1. **Introduction**

The field of behavioral economics and finance has emerged by addressing the limitations and challenges to the traditional concept of Homo-Economicus (Rational Economic Man), which assumes that investors are perfect in decision making. Year 2008 forced the world of finance to revisit its foundation and basis, in the words of Ariely (2009), “In 2008, a massive earthquake reduced the financial world to rubble. Standing in the smoke and ash, Alan Greenspan, the former chairman of the U.S. Federal Reserve once hailed as “the greatest banker who ever lived,” confessed to Congress that he was “shocked” that the markets did not operate according to his lifelong expectations. He had “made a mistake in presuming that the self-interest of organizations, specifically banks and others, was such that they were best capable of protecting their own shareholders.” We are now paying a terrible price for our unblinking faith in the power of the invisible hand. We’re painfully blinking awake to the falsity of standard economic theory—that human beings are capable of always making rational decisions and that markets and institutions, in the aggregate, are healthily self-regulating. If assumptions about the way things are supposed to work have failed us in the hyper-rational world of Wall Street, what damage have they done in other institutions and organizations that are also made up of fallible, less-than-logical people?”

Many may consider year 2008 as the epitome of our failure, but human beings have been irrational with investments and decision making for ages. Further discussing about rational economic man and assumptions related to his behavior, researchers suggest that human brain largely functions irrationally and humans are not as smart as they think with their decisions. Researchers have raised frightening questions as by Ariely (2008) in one of his Ted talks, “Are we in control of our own decisions”. In fact, the field of behavioral economics came into lime
light when Daniel Kahneman was awarded Nobel prize in year 2002 for his empirical findings challenging the assumptions of human rationality prevailing in modern economic theory.

Bringing in the perspective of Kahneman (2010), decisions involve memory, and memory of an event may be different than its actual experience, hence leading to incorrect decisions. Schwartz (2004) discusses paradox of choice and cites an example that how increased number of options causes choice paralysis; US data suggests that for every ten additional mutual funds offered by the employer, 2% reduction in retirement fund participation was observed. The reason for reduced participation is increased expectations due to increased options. Comparing this research with the assumptions of standard finance, which suggest return expectations rely simply on risk, we are bound to believe that the standard world of finance is not well aligned with the real world of finance.

Behavioral economics provides newer insights to the process of decision making, interesting researches have been reported internationally, such as, Camerer (2003) has reported that an individual perceives a certain deal benefitting if it is presented along with a little inferior option. While studying saving tendencies of investors Hershfield et al. (2011), reported that by allowing people to interact with age-progressed renderings of their future selves using immersive virtual reality hardware and interactive decision aids, they allocated more resources for their future selves.

Another interesting study by Chen (2013) suggests that the languages that grammatically associate the future and the present (e.g. in Hindi, we can have: कल मिले हैं, कल मिले थे), foster future-oriented behaviour, speakers of such languages: save more, retire with more wealth. This holds both across countries and within countries when comparing demographically similar native households.

Addressing behavioral aspects of individuals leads to policy level improvements, as provided by Sutherland (2010), if governments align to behavior of individuals then their
policies will be highly effective, he also makes a strong point that solutions need not be complex and costly, as is the case with traditional economics and finance. Ayres, Raseman, & Shih (2012), who have reported that electricity and fuel consumption can be reduced when peer comparison feedback is provided to consumers. Benefits of understanding behavioral paradigm are many and are being reported from various fields, Mullainathan (2009) in his quest to understand high infant mortality rates in India found that 35-50% mothers recommended reducing water supply of babies facing diarrhoea; Author makes an interesting behavioral observation that oral rehydration solution is available throughout the country but mothers thought feeding water to the affected baby was like keeping water in a leaking bucket.

One of the major thrust in the field of behavioral finance is to understand the way investors take decisions. Understanding the decision process of an investor is necessary for client-advisor relationship, which in turn can help clients to achieve most optimal portfolio in accordance to their taste and knowledge, as well as, fulfilling if not all, but many of the principles of standard finance.

Standard finance has limited acceptability to investors given their varied personalities and life experiences, according to Statman (1999), the world of standard finance models people as “rational,” whereas in behavioral finance people are modelled as “normal.” This study also describes standard finance as the body of knowledge contributed by arbitrage principles of Miller and Modigliani, the portfolio principles of Markowitz, the capital asset pricing theory of Sharpe, Lintner, and Black, and the option pricing theory of Black, Scholes, and Merton. It is simply untrue to assume that investors understand these principles and take account of standard finance before making investment decisions, as proposed by Keynes (1936) that no human can be fully informed of all circumstances and maximize his expected utility by determining his complete, reflexive, transitive, and continuous preferences over alternative bundles of consumption goods at all times.
Another contrast of behavioral finance with standard finance is based on utility theories. Where the world of standard finance believes in diminishing marginal utility of wealth, and the traditional risk aversion suggests individuals are risk averse and have diminishing marginal utility of wealth with concave utility curves. Friedman & Savage (1948) however, propose double inflection utility function which is concave up to inflection point 1 and then turns convex to again turn to concave at inflection point 2. (See Figure 1-2)

*Figure 1-1 Diminishing Marginal Utility of Wealth*

*Figure 1-2 Double Inflection Utility Function of Wealth*
Kahneman & Tversky (1979) present a critique of expected utility theory and suggest, given choices under risk, people are risk averse in choices involving sure gains and risk seeking in choices involving sure losses. This leads to a ‘S’ shaped utility curve (see Figure 1-3).

![Figure 1-3 Prospect Theory Utility Curve](image)

The change in the perception of risk during different wealth levels as presented by Kahneman & Tversky (1979) certainty effect, as in the above mentioned ‘S’ shaped utility curve is another important dimension to which financial advice shall largely depend. Easier said than done, the process through which a client takes decisions is complex. Behavioral finance helps for better financial decision as it tries to analyse a “real” person’s thought process in decision making, Raiffa (1997) discusses three approaches: Normative Analysis – it is concerned with the rational and ideal solutions, Descriptive Analysis – it is concerned with the manner in which real people actually make decisions and Prescriptive Analysis – it is concerned with practical advice and tools that might help people achieve results approximating to normative analysis. Raiffa further adds that, standard finance may be considered more of normative, behavioral finance as more of descriptive and efforts to use behavioral finance in practice as prescriptive.

Two of the important prescriptive frameworks have been provided by H. Shefrin & Statman (1994) and Pompian & Longo (2005). H. Shefrin and Statman (1994) developed Behavioral Portfolio Theory (BPT) and presented its two versions: BPT-SA, where the portfolio...
is integrated into a single mental account and BPT-MA, where the portfolio resembles layered pyramids with each layer mapping to respective mental account (aspiration level) of investor and subsequent portfolio, given that covariances among layered portfolios are overlooked, this may result into an asset being long in one layer while short in another. The salient feature of this approach is that the investors are simultaneously risk averse and risk seeking.

Pompian and Longo (2005), offer two propositions for helping a private wealth manager to counsel and help in decision making of a client (figure 1-4):

**Proposition I:** For a wealthier client, the advisor should adapt to client’s behavioral biases, for a less wealthy client, the advisor must counsel and moderate client’s biases.

**Proposition II:** Clients exhibiting cognitive errors, which stem due to inefficiency to information procurement and processing of clients, should be moderated; and the clients exhibiting emotional biases, which stem due to impulse, intuition and feelings, should be adapted.

![Figure 1-4 Behavioral Finance in Practice](image-url)
In the above discussion, it is clearly visible that behaviorally modified asset allocation deals with investor’s biases, counselling of investors and providing proper information to investors for correct decision making, all based upon investor profile (wealth) and investor’s biases. Hence a private wealth manager may have to understand the nuances of investor biases, personality of investors (for counselling purposes) and investor’s demographic profile; while biases, personality traits and demographic profile are all individually measurable using respective techniques but their inter relationships may also add to the process of advising portfolios. If the study produces significant and strong relationship, the ability to counsel particular client by a portfolio manager may increase as now he may address behavioral biases via personality traits and demographics.

Literature has indicated that personality trait and demographics have reasonable relationship with the way people invest. Almlund, Duckworth, Heckman, & Kautz (2011) provide that “the intervention studies, along with studies in biology and neuroscience, establish a causal basis for the observed effect of personality traits on economic and social outcomes”. Given that returns of investments are affected by behavioral biases and personality traits relate to economic outcomes, the relationship between personality traits and behavioral biases may provide a better insight as in which personality may be prone to which biases.

Mittal & Vyas (2007) and Geetha & Ramesh (2012) suggest that demographics and investment choice are related in Indian scenario. If we connect this with the behavioral portfolio theory and framework of behaviorally modified asset allocation, then we have reasons to believe that there may be relationship between demographics and behavioral biases. Pictorially we can describe our discussion using figure 1-5, certainly this forms the basis of this research. Please note, we have established that demographics and personality traits may relate with biases, however, this study is not intended to determine causality, also, the relationships between biases and demographics, and, between biases and personality traits are studied.
separately. As no prediction model is proposed through the study, interaction between personality traits and demographics is neglected.

Figure 1-5 Basic Framework of Research

The importance of this study not only lies in reporting the relationships, but this study is also supposed to open various avenues to further researches which may seek reasons of relationships reported and thus enhancing our understanding of world of behavioral finance and economics.

This study is divided into eleven chapters, the next chapter reports literature review based upon the above established premises of research, the chapter also reports focused research gap for study of relationships of behavioral biases with personality traits and demographic factors, the research gap also generates research objectives which are pursued in subsequent chapters. The research gap goes through the thematic literature review and meta-analysis which starts with literature on building blocks of behavioral finance and funnels down to topics directly related to the study, i.e. ‘personality traits and biases’ and ‘biases and investor demographics’.
The following table summarises the sequence through which research objectives are obtained and pursued:

**Table 1-1 Thesis Flow to Obtain Research Objectives**

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Relevant Outcomes</th>
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| 1. Introduction   | This chapter:  
|                   | • Elaborates the field of Behavioral Finance at high level  
|                   | • Seeks hints from famous client-advisor models and suggests the possibility of relationship of biases with personality traits and demographics of Individual Investors |
| 2. Literature Review | The above suggested relationship is not only further explored in this section, but there is an attempt to locate this research in the world of Behavioral Finance. This Chapter:  
|                   | • Funnels down the broader area of behavioral finance to research topic. Hence, the research area is properly located in the domain of behavioral finance.  
|                   | • Provides related meta-analysis of the researches involving demographics, personality traits and their relations with investor behaviour. This produces fine threads of research inputs, such as possible variables of the study,  
|                   | • Reports research gap and factors which can be explored in Indian context for relationships. |
| 3. Methodology    | This Chapter:  
|                   | • Frames the research objectives and hypotheses  
<p>|                   | • Defines the variables |</p>
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<th>Chapter</th>
<th>Relevant Outcomes</th>
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<tr>
<td></td>
<td>• Checks the reliability and validity of questionnaire</td>
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<td></td>
<td>• Produces the sample size</td>
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<td></td>
<td>• Elaborates the statistical measures to test the relationship</td>
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<tr>
<td></td>
<td>• Scientifically removes the variables which produced measurement errors</td>
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This study tests relationship between all major emotional biases and cognitive errors with relevant demographic factors and big five personality traits in Indian scenario, using primary data and survey methods. This involves a lot of methodology related discussion which is presented in Chapter 3 titled “Research Methodology”.

Chapter 3 discusses definition of variables, formulation of hypothesis, reliability and validity of questionnaire, sample size and statistical tools used for testing relationships. The methodology is derived with survey of related literature and statistical tools are selected based on scales of measurement of variables. A detailed pretesting of questionnaires and their translation with the exploratory study undertaken for reliability and validity of questionnaires is also discussed.

As this study reports relationship between 17 biases, 6 demographic variables and 5 personality traits, an array of hypotheses are formed which are discussed accordingly in Chapter 4, 5, 6 and 7.

Chapter 4 discusses relationship between demographic variables and emotional biases, while chapter 5 discusses relationship between demographic variables and cognitive errors. Chapter 6 discusses relationship between personality traits and emotional biases while chapter 7 discusses relationship between personality traits and cognitive errors. The elaborated results are reported and the significant results are highlighted.
All the reported results are summarized and discussed in chapter 8 titled “Conclusion and Discussion”. Chapter 8 also presents charts that a portfolio manager may use to counsel clients with additional effectiveness,

Chapter 9 presents the scope of further research, and chapter 10 - 11 discuss implications of the study and its limitations respectively.