The Study of Consumer Stock Market Behaviour by Consequence of Prospect Theory

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ABSTRACT

This study analyses the application of prospect theory concepts to understand stock market fluctuations. Prospect theory is the most frequently encountered alternative to utility theory when the latter is seen as insufficient in explaining empirical data. It incorporates principles of cognitive psychology and encapsulates choice behavior theories from various disciplines to put forth a more comprehensive approach in the study of patterns in consumer behavior. This research also lists various metrics to be used in the calculation of an investor’s readiness in case of an opportunity involving a risky underlying asset and further classifies investors based upon their scores in each of these five metrics. Based upon the principles of behavioral economics, this area of interest offers several challenging problems for further research, and their importance is only enhanced by the ease of extension of their solutions to real world implementation.

KEYWORDS

Behavioural Economics, Prospect Theory, Stock Market

1. INTRODUCTION

Prospect theory is an aspect of behavioral economics which describes how people choose between alternatives involving risk. The presumption is that these alternatives are probabilistic, and these probabilities are known. This study aims to take advantage of prospect theory to understand consumer behavior in stock markets. Quantifiable metrics for consumer behavior are gauged to draw a reference to prospect theory and qualitatively analyze consumer behavior.

Stock markets serve as an efficient indicator of the future economic trends and policy decisions. These patterns account for consumers’ saving pattern and consequently, their propensity to spend, while also reflecting on the leading sectors of the economy and capital investment in this context simultaneously. However, the decision of an individual to buy or sell stocks is not merely the product of purely rational, carefully calculated estimates that seek to predict future highs or lows. It is only natural that their decision also reflects a strong intuitive influence drawing on their past experiences, and it is this factor that is often neglected in traditional economic models of consumer behavior. This is the most likely cause for the inadequacy of these models in explaining empirical facts. Prospect theory realizes that the motivation behind the purchase or sale of stocks may be beyond the exclusive economic realm. The questions raised and dealt with in the domain of behavioral economics have proven to be of increasing inter-disciplinary interest, owing primarily to the fact that these issues have a strong bearing on real world issues and the solutions proposed can be more or less directly applied...
in actual implementation. Operating on the fairly well-established principles of this field, prospect theory aims to model this component building on the tenets of cognitive psychology to understand how their individual reactions justify the end goal of higher returns and financial stability.

Conventionally, aggregate stock market behavior has been analyzed from the consumption standpoint by Hansen and Singleton (1983), Mehra and Prescott (1985), and Hansen and Jagannathan (1991). This has presented a two-fold problem: (1) It fails to explain the historically high returns and volatility and (2) It can’t substantiate for striking variation in time-series stock market returns’ analyses.

Some areas which were proposed to better capture the investor behavior included the utility framework but further included some areas of the prospect theory. One, investors are more sensitive to reductions in financial wealth than gains, also termed as loss aversion. This means that if an investor A experiences a gain now that equals the amount of loss incurred earlier, the situation is not equivalent to an investor B who has experienced no loss or no gain. Although they stand on equal footing from the point of view financial accounting, their decisions will probably be guided by differing motivations. For this case specifically, investor A is likely to be more loss averse while making future investment decisions. However, another important consideration comes into play in this regard. The second concern is that the extent to which an investor exhibits this loss aversion depends on previous investment performance. Prior gains would make the investor less averse to losses as the gains may offset the potential losses and prior losses would make the investor more sensitive to future reductions in financial wealth.

Barberis et al. (1998) in their study suggested that these empirical metrics for stock market returns are weakly correlated to consumption. In their framework, dividends are assumed to be the sole driver for equity performance which has very weak correlation with dividends.

Understanding the basis of prospect theory also requires a preliminary knowledge of the dominant theories dealing with how the various determinants of individual choices are combined and prioritized before a decision is made. These concepts encapsulate actions based on intuition, impulse and frequently enough, deliberate decision-making. The duration of the process slated to be undertaken, the obstacles encountered, their complexity and the final benefits that one stands to gain – all are distinct, relevant components and the resulting universality implies that its applicability extends to strategic and operational decisions. However, it is of the utmost importance that the difference between the two is discerned and this can be effectively accomplished by judging the character and possible impact of the choice in question. Prospect theory is different from the expected utility theory in the sense that the former deals with the value which need not have linear probabilities while the latter which deals with utility does. Expected utility theory also deals with the overall wealth while prospect theory is based on the gains and losses from a neutral state.

Following this introduction, this paper has been broadly divided into three stages: Cross-sectional returns, aggregate movement of the stock markets and consumer trading behavior. Lastly, some inference is drawn from the irrational behavior that consumers exhibit owing to psychological effects from the field of behavioral economics such as endowment effect (divestiture aversion), confirmation bias, availability bias, disposition effect and familiarity bias.

2. MOTIVATION BEHIND THE RESEARCH PROBLEM

The study of consumer stock market behavior has always been an intriguing field of study in Economics. The reasoning behind consumption, the nature of possible incentives that can be introduced and their impact, have led to the formulation of important questions in this regard and these serve as the origin of influential theories proposed in response. Several theories have surfaced over the past century, trying to qualitatively and quantitatively explain the phenomena, and while most have been successful, their most important contribution lies in the fact they have, nearly without exception, paved the way for new theories by virtue of the inefficiencies in their explanation. Tackling each of these inefficiencies as individual problems and removing assumptions implicit in earlier work in an
attempt to incorporate a greater degree of resemblance to the real world. Previous literature in the area has mainly justified the demand for these financial products through behavioral biases and the reason behind the premium that these products demand over other conventional means for returns, even though ‘rationally’ they mean the same level of utility to the consumer. It can be seen here that the use of utility as a metric in evaluating consumer decisions provides little insight into the outcome when two goods which may be valued equally happen to be pitched against each other. Although useful as a preliminary quantifying concept, assimilating utility into formal economic models may prove to be cumbersome. As the focus shifted to finding possible alternatives that would proxy the contribution of utility while overriding its shortcomings, Ofir and Wiener (2009) noted through their empirical experiment that these financial products do, in fact, cater to certain consumers exhibiting biases such as – disposition, herding, ostrich effect, hindsight bias and loss aversion.

Analysis of the structured markets in any economy indicate a 3-6% premium in the pricing compared to the prices of the underlying components of the instrument. The demand for these products is still staggering and the mismatch in expected and actual demand provides an interesting area for us to understand the underlying reasons behind the same.

The classic utility framework prescribes a wealth curve with constant concavity which would mean that an increased use of financial instruments should pose no added utility. This framework (Expected Utility, EU) has been generally agreed to be the normative model for rational choice and said to replicate the consumer behavior on markets.

According to the Allais Paradox, given by Allais (1953), observed choices made by consumers in a situation involving gains are inconsistent with the predictions made by the expected utility theory. The paradox showed that the domination principle where: If option A is better than B, B is better than C, then A must be better than C, need not necessarily hold true. It also claimed that the pattern of this choice was predictable.

In a research by Rieger (2010), the obscure differential in demand for financial products such as stocks has been linked to the estimates made by consumers about their returns. The probability distribution has consistent biased estimates for consumers. He further mentioned that this misestimation could be significantly correlated to the demand for structured financial products that have guaranteed return barriers. Even though this field is beyond the scope of this paper, the underlying reason for this phenomenon could be the same in the sense that investors overestimate the likelihood of these products breaching the return barrier levels.

In another research by Rieger and Hens (2009), several payment structures have been tested to identify which utility frameworks would explain the decision behavior to a greater extent. It was found that individuals or consumers with a utility framework dependent on a reference level would benefit from non-linear payment structures, given their sensitivity and weighting behavior with losses and gains. This study shows that there could be a significant utility increase for consumers under the prospect utility framework with the use of financial products with a return guarantee.

In a subsequent study by Hens and Rieger (2011), the authors examined the application of prospect theory utility as opposed to rational utility when investors are faced with the choice of purchase of structured products. These authors primarily focused on the area of capital protection products. Capital Protected Products give the investors full or partial protection combined with equity-linked performances and a variable degree of leverage. These products are majorly used to boost up the portfolio in terms of raising the returns and also limiting the capital loss risk. Hens and Rieger (2011) also revealed that investors with prospect theory utility perceive a discernible rise in their level of utility and hence, would choose to buy structured products. These products, however, are not seen to be an optimal investment by their counterparts who subscribe to the rational utility framework. The conducted study offered the participants a choice between five different structured products, each with different levels of capital protection. They were asked to repeat this process of decision-making and their choices were analyzed through subsequent rounds. Since the values of the underlying assets were randomly distributed, the only factor that differed through consecutive rounds was the gradual
experience gained by the participants. They observed that the subjects were more likely to choose riskier products as they garnered more experience. This also gave them helpful insights pertaining to the role of financial analysts when dealing with different types of investors, who may display varying levels of risk aversion. Additionally, they also analyzed the rationale and feasibility of investing in these products, as under prospect theory.

Building on this evidence against the principle of the state independence, Kahneman and Tversky (1974) showed that the expected utility hypothesis might not fully replicate the decision choices made by the consumers involving risk.

Kahneman and Tversky (1979) then formulated the prospect theory which relies on three basic principles. One, individuals are loss averse and would not make a choice that might reduce their wealth. Two, their sensitivity to losses and gains is assumed to be diminishing. Lastly, the weights associated with these decisions related to gains or losses inherently deviate from convention, underweighting large probabilities and overweighting small probabilities. Consumer preferences are now defined by the reference point dependent framework of the prospect theory, and the conventional relationship between mean and variance no longer holds true. This paves way for an explanation for the pricing gap or demand gap for financial instruments.

In this study, the above ideas are expanded by qualitatively analyzing the literature to determine and understand the variety of factors under which the assumptions hold, and the decisions are rationally justified. The methodology of the paper involves two phases wherein the first phase caters to studying the human behaviour based on the proposed prospect theory and understanding how the theory evolved out of the ramification for the inferences that were derived from the utility theory. During the second phase of methodology, this study takes certain cues from empirical study conducted by Wood and Zaichkowsky (2004) on individual investors. In this second phase, certain constructs were used to identify four main clusters of consumers which ultimately helps in understanding consumer behavior on stock markets and their categorization based on several metrics. The focus is to provide a generalized answer to the drivers of the demand for financial products, more specifically, on the stock market from a behavioral standpoint.

3. LITERATURE REVIEW

The expected utility theory was first proposed by Nicholas Bernoulli and then solved by Daniel Bernoulli in 1738. It deals with the analysis of decision-makers’ choice and their invariable risk-aversion characteristic. Kahneman and Tversky (1979) developed the prospect theory as an alternative model while critically analyzing the expected utility model. They proposed the above theory for situations that were dominantly risky.

The assumption that economic theory is a combination of both positive and normative science was first put forward by Thaler (1980). In certain well-defined situations, it was empirically found that consumers’ actions are not conventional and are inconsistent with economic theory predictions. The application of economic theory thought to be relevant in this regard proved to be insufficient in explaining the actually observed scenario. The prospect theory was used to explain this deviation in prediction while simultaneously being further strengthened by the use of topics such as underweighting probabilistic outcomes, pre-commitment and other biases in judgement.

Comparison between the assumptions of the expected utility theory and prospect theory by Van de Kaa (2010), led to an extension of the prospect theory which was able to describe the empirical finding to a greater extent than the utility theory. With this new vantage point, it was possible to assess why and to what extent consumers valued fluctuations in financial wealth over those in consumption. The combined effect of econometric parameters and proxies for behavioral influences were explored at length and choice behavior was derived to be a direct function of different decision rules and valuation attributes. Drawing from the idea that prospect theory is the alternative that is most frequently encountered to traditional utility theory, Van de Kaa (2010) analyzed further to examine
how choice behavior theories from different science streams were interlinked and could coalesce to create an explanation for choice behavior, as observed even in the financial market scenario. He propounded the systems theory, which treated all processes as individual systems, which may or may not directly interact with their surrounding environment. The inputs to these systems are the mental perceptions procured through observation and these inputs are processed so that the individual can make his final choice as the output. This entire system processing can be broadly broken down into four different mental functions:

1. **Framing** of the state of choice in mind with respect to some reference state. In order to clearly perceive the goal in mind, it is not enough to describe its characteristics, it is also important to outline what the possible courses of action are and the categorization of the repercussions of these actions.

2. The function of **judgement** implies that once the primary attributes of the state are known, it is equally important to know how this state fares against others on the strength of all the defined characteristics while taking into account their individual probabilities.

3. **Evaluation-and-choice** is required to finally assess the final valuations of all possible alternative states so that the one which is the best fit for the choice criteria can be chosen.

4. **Choice behavior strategy** is a tool employed in understanding how the previous three functions are coordinated and the conditions to be met for proceeding from one stage to the next.

Barberis (2013) in his review of prospect theory argued about the importance of prospect theory even outside of an experimental setting. He further mentions that over the past decade, the applications for prospect theory have increased by leaps and bounds. The inherent concepts in this area have found unforeseen relevance in other seemingly unrelated domains of economic research and there exist several examples that evidence this prominently. Aspects of prospect theory have been fused into more traditional economic models and empirical tests have provided insights into this unexplored area in economic analysis.

Barberis (2013) compares the entire process of modelling stock market fluctuations using prospect theory to another simple one of transitioning risk aversion. From the two main parameters in his consideration – loss aversion and prior investment experience – it can be expected that an initial streak of high returns in investments will make the investor less risk averse. The idea here is that the individual treats the gains experienced in the first few stages like a safety cushion – he may be more likely to take decisions involving greater degrees of risk because the losses incurred, if any, can now be absorbed without significant damage to his financial wealth. Once stock prices are seen to decline, the investor would be more averse to taking risky decisions. Its implications with regard to modelling stock price variations are centered on the concept that returns accounted for in the model will be more volatile than the underlying dividends. This is because the returns expected by the investor account for the value of underlying assets along with their own expectations and that an unusually high dividend raises stock prices while simultaneously giving higher returns to the investor and making him less risk averse. So, he is more likely to purchase the highly priced stock, thus, continuously increasing supply only serves to drive the price up even higher. The subsequent predicted lower returns are consistent with the observed data.

Barberis’ (2013) model differs from its predecessors in one more aspect – he gives importance to the concept of equity premium. If a stock price is plummeting, investors would be reluctant to purchase stock owing to their increasing aversion to risk and hence, it follows that a large premium is required to convince them to hold up stocks. This model also markedly deviates from the Campbell and Cochrane (1999) model in another way. The Campbell and Cochrane (1999) model adopts a consumption-based approach and hence, it is inevitable that changes in risk aversion, at the most basic level, are driven by changes in consumption. Barberis, however, takes an opposing position
to insist that changes in risk aversion are driven by past trends in stock market fluctuations, which ultimately leads to news about dividends as the major contributing factor.

When reviewing past literature on the subject, Barberis’ (2013) model stands out because of the way risk is defined, at a fundamental level. For all previous consumption-based models, the risk associated with an asset is characterized by the extent to which the returns to the said asset vary with respect to consumption. However, in this framework, the investor associates risk with the magnitude and duration of fluctuations in the stock market, irrespective of whether these fluctuations actually lead to an increase or decrease in consumption. The intrinsic nature of risk is characterized differently in these frames of reference and hence, it is evident that the amount of risk aversion required to explain the patterns in available data will also be different.

4. THEORY AND HYPOTHESES

4.1 Utility Theory

In behavioral economics, Utility theory has been classically used to explain the total utility of multiple risky choices as the linear combination of expected utilities weighted by each of their probabilistic possibilities. This theory also assumes that individuals have well defined wants and thereby preferences and can always make a choice between the multiple possibilities.

These individuals are also assumed to be completely rational in integrating their choices over the economic investment period. The relevant period, in literature, for the same has often been assumed to be over their entire lifetime.

The expected utility of a combination of all the possible outcomes, given by \( E(U) \) is the weighted some of individualistic \( (x_i) \) probabilities and utilities.

\[
E(U) = \sum p_i U(x_i) \\
\sum p_i = 1
\]

*1: Equation: Expected Utility given as a probability weighted sum of possible outcomes.*

\[
U(x_a) > U(x_b) > U(x_c) < U(x_d)
\]

*2: Inequality: Showing the relation between the points and their relative utilities on the graph, preceding.*

Figure 1.

![Figure 1](image1.png)

Figure 2.

![Figure 2](image2.png)
4.2 Prospect Theory

Prospect theory as posited by Kahneman and Tversky (1979) is based on the cognitive principles of cognitive psychology. It was given as an alternative to study the decision making by individuals under risk. The assumptions under prospect theory are similarly poised to the utility theory. For example, the value of an attribute such as utility is considered in convex terms in the loss domain for individuals. These assumptions are not to be confused with the simplified formulations and specifications that are invaluable in the conventional and restricted use of understanding consumer behavior in terms of prediction. Traditionally, in the loss domain the value of utility is viewed as proportionate to the inverse of utility raised to a power between zero and one.

Prospect theory was initially applied by Kahneman and Tversky (1979) to understand simple decision prospects with monetary implications and stated probabilities. In 1991, they developed the theory to cover a broader range of implications including a restricted use of the assumptions to study choice behavior in a situation with prospects involving certain outcomes. Later in 1992, they further expanded the theory to include an unlimited number of uncertain outcomes. In this way, they claim to have taken the theory from a ‘reference dependent model’ to a cumulative one.

In this study, the focus is on understanding the assumptions included in prospect theory as stated by Kahneman and Tversky (1979) and their generic influence on consumer behavior understanding. Some of the assumptions as stated by Van de Kaa (2004) are mentioned below:

I. People’s choices both in raw choice in a situation and the order in which they are taken are not only dependent on the context in which these said choices are presented but also in the way these choices are presented and how they are perceived by individuals.

II. People frame their choice decisions based on net expected change in their asset levels rather than on the expected net state the choice would leave them in. The carriers of utility are changes and not the net states.

III. The extent to which people would value a given choice depends on the gains and losses relative to reference level set by people for themselves. Increases in utility or satisfaction are viewed as gains when compared to a reference level and decreases as losses, not entirely depending on the net state change.

IV. Loss aversion: When people are poised with losses and gains of equivalent size, individuals tend to value losses more than gains. As mentioned by Kahneman (2002), the value function is kinked at the reference point and the slope changes while moving from gains to losses, becoming steeper.

V. The sensitivities for both gains and losses decrease with magnitude as the marginal value associated with either of these situations is generally decreasing.

VI. Individuals tend to over-weight low probabilities while at the same time underweighting higher probabilities. Kahneman and Tversky (1979) use this to shed some light on the popularity of lotteries and insurance. This also explains the prevalence of risk aversion in choices between probable gains and sure gains and the prevalence of risk seeking behavior in a choice between probable and sure losses.
Calibrating to experimental evidence and satisfying the above characteristics, Kahneman and Tversky (1979) gave the above functional forms for the value function and probability weighting function, with the carriers of value as gains and losses and not overall wealth levels as in the expected utility theory.

4.3 Investor Behaviour

In India, individual investors own more than half of the stocks and by virtue of their unpredictable and sporadic decisions on the stock market the markets are often volatile (Gibbs, 2000). Financial catastrophes right from the Kipper Und Wipper crash in the Holy Roman Empire in 1623 to the financial crisis of 2007-08 have been caused by investor panic and have greatly reduced corporations’ ability to rely on their portfolio to raise capital. It would be extremely difficult to try and understand the theory lying underneath the investors’ decisions and promote long term stable investing as there is only experimental evidence of individual investors’ choice.

To better understand investor decisions, this study aims to categorize investors into segments based on their trading behavior, attitude towards risk and investing panache. Studies in the field have shown that the profiling and delivery of this investor behavior by companies to sects of investors can encourage investment growth.

The underlying theory behind the study of this investor attitude and further, their behavior in the broader sense would reveal five metrics from behavioral finance.

- **First, Personalization of loss.** The extent to which the loss is personalized is a very subjective metric which may be understood by the kind of investor being studied. The measure of this contributing factor will be decided by its impact on the investor’s financial wealth. Since this is clearly a comparison by proportion, the more influential or wealthy an investor is, lesser will be the value of this metric. It is essential for it to be included in financial analysis since it is the extent of loss, as measured against one’s own capacity to absorb it, and will serve to determine the degree of loss aversion exhibited by the investor. The kind of investment being made may be a suitable proxy to understand this metric.

- **Second, Confidence.** This would reflect the confidence the investor levies on the investment in terms of the probability with which it would resonate with one’s own requirements from the investment in terms of returns, risk involved and volatility. The inclusion of confidence displayed...
by the investor can also be interpreted in the context of equity premium. If the investor is highly confident of a future increase in the price of stock in question, he will require less equity premium to hold those stocks, even if the prices are seen to be declining in the short run.

- **Third, Control.** Investors’ may also lean towards their ability to have control over the investment in terms of ease of liquidity and other dynamic decisions and this may be quantified by this metric. This metric is especially seen to be relevant in studies that compare investor preference amongst various financial instruments as liquidity concerns play a deciding role in these cases. With reference to the stock market, control exerted by the investor also relates to the role of any intermediate agents involved or that of investment partners.

- **Fourth, Risk Attitude.** This is probably the easiest understood variable of this list as it could simply be understood by the tolerable level of variance an investor seeks in the returns. Some proportion of the risk attitude can also be gauged through the confidence metric; however, confidence embodies the matching of expected probabilities from the investment whereas risk attitude is solely dependent on the investor. For two investment portfolios with the same financial characteristics, the confidence metric may vary depending upon the past projects undertaken by the respective firms; however, risk attitude of the investor will be the same.

- **Fifth, Investment horizon,** dealing with the duration of investment and tentative timeline during which the investor would like to hold the instrument/investment. Investment horizon is interrelated with several important concepts in the context of financial analysis. If the investor intends to hold the instrument for a relatively long period of time, he would be less loss averse to small dips in the underlying asset values as compared to someone who seeks to gain high returns in the short run.

5. STUDY AND METHODOLOGY

This paper includes a two-fold study: First trying to understand the basis of prospect theory and testing the basic assumptions as understood in literature, which have been stated above, and second, using the empirical tests conducted by researchers in this field to understand consumer behavior on stock markets and their categorization based on several metrics.

5.1. Phase 1

This involved the study of human behavior based on the proposed prospect theory and understanding how the theory evolved out of the ramification for the inferences that were derived from the utility theory. Respondents were asked to give a survey mentioned in Appendix 1.

It could be seen that a staggering 82 percent of the 44 individuals sampled showed that they were clearly loss averse and even though the options presented to them had the same level of total expected utility reaped by the individual when calculated using the cumulative probabilistic weights. Individuals were seen to choose the option that they perceived as lesser ‘threat’ or ‘loss’ to them.

Framing of the choices given to the individuals to test could be used to understand the particular behavioral trait that the individual exhibits and we may extrapolate it to their trading behavior. However, Phase 1 of the study was used to understand and test some of the assumptions of Prospect theory.
5.2. Phase 2

Based on an empirical study conducted by Wood and Zaichkowsky (2004) on individual investors, some of the constructs mentioned above including investor risk behavior, confidence, personalization of loss and investment horizon were used to identify four main clusters of consumers. The clusters were identified based on the metrics discussed in Investment Behaviour. (See 4.3)

5.2.1. Loss Averse Traders

This group of investors are characterized by their willingness to take risks and at the same time their inability to engage in investment decisions where they will clock monetary losses. The investors are found to be younger than other investors at large and use the internet to study any risky or volatile investments they might want to trade in while relying on financial gurus for the stable investments for a sense of safety.

5.2.2. Conservative Long-Term Traders

These traders have low ratings for ideal level of control and confidence that would like to cherish in their investment decisions and invest primarily in mutual funds and other structured financial products. These investments are also made with the aid of certified financial advisors given their conservative nature. This group is known to trade less frequently and look for long term positions in their portfolios. They also investigate the performance of their investments infrequently and do not study intricate financials of their investments helpful for decision making.

5.2.3. Risk Intolerant Investors

These consumers are known to have low to medium levels of confidence and control. While their investment behavior does not even come close to active financial traders, they are known to check the performance of their investments frequently and seek advice from external factors in an advisory capacity.
5.2.4. Confident Investors

These investors are classified with their peculiarly high levels of confidence and control and trade very actively. They are typically older than the investor global average age of ~25 and have large portfolios both in terms of assets under management and the diversification of the kind of financial products invested in. These investors are also seen to invest heavily in the technology space and smaller growth stocks as they seem to have a broader investment horizon, while at the same time maintaining the diversity factor in their portfolio.

6. RESULTS AND FINDINGS

The results of the study can help explain the differential in expected and actual investor decisions on stock markets. Prospect theory helps understand this utility that consumers look for in any investment decision. Literature has shown that in some studies, the most preferred investment choice does not necessarily coincide with the option providing the most utility. The inclusion of a metric factoring decisions based on experience (probability weighting) provides a better understanding of this mismatch.

Studying the existing literature has shown that decisions taken by consumers under the influence of experience seem to differ from the predictions of prospect theory. Empirical studies in the field have shown that estimating the parameters in the weighting function deliver reason for the degree of risk aversion but are unable to quantify or further justify the loss aversive nature of the investment decisions.

Based on the study conducted by Wood and Zaichkowsky (2004), some findings which may be helpful to the clusters of investors identified are as follows:

I. Loss Averse Traders: Financial advisors should help the investors focus on diversifying the portfolio to reduce the levels of risk and provide them with information on how to control losses. Companies could use online media and pages to target this investor segment by offering news updates which the investors might use for evaluating their investments which may showcase volatility. Loss aversion towards stock trading or other financial instruments is likely to subside if the traders have enough knowledge about the financial markets and can predict, within a reasonable range, the returns they stand to gain or losses that can be incurred. This means that rather than staying away from risk-prone investments entirely, they can make smart decisions about the kind of investments and the time for which they wish to hold them.

II. Conservative long-term traders: Given the nature of investors, information provided to this group is to be summarized. Financial advisors may also work along the lines of explaining the benefits of long-term stock investing to resonate with their needs. Since they will typically not concern themselves with temporary spikes or decline in the market, the information they require concerns the stability of past investments and the projected demand for the underlying asset, which will ultimately determine prices in the future. As long as returns are likely to be promising in the long term, conservative traders are not extremely sensitive to losses incurred in the short term.

III. Risk intolerant investors: These investors are typically looking for advice that is centered upon any form of risk diversification and lower volatility. Their financial wealth may render them incapable of absorbing losses they may incur in the pursuit of high long-term returns and hence, they generally prefer to engage intermediate agents who can minimize their risk either through their knowledge of the stock market or through asset transformation, for example through mutual funds.

IV. Confident Investors: These investors are to receive communication about the performance of their portfolio. To them, current news about the investments is often seen to be more useful than historical financial data for stocks with volatile return ranges. They are characterized by
a relatively lower degree of risk aversion and indulge in short-term and long-term investments depending upon other relevant financial parameters that characterize the investment.

Figure 5. Clusters made on behavioral traits, Wood and Zaichkowski (2004)

It can be seen above that the clusters have been made to classify investor trading behavior based on the five-metrics discussed above. The data exact values for the same can be seen at Appendix 2. The findings may prove useful to enable longer term stable investing behavior among consumers and help companies target investors based on the investment patterns they may exhibit.

It has been shown that accurately predicting the parameter values in a weighting function is essential for understanding the choice in investment among consumers and broadly, their overall behavior in stock markets. These parameters have a strong correlation with the utility that consumers perceive to derive from the investment.

7. CONCLUSIONS

Prospect theory has played a significant role in contributing towards the study of consumer behavior and economics as a whole. It has challenged certain basic assumptions that economists have made while understanding and studying consumer behavior. Kahneman and Tversky (1979), won a Nobel Prize in Economics for their work in this field. Considering its advent was only in 1979, it has often been humored to not have impacted any real-world problems. Barberis (2013) from Yale found this conclusion rather untrue and showed that prospect theory did actually influence the study of finance at least partly, if not in its entirety. He believes that it can explain some of the most common yet complex conundrums of consumer behavior.

Prospect theory disagrees with certain underlying assumptions or results that the conventional expected utility framework provides. The expected utility framework suggests that individuals are completely rational in assessing the probabilities of events such as the probability of an airplane they are travelling by crashing. They know for certain that it wouldn’t crash and hence do not worry about
it. However, the same framework also explains that individuals value gains and losses equally - it would be as pleasurable to find INR 100 on the street as it is painful to lose the same value.

Prospect theory has disagreed with these two assumptions, among the numerous other assumptions that the expected utility framework has out forward. Researchers have used a multitude of psychological and empirical tests to infer the same. In my thesis, we have seen that prospect theory in fact portrays individuals as terrible at assessing probabilities, or probability weighting. People will feel nervous about the smaller probabilistic events and over-weight even if they are presented with a barrage of statistical information contrary to the same. The theory also postulates that individuals inevitably find losses relatively more dissatisfying than an equivalent gain, explaining their loss averse nature. People tend to find losing the INR 100 significantly agonizing yet are only mildly satisfied to find INR 100 on the street.

While prospect theory builds on some abstract reasoning, its complex equations are useful in tackling and understanding some of the most complex problems and situations in today’s financial markets.

One of the conundrums that prospect theory has helped answer is the reason behind the consistently lower than average returns for certain stocks. The example of stocks that undergo an Initial Public Offering (IPO) and have lower returns than other stocks provides reason enough for us to delve in to the underlying reason for the same. Conventionally, the Capital Asset Pricing Model (CAPM) has been used to answer this conundrum. CAPM used a risk premium method of explanation to justify this premium by stating that riskier instruments should have higher rates of return, if they are indeed more volatile than the market average. While this explanation is deductible, it is very weakly backed empirically as the stocks with most deviation in price or sensitivity do not usually have the greatest returns.

Throughout this study, it can be seen that Prospect Theory has been used a viable explanation for these mysteries that have plagued researchers in the past. Barberis (2013), in his research work contends that instruments that have the lowest returns have the highest “positive skewness”. He goes on to describe positive skewness as a case where in a stock has average returns for a long-time frame and an occasional outlier on the positive side to a very high level. Due to this ‘positive skewness’ investors are drawn to the miniscule chance of obtaining this skewed return to get really wealthy.

Studying investor behavior suggests that they traditionally intend to convert an outlier on the good side in terms of stock performance to an extraordinary one with even lesser probability so they can reap maximum returns. They believe that the stock they own could be the next Alphabet or Tesla. It most definitely will not be this, but consumers are poor at weighing these future probabilities. Due to this poor sense of weighing probabilities, investors and consumers overweight the unlikely chance of the stock returning stunning results to make them wealthy and pile in. This causes the returns to fall.

One other puzzle that has often garnered attention in consumer behavior research has been the return level differential between stocks and government bonds. Throughout the past century, the returns for government bonds were around five percentage points lower than stock market averages. Conventional models using expected utility theory based on consumer consumption and asset pricing have been unable to answer this puzzle. Prospect theory has helped shed some light on the reason for this disparity.

One of the fundamental assumptions under the prospect theory is how investors find the idea of logging losses more hurtful than they find the idea of clocking profits satisfying. So, the volatility of returns prevalent in the stock market is a good enough reason for them to be less comfortable with investing in stock markets. Investing in stock markets could lead to losses and investors find this very possibility very displeasing. In contrast, government bills or T-Bills do not have this volatility associated with them and have a relatively incomparable distribution of returns. Investors feel ‘safer’ with investing in these bonds and due to their ‘loss averse’ nature demand higher average returns from socks than bills.
Through the course of this study, we have seen that any model in behavior economics or even financial economics relies on certain assumptions about human decision-making behavior. In most cases, new models have been formulated to address the inability of an existing model in explaining a certain phenomenon. Researchers have become aware of this fact and have begun to develop on pre-existing models, and this has paved the way for the development and understanding of Prospect Theory.

The use of Prospect Theory is rather limited in other areas of economics which do not involve studying the consumer decision making behavior. We can see both from existing research and intuition that Prospect theory can potentially be extremely useful in explaining certain phenomena in macroeconomics.

Prospect theory could also be used to formulate better controls in terms of regulation in financial markets. Even the recent COVID 19 pandemic has shown the world that improved governmental policies and emergency management systems are the need of the hour to tackle such gigantic events. Here, the above discussed prospect theory can also be brought to forefront and used a policy tool by governments round the world to tackle and address such pandemic events. Both macroeconomics and regulation are areas which are very dynamic and any advancement in understanding how humans make certain decision choices and their behavior in the overall sense would result in the need for updating these models.

8. FURTHER SCOPE OF STUDY

This study has shed light on understanding the various metrics that go into analyzing the investment behavior that consumers exhibit in the stock markets. Going into the future, another interesting area that can be looked into would be the study of decisions from experience.

This area incorporated with the utility gains and the probability weighting functions could help us understand differences in consumer behavior from conventional expected utility theory and further even prospect theory, if any.

Within the domain of risk and uncertainty, a priori and statistical probabilities are mapped to decisions made from description and experience (Hau and Pleskac, 2009). The understanding of this distinction between the two types of decision making is of particular importance as the perceived utility gains from either type of decision, a priori (described) and statistical (experienced), can substantially diverge.

The variability of the pay-off or in other words, the volatility, and description from memory contribute to this gap. However, the representation of rare occurrences which can be viewed as natural frequencies in decisions from experience or as single-event probabilities in decisions from description also explain this logical gap in the difference between the kind of decisions made by investors on stock markets.

The area of decision making from experience and description has seen significant interest in research work and may be the answer to understanding investor behavior in the coming years. The study by Wood and Zaichkowsky (2004) was an empirical attempt to understand the intricacies of individual investor behavior. Some of the findings such as the clustering or pegging of attributes would need further research to validate the inferences. The sampling in any such empirical test to understand human behavior would have to be a convenience procedure as the nature of the findings are highly personalized. According to the study, there is speculation that a significant portion of the investing population could belong to the risk intolerant group. Investing attitudes and thereby overall consumer behavior is a very complex science. It is nearly impossible to predict the behavior accurately through questionnaires. Further research in the area of each of these characteristic concepts would make it easier to target these attributes more specifically.

The relationship between investor confidence and trading portrays an inverted U relationship with the most confident investors performing the average number of trades per year. Individuals with the maximum and minimum number of trades exhibited a lower level of confidence. This empirical
result would mean that excessive trading among investors would have a deeper reason and not just the level of confidence associated with it.

The actual investing behavior in the empirical research so far has only included descriptive analysis of the responses given by respondents. It is important for any future research or financial model to incorporate actual investor behavior and other metrics such as the nature of the instruments in the portfolio chosen and the performance of these instruments.

Explaining asset price trends and expected returns on the basis of consumer attitudes and past financial behavior has proven to be exceptionally tricky in the past. A set of papers by Barberis, et al. (1998) and another one by Daniel et al. (1998) attempted to predict financial consumer behavior by looking into the determinants of their choices and expectations. Based on the results of their experimental study, they concluded that certain empirical features of asset returns can be explained by accounting for some amount of irrationality on part of the investors. In their studies, the irrationality consideration was incorporated through the use of suitable proxies and the results were observed to be startlingly accurate when modelling investors making predictions of metrics, such as cash flows.

Other papers, including Hong and Stein (1999) adopt a different approach to this problem. Here, the investor's irrationality is not a pressing concern. The investor is assumed to be rational and hence, will be in favor of the decision that maximizes his net gain. However, what makes their model different from previous ones in the same vein is that Hong and Stein (1999) assumed that investors can process only sects of information and not the entirety of the information at any given time. This radically changes his investment preferences and although the investor may be rational throughout, he may not be dynamically consistent since he is exposed to different subsets of information in different intervals of time. The recent COVID – 19 pandemic has also taught us that irrational behaviour can be observed. The future scope of research should be aimed at understanding the investor behaviour during times of such pandemic and at the same analyzing how economic behaviour correlates with the stimulus packages given by various governments during a pandemic. Do investors really act rational when stimulus packages are given and their economic behaviour aligns with the prospect theory or not, is the main research question which should be focused upon in the future course of research works.
REFERENCES


**APPENDIX 1**

Sampling Sheet used for Phase 1 of study  
NAME: SIGNATURE:  
OCCUPATION: E-MAIL ID:  
CONTACT NUMBER:  
NOTE: The results of the survey will be used for educational purposes only and are strictly confidential.  
To save or not to save?  
Situation: Imagine you are the chief strategist at the World Health Organization office for developing nations. In a recent meeting, you have been entrusted with the task of preparing for an outbreak of the deadly ‘Zika’ virus expected to kill 600,000 people in country A and 990,000 in country B.  
If you were presented with the following programs by your team after extensive research, which one would you choose? (Choose one for each country)  
For Country A:  
I: Program I which will save 200,000 people with 100% probability, and the choice of individuals saved will be randomized.  
II: Program II which will save all 600,000 with 33% probability and save nobody with 66% probability.  
For Country B:  
I: Program I in which 660,000 people will die with 100% probability as the drug has been extensively tested and the survival rate for individuals has been pegged at 33 percentage points.  
II: Program II in which there is one-third probability that no one will die and two-thirds probability that 990,000 will die.  
CHOICE:  
Country A: I / II Country B: I / II

**APPENDIX 2**

Behavioral metrics’ values used in the study cited in Phase 2  
Source: Attributes and trading behavior of stock market investors, Wood and Zaichkowsky (2004)

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