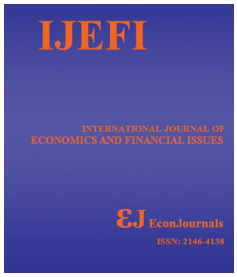


International Journal of Economics and Financial Issues

ISSN: 2146-4138

available at http: www.econjournals.com

International Journal of Economics and Financial Issues, 2019, 9(4), 101-108.

Behavioural Asset Pricing: A Review

N. S. Nanayakkara*, P. D. Nimal, Y. K. Weerakoon

Department of Finance, Faculty of Management Studies and Commerce, University of Sri Jayewardenepura, Sri Lanka.
*Email: neelangie@sjp.ac.lk

Received: 30 April 2019 **Accepted:** 07 July 2019 **DOI:** https://doi.org/10.32479/ijefi.8190

ABSTRACT

Neoclassical asset pricing is built on the premise investors are rational and there are unlimited arbitrage opportunities. Behavioural implications of irrational investors led to the development of the counter paradigm, behavioural asset pricing. This study systematically reviews the origin and evolution of behavioural asset pricing distinct to neoclassical asset pricing. It addresses the two pillars of behavioural asset pricing where; investors are not always rational and there are limits to arbitrage. The study captures investor irrationality in two perspectives; investors' beliefs and their preferences. It reviews psychological biases and heuristics adopted from experimental psychology to behavioural asset pricing in explaining beliefs and preferences of irrational investors. Furthermore, it lists key biases and heuristics recognised in behavioural asset pricing literature. It discusses theoretical behavioural asset pricing models that try to explain variation of stock returns through specific biases of investor psychology. Lastly, the study reviews aggregate investor sentiment studies that try to capture mass psychology of investors in financial markets. The significance of this study is that it attempts to develop a holistic view of the foundation and evolution of behavioural asset pricing.

Keywords: Asset Pricing, Behavioural Finance, Irrational Investor, Arbitrage, Biases, Heuristics
JEL Classifications: D81, D91, G12

1. INTRODUCTION

Neoclassical finance is built upon the assumptions that investors are rational, markets are perfectly competitive, and information is freely available. Neoclassical finance encompasses pioneering theories; the portfolio theory (Markowitz, 1952; 1959), the capital structure irrelevance theorem (Miller and Modigliani, 1961), the Capital Asset Pricing Model (Sharpe, 1964; Lintner, 1965; Black, 1972) and the option pricing theory (Black and Scholes, 1973). According to Statman (1999) neoclassical finance is compelling because it uses minimum of tools to build a unified theory intended to answer all the questions in finance. However, according to Barberis and Thaler (2003) though neoclassical framework is appealingly simple, it has become clear that financial phenomena are not easily understood in this framework.

Behavioural finance emerged in response to the difficulties faced by neoclassical paradigm in explaining financial phenomena. It argues investors' decisions are affected by human psychology and that the economic agents are not always rational. Thus, they may make decisions subject to psychological biases and heuristics (DeLong et al., 1990). It argues financial phenomena can be better understood using models in which some agents are not fully rational. Behavioural finance is applied in many areas in finance such as; asset pricing, corporate finance and portfolio management (Byrne and Brooks, 2008).

Asset pricing is central to both neoclassical and behavioural finance and they try to explain cross sectional variation of stock returns. In neoclassical models, the unemotional investors always force capital market prices to equal the rational present value of expected future cash flows (Baker and Wurgler, 2007). In such markets, if a stock is mispriced, the rational arbitrageurs will quickly eliminate the mispricing and drive the price to its fundamental value. Neoclassical asset pricing emerged as a strong body of knowledge with the portfolio theory of Markowitz (1952;

1959), the separation theorem of Tobin (1958) and the capital asset pricing model (CAPM) (Sharpe, 1964; Lintner, 1965; Black, 1972) (SLB). Nonetheless, empirical investigations uncovered anomalies (Basu, 1983; Banz, 1981; Stattman, 1980; Bhandari, 1988) and puzzles (Shiller, 1989; Mehra and Prescott, 1985; Shiller, 1989; Fama and French, 1998) that could not be justified by neoclassical asset pricing models. Yet neoclassical models argue that long term anomalies which challenge the efficient market hypothesis can be captured by changes in methodology (Fama, 1998).

Limitations in neoclassical asset pricing led to the development of psychology-based explanation for asset prices. It is built on the assumptions that investors are not always rational (DeLong et al., 1990; Barberis and Thaler, 2003; Ritter, 2003) and there are limits to arbitrage (Shleifer and Vishny, 1997; Barberis and Thaler, 2003; Ritter, 2003). Behavioural asset pricing evolved considerably on these key assumptions. Theoretical behavioural asset pricing models (Daniel et al., 1998; Barberis et al., 1998) try to explain variation of stock prices through specific biases of investor psychology. There is behavioural literature that tries to identify individual human heuristics and biases that affect stock prices (De Bondt and Thaler, 1984; 1985; Weinstein, 1980; Taylor and Brown, 1988; Statman, 2002, Shiller, 1998). Empirical investigations such as Baker and Wurgler (2006), Brown and Cliff (2004) try to capture aggregate investor psychology and its effect on stock returns.

There are criticisms levelled at behavioural asset pricing comparative to neoclassical theory. Neoclassical literature is considered a coherent body of knowledge rather than a disjointed collection of studies (Dimson and Mussavian, 1999). Behavioural asset pricing theory is considered eclectic with wide variety of models, where it lacks mutual consistency and unifying structure (Shefrin, 2009). Fama (1998) argues that market efficiency can only be replaced by a better specific model of price formation and the problem in developing an overall perspective on long-term behavioural studies is that they rarely test a specific alternative to market efficiency. However, behavioural finance has emerged as a descriptive theory of actual investor behaviour rather than on a normative explanation of how they should behave.

Behavioural finance does not completely replace traditional finance; it plays a complementary role for understanding the issues in traditional finance (Subrahmanyam, 2007).Thus, the objective of this paper is to review how behavioural asset pricing emerged as a counter argument to rational behaviour of investors. It compares the roots of neoclassical and behavioural asset pricing. The study reviews the core assumption that investors are not always rational. It investigates investor irrationality from the two perspectives; investors' beliefs and their preferences. It discusses the biases and heuristics of experimental psychology that is adopted in explaining these beliefs and preferences. Furthermore, this study discusses behavioural theoretical models of asset pricing and aggregate investor sentiment models in behavioural asset pricing.

First section of this study will have a brief introduction of evolution of neoclassical asset pricing theory. The second section reviews the roots of behavioural asset pricing theory based on its two key assumptions; investor irrationality and limits to arbitrage. It will elaborate investor irrationality through investor belief and preferences. Prospect theory will be addressed as the prominent decision theory in behavioural asset pricing. Section three outlines behavioural biases and heuristics investigated in behavioural literature. It further focuses on theoretical behavioural asset pricing models and models of aggregate investor sentiment in behavioural asset pricing. Section four concludes the study.

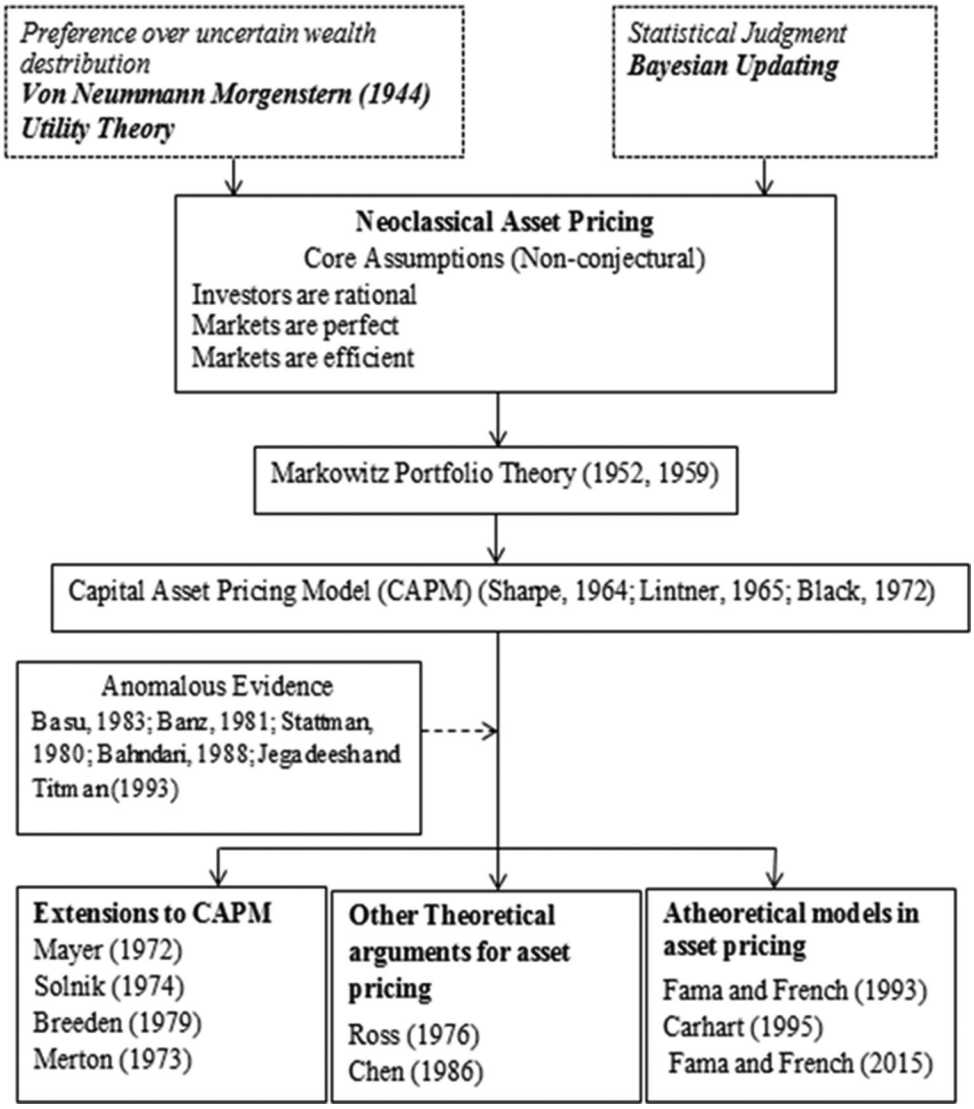
2. NEOCLASSICAL ASSET PRICING

In neoclassical asset pricing, value of a stock in a capital market equals to the present value of its expected future cash flows. If stock prices deviate from its intrinsic value, the rational arbitrageurs immediately correct the mispricing to its fundamental value. The asset pricing theory assumes investors are always rational and there are unlimited arbitrage opportunities in a market. Figure 1 depicts the roots of the empirical and theoretical development of the neoclassical asset pricing theory and its models. According to the neoclassical theory when investors receive new information, they update their beliefs through Bayesian updating and make their preferences according to Morgenstern (1944) utility theory to maximise their expected utility.

Markowitz (1959) portfolio selection theory led to the development of the pioneering neoclassical model; the capital asset pricing model (CAPM) (Sharpe, 1964; Lintner, 1965; Black, 1972) (SLB). CAPM relates the stock return to a measure of its systematic risk, beta. According to the model, the expected returns of securities are a positive linear function of their market betas; and market betas suffice to describe the cross section of expected returns. Earlier studies support the linear relationship between average return and beta (Black et al., 1973; Fama and MacBeth, 1973). However, subsequent empirical evidence identified anomalies to the SLB model that could not be captured by beta alone (Basu, 1983; Banz, 1981; Stattman, 1980; Bhandari, 1988).

The mixed evidence to the CAPM model led to new theoretical and empirical developments in asset pricing. As depicted in Figure 1, this study identifies three major areas of these developments namely; extensions to the CAPM model (Mayers, 1972; Merton, 1973; Breeden, 1979), new theoretical arguments in the form of factor models (Ross, 1976; Chen et al., 1986) and atheoretical factor models to fit the anomalous empirical evidence to the CAPM model (Fama and French, 1993; 2015; Cahart, 1997). However, apart from anomalies, many puzzles in equity markets challenged the applicability of neoclassical asset pricing models. Equity premium puzzle (Mehra and Prescott, 1985), excess volatility (Shiller, 1989), predictability (Fama and French, 1998) are findings that do not align with the rational framework. It has become evident that neoclassical asset pricing models lack the ability to capture existing anomalies and puzzles in the market. Solnik (1974) emphasizes that a full understanding of human limitations will ultimately benefit decision maker more than their naive faith in the infallibility of their intellect. Therefore, human limitations ignored by rational models led to the development of an alternative behavioural explanation for asset prices.

Figure 1: Evolution of neoclassical asset pricing models



Source: Author

3. BEHAVIOURAL ASSET PRICING

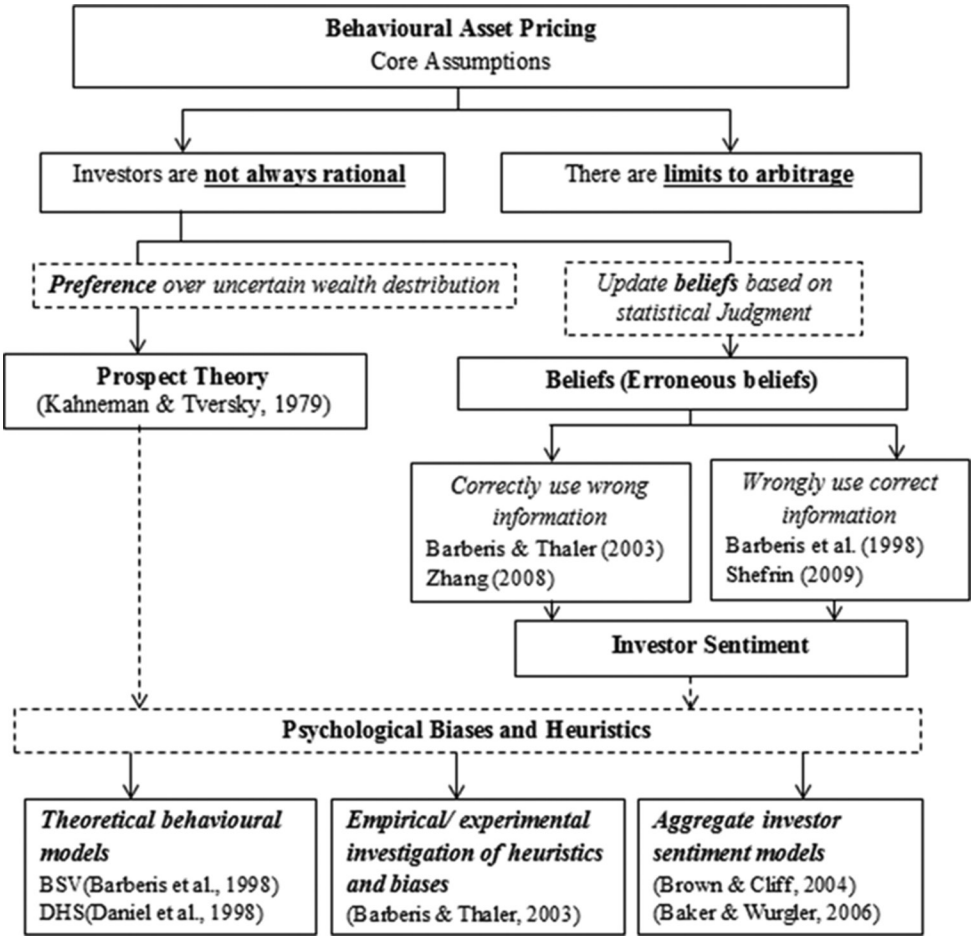
Behavioural asset pricing tries to uncover a psychology-based explanation for variation of stock returns. It is built on the counter argument that investors are not always rational and they make decisions subject to psychological biases and heuristics (DeLong et al., 1990). Black (1986) theorise irrational investors as noise traders. According to the noise trader theory, irrational traders trade on noise as if it was information and thereby introduce inefficiency into the trading process. It is expressed that in noisy markets, it is costly and risky to bet against irrational investors since their decisions are unpredictable (Shleifer and Vishny, 1997). As a result, the rational investors in the market are not aggressive in forcing prices to fundamentals as suggested by neoclassical models. Hence behavioural asset pricing makes the second assumption that there are limits to arbitrage.

As discussed, behavioural asset pricing evolves on its core assumptions; investors are not always rational and that there are limits to arbitrage. This section reviews theoretical and empirical evolution of behavioural asset pricing based on the structure depicted in Figure 2. Initially, it will consider the two perspectives of investor irrationality; their preferences and their beliefs. Investor preferences are discussed based on the prospect theory. Figure 2 depicts how irrational investors form beliefs and how the concept of investor sentiment emerges. Then the study considers psychological biases and heuristics in behavioural literature that tries to explain beliefs and preferences of irrational investors. This study identifies three main areas of development in behavioural asset pricing namely; empirical and experimental evidence of specific heuristics and biases, the theoretical behavioural models and aggregate investor sentiment models which try to capture aggregate investor irrationality in a market.

3.1. Investor Preference and Beliefs

As depicted in Figure 2, investor irrationality can be expressed through investor preferences and beliefs. Preference is how an economic agent makes decisions given different choices with the risky outcomes. Neoclassical finance assumes rational investors make preferences based on expected utility framework

Figure 2: Evolution of behavioural asset pricing



Source: Author

of Morgenstern (1944). According to Barberis and Thaler, (2003) empirical work has proved that people systematically violate expected utility theory when choosing among risky investments. Therefore, investors may not always be risk averse and they may not try to maximize their overall wealth as postulated by utility theory.

Behavioural models try to explain investor preferences through theories such as; weighted utility theory (Chew and MacCrimmon, 1979), regret theory (Bell, 1982), implicit expected utility theory (Chew, 1989). However, Barberis and Thaler (2003) argue that these theories are quasi-normative and that they show unsatisfactory outcomes since it tries to achieve two contrasting goals, normative and descriptive. On the other hand, the prospect theory (Kahneman and Tversky, 1979) tries to capture people's attitudes towards risk in a parsimonious manner. Thus, it has become the prominent descriptive theory in behavioural finance. According to the theory, people do not judge outcomes on an absolute scale but compare outcomes with an initial reference point (Kahneman and Tversky, 1979). Further it assumes people are risk averse in sure gains and risk seeking in choices involving sure losses. The theory when compared to the utility theory assign values to gains and losses rather than to the final assets in which, probabilities are replaced by decision weights. According to the theory, people underweight outcomes that are merely probable in comparison with outcomes that are obtained with certainty. Therefore, unlike expected utility theory, which concerns itself with how decisions under uncertainty should be made, prospect theory concerns itself with how decisions are made.

The second arm of investor irrationality is their beliefs. Belief is how economic agents form expectations. Neoclassical theory assumes that the rational investors update their beliefs objectively based on fundamental information and in accordance with Bayesian techniques (Celik, 2012). Behavioural asset pricing assumes irrational investors' decisions are affected by psychological biases and heuristics. Thus, they are considered erroneous compared to rational decision making. As depicted in Figure 2, there are two possible ways how erroneous beliefs can occur; individuals correctly use wrong information, or that they wrongly use correct information (Zhang, 2008). In the first instance, the wrong information includes noisy signals, therefore even though investors use Bayesian updating correctly the information is incorrect. In the second instance, the investors use correct fundamental information, but they use Bayesian techniques incorrectly. In behavioural literature, the erroneous beliefs of irrational investors, are considered as investor sentiment.

3.2. Psychological Biases and Heuristics

As depicted in Figure 2, behavioural asset pricing tries to explain investor preferences and beliefs through various psychological biases and heuristics. Behavioural bias is the tendency to

reason in certain ways that can lead to systematic deviations from a standard of rationality (Shefrin, 2006). Heuristics refer to economic shortcuts for information processing, or simple rules that ignore information (Marewski at el., 2010). Since information is vast, dispersed and costly, people develop rules of thumb to make decisions, which may lead them to make errors (Shefrin, 2002). When identifying behavioural biases and heuristics, behavioural economists turn to the experimental evidence compiled by cognitive psychologists on the systematic biases that arise when people form beliefs and preferences (Barberis et al., 1998).

The table show original taxonomies of behavioural biases and heuristics. Column one shows the reference of the taxonomy. Column two shows the classification of biases and heuristics by the taxonomy.

This study surveys biases and heuristics addressed in the mainstream behavioural finance literature. According to Arnott (1998), the literature of behavioural biases is vast and boundless and trying to cover them all in detail would be unfeasible. However, there are taxonomies of behavioural biases that provide classifications for different biases and heuristics (Tversky and Kahneman, 1974; 1992; Kahneman et al., 1982; Plous, 1993; Barberis and Thaler, 2003; Hirshleifer, 2001; Baker and Nofsinger, 2002) which make it easier to identify specific biases and heuristics. Therefore, as depicted in Table 1, this study outline original taxonomies of behavioural biases from which biases and heuristics are adopted in behavioural asset pricing. In Table 2, the study lists and defines specific biases and heuristics investigated in behavioural literature during the period 1973-2000.

Tversky and Kahneman (1974) taxonomy categorises heuristics based on their theory of general judgemental heuristics (Table 1). They identify; representativeness, availability and anchoring adjustment as rules of thumb in decision making. According to Arnott (1998), though the taxonomy is influential, the general heuristics as an explanation for human decision-making is untestable. Kahneman et al. (1982) list heuristics and biases in seven categories, while Tversky and Kahneman (1992) see five major phenomena: Framing effects, nonlinear preference, source

Table 1: Taxonomies of behavioural biases and heuristics

Reference	Classification of behavioural biases and heuristics
Tversky and Kahneman (1974)	Heuristic; representativeness, availability and anchoring adjustments
Kahneman et al. (1982)	Representativeness, causality and attribution, covariation and control, overconfidence, conservatism, availability, judgement bias
Tversky and Kahneman (1992)	Framing effects, nonlinear preferences, source dependence, risk seeking and loss aversion
Plous (1993)	Perception, memory and context; heuristics and biases; framing
Barberis and Thaler (2003)	Beliefs and preferences
Hirshleifer (2001)	Heuristic simplification, self-deception and emotional loss
Baker and Nofsinger (2002)	Editing and evaluating in decision making

Source: Author

Table 2: Behavioural heuristics and biases in decision making

Reference	Heuristic/Bias	Description
Tversky and Kahneman (1973)	Availability heuristic	A judgmental heuristic in which a person evaluates the frequency of classes or the probability of events by availability
Tversky and Kahneman (1974)	Representativeness	The overreliance on stereotypes, basing judgements and the degree to which the outcome represent the essential features of evidence The judgement based on stereotype. It causes investors to buy stocks that represent desirable qualities (Shefrin, 2000)
	Availability	Investors overstate the probabilities of recent observed or experiences event because the memory is fresh
	Anchoring	In numerical predication, when a relevant value (an anchor) is available people make estimates by starting from an initial value that is adjusted to yield the final answer
Thaler (1980)	Endowment effect	People tend to hold investments they already hold
Tversky and Kahneman (1981)	Framing	The form of presentation of information can affect the decision made
Thaler (1980)	Mental accounting	Process by which brain keeps goals and moves toward those goals separately from each other
Akerlof and Dickens (1982)	Cognitive dissonance	People tend to ignore, reject, or minimize any information that conflicts belief
Samuelson and Zeckhauser (1988)	Status quo bias	When faced with taking an action in an investor's best interest, this bias influences the investors to do nothing. People prefer to hold investments they already have
Benartzi and Thaler (1995)	Loss aversion	Myopic loss aversion
Odean (1998)	Disposition effect	Tendency of investors to sell winning investment too soon and hold losing investment for too long Fearing regret and seeking pride cause investors to be predisposed to selling winners too early and riding losers too long
Belsky and Gilovich (1999) Barber and Odean (2000)	Overconfidence	It is referred as the ego trap. Illusion of knowledge, illusion of control and precision of their information make investors believe more strongly in their decision and less about the belief of others

Source: Author

dependence, risk seeking and loss aversion. Barberis and Thaler (2003) classify biases based on investor beliefs and preferences.

Hirshleifer (2001) discusses psychological biases that are potentially relevant in security markets. The study argue that heuristic simplification, self-deception and emotional loss of control provide a unified explanation for most judgement and decision biases of investors. Heuristic simplification discusses how cognitive constraints force to use heuristics or rules of thumb in decision making. Narrow framing, mental accounting and representative heuristic being few of the heuristics in decision making. The self-deception theory implies overconfidence, where investors believe their knowledge is more accurate than it really is (Odean, 1998). Emotions reflect the calculated avoidance of unpleasant feeling.

Baker and Nofsinger (2002) state psychological biases in decision making can be derived from the dynamics of the prospect theory. According to them, decision making in the face of risk, involves two processes: Editing and evaluating and many biases can be derived through this process. Mental accounting, status quo bias, reference point and disposition effect being biases derived from prospect theory. Table 2 depicts specific behavioural biases and heuristics identified in behavioural asset pricing during the period 1973-2000. This study does not provide an exhaustive list of biases and heuristics mainly because literature in behavioural biases is vast and it is expanding rapidly. However, Table 2 lists and describes few of the prominent biases and heuristics identified in behavioural literature.

3.3. Theoretical Behavioural Asset Pricing Models

Theoretical behavioural models in asset pricing (Daniel et al. [DHS], 1998; Barberis et al. [BSV], 1998) are built on specific investor biases or heuristic in explaining stock returns. One of the pioneering models, DHS (1998) tries to explain market underreaction and overreaction using two investor biases; overconfidence and self-attribution. According to DHS (1998), overconfidence about private signals causes overreaction whereas self-attribution maintains overconfidence and allows prices to continue to overreact, creating momentum. The BSV (1998) model is based on two judgment biases; the representativeness bias and conservatism. According to BSV (1998), people give too much weight to recent patterns in data rather than to the properties that generates the data. The investors believe that the earning process stochastically fluctuate between two regimes; a regime with mean revert earnings and a regime with expected earning growths. Unlike neoclassical models, these behavioural asset pricing models accommodate investor overreaction and underreaction which are apparent in the markets. Though these models build theoretical arguments on how irrational investors behave in stock markets, the empirical investigation of these models are challenging.

The table depict behavioural biases and heuristics identified in behavioural literature. Column one shows the reference of the study while column two show the specific heuristics or the bias. The third column describes the specific heuristic or the bias.

3.4. Aggregate Investor Sentiment Approach in Asset Pricing

Baker and Wurgler (2007) argue that theoretical behavioural models try to address only a few of the vast number of biases of individual investor psychology that affect how individual investors behave in markets. They argue that real investors and markets are too complicated to be neatly theorised by a few selected biases and trading frictions. Therefore, they investigate top down investor sentiment approach which is top down and macroeconomic. It focuses on the measurement of reduced-form, aggregate sentiment and traces its effect on stock returns. They introduce the development of a composite investor sentiment index to capture the aggregate investor sentiment in markets. Baker and Wurgler (2006), Brown and Cliff (2004) are considered sharper tests of investor sentiment which are developed with the interim advances in behavioural finance. Similarly, there are studies (Neal and Wheatley, 1998; Kumar and Lee, 2006; Lemmon and Portniaguina, 2006) that examine the forecast power of different measures of investor sentiment in stock returns.

4. CONCLUSION

Compared to neoclassical finance, behavioural finance is in its infancy. As Subrahmanyam (2007) points out, it is not a separate discipline, but instead, is a part of mainstream finance. This study reviews how behavioural asset pricing emerge as a counter argument to neoclassical asset pricing. It briefly summarises how neoclassical asset pricing evolved with empirical anomalies and puzzles. The study emphasises on the roots and evolution of behavioural asset pricing. It discusses the core assumptions; how investors are not always rational in a market and how it creates limits to arbitrage. It reviews investor irrationality in two perspectives; investor beliefs and preferences. It discusses the biases and heuristics of experimental psychology that is adopted in explaining beliefs and preferences of irrational investors.

Lastly, the study highlights three main areas of development in behavioural asset pricing namely; theoretical behavioural models of asset pricing, aggregate investor sentiment models of asset pricing and studies on specific biases and heuristics in investor behaviour. This review shows how behavioural asset pricing has systematically emerged as a strong body of knowledge in asset pricing.

REFERENCES

Akerlof, G.A., Dockens, W.T. (1982), The economic consequences of cognitive dissonance. The American Economic Review, 72(3), 307-319.

Arnott, D. (1998), A Taxonomy of Decision Biases. Technical Report. Caulfield East: Monash University.

Baker, K.H., Nofsinger, J.R. (2002), Psychological biases of investors. Financial Services Review, 11, 97-116.

Baker, M., Wurgler, J. (2006), Investor sentiment and cross section of stock returns. The Journal of Finance, 61(4), 1645-1680.

Baker, M., Wurgler, J. (2007), Investor sentiment in the stock maret. Journal of Economic Perspectives, 21, 129-151.

Banz, R.W. (1981), The relationship between return and market value of

common stocks. Journal of Financial Economics, 9, 3-18.
Barber, B.M., Odean, T. (2000), Trading is hazardous to your wealth: The common stock investment performance of individual investors. The Journal of Finance, 55(2), 773-806.
Barberis, N., Shleifer, A., Vishny, R. (1998), A model of investor sentiment. Journal of Financial Economics, 49, 307-343.
Barberis, N., Thaler, R. (2003), A survey of behavioral finance. Handbook of the Economics of Finance, 1, 1053-1128.
Basu, S. (1983), The relationship between earnings yield, market value and return for NYSE common stock: Further evidence. Journal of Fiancial Economics, 12, 129-156.
Bell, D. (1982), Regret in decision making under uncertainty. Operations Research, 30, 961-981.
Belsky, G., Gilovich, T. (1999), Why Smart People Make Big Mistakes and How to Correct Them. New York: Simon and Schuster.
Benartzi, S., Thaler, R. (1995), Myopic loss aversion and equity premium puzzle. The Quarterly Journal of Economics, 110(1), 73-92.
Bhandari, L. (1988), Debt/equity ratio and expected common stock returns: Empirical evidence. Journal of Finance, 43, 507-528.
Black, F. (1972), Capital market equilibrium with restricted borrowing. The Journal of Business, 45(3), 44-455.
Black, F. (1986), Noise. The Journal of Finance, 41(3), 529-543.
Black, F., Jensen & Scholes (1973), The Capital Asset Pricing Model; Some Empirical Tests. New York: Praeger Publishers.
Breeden, D.T. (1979), An intertemporal asset pricing model with stochhastic consumption and investment oppertunities. Journal of Financial Economics, 7(3), 265-296.
Brown, G., Cliff, M. (2004), Investor sentiment and the near term stock market. Journal of Financial Economics, 11, 1-27.
Byrne, A., Brooks, M. (2008), Behavioral finance: Theories and evidence. the research foundation of CFA. Institute Literature Review, 3(1), 1-26.
Cahart, M.M. (1997), On persistence in mutual fund performance. The Journal of Finance, 52, 57-82.
Celik, S. (2012), Theoritical and empirical reveiw of asset pricing models: A structural synthesis. International Journal of Economics and Financial Issues, 2, 141-178.
Chen, N., Roll, R., Ross, S.A. (1986), Economic forces and stock market. Journal of Business, 59(3), 383-403.
Chew, S. (1989), Axiomatic utility theories with betweeness property. Econometrica, 19, 273-298.
Chew, S., MacCrimmon, K. (1979), Alpha-Nu Chices Theory: An Axiomatization of Expected Utility. Working Paper. Colombia: University of British Colombia.
Daniel, K., Hirshleifer, D., Subrahmanyam, A. (1998), Investor psychlogy and security market under and overreaction. The Journal of Finance, 53(6), 1839-1885.
De Bondt, W., R., T. (1985), Does stock market overreact? Journal of Finance, 40, 793-805.
De Bondt, W.F.M., Thaler, R. (1984), Does the stock market overreact? The Journal of Finance, 40, 28-30.
DeLong, J., Shleifer, A., Summers, L.H.,Waldmann, R.J. (1990), Noise trader risk in financial markets. Journal of Political Economy, 98(4), 703-738.
Dimson, E., Mussavian, M. (1999), Three centuries of asset pricing. Journal of Banking and Finance, 23, 1745-1769.
Fama, E.F. (1998), Market efficiency, long-term returns, and behavioral finance. Journal of Financial Economics, 49, 283-306.
Fama, E.F., French, K.R. (1993), Common risk factors in the stocks and bonds. Journal of Finance, 33(1), 3-56.
Fama, E.F., French, K.R. (1998), Value versus growth: The international evidence. Journal of Finace, 53, 1975-1999.
Fama, E.F., French, K.R. (2015), A five factor asset pricing model. Journal of Financial Economics, 116, 1-22.
Fama, E.F., MacBeth, J.D. (1973), Risk, return and equilibrium: Empirical tests. Journal of Political Economy, 81(3), 607-630.
Hirshleifer, D. (2001), Investor psychology and asset pricing. Journal of Finance, 56(4), 533-597.
Kahneman, D., Slovic, P., Tversky, A. (1982), Judgment Under Uncertainty: Heuristics and Biases. Cambridge: Cambridge University Press.
Kahneman, D., Tversky, A. (1979), Prospect theory: An analysis of decision under risk. Econom rtrica, 47(2), 263-292.
Kumar, A., Lee, C.M.C. (2006), Retail investor sentiment and return comovement. The Journal of Finance, 61(5), 2451-2486.
Lemmon, M., Portniaguina, E. (2006), Consumer confidence and asset prices: Some empirical evidence. The Review of Financial Studies, 19, 1499-1529.
Lintner, J. (1965), The valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets. Review of Economics and Statistics, 47, 13-37.
Marewski, J.N., Gaissmaier, W., Gigerenzer, G. (2010), Good judgement do not require complex cognition. Cognition Processing, 11(2), 103-121.
Markowitz, H. (1952), Portfolio selection. The Journal of Finance, 7, 77-91.
Markowitz, H. (1959), Portfolio Selection: Efficient Diversification of Investment. New York: John Wiley and Sons.
Mayers, D. (1972), Nonmarketable assets and capital market equlibrium under uncertainty. In: Studies in Theory of Capital Markets. New York: Praeger. p223-248.
Mehra, R., Prescot, E.C. (1985), The equity premium: A puzzle. Journal of Monetary Economics, 15, 145-161.
Merton, R.C. (1973), An intertemporal capital asset pricing model. Econometrica, 41, 867-887.
Miller, M.F., Modigliani, F. (1961), Dividend Policy, Growth and the Valuation of Shares. The Journal of Business, 34, 411.
Morgenstern, V.N. (1944), Theory of Games and Economic Behavior. New Jersey: Princeton University.
Neal, R., Wheatley, S.M. (1998), Do Measures of investor sentiment predict returns? The Journal of Financial and Quantitative Analysis, 33(4), 523-547.
Odean, T. (1998), Volume, volatility, price and profit when all traders are above average. The Journal of Finance, 53, 1887-1934.
Plous, S. (1993), The Psychology of Judgment and Decision Making. New York: Mcgraw-Hill Book Company.
Ritter, J.R. (2003), Behavioral Finance. Pasific-Basin Finance Journal, 11, 429-437.
Ross, S.A. (1976), The arbitrage theory of capital aseet pricing. Journal of Economic Theory, 13, 341-360.
Samuelson, W., Zeckhauser, R. (1988), Status quo bias in decision making. Journal of Risk and Uncertainty, 1(1), 7-59.
Sharpe, W. (1964), Capital asset prices: A theory of market equilibrium under conditions of risk. Journal of Finance, 19, 425-442.
Shefrin, H. (2002), Beyond Greed and Fear: Understanding Behavioral Finance and Psychology of Investing. 2nd ed. Oxford: Oxford University Press.
Shefrin, H. (2006), Behavioral Corporate Finance. NewYork: McGraw-Hill.
Shefrin, H. (2009), Behavioralizing finance. Foundation and Trends in Finance, 4, 1-184.
Shiller, R.J. (1989), Market Volatility. Cambridge: MIT Press.
Shleifer, A.,Vishny, R. (1997), The limits of arbitrage. Journal of Finance, 52(1), 35-55.
Solnik, B.H. (1974), The international pricing of risk: An empirical investigation of the world capital market. Journal of Finance, 29(2), 365-378.

Statman, M. (1999), Behavioral finance: Past battles and future engagements. Financial Analysts Journal, 55, 18-27.
Statman, R. (2002), Lottery players/stock traders. Financial Analysts Journal, 58(1), 14-21.
Stattman, D. (1980), Book Values and Expected Stock Returns. Unpublished MBA Honors Paper. Chicago: University of Chicago.
Subrahmanyam, A. (2007), Behavioural finance: A review and synthesis. European Financial Management, 14(1), 12-29.
Taylor, S., Brown, J.D. (1988), Illusion and well being: A social psychological perspective on mental health. Psychological Bulletin, 103, 193-210.
Thaler, R. (1980), Toward a positive theory of consumer choice. Journal of Economic Behavior and Organization, 1(1), 39-60.
Tobin, J. (1958), Estimation of Relationships for Limited Dependent Variables. Econometrica, 26, 24-36.
Tversky, A., Kahneman, D. (1973), Availability: A heuristic for judging frequency and probability. Cognitive Psychology, 5(2), 207-232.
Tversky, A., Kahneman, D. (1974), Judgment under uncertainty: heuristics and biases. Science, 185, 1124-1131.
Tversky, A., Kahneman, D. (1981), The framing of decisions and psychology of choice. Science, 211, 453-458.
Tversky, A., Kahneman, D. (1992), Advances in prospect theory: cumulative representation of uncertainty. Journal of Risk and Uncertainty, 5(4), 297-323.
Weinstein, N. (1980), Unrealistic optimism about future life events. Journal of Personality and Social Psychology, 39, 806-820.
Zhang, C. (2008), Defining, Modeling and Measuring Investor Sentiment. Thesis. Berkeley: University of California.