as pyramids of assets, layer by layer, where each layer is associated with its specific goal and risk attitude.

Shleifer (2000) presents behavioural models that explains various market anomalies such as the superior performance of value stocks, the closed end fund puzzle, the high returns on stocks included in market indices, the persistence of stock price bubbles, and collapse of several well-known hedge funds in 1998. Shiller (2002) stresses on the impact on investor perception, along with psychological and cultural factors in creating the bubbles in stock markets. In addition, Jegadeesh and Titman (1993) also provide significant evidence for momentum. They found that individual stock prices over a period of six to twelve months tends to predict the future price movement in the same direction. This finding violates even the weak form of market efficiency.

2.2 Behavioural Finance and Financial Market Behaviour

Classical economics believes or assumes that people and/or investors are rational when they make economic or financial decisions. In this sense, rational means that investors respond to incentives because their main goal is always to maximize benefit at the minimum costs possible. However, not everyone shares the same idea of benefit and cost, but in a financial market with millions of participants, there tends to be a belief in rationality, which leads to the idea of the financial market to be efficient.

In an efficient market, prices reflect “fundamental value” as appraised by rational financial decision makers who have access to information and are free to choose to buy or sell as their rational decisions dictate. The belief in efficiency assumes that when prices do not reflect real value, people will notice and will act on the anomaly with the result that the market “corrects” that price. However, market systems are riddled with imperfections, risk, uncertainty and rigidities that prevent information from being readily available, therefore, making decisions in such an environment is susceptible to “cognitive biases” and “bounded rationality” (García, 2013).



People are not always rational, however, and markets are not always efficient. From the foregoing, it can be seen that individuals do not always make the decisions they are expected to make and markets do not reliably behave as they are expected to behave. As market participants, individuals are affected by others' behavior, which collectively affects the financial market behavior, which in turn affects all the participants and/or investors in the market. One kind of investor behavior that leads to unexpected decisions is bias, a predisposition to a view that inhibits objective thinking (Shefrin, 2002).

Biases can cause people to emphasize or discount information or can lead to too strong an attachment to an idea or an inability to recognize an opportunity. According to Shefrin (2002), components of biases that affect investment decision include; availability bias, representativeness, overconfidence, anchoring, and ambiguity aversion.

Availability bias, that is an investor's tendency to base the probability of an event on the availability of information occurs because investors rely on information to make informed decisions, but not all information is readily available. Investors tend to give more weight to more available information and to discount information that is brought to their attention less often. The stocks of corporations that get good press, for example, claim to do better than those of less publicized companies when in reality these "high-profile" companies may actually have worse earnings and return potential (Shefrin, 2002).

In the words of Shefrin (2002), representativeness is decision making based on stereotypes, characterizations that are treated as "representative" of all members of a group. In investing, representativeness is a tendency to be more optimistic about investments that have performed well lately and more pessimistic about investments that have performed poorly. An investor may stereotype the immediate past performance of investments as "strong" or "weak." This representation then makes it hard to think of them in any other way or to analyze their potential. As a result, the investor may put too much emphasis on past performance and not enough on future prospects.

Normally, objective investment decisions involve forming expectations about what will happen, making educated guesses by gathering as much information as possible and making as good use of it as possible. Hence, overconfidence is a bias in which an investor indicates too much faith in the precision of his estimates, causing him to underestimate the range of possibilities that actually exist. An investor may underestimate the extent of possible losses, for example, and therefore underestimate investment risks (Shefrin, 2002).

Anchoring which is a bias where the investor relies too heavily on limited known factors happens when an investor cannot integrate new information into his thinking because he is too "anchored" to his existing views. In this situation, an investor hardly gives new information its due, especially if it contradicts his previous views. By devaluing new information, an investor tends to underreact to changes or news and become less likely to act, even when it is in his interest (Shefrin, 2002).



Ambiguity aversion that is a preference for known risks over unknown risks is the tendency to prefer the familiar to the unfamiliar or the known to the unknown risks. Avoiding ambiguity can lead to discounting opportunities with greater uncertainty in favor of “sure things.” Availability bias and ambiguity aversion can result in a failure to diversify, as investors tend to “stick with what they know” (Shefrin, 2002).

Economic forces and financial behaviour can converge to create extreme markets or financial crises, such as booms, bubbles, panics, crashes, or meltdowns. These atypical events actually happen fairly frequently. Between 1618 and 1998, there were thirty-eight financial crises globally, or one every ten years (Kindleberger and Aliber, 2005).

Accordingly, a period of economic expansion is sparked by a new technology, the discovery of a new resource, or a change in political balances. This leads to increased production, markets, wealth, consumption, and investment, as well as increased credit and lower interest rates. People are looking for ways to invest their newfound wealth. This leads to an asset bubble, a rapid increase in the price of some asset: bonds, stocks, real estate, or commodities such as cotton, gold, oil, or tulip bulbs that seems to be positioned to prosper from this particular expansion (Kindleberger & Aliber, 2005).

The bubble continues, reinforced by the behavioural and market consequences that it sparks until some event pricks the bubble. Then asset values quickly deflate, and credit defaults rise, damaging the banking system. Having lost wealth and access to credit, people rein in their demand for consumption and investment, further slowing the economy.

In many cases, the event that started the asset speculation was not a macroeconomic event but nevertheless had consequences to the economy: the end of a war, a change of government, a change in policy, or a new technology. Often the asset that was the object of speculation was a resource for or an application of a new technology or an expansion into new territory that may have been critical to a new emphasis in the economy. In other words, the assets that became the objects of bubbles tended to be the drivers of a “new economy” at the time and thus were rationalized as investments rather than as speculation.

2.3 Behavioral Finance Theories

In this section, some theories of behavioural finance are presented as follows;

- i. Expectation Theory - Kahneman and Tversky:** The theory of expectation was developed by Daniel Kahneman and Amos Tversky in 1979. The starting point of the theory is to determine people's decision-making in situations with high risk and uncertainty. The expectation theory, which emerged as an alternative theory to the expected benefit theory, was published in 1979 with the study "Prospect Theory: An Analysis of Decisions under Risk". When the formation stages of the theory are examined, Kahneman and Tversky (1979) presented the problems to the subjects in terms of how people prefer to present the possibilities. Then, they compared the answers of the subjects with the probability of having options and their findings were examined. In the continuation of the study, it was determined that people do not behave rationally in contrast to the expected benefit theorem and the findings of the study are presented in theory.



- ii. **Barberis, Shleifer and Vishny Model:** The main purpose of the model, developed by Barberis, Shleifer and Vishny (1998) is to try to determine the investors' reaction to the developing financial markets. Barberies et al. (1998), trying to identify differences in investors' behavior, found that their response to the good and bad news received by the investor about the market under the market conditions was inadequate or, on the contrary, excessive than expected.

Barberis, Shleifer, and Vishny (1998) found that investors will exhibit two types of behavior in a study examining the relationship between current price movements in the market and investors' behaviors. These are bias of representativity and conservatism. The conservative behavior observed in the investors is expressed as the investment behavior pattern exhibited by the investors who cannot come out of the effect of the knowledge gained from their past experiences and make investment decisions in this direction. On the other hand, the bias of representativeness is explained by taking into account the artificial and striking value created by the investors rather than taking into consideration the statistical weight of the information obtained from the market by the investors.

Barberies *et al.* (1998) determined the insufficient reaction and overreaction behavior of investors in market conditions as a result of two situations. Insufficient reaction behavior indicates that investors are slow to act in the absence of the expected investment reaction in the face of a company operating in the market declaring that it is making a profit. Overreaction behavior means that after a series of positive and negative news about a company, investors react differently than expected in an extreme reaction, regardless of the firm's profit-loss relationship.

- iii. **Daniel, Hirshleifer and Subrahmanyam Model:** Daniel *et al.* (1998) state that two basic emotions emerge by focusing on the psychological factors that investors are affected in making their investment decisions. These are excessive trust and self-attribution. Hence, Daniel et al. (1998) pointed out that investors consider themselves superior in exhibiting investment behavior in order to increase the value of their assets, and they show that investors act with the illusion of over-confidence in making investment decisions. The other error that directs investors to make a wrong investment decision is the self-attribution fallacy. Investors are influenced by the success of their previous investments and make their own success while making investment decisions. Investors applying the investment behavior in this context reinforce these feelings if the investment decisions are successful. In case of failure of investment decisions, they deceive themselves by putting the situation to chance.

That is to say, people are affected by many factors when making investment decisions. These factors result from both personal characteristics and environmental factors. Bolhuis and Goodman (2005) state that investors are influenced and acted on certain factors such as benefiting from past experiences, avoiding loss and overconfidence when making investment decisions. Daniel *et al.* (1998) base the two psychological conditions under which investors are influenced by the misinterpretation of real information shared with the market about investment instruments. The results of these two basic psychological emotions, which ignore the real information, mislead investors and lead them to make wrong investment decisions.



De Long, Shleifer, Summers, and Waldman (1991) suggest that there are positive effects of overconfidence of investors and that investors who make rational decisions on the basis of statistics will not be profitable in the long term, and that investors with excessive confidence can make high-profit investments with the information obtained from the market and interpreted correctly. Although this interpretation creates a paradoxical situation in the face of the psychological illusion of excessive trust, it ignores the assumption that investors with excessive trust cannot exhibit successful behavior in interpreting real and accurate information from the market.

Gervais and Odean (1992) point out to the positive results of an aggressive attitude in the behavior of the investor with excessive confidence in himself, suggesting that acting with excessive confidence will provide investors with advantages and competitors may be unresponsive to this situation. Daniel et al. (1998), on the other hand, assert that excessive self-confidence behavior is seen more in investors with low investment liquidity, and that low investment liquidity will lose the advantage of this situation and that the competing investment instruments can react quickly and without reacting to this situation.

Odean (1998) argues that markets will be affected by the excessive confidence investment behavior of investors and may create market fluctuations. It strengthens the conclusion that in an investment environment where market fluctuations are high, investors will act with reference to incomplete and incorrect information, which will mislead investors and especially those who act with excessive confidence, will be affected more.

Coval and Shumway (2005) state that investors who have achieved successful results in their investments have self-attribution behavior in their investment decisions based on their past success related with their future investments and have more confidence in self-attribution behavior in each successful investment. This situation triggers investors to be more risk-oriented and to act on their own interpretations rather than statistical values of actual information. Investors who are affected by this psychological situation and exhibit irrational behaviors also support the model proposed by Daniel *et al.* (1998).

As a result, in the behavioral finance model developed by Daniel *et al.* (1998), it is determined that investors will act by being influenced by excessive confidence and misconception of self-attributability and that they will exhibit irrational behaviors.

- iv. Hong and Stein's Model, News Hunting and Momentum Behavior:** The model of Hong and Stein (1999), unlike other models, tries to determine how investors exhibit their investment behavior and explain the types of investor behavior in line with their findings rather than questioning rational behaviors that emerge on a psychological basis.

Hong and Stein (1999), divide the type of investor behavior into two. The first of these is news hunters who determine investment behaviors in line with the developments in the market and the information obtained. The second investor behavior type is momentum investors who take into account the investment trends of the investment instruments in the previous periods and act according to the change situation of the investment instrument in a certain period.



When these two types of behaviors are associated with investor reactions, it is seen that news hunters show inadequate reactions due to the low rate of dissemination of information obtained from the market and taking a certain time to accept the accuracy. Momentum investors, on the other hand, are observed to be overreacting by making predictions together with examining the situation of the investment instrument in the past periods instead of following the information coming from the market (Hong & Stein, 1999).

Looking at the effects of investor behavior on each other, it is seen that both investment behavior types have their own weaknesses and these weaknesses affect each other. The weak point of news hunters is that they are not able to react to the information coming from the market in a timely manner and are open to losing investment opportunities and profits from investment opportunities (Hong & Stein, 1999).

The main weakness of Momentum investors is the fact that they only evaluate the investment instrument by looking at the past conditions and ignoring the information obtained from the market. This increases the risk level of investment decisions of momentum investors. Looking at the effect of weak points on each other, the lack of reaction of news hunters prevents the market value of the investment instrument from reaching its required level and causes momentum investors to gain below the expected earnings level if they succeed in their predictions. Investments made by Momentum investors based on historical data appear to inflate the market situation of the investment instrument, causing news hunters to mislead and make wrong investments. When the common points of both investor types are considered, it is seen that the investors have limited rational behavior rather than rational behavior (Hong & Stein, 1999).

Zhang (2006) compares the two types of investment behavior based on the uncertainty of the market and the gains of the investment instruments to investors under these uncertainties. According to Zhang (2006), the increase in the risk level in uncertain environments increases the amount of gain to be obtained from investment instruments whose uncertainty level is higher than other investment instruments. The investor behavior that will benefit the most from this situation is the momentum investor type. The investor exhibiting momentum investor behavior increases the level of earnings by receiving the reward of early reaction.

As a result, based on the model developed by Hong and Stein (1999), instead of seeing people as rational investors as in traditional finance theories, it is seen that the investors prefer a certain investor behavior attitude based on their beliefs and general acceptances.

At this juncture, this paper is theoretical in nature which introduce the principal concepts and set the general framework about behavioural finance. This is done by exposing the theoretical background of the subject matter.

3. CONCLUSIONS AND RECOMMENDATIONS

In conclusion, the theoretical discussions show that the knowledge of behavioural finance can be beneficial in a number of ways as follow:

- a.** It alerts and counteract the investors' tendencies to bias and framing.



- b. It provides basis for investment plan as well as determine the asset and capital allocation that can produce desired objective and risk tolerance within defined constraints.
- c. It helps in avoiding anchoring by not believing that current performance indicates future performance.
- d. Similarly, investors should have it that current market trend may resemble, but they are not the same.

References

- Barberis, N., Huang, M., & Santos, T. (1999). Prospect theory and asset prices (No. w7220). National bureau of economic research.
- Barberis, N., & Thaler, R (2003). "A survey of behavioral finance." In *Handbook of the Economics of Finance*. Edited by G. Constantinides, M. Harris, and R. Stulz. Amsterdam, Holland: Elsevier/North-Holland.
- Bolhuis, M., and Goodman, N. (2005). Reading between the lines of investor biases. *Journal of Financial Planning*, 18(1); 62-70
- Coval, J., & Shumway, T. (2005). Do behavioral biases affect prices?. *Journal of Finance*. 60. 1-34.
- Cooper, M.J., Dimitrov, O., & Rau, P.R. (2001). A rose.com by any other name. *Journal of Finance*, 56(6), 2371-2388.
- Daniel, K., Hirshleifer, D., & Subrahmanyam, A. (1998). A Theory of overconfidence, self attribution and security market under and overreactions. *Journal of Finance*, 53: 1839-1886.
- De Bondt, W. (2002). Bubble psychology. in *asset price bubbles: The implications for monetary, regulatory, and international policies*. Cambridge, London, England: The MIT Press.
- De Long, J.B., Shleifer, A., Summers, L, and Waldman, R. (1991). The Survival of Noise Traders in Financial Markets. *The Journal of Business*, 64(1), 1-19
- Fakhry, B. (2016). A literature review of behavioural finance. *Journal of Economics Library*, 3(3); 458-465.
- Garcia, M. J. R. (2013). Financial education and behavioural finance: New insights into the role of information in financial decisions. *Journal of Economics Survey*, 27(2), 297-315. doi:10.1111/j.1467.6419.2011.00705.x
- Gervais, S., & Odean, T. (2001). Learning to be overconfident. *Review of Financial studies*, 14(1), 1-27.
- Gervais, S., & Odean, T. (2001). Learning to be overconfident. *The Review of Financial Studies*, 14(1), 27.
- Hong, H., & Stein, J. C. (1999). A unified theory of under-reaction, momentum trading, and over-reaction in asset markets. *The Journal of Finance*, 54(6), 2143-2184.
- Jegadeesh N., & Titman, S. (1993). Returns to buying winners and selling losers: Implications for stock market efficiency. *The Journal of Finance*, 48 (1): 65-91.
- Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica: Journal of the Econometric Society*, 263-291.
- Kamoun, A., & Ibenrissoul, N. (2022). Traditional versus behavioral finance theory. *International Journal of Accounting, Finance, Auditing, Management and Economics, Theoretical Research*, 3 (2-1), 282-294. 10.5281/zenodo.6392167. hal-03634756



- Kapoor, S. & Prosad, J. M. (2017). Behavioural finance: A Review. Information Technology and Quantitative Management (ITQM, 2017). Available online at www.sciencedirect.com
- Kindleberger, C. P. & Aliber, R. (2005). *Manias, Panics, and Crashes*, 5th ed. Hoboken, NJ: John Wiley & Sons, Inc.
- Kourtidis, D., Sevic, Z. & Chatzoglou, P. (2011). Investors' trading activity: A behavioural perspective and empirical results. *The Journal of Socio-Economics*, 4(5), 548-557. doi. 10.1016/j.socec.2011.04.008
- Mackay, C. (2003). *Memoirs of extraordinary popular delusions and the madness of crowds. original*. Minneapolis, New York: Dover Publication Inc. (Originally published 1841)
- Markowitz, H. (1952a). Portfolio selection. *Journal of Finance*, 7(1), 77-91.
- Odean, T. (1998). Volume, volatility, price, and profit when all traders are above average. *The Journal of Finance*, 53(6), 1887-1934.
- Pompian, M. (2011). *Behavioural finance and wealth management: How to build optimal portfolios that account for investor biases* (2nded.). New Jersey: Wiley Finance Publications.
- Sewell, M. (2010). *Behavioural finance*. University of Cambridge.
- Shefrin, H. (2002). *Beyond greed and fear: understanding financial behavior and the psychology of investing*. Oxford: Oxford University Press.
- Shefrin, H., & Statman, M. (1994). Behavioural capital asset pricing theory. *Journal of Financial and Quantitative Analysis*, 29(3), 323-349.
- Shiller, R. J. (2002). Bubbles, human judgment, and expert opinion. *Financial Analysts Journal*, 58(3):18–26.
- Shleifer, A. (2000). *Inefficient markets: An introduction to behavioural finance* (1st ed.). New York: Oxford University Press Inc.
- Statman, M. (2014). Behavioral finance: Finance with normal people. *Borsa Istanbul Review*, 14(2014) 65-73. <http://www.elsevier.com/journals/borsa-istanbul-review/2214-8450>.
- Statman, M. (2010). *What is behavioral finance*. In A. Wood (Ed.), *Behavioral finance and investment management*. Research Foundation of CFA Institute.
- Zhang, X. (2006). Information uncertainty and stock returns. *The Journal of Finance*, 61(1), 105-137.