A Project on A Behavioural Study Of Investment Pattern With Respect To Age Group, in Mumbai

Submitted to

INDIRA GHANDHI NATIONAL OPEN UNIVESRSITY



In Partial fulfillment MBA-FM

Under the guidance of

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Program MBA-FM IGNOU

**A Behavioural Study Of Investment Pattern With Respect To Age Group, in Mumbai**

Location of the research study

Mumbai

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# Professional and Educational Qualification

**M.B.A (Finance) –** June 2004**-** April 2006 (87.5%)………..IMT, Ghaziabad (Top 10 percentile in batch)

**Chartered Accountant –** November 2003 (54.3%)…….....I.C.A.I. (First Attempt)

**C.F.A. (Level I) –** October 2003 (59.5%)……………………I.C.F.A.I. (First Attempt)

**B. Com. (H) –** April 2002 (69.1%)……………………………St. Xavier College, Kolkata (Top 50 in Cal. Unv.)

**H.S.C. (Commerce) –** March 1998 (69.6%) …………….....BGES College, Kolkata

**S.S.C.** – March 1996 (85.2%)…….…………………………..M.P.Birla School, Kolkata

# Professional Experience

# Lodha Group, Mumbai (Since Aug 2012- Till Date) Deputy General Manager – Corporate Finance

* Team members for acquisition of Jawala Real Estate Pvt. Ltd from DLF for INR 27,270 MM. Fund raising of INR 20,000 MM from Bank/ PEs/ NBFCs
* Team member for fund raising of INR 8,000 MM for Phase II of Shreeniwas Cotton Mills Ltd.
* Fund raising of INR 2,500 MM from Bank for project finance of Washington House
* Valuation of the company, Analysis and discussion of the Term Sheet
* Assisting in business and financial due diligence
* End to end responsibility for submission of proposal to consortium of bankers, moving the proposal and ensuring the closure of the deal
* Relationship management with Investment bankers and Private Equity funds
* Ensuring Rating and Grading of projects with Credit Rating Agencies

# Microsec Capital, Mumbai (Since May 2010- July 2012) Associate Vice President – Investment Banking

* Business Development / Deal Sourcing, Analysis/Preparation of Business Model/ Plan
* Preparation of Information Memorandum and Financial Model
* Valuation of the company, Analysis and discussion of the Term Sheet
* Assisting in business and financial due diligence
* Designing capital structure of deals, ensuring bankability of deals, using debt and equity instruments
* Key Assignment
  + Private Equity sourcing for NTK small cap Pharmaceutical company for equity dilution
  + Business Structuring, Strategic Alliance, term sheet preparation and valuation of East India based Education Institute, Pailan World School with Pearson Education
  + Business Structuring and fund raising of INR 250 Million for East Indian prominent EPC service provider
  + Arrangement of acquisition financing for Jindal ITF for a Italian desalination company

# Morgan Stanley, Mumbai (Since May 2007-Apr 2010) Senior Associate – Investment Banking

**Morgan Stanley, London (Since Sep 2009- Feb 2010) Senior Associate – Investment Banking**

* Extensive financial valuation analysis – Financial modeling (DCF, LBO, EPS Accretion/Dilution), WACC calculation, Proforma merger analysis, Comparable companies analysis, Precedent transaction analysis, Benchmarking analysis
* Industry analysis – Conducting industry research, Analyzing industry trends, Summarizing the competitive landscape within an industry, Identifying & analyzing potential acquisition opportunities
* Company specific analysis – Company profiles, Credit history reviews/credit agency overviews, Equity and debt research reviews, Management profiles, Relative share price performance analysis, Buy in Analysis, SWOT analysis & Strategic Evaluation
* Recruitment, induction and mentoring of junior team members
* Key Assignment
  + Team member for advising Fresenius $278 MM open offer for Dabur Pharma: Involved in preparation of pitch book, DCF valuation & various financial analysis for client
  + Team member for advising Hospira for acquiring Injectable Business of Orchid Chemical for $400 MM : Involved in preparation of pitch book, DCF valuation & various financial analysis for client
  + Advising MNC Pharma Company for acquisition of Indian target: Involved in preparation of pitch book evaluating strategic option for fitment. Valuation using DCF, Comparable companies analysis and Precedent transaction analysis
  + Team member for $259 MM IPO by Spanish pharma company Rovi: Valued the company using DCF and LBO models during the bidding round. Worked on Road show presentation
  + Overview of Indian Healthcare Environment : Overview of various Sub-Sectors, Key Drivers & Challenges, Profiles for Key Players & Comps

# Dr. Reddy’s, Hyderabad (May 2006- Apr 2007)

* Development of financial model to segregate the cost of ECB for betapharm under various heads, sensitivity analysis to analyze the impact of different variables
* End to end analysis of financial and business performance of business units including benchmarking with peers. Preparation and analysis of Consolidated Company MIS with BU wise drill down on monthly basis
* Providing early performance alerts and lead indicators to the management
* Performance Evaluation and Risk Mitigation plan for betapharm
* Preparation of Five year Strategic Plan and Six Quarter Budget for Europe Union
* Competitive Intelligence of Active Pharmaceutical Ingredient

# D. Bandyopadhyay & Co., Kolkata (Dec 2002- May 2004)

* Statutory Audit, Internal Audit, Tax Audit
* Finalization of Accounts of Companies, Partnership firms & Proprietorship concerns
* Tax consultancy for individuals

# Summer Internship Experience

# Power Finance Corporation Ltd. – ALRM Department (April 2005 - May 2005)

**Project**: **Risk Management of External Commercial Borrowings of PFCL –** [Summer Internship Project selected for “TATVA 2005 “, the inter B-School Competition ]

* Preparation of Swap Book for all the deals
* Made recommendations as to handling of such risks providing a feasible strategy
* Asset Liability Management at PFC

# Other Projects (During MBA Course)

* **IDBI Bank** – Overview of US Bond Markets
* **UTStarcom** – Feasibility study of converting a branch of a foreign company to a WOS in India

# Awards and Accomplishments

* Business Plan – “Plantation Tourism” selected for the final round of Atharva (Annual Feast of TAPMI School of Business )
* Nominated for the prestigious “Duke of Edinburgh’s award for social work” by Uttam School For Girls, Ghaziabad, for helping weaker section of society
* Winner of “Best Innovative Strategy Award” for STRATEGM held at FORE School of Management
* Conceptualized & started a Magazine at IMT – ‘Inspirare’, at a national level dedicated to International Business
* Article published in ‘Alumni Newsletter of IMT’ – “Random Walk Theory”

# Extra Curricular Activities

* Member – Organizing Committee, Tatva’04 – The Annual Inter B-School Summer Training Contest
* Founder Member – Sameeksha (Organized Intra B-School Quizzes) at IMT
* Member – Pradakshana – The Management Event Organizers at IMT
* Founder Member – International Linkages Committee at IMT
* Volunteered in Organizing and donating blood for a Blood Donation camp organized at St. Xaviers College
* Passion 2005 – The Annual Inter B-School Festival:
  + Member of the Winning Team- “Pratham”
  + Bazaar (A Marketing Simulation Game) – 1st Runners up
  + Bazaar Presentation (A Marketing Simulation Game) – 1st Runner up

**CA_logo_icai_small2.jpgASHWINI GUPTA**

F-25/26, Karnataka Buildings,

Matunga Road, Mumbai,

Maharashtra-400016

Mobile: +91-9819405841

EMail:caguptaashwini@gmail.com

Dear Madam/Sir,

It was with great interest that I got information about your recent posting; my resume is enclosed herewith for your reference.

Review of my credentials will confirm that I am capable of serving as the catalyst for achieving revenue objectives and organic growth through effective contributions. **I am a Qualified Chartered Accountant.**

I understand that working for your organization requires a candidate who is dedicated; team oriented and is able to deal with people in various departments. I am confident that I possess these skills, which will help me to perform the job efficiently and effectively.

I have enclosed my resume which will provide you a more detailed description of my education, skills, and work experience. So I would welcome an opportunity to speak with you to evaluate your needs & share my ideas. Thank you for your time and consideration.

Thanking you.

**Sincerely**,

**CA ASHWINI GUPTA**

**CA Ashwini Gupta**

**Contact No.:** +91-9819405841

**E-Mail:** caguptaashwini@gmail.com

**Aspire to excel in Internal Audit & Risk Advisory/ Finance & Accounts/ Statutory Audit/ Taxation domain being part of a dynamic & growth oriented organization where my skills and knowledge can be utilized in the best interest of the company.**

**CAREER ABRIDGEMENT**

* Qualified Chartered Accountant by profession having experience in Internal Audit, Statutory Audit & Tax Audit. Exposure in Internal Audits of companies spanning across Manufacturing, Finance, Consumer Goods.
* Well versed with Financial Accounting, Project Accounting, Project Finance, Budgeting, MIS Reporting, Taxation and Fund management and Tax Laws & Procedures.
* Knowledge of different accounting and auditing standards like **IFRS, IGAAP etc.**
* Good understanding in collating and interpreting financial data for determining the financial performance of various companies / organisations.
* Abilities in analysing financial performance as well as qualitative performance indicators, preparing reports & recommending suitable corrective actions.
* Good understanding of various accounting and auditing concepts & principles in a business.
* Ability to work as both independently and as a team member.
* Able to communicate effectively.

**AREAS OF EXPOSURE**

**Key positions held:**

|  |  |  |
| --- | --- | --- |
| **Designation** | **Organisation** | **Period** |
| Manager | ICICI Lombard General Insurance Co. Ltd – India | Nov 2011 - Present |
|  |  |  |

**Key Responsibilities & Accountabilities:**

* **Finance & Accounts:** Being a part of Corporate Accounts, Currently handling accounting of Reinsurance transactions i.e. Premium, Claims, Unexpired Risk Reserves, IBNR as per various Accounting Standards & Accounting Policies applicable and requirement of IRDA. Participation in Closing Accounting Activity & finalizing the figures. Reconciliations of Reinsurance premium payable and claims receivables.

Management of Reinsurance Receivables and Payables including the foreign currency transactions which includes transactions between Reinsurance and Coinsurance and liaison with Public Sector & Private Insurance Companies and Insurance Broking Houses both National and International.

Member of Finalisation of Accounts Team, Preparation of Reports and Schedules for Finalisation of Accounts, detail for Notes to Accounts as per IRDA and Companies Act. Responsibility of SOAX Compliance according to Sarbanes Oxley Act

* **MIS / Budgeting:** Preparation & Presentation of monthly management report in respect of Premium Booked, Claim reported, URR Created and Released, Reinsurance Claims Recoverable and Reinsurance Premium Payable.
* **Taxation / Auditing:**  Ensuring Compliance of Service Tax, VAT and TDS as per Direct and Indirect Tax laws in respect of Reinsurance transactions. Coordinating with auditors for conducting internal and statutory audits; evaluating internal control systems to highlight shortcomings & implement corrective actions.
* **Team Management/Co-ordination:** Responsible for the implementation of the Sound Control Environment. Preparing targets for the team subordinates, delegating and reviewing the work done. Liasoning with Reinsurers, Brokers, Underwriters, Tax, Legal & other departments for resolving various issues. Handling queries related to balances of Reinsurer/Broker & coordinating with Reinsurance Team for resolving issues.

**ARTICLESHIP**

**Key positions held:**

|  |  |  |
| --- | --- | --- |
| **Designation** | **Organisation** | **Period** |
| Article | G.K. Jain & Associates Jaipur,Rajasthan | Jan’07-July-10 |

**Accountabilities:**

|  |  |  |
| --- | --- | --- |
| **Accounting** | - Prepare, analyze financial reports and documents of an organization  - Maintaining of books of accounts, manual or computerized  - Preparing final accounts -Application of statutory provisions, compliances with Accounting Standards and other pronouncements of the Institute, etc.  - Analysis and Interpretation of financial statements -Preparing and reviewing budgets  - Preparing and reviewing fund flow and cash flow statements |  |
| **Auditing** | - Check the accuracy of financial statements, ensure that the accounts presented are drawn on correct accounting principles Preparing audit programmes  - Audit working papers and documentation  -Understanding, recording and evaluating internal control system  - Performing substantive audit procedures  - Scrutinizing financial statements  - Compliance with auditing and assurance standards  - Drafting audit report. |  |
| **Taxation** | - Dealing with income tax, assessment of taxes, filing returns.  - Computation of Total Income under Income tax law -Preparation and filing of returns under various direct tax laws like Income-tax. - Tax Planning -Elementary knowledge of Excise Law, Central Sales Tax, State Sales Tax, Service Tax etc.  - Procedural compliance under various direct and indirect tax laws e.g. Tax deduction/collection at source, interest for late payment of taxes, appeals etc. |  |

**ASSIGNMENTS HANDLED**

**Internal & Statutory Audit:**

* **Internal Audit of Sri Ram Transport Finance Corporation (Northern Region)**
* Involved in verification of controls established in relation to approval & actual disbursement of loan, due instalments, receipt of instalments, interest calculations & action taken in case of failure in repayment of instalments
* Preparation of audit report & reporting it to higher authorities
* **Internal Audit of Dabur India Ltd**
* Conducting audit of different plant locations and handling areas of work in-progress, raw material purchase and consumption, stock counts, ageing analysis for the division.
* Preparation of audit report & reporting it to higher authorities
* **Internal Audit Of Fresenius Kabi Oncolgy Ltd**
* Conducting audit of different location and handling areas of material purchase and consumption, stock counts, ageing analysis for the location
* Preparation of audit report & reporting it to higher authorities
* **Statutory Audit of PG Foils and Simran Exports (P) Ltd**
* Checking of Various kinds of Registers and books of accounts required to be maintained under Companies Act 1956
* Checking of Loans and Advances
* Ensuring Compliance of applicable Accounting Standards issued by ICAI
* Finalization of financial statements and Preparation in accordance with Schedule VI

**Tax Audits:**

* **Company (Manufacturing, Financial Broker, Builders & Property Dealers etc):**
* Handled complete audit from start till finalization of financial statements
* **Trusts**
  + Tax audit of Shruti Mandal & Brij Sur Mandal (Bhuramal Rajmal Surana Trust)
  + Preparation of 10B report
* **Individual & Partnership Firms (Manufacturing concerns, C&F Agencies, Hospitals, Nursing Homes and Pathological Labs, Financial Agents, Oil and Gas Agencies, Jewellers and Export Houses etc )**
* Assignments handled in complete terms from start till finalisation of financial statements
* Preparation of various statements like Balance Sheet, P & L account, Receipts and Payments account, Bank summary etc
* Preparation of 3CD report
* Preparing various compliances including the taxation part.

**EDUCATIONAL CREDENTIALS**

|  |  |  |
| --- | --- | --- |
| **Examination** | **Institute** | **Year** |
| Chartered Accountant | ICAI | May, 2011 |
| Company Secretary - Inter | ICSI | December, 2010 |
| M.com | University of Rajasthan | 2010 |
| B.com | University of Rajasthan | 2008 |
| Higher Secondary | CBSE | 2005 |
| Secondary | CBSE | 2003 |

**I.T. SKILLS**

|  |
| --- |
| * Well conversant with MS- Office; * Obtained a certificate of **‘Advanced Excel’** course from NIIT, Jaipur; * Working Knowledge of SAP * Working experience of Tally (accounting software);; * Good understanding of database structure and data definition; * Experience to handle large amount of data from diverse sources; * Completed 100 Hours Computer Training Course under ICAI; * Tech- savvy with fair knowledge and flair for information technology. |

**ADDITIONAL SKILLS AND CERTIFICATIONS**

* Attended various corporate/project finance conferences and seminars.
* Technical workshops (In-house updation course organized by ICAI annually).
* Attended various seminars on IFRS Convergence/Corporate Governance organized by ICAI & ICSI.

**PERSONAL DETAILS**

|  |
| --- |
| * Date of Birth : August 13, 1987 * Linguistic abilities : English & Hindi * Passport No : K2366016 Issued by Govt. Of India. * Permanent Address: 535, Munshi Ram Das Ji Ka Rasta, Amer Road, Jaipur - 302002 * Nationality : Indian * Marital Status : Single |

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Declaration

“I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except where due acknowledgment has been made in the text.”

Signature

Name Girish Malekar

Date 13/04/2013

Certificate

This is to certify that the thesis entitled

A Behavioural Study Of Investment Pattern With Respect To Age Group, in Mumbai submitted by Mr Girish Malekar to Indira Gandhi Open University towards partial fulfillment of the requirements for the award

Of the degree of MBA - Financial Markets is a bona fide record of the work carried out by him/her under my/our supervision and guidance.

Signed by Thesis Supervisor(s)

Name/s

Date

Place

Acknowledgement

Firstly, I express my deep sense of gratitude to my faculty guide Mr. **ARPIT BHADANI** for his inspiring guidance, scholarly interpretations and valuable criticisms throughout the course of my work.

Then I would like to express my special gratitude and thanks to **Mr Ashwini Gupta** who has been my External guide for the study. I appreciate his efforts in updating my knowledge about the latest scenario in the investment industry and extending his support for completion of the project.

I extend my sincere thanks to **Mrs. Shashi Gupta** who has played a pivotal role in ensuring that the project guidelines and dates were met.

I am gratefully obliged to all the Investor who took time from their busy schedule to grant me an interview and answering my questionnaire.

I also thank my family members and colleagues for all their support and encouragement throughout the completion of the work

Above all, I bow before and thank ‘God Almighty’ without whose blessings this work would have never been completed.

Girish Malekar

# Executive summary

The financial world has been changed greatly since last 20 years. Individual investors have started to participate actively in the investment activities.

It has become very crucial to understand the investors’ behaviour for their investment decision.

This study examines the investors’ behaviour with the help of different behavioural finance theories viz. overconfidence, disposition effect, conservatism, cognitive dissonance, rationality and regret theory. And how do these behavioural financial theories affect investors with respect to their age, specifically investors above the age of 35 years and investors below the age of 35 years. This research report mainly compromises of the how various aspect of behavioural finance affects the retail individuals and its impact on their investment pattern or their investment decision.

The study found that investors are irrational with different investment options, investors were found overconfident.

The findings with respect to investors above the age of 35yrs support the rationality, disposition effect, conservatism and regret theory concepts of behavioural. While the findings do not support the overconfidence and cognitive dissonance in investors above the age of 35yrs

The findings with respect to investors below the age of 35 yrs support the rationality, disposition effect, cognitive dissonance and regret theory concepts of behavioural. But the findings do not supports the overconfidence and conservatism in investors below the age of 35yrs old.

# Introduction

Behavioural finance is the study of the influence of psychology on the financial practitioners and the subsequent effect on markets. al finance is of interest because it helps explain why and how markets might be inefficient. Much of the economic and financial theories presume that individuals act rationally in the process of decision making, by taking into account all available information. But there is evidence to show repeated patterns of irrationality in the way humans arrive at decisions and choices when faced with uncertainty. Behavioural finance, a study of the market that draws on psychology, throws light on why people buy or sell stocks and why sometimes do not buy or sell at all. The most crucial challenge faced by the investor is in the area of investment decisions. The profit made, or losses incurred by an investor can be attributed mainly to his decision-making abilities. The fact that even the most prominent and well-educated investors were affected by the collapse of the speculative bubble in the 2008 subprime crisis proved that something was fundamentally missing in the traditional models of rational market behaviour.

In this study, the aim is to establish the existence of such fundamental issues, driven by various psychological biases, in the investment decision-making process of investors based on their age. Behavioural economists firmly believe that psychological factors influence investment decisions. They argue that today’s investment decisions demand a better understanding of individual investors’ al biases. However, many economists believe completely in the application of traditional theories in the decision making process and hence do not consider the concept of irrational behaviour. In this context, it seems relevant to check whether the behavioural factors have an influence on the decision making process of portfolio investors.

Indian stock market is considered to be highly volatile, sensitive and reactive to unanticipated shocks and news and it takes no time to impact the market activities. However at the same time, Indian stock market is resilient and recovers soon after shocks. The role and importance of individual investors and their trading in Indian stock market is also very crucial. Unlike institutional investors, individual investors are believed to be less informed, have psychological biases and also thought of as the proverbial noise traders in the stock market. It is believed that trading of individual investors rarely influences the stock prices. With this perception about the individual investors, majority of trading strategies and stock market policies are designed and focused to their institutional counterparts, thereby ignoring the individual investor's interests to some extent.

The efficient markets hypothesis has been the central proposition in finance for nearly thirty years. It states that securities prices in financial markets must equal fundamental values, either because all investors are rational or because arbitrage eliminates pricing anomalies. This study describes an alternative approach to the study of financial markets: behavioural finance. This approach starts with an observation that the assumptions of investor rationality and perfect arbitrage are overwhelmingly contradicted by both psychological and institutional evidence. In actual financial markets, less than fully rational investors trade against arbitrageurs whose resources are limited by risk aversion, short horizons, and agency problems. Behavioural finance attempts to explain and increase the understanding of reasoning patterns of investors, including the emotional processes involved and the degree to which they influence the decision-making process. Essentially, the behavioural finance attempts to explain “what”, “why”, and “how” of finance and investment, from a human perspective. Ricciardi and Simon (2000) discussed some general principles of behavioural finance including the overconfidence, financial cognitive dissonance, the theory of regret, and prospect theory, and compare it with modern portfolio theory and the efficient market hypothesis.

There is an old joke, widely told among economists, about an economist strolling down the street with a companion. They come upon a $100 bill lying on the ground, and as the companion reaches down to pick it up, the economist says, ‘Don’t bother – if it were a genuine $100 bill, someone would have already picked it up’. This humorous example of economic logic gone awry is a fairly accurate rendition of the efficient markets hypothesis (EMH), one of the most hotly contested propositions in all the social sciences. It is disarmingly simple to state, has far-reaching consequences for academic theories and business practice, and yet is surprisingly resilient to empirical proof or refutation. Even after several decades of research and literally thousands of published studies, economists have not yet reached a consensus about whether markets – particularly financial markets – are, in fact, efficient.

The origins of the EMH can be traced back to the work of two individuals in the 1960s: Eugene F. Fama and Paul A. Samuelson. Remarkably, they independently developed the same basic notion of market efficiency from two rather different research agendas. These differences would propel the them along two distinct trajectories leading to several other breakthroughs and milestones, all originating from their point of intersection, the EMH.

Like so many ideas of modern economics, the EMH was first given form by Paul Samuelson (1965), whose contribution is neatly summarized by the title of his article: ‘Proof that Properly Anticipated Prices Fluctuate Randomly’. In an informationally efficient market, price changes must be unforecastable if they are properly anticipated, that is, if they fully incorporate the information and expectations of all market participants. Having developed a series of linear-programming solutions to spatial pricing models with no uncertainty, Samuelson came upon the idea of efficient markets through his interest in temporal pricing models of storable commodities that are harvested and subject to decay. Samuelson’s abiding interest in the mechanics and kinematics of prices, with and without uncertainty, led him and his students to several fruitful research agendas including solutions for the dynamic assetallocation and consumption-savings problem, the fallacy of time diversification and logoptimal investment policies, warrant and option-pricing analysis and, ultimately, the Black and Scholes (1973) and Merton (1973) option-pricing models.

In contrast to Samuelson’s path to the EMH, Fama’s (1963; 1965a; 1965b, 1970) seminal papers were based on his interest in measuring the statistical properties of stock prices, and in resolving the debate between technical analysis (the use of geometric patterns in price and volume charts to forecast future price movements of a security) and fundamental analysis (the use of accounting and economic data to determine a security’s fair value).

Among the first to employ modern digital computers to conduct empirical research in finance, and the first to use the term ‘efficient markets’ (Fama, 1965b), Fama operationalized the EMH hypothesis – summarized compactly in the epigram ‘prices fully reflect all available information’ – by placing structure on various information sets available to market participants. Fama’s fascination with empirical analysis led him and his students down a very different path from Samuelson’s, yielding significant methodological and empirical contributions such as the event study, numerous econometric tests of single- and multi-factor linear asset-pricing models, and a host of empirical regularities and anomalies in stock, bond, currency and commodity markets.

The EMH’s concept of informational efficiency has a Zen-like, counter-intuitive flavour to it: the more efficient the market, the more random the sequence of price changes generated by such a market, and the most efficient market of all is one in which price changes are completely random and unpredictable. This is not an accident of nature, but is in fact the direct result of many active market participants attempting to profit from their information. Driven by profit opportunities, an army of investors pounce on even the smallest informational advantages at their disposal, and in doing so they incorporate their information into market prices and quickly eliminate the profit opportunities that first motivated their trades. If this occurs instantaneously, which it must in an idealized world of ‘frictionless’ markets and costless trading, then prices must always fully reflect all available information.

Therefore, no profits can be garnered from information-based trading because such profits must have already been captured (recall the $100 bill on the ground). In mathematical terms, prices follow martingales.

Such compelling motivation for randomness is unique among the social sciences and is reminiscent of the role that uncertainty plays in quantum mechanics. Just as Heisenberg’s uncertainty principle places a limit on what we can know about an electron’s position and momentum if quantum mechanics holds, this version of the EMH places a limit on what we can know about future price changes if the forces of economic self-interest hold.

A decade after Samuelson’s (1965) and Fama’s (1965a; 1965b; 1970) landmark papers, many others extended their framework to allow for risk-averse investors, yielding a ‘neoclassical’ version of the EMH where price changes, properly weighted by aggregate marginal utilities, must be unforecastable (see, for example, LeRoy, 1973; M. Rubinstein, 1976; and Lucas, 1978). In markets where, according to Lucas (1978), all investors have ‘rational expectations’, prices do fully reflect all available information and marginal-utilityweighted prices follow martingales. The EMH has been extended in many other directions, including the incorporation of non-traded assets such as human capital, state-dependent preferences, heterogeneous investors, asymmetric information, and transactions costs. But the general thrust is the same: individual investors form expectations rationally, markets aggregate information efficiently, and equilibrium prices incorporate all available information instantaneously.

Rational choice theory, also known as choice theory or rational action theory, is a framework for understanding and often [formally modeling](http://en.wikipedia.org/wiki/Model_(abstract))social and economic behaviour. Rationality, interpreted as "wanting more rather than less of a good", is widely used as an assumption of the behaviour of individuals in [microeconomic](http://en.wikipedia.org/wiki/Microeconomic) models and analysis and appears in almost all economics textbook treatments of human decision-making. It is also central to some of modern [political science](http://en.wikipedia.org/wiki/Political_science), [sociology](http://en.wikipedia.org/wiki/Sociology) and [philosophy](http://en.wikipedia.org/wiki/Philosophy). It attaches "wanting more" to [instrumental rationality](http://en.wikipedia.org/wiki/Instrumental_rationality), which involves seeking the most cost-effective means to achieve a specific goal without reflecting on the worthiness of that goal. [Gary Becker](http://en.wikipedia.org/wiki/Gary_Becker) was an early proponent of applying rational actor models more widely. He won the 1992 [Nobel Memorial Prize in Economic Sciences](http://en.wikipedia.org/wiki/Nobel_Memorial_Prize_in_Economic_Sciences) for his studies of discrimination, crime, and [human capital](http://en.wikipedia.org/wiki/Human_capital).

The "rationality" described by rational choice theory is different from the colloquial and most philosophical use of the word. For most people, "rationality" means "sane," "in a thoughtful clear-headed manner," or knowing and doing what's healthy in the long term. Rational choice theory uses a specific and narrower definition of "rationality" simply to mean that an individual acts as if balancing costs against benefits to arrive at action that maximizes personal advantage. For example, this may involve kissing someone, cheating on a test, buying a new dress, or committing murder rather than the [catallactic](http://en.wikipedia.org/wiki/Catallactics) information many people may primarily think of as economics. Rational choice theory is closely linked with [methodological individualism](http://en.wikipedia.org/wiki/Methodological_individualism) and [subjective value theory](http://en.wikipedia.org/wiki/Subjective_value_theory) most associated with [Ludwig Von Mises](http://en.wikipedia.org/wiki/Ludwig_Von_Mises)' [Human Action](http://en.wikipedia.org/wiki/Human_Action) and the classical science developed by Spanish, Italian, and French economists.

The practitioners of strict rational choice theory never investigate the origins, nature, or validity of human motivations (why we want what we want) but instead restrict themselves to examining the expression of given and inexplicable wants in specific social or economic environments. That is, they do not examine the biological, psychological, and sociological roots that make people see the benefits encouraging them to kiss another, cheat on a test, use cocaine, or murder someone. Instead, all that is relevant are the costs of doing so—which for crimes, reflects the chance of being caught.

In rational choice theory, these costs are only [extrinsic](http://en.wikipedia.org/wiki/Motivation) or external to the individual rather than being intrinsic or internal. That is, strict rational choice theory would not see a criminal's self-punishment by inner feelings of remorse, guilt, or shame as relevant to determining the costs of committing a crime. In general, rational choice theory does not address the role of an individual's sense of morals or ethics in decision-making. Thus, [economics Nobelist](http://en.wikipedia.org/wiki/Nobel_Memorial_Prize_in_Economic_Sciences) [Amartya Sen](http://en.wikipedia.org/wiki/Amartya_Sen) sees the model of people who follow rational choice model as "rational fools."

Because rational choice theory lacks understanding of consumer motivation, some economists restrict its use to understanding business behaviour where goals are usually very clear. As [Armen Alchian](http://en.wikipedia.org/wiki/Armen_Alchian) points out, competition in the market encourages businesses to maximize profits (in order to survive). Because that goal is significantly less vacuous than "maximizing utility" and the like, rational choice theory is apt.

Although models used in rational choice theory are diverse, all assume individuals choose the best action according to unchanging and stable [preference](http://en.wikipedia.org/wiki/Preference) functions and constraints facing them. Most models have additional assumptions. Those proponents of rational choice models associated with the [Chicago school of economics](http://en.wikipedia.org/wiki/Chicago_school_of_economics) do not claim that a model's assumptions are a full description of reality, only that good models can aid reasoning and provide help in formulating falsifiable hypothesis, whether intuitive or not. In this view, the only way to judge the success of hypothesis is empirical tests. To use an example from [Milton Friedman](http://en.wikipedia.org/wiki/Milton_Friedman), if a theory that says that the behaviour of the leaves of a tree is explained by their rationality passes the empirical test, it is seen as successful.

However, it may not be possible to empirically test or falsify the rationality assumption, so that the theory leans heavily toward being a [tautology](http://en.wikipedia.org/wiki/Tautology_(logic)) (true by definition) since there is no effort to explain individual goals. Nonetheless, [empirical](http://en.wikipedia.org/wiki/Empirical) tests can be conducted on some of the results derived from the models. In recent years the theoretical vision of rational choice theory has been subject to more and more doubt by the experimental results of [behavioural economics](http://en.wikipedia.org/wiki/Behavioral_economics). This criticism has encouraged many social scientists to utilize concepts of [bounded rationality](http://en.wikipedia.org/wiki/Bounded_rationality) to replace the "absolute" rationality of rational choice theory: this points to the difficulties of data-processing and decision-making associated with many choices in economics, political science, and sociology. More economists these days are learning from other fields, such as [psychology](http://en.wikipedia.org/wiki/Psychology), in order to get a more accurate view of human decision-making than offered by rational choice theory. For example, the behavioural economist and experimental psychologist [Daniel Kahneman](http://en.wikipedia.org/wiki/Daniel_Kahneman) won the [Nobel Memorial Prize in Economic Sciences](http://en.wikipedia.org/wiki/Nobel_Memorial_Prize_in_Economic_Sciences) in 2002 for his work in this field.

Because of the relative success of economics at understanding markets, rational choice theory has also become increasingly employed in [social sciences](http://en.wikipedia.org/wiki/Social_sciences) other than [economics](http://en.wikipedia.org/wiki/Economics), such as [sociology](http://en.wikipedia.org/wiki/Sociology) and [political science](http://en.wikipedia.org/wiki/Political_science) in recent decades. It has had far-reaching impacts on the study of [political science](http://en.wikipedia.org/wiki/Political_science), especially in fields like the study of interest groups, elections, behaviour in legislatures, coalitions, and [bureaucracy](http://en.wikipedia.org/wiki/Bureaucracy). Models that rely on rational choice theory often adopt [methodological individualism](http://en.wikipedia.org/wiki/Methodological_individualism), the assumption that social situations or collective behaviours are the result of individual actions alone, with no role for larger institutions. The poor fit between this and sociological conception of social situations partially explains the theory's limited use in [sociology](http://en.wikipedia.org/wiki/Sociology). Among other things, sociology's emphasis on the determination of individual tastes and perspectives by social institutions conflicts with rational choice theory's assumption that our tastes and perspectives are given and inexplicable.

Heuristics in judgment and decision making

In [psychology](http://en.wikipedia.org/wiki/Psychology), heuristics are simple, efficient rules which people often use to form judgments and [make decisions](http://en.wikipedia.org/wiki/Decision_making). They are mental shortcuts that usually involve focusing on one aspect of a complex problem and ignoring others. These rules work well under most circumstances, but they can lead to systematic deviations from [logic](http://en.wikipedia.org/wiki/Logic), [probability](http://en.wikipedia.org/wiki/Probability) or [rational choice theory](http://en.wikipedia.org/wiki/Rational_choice_theory). The resulting errors are called "[cognitive biases](http://en.wikipedia.org/wiki/Cognitive_bias)" and many different types have been documented. These have been shown to affect people's choices in situations like valuing a house or deciding the outcome of a legal case. Heuristics usually govern automatic, intuitive judgments but can also be used as deliberate mental strategies when working from limited information.

Cognitive scientist [Herbert A. Simon](http://en.wikipedia.org/wiki/Herbert_A._Simon) originally proposed that human judgments are based on heuristics, taking the concept from the field of [computation](http://en.wikipedia.org/wiki/Computation).  In the early 1970s, psychologists [Amos Tversky](http://en.wikipedia.org/wiki/Amos_Tversky) and [Daniel Kahneman](http://en.wikipedia.org/wiki/Daniel_Kahneman) demonstrated three heuristics that underlie a wide range of intuitive judgments. These findings set in motion the Heuristics and Biases research program, which studies how people make real-world judgments and the conditions under which those judgments are unreliable. This research challenged the idea that human beings are rational actors, but provided a theory of information processing to explain how people make estimates or choices. This research has guided almost all current theories of decision making.

Although a lot of research has focused on how heuristics lead to errors, they can be seen as rational in an underlying sense. According to this perspective, heuristics are good enough for most purposes without being too demanding on the brain's resources. Another theoretical perspective sees heuristics as fully rational in that they are rapid, can be made without full information and can be as accurate as more complicated procedures. By understanding the role of heuristics in human psychology, marketers and other persuaders can influence decisions, such as the prices people pay for goods or the quantity they buy.

Types

In their initial research, Tversky and Kahneman proposed three heuristics—availability; representativeness; and anchoring and adjustment. Subsequent work has identified many more. Heuristics that underlie judgment are called "judgment heuristics". Another type, called "evaluation heuristics", are used to judge the desirability of possible choices.

### Availability

In psychology, availability is the ease with which a particular idea can be brought to mind. When people estimate how likely or how frequent an event is on the basis of its availability, they are using the availability heuristic.  When an infrequent event can be brought easily and vividly to mind, this heuristic overestimates its likelihood. For example, people overestimate their likelihood of dying in a dramatic event such as a [tornado](http://en.wikipedia.org/wiki/Tornado) or [terrorism](http://en.wikipedia.org/wiki/Terrorism). Dramatic, violent deaths are usually more highly publicised and therefore have a higher availability. On the other hand, common but mundane events are hard to bring to mind, so their likelihoods tend to be underestimated. These include deaths from [suicides](http://en.wikipedia.org/wiki/Suicide), [strokes](http://en.wikipedia.org/wiki/Stroke) and [diabetes](http://en.wikipedia.org/wiki/Diabetes). This heuristic is one of the reasons why people are more easily swayed by a single, vivid story than by a large body of statistical evidence. It may also play a role in the appeal of lotteries: to someone buying a ticket, the well-publicised, jubilant winners are more available than the millions of people who have won nothing.

When people judge whether more English words begin with T or with K, the availability heuristic gives a quick way to answer the question. Words that begin with T come more readily to mind, and so subjects give a correct answer without counting out large numbers of words. However, this heuristic can also produce errors. When people are asked whether there are more English words with K in the first position or with K in the third position, they use the same process. It is easy to think of words that begin with K, such as kangaroo, kitchen or kept. It is harder to think of words with K as the third letter, such as lake, or acknowledge, although objectively these are three times more common. This leads people to the incorrect conclusion that K is more common at the start of words. In another experiment, subjects heard the names of many celebrities, roughly equal numbers of whom were male and female. The subjects were then asked whether the list of names included more men or more women. When the men in the list were more famous, a great majority of subjects incorrectly thought there were more of them, and vice versa for women. Tversky and Kahneman's interpretation of these results is that judgments of proportion are based on availability, which is higher for the names of better-known people.

In one experiment that occurred before the [1976 US Presidential election](http://en.wikipedia.org/wiki/U.S._presidential_election,_1976), some participants were asked to imagine [Gerald Ford](http://en.wikipedia.org/wiki/Gerald_Ford) winning, while others did the same for a [Jimmy Carter](http://en.wikipedia.org/wiki/Jimmy_Carter) victory. Each group subsequently viewed their allocated candidate as significantly more likely to win. The researchers found a similar effect when students imagined a good or a bad season for a college football team. The effect of imagination on subjective likelihood has been replicated by several other researchers.

A concept's availability can be affected by how recently and how frequently it has been brought to mind. In one study, subjects were given partial sentences to complete. The words were selected to activate the concept either of hostility or of kindness: a process known as [priming](http://en.wikipedia.org/wiki/Priming_(psychology)). They then had to interpret the behaviour of a man described in a short, ambiguous story. Their interpretation was biased towards the emotion they had been primed with: the more priming, the greater the effect. A greater interval between the initial task and the judgment decreased the effect.

Tversky and Kahneman offered the availability heuristic as an explanation for [illusory correlations](http://en.wikipedia.org/wiki/Illusory_correlations) in which people wrongly judge two events to be associated with each other. They explained that people judge correlation on the basis of the ease of imagining or recalling the two events together.

### Representativeness

The representativeness heuristic is seen when people use categories, for example when deciding whether or not a person is a criminal. An individual thing has a high representativeness for a category if it is very similar to a prototype of that category. When people categorise things on the basis of representativeness, they are using the representativeness heuristic. "Representative" is here meant in two different senses: the prototype used for comparison is representative of its category, and representativeness is also a relation between that prototype and the thing being categorised. While it is effective for some problems, this heuristic involves attending to the particular characteristics of the individual, ignoring how common those categories are in the population (called the base rates). Thus, people can overestimate the likelihood that something has a very rare property, or underestimate the likelihood of a very common property. This is called the [base rate fallacy](http://en.wikipedia.org/wiki/Base_rate_fallacy). Representativeness explains this and several other ways in which human judgments break the laws of probability.

The representativeness heuristic is also an explanation of how people judge cause and effect: when they make these judgements on the basis of similarity, they are also said to be using the representativeness heuristic. This can lead to a bias, incorrectly finding causal relationships between things that resemble one another and missing them when the cause and effect are very different. Examples of this include both the belief that "emotionally relevant events ought to have emotionally relevant causes", and magical [associative thinking](http://en.wikipedia.org/wiki/Magical_thinking#Associative_thinking).

#### Ignorance of base rates

A 1973 experiment used a psychological profile of Tom W., a fictional graduate student. One group of subjects had to rate Tom's similarity to a typical student in each of nine academic areas (including Law, Engineering and Library Science). Another group had to rate how likely it is that Tom specialised in each area. If these ratings of likelihood are governed by probability, then they should resemble the [base rates](http://en.wikipedia.org/wiki/Base_rates), i.e. the proportion of students in each of the nine areas (which had been separately estimated by a third group). If people based their judgments on probability, the would say that Tom is more likely to study Humanities than Library Science, because there are many more Humanities students, and the additional information in the profile is vague and unreliable. Instead, the ratings of likelihood matched the ratings of similarity almost perfectly, both in this study and a similar one where subjects judged the likelihood of a fictional woman taking different careers. This suggests that rather than estimating probability using base rates, subjects had substituted the more accessible attribute of similarity.

#### Conjunction fallacy

When people rely on representativeness, they can fall into an error which breaks a fundamental law of [probability](http://en.wikipedia.org/wiki/Probability). Tversky and Kahneman gave subjects a short character sketch of a woman called Linda, describing her as, "31 years old, single, outspoken, and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in anti-nuclear demonstrations." People reading this description then ranked the likelihood of different statements about Linda. Amongst others, these included "Linda is a bank teller," and, "Linda is a bank teller and is active in the feminist movement." People showed a strong tendency to rate the latter, more specific statement as more likely, even though a conjunction of the form "Linda is both X and Y" can never be more probable than the more general statement "Linda is X". The explanation in terms of heuristics is that the judgment was distorted because, for the readers, the character sketch was representative of the sort of person who might be an active feminist but not of someone who works in a bank. A similar exercise concerned Bill, described as "intelligent but unimaginative". A great majority of people reading this character sketch rated "Bill is an accountant who plays jazz for a hobby," as more likely than "Bill plays jazz for a hobby."

In vain, Tversky and Kahneman used what they described as "a series of increasingly desperate manipulations" to get their subjects to recognise the logical error. In one variation, subjects had to choose between a logical explanation of why "Linda is a bank teller" is more likely, and a deliberately illogical [argument](http://en.wikipedia.org/wiki/Argument) which said that "Linda is a feminist bank teller" is more likely "because she resembles an active feminist more than she resembles a bank teller." Sixty-five percent of subjects found the illogical argument more convincing. Other researchers also carried out variations of this study, exploring the possibility that people had misunderstood the question. They did not eliminate the error. The error disappears when the question is posed in terms of frequencies. Everyone in these versions of the study recognised that out of 100 people fitting an outline description, the conjunction statement ("She is X and Y") cannot apply to more people than the general statement ("She is X").

#### Ignorance of sample size

Tversky and Kahneman asked subjects to consider a problem about random variation. Imagining for simplicity that exactly half of the babies born in a hospital are male, the ratio will not be exactly half in every time period. On some days, more girls will be born and on others, more boys. The question was, does the likelihood of deviating from exactly half depend on whether there are many or few births per day? It is a well-established consequence of [sampling theory](http://en.wikipedia.org/wiki/Sampling_(statistics)) that proportions will vary much more day-to-day when the typical number of births per day is small. However, people's answers to the problem do not reflect this fact. They typically reply that the number of births in the hospital makes no difference to the likelihood of more than 60% male babies in one day. The explanation in terms of the heuristic is that people consider only how representative the figure of 60% is of the previously given average of 50%.

#### The dilution effect

[Richard E. Nisbett](http://en.wikipedia.org/wiki/Richard_E._Nisbett) and colleagues suggest that representativeness explains the dilution effect, in which irrelevant information weakens the effect of a [stereotype](http://en.wikipedia.org/wiki/Stereotype). Subjects in one study were asked whether "Paul" or "Susan" was more likely to be assertive, given no other information than their first names. They rated Paul as more assertive, apparently basing their judgment on a gender stereotype. Another group, told that Paul's and Susan's mothers each commute to work in a bank, did not show this stereotype effect; they rated Paul and Susan as equally assertive. The explanation is that the additional information about Paul and Susan made them less representative of men or women in general, and so the subjects' expectations about men and women had a weaker effect.

#### Misperception of randomness

Representativeness explains systematic errors that people make when judging the probability of random events. For example, in a sequence of coin tosses, each of which comes up heads (H) or tails (T), people reliably tend to judge a clearly patterned sequence such as HHHTTT as less likely than a less patterned sequence such as HTHTTH. These sequences have exactly the same probability, but people tend to see the more clearly patterned sequences as less representative of randomness, and so less likely to result from a random process. Tversky and Kahneman argued that this effect underlies the [gambler's fallacy](http://en.wikipedia.org/wiki/Gambler%27s_fallacy); a tendency to expect outcomes to even out over the short run, like expecting a [roulette](http://en.wikipedia.org/wiki/Roulette) wheel to come up black because the last several throws came up red. They emphasised that even experts in statistics were susceptible to this illusion: in a 1971 survey of professional psychologists, they found that respondents expected samples to be overly representative of the population they were drawn from. As a result, the psychologists systematically overestimated the [statistical power](http://en.wikipedia.org/wiki/Statistical_power) of their tests, and underestimated the[sample size](http://en.wikipedia.org/wiki/Sample_size) needed for a meaningful test of their hypotheses.

### Anchoring and adjustment

Anchoring and adjustment is a heuristic used in many situations where people estimate a number.  According to Tversky and Kahneman's original description, it involves starting from a readily available number—the "anchor"—and shifting either up or down to reach an answer that seems plausible.[[24]](http://en.wikipedia.org/wiki/Heuristics_in_judgment_and_decision_making#cite_note-baron_anch-25) In Tversky and Kahneman's experiments, people did not shift far enough away from the anchor. Hence the anchor contaminates the estimate, even if it is clearly irrelevant. In one experiment, subjects watched a number being selected from a spinning "wheel of fortune". They had to say whether a given quantity was larger or smaller than that number. For instance, they might be asked, "Is the percentage of African countries which are members of the [United Nations](http://en.wikipedia.org/wiki/United_Nations) larger or smaller than 65%?" They then tried to guess the true percentage. Their answers correlated well with the arbitrary number they had been given. Insufficient adjustment from an anchor is not the only explanation for this effect. An alternative theory is that people form their estimates on evidence which is selectively brought to mind by the anchor.

The amount of money people will pay in an auction for a bottle of wine can be influenced by considering an arbitrary two-digit number.

The anchoring effect has been demonstrated by a wide variety of experiments both in laboratories and in the real world. It remains when the subjects are offered money as an incentive to be accurate, or when they are explicitly told not to base their judgment on the anchor. The effect is stronger when people have to make their judgments quickly.  Subjects in these experiments lack [introspective awareness](http://en.wikipedia.org/wiki/Introspection) of the heuristic, denying that the anchor affected their estimates.

Even when the anchor value is obviously random or extreme, it can still contaminate estimates.  One experiment asked subjects to estimate the year of [Albert Einstein](http://en.wikipedia.org/wiki/Albert_Einstein)'s first visit to the United States. Anchors of 1215 and 1992 contaminated the answers just as much as more sensible anchor years.[[28]](http://en.wikipedia.org/wiki/Heuristics_in_judgment_and_decision_making#cite_note-yud_anch-29) Other experiments asked subjects if the average temperature in [San Francisco](http://en.wikipedia.org/wiki/San_Francisco) is more or less than 558 degrees, or whether there had been more or fewer than 100,025 top ten albums by [The Beatles](http://en.wikipedia.org/wiki/The_Beatles). These deliberately absurd anchors still affected estimates of the true numbers.

Anchoring results in a particularly strong bias when estimates are stated in the form of a [confidence interval](http://en.wikipedia.org/wiki/Confidence_interval). An example is where people predict the value of a stock market index on a particular day by defining an upper and lower bound so that they are 98% confident the true value will fall in that range. A reliable finding is that people anchor their upper and lower bounds too close to their best estimate. This leads to an [overconfidence effect](http://en.wikipedia.org/wiki/Overconfidence_effect). One much-replicated finding is that when people are 98% certain that a number is in a particular range, they are wrong about thirty to forty percent of the time.

Anchoring also causes particular difficulty when many numbers are combined into a composite judgment. Tversky and Kahneman demonstrated this by asking a group of people to rapidly estimate the product 8 x 7 x 6 x 5 x 4 x 3 x 2 x 1. Another group had to estimate the same product in reverse order; 1 x 2 x 3 x 4 x 5 x 6 x 7 x 8. Both groups underestimated the answer by a wide margin, but the latter group's average estimate was significantly smaller. The explanation in terms of anchoring is that people multiply the first few terms of each product and anchor on that figure. A less abstract task is to estimate the probability that an aircraft will crash, given that there are numerous possible faults each with a likelihood of one in a million. A common finding from studies of these tasks is that people anchor on the small component probabilities and so underestimate the total. A corresponding effect happens when people estimate the probability of multiple events happening in sequence, such as an [accumulator bet](http://en.wikipedia.org/wiki/Parlay_(gambling)) in horse racing. For this kind of judgment, anchoring on the individual probabilities results in an overestimate of the combined probability.

#### Applications

People's valuation of goods, and the quantities they buy, respond to anchoring effects. In one experiment, people wrote down the last two digits of their social security numbers. They were then asked to consider whether they would pay this number of dollars for items whose value they did not know, such as wine, chocolate, and computer equipment. They then entered an auction to bid for these items. Those with the highest two-digit numbers submitted bids that were many times higher than those with the lowest numbers. When a stack of soup cans in a supermarket was labelled, "Limit 12 per customer," the label influenced customers to buy more cans. In another experiment, real estate agents appraised the value of houses on the basis of a tour and extensive documentation. Different agents were shown different listing prices, and these affected their valuations. For one house, the appraised value ranged from [US$](http://en.wikipedia.org/wiki/United_States_dollar)114,204 to $128,754.

Anchoring and adjustment has also been shown to affect grades given to students. In one experiment, 48 teachers were given bundles of student essays, each of which had to be graded and returned. They were also given a fictional list of the students' previous grades. The mean of these grades affected the grades that teachers awarded for the essay.

One study showed that anchoring affected the sentences in a fictional rape trial. The subjects were trial judges with, on average, more than fifteen years of experience. They read documents including witness testimony, expert statements, the relevant penal code and the final pleas from the prosecution and defence. The two conditions of this experiment differed in just one respect: the prosecutor demanded a 34 month sentence in one condition and twelve months in the other. There was an eight month difference between the average sentences handed out in these two conditions. In a similar mock-trial study, the subjects took the role of jurors in a civil case. They were either asked to award damages "in the range from $15 million to $50 million" or "in the range from $50 million to $150 million." Although the facts of the case were the same each time, jurors given the higher range decided on an award that was about three times higher. This happened even though the subjects were explicitly warned not to treat the requests as evidence.

### Affect heuristic

"[Affect](http://en.wikipedia.org/wiki/Affect_(psychology))", in this context, is a [feeling](http://en.wikipedia.org/wiki/Emotion) such as fear, pleasure or surprise. It is shorter in duration than a [mood](http://en.wikipedia.org/wiki/Emotional_mood), occurring rapidly and involuntarily in response to a [stimulus](http://en.wikipedia.org/wiki/Stimulation). While reading the words "lung cancer" might generate an affect of [dread](http://en.wikipedia.org/wiki/Dread), the words "mother's love" can create an affect of [affection](http://en.wikipedia.org/wiki/Affection) and comfort. When people use affect ("gut responses") to judge benefits or risks, they are using the affect heuristic. The affect heuristic has been used to explain why messages [framed](http://en.wikipedia.org/wiki/Framing_(social_sciences)) to activate emotions are more persuasive than those framed in a purely factual way.

Rationality

A rational decision is one that is not just reasoned, but is also optimal for achieving a goal or solving a problem. Rabin (1998) discussed and compared the view of economist and psychologist and concluded that in short duration investors were irrational but in long duration the human nature became rational. Sevil, Sen and Yalama (2007) surveyed and analyzed the attitude of investors of Istanbul Stock Exchange. Through the questionnaire they examined the prospect theory, regret aversion, cognitive dissonance and heuristics. They found that investors were not totally rational.

Rational expectations is a hypothesis in [economics](http://en.wikipedia.org/wiki/Economics) which states that agents' predictions of the future value of economically relevant variables are not systematically wrong in that all errors are [random](http://en.wikipedia.org/wiki/White_noise). Equivalently, this is to say that agents' [expectations](http://en.wikipedia.org/wiki/Expectation_(epistemic)) equal true [statistical](http://en.wikipedia.org/wiki/Statistics) [expected values](http://en.wikipedia.org/wiki/Expected_value). An alternative formulation is that rational expectations are model-consistent expectations, in that the agents inside the model assume the model's predictions are valid. The rational expectations assumption is used in many contemporary [macroeconomic models](http://en.wikipedia.org/wiki/Macroeconomic_model), [game theory](http://en.wikipedia.org/wiki/Game_theory) and applications of [rational choice theory](http://en.wikipedia.org/wiki/Rational_choice_theory).

Since most macroeconomic models today study decisions over many periods, the expectations of workers, consumers and firms about future economic conditions are an essential part of the model. How to model these expectations has long been controversial, and it is well known that the macroeconomic predictions of the model may differ depending on the assumptions made about expectations (see [Cobweb model](http://en.wikipedia.org/wiki/Cobweb_model)). To assume rational expectations is to assume that [agents](http://en.wikipedia.org/wiki/Agent_(economics))' expectations may be individually wrong, but are correct *on average*. In other words, although the future is not fully predictable, agents' expectations are assumed not to be systematically [biased](http://en.wikipedia.org/wiki/Bias_(statistics)) and use all relevant information in forming expectations of economic variables.

This way of modeling expectations was originally proposed by [John F. Muth](http://en.wikipedia.org/wiki/John_Muth) (1961) and later became influential when it was used by [Robert Lucas, Jr.](http://en.wikipedia.org/wiki/Robert_Lucas,_Jr.) and others. Modeling expectations is crucial in all models which study how a large number of individuals, firms and organizations make choices under uncertainty. For example, negotiations between workers and firms will be influenced by the expected level of [inflation](http://en.wikipedia.org/wiki/Inflation), and the value of a share of stock is dependent on the expected future income from that stock. Rational expectations theory defines this kind of expectations as being identical to the best guess of the future (the optimal forecast) that uses all available information. Thus, it is assumed that outcomes that are being forecast do not differ systematically from the market [equilibrium](http://en.wikipedia.org/wiki/Economic_equilibrium) results. As a result, rational expectations do not differ systematically or predictably from equilibrium results. That is, it assumes that people do not make systematic errors when predicting the future, and deviations from perfect foresight are only random. In an economic model, this is typically modelled by assuming that the expected value of a variable is equal to the expected value predicted by the model.

Disposition Effect

The common behaviour of investors to hold looser stocks too long and sell the winner stock too early is called disposition effect (Grinblatt and Han, 2002). Investors may rationally, or irrationally, believe that their current losers in future will outperform their current winners. They may sell winners to rebalance their portfolios or they may refrain from selling losers due to the higher transactions costs of trading at lower prices. The disposition effect was studies by Odean (1998). He analysed 10,000 trading accounts and their trading pattern. He found that the investors demonstrate a disposition effect; it means hold losing investment too long and sells winning investment soon.

The disposition effect, introduced into the finance literature by Shefrin and Statman (1985), refers to the tendency of investors to ride losses and realize gains. This runs counter to sound tax planning. With the availability of accountlevel transaction data, the disposition effect has become a widely documented empirical regularity. Indeed, subsequent to the well-known paper by Odean (1998), several studies find that investors are reluctant to unload assets at a loss relative to the price at which they were purchased. The available evidence shows that although greater investor sophistication is associated with less susceptibility to the disposition effect, professional traders are far from immune to it. Locke and Mann (2000) analyze the trading behaviour of professional futures traders and find that while all traders hold losers longer than winners, the least successful traders hold losers the longest, while the most successful traders hold losers for the shortest time. Coval and Shumway (2000) report evidence of loss aversion among professional market makers at the Chicago Board of Trade, with the most compelling evidence concentrated in morning loser traders. Shapira and Venezia (2001) find evidence of the disposition effect among professional investors in Israel, while results in Wermers (2003) show that managers of underperforming funds appear reluctant to sell their losing stocks, which is consistent with their being disposition prone.

Conservatism

Conservative is simply means traditional. Conservatism as psychological attitude means human being has some excess attachment to the things which they have already with them. And something new offer to them then they are not ready to accept that new thing or slowly and gradually they are accept that new thing. Edward (1962) explains conservatism bias. It means “Investors are too slow (too conservative) in updating their beliefs in response to recent evidence. This means that they might initially under react to news about a firm, so that prices will fully reflect new information only gradually. Such a bias would give rise to momentum in stock market returns.”

Conservatism bias is a mental process in which people cling to their prior views or forecasts at the expense of acknowledging new information. For example, suppose a trader receives some bad news regarding a company’s earnings and that this news negatively contradicts another earnings estimate issued the previous month. Conservatism bias may cause the trader to under-react to the new information, maintaining impressions derived from the previous estimate rather than acting on the updated information. It is important to note that the conservatism bias may appear to conflict with representativeness bias, but the latter refers to over-reacting to new information, while conservatism bias refers to under-reacting to new information. The problem arises when traders cling to a particular view, behaving inflexibly when presented with new information which could signal a change in trend or underlying price action. Even when conservatism-biased traders do react, they do so more slowly, and will have increased difficulty in dealing with this new information. The key here once again is adaptability and objectivity,  and when the wisest course of action becomes clear, it should be implemented resolutely and without hesitation. A good trader is continually assessing and re-assessing the situation, and not getting tied down to a particular viewpoint.

Regret theory

According to Investopedia “simply regret theory deals with the emotional reaction people experience after realizing they've made an error in judgment. Faced with the prospect of selling a stock, investors become emotionally affected by the price at which they purchased the stock. So, they avoid selling it as a way to avoid the regret of having made a bad investment, as well as the embarrassment of reporting a loss.”

Traditionally, it is believed the net effect of the gains and losses involved with each choice are combined to present an overall evaluation of whether a choice is desirable. Academics tend to use "utility" to describe enjoyment and contend that we prefer instances that maximize our utility.   
However, research has found that we don't actually process information in such a rational way. In 1979, Kahneman and Tversky presented an idea called [prospect theory](http://www.investopedia.com/terms/p/prospecttheory.asp), which contends that people value gains and losses differently, and, as such, will base decisions on perceived gains rather than perceived losses. Thus, if a person were given two equal choices, one expressed in terms of possible gains and the other in possible losses, people would choose the former - even when they achieve the same economic end result.  
According to prospect theory, losses have more emotional impact than an equivalent amount of gains. For example, in a traditional way of thinking, the amount of utility gained from receiving $50 should be equal to a situation in which you gained $100 and then lost $50. In both situations, the end result is a net gain of $50.    
However, despite the fact that you still end up with a $50 gain in either case, most people view a single gain of $50 more favorably than gaining $100 and then losing $50.

The prospect theory can be used to explain quite a few illogical financial behaviours. For example, there are people who do not wish to put their money in the bank to earn interest or who refuse to work overtime because they don't want to pay more taxes. Although these people would benefit financially from the additional after-tax income, prospect theory suggests that the benefit (or utility gained) from the extra money is not enough to overcome the feelings of loss incurred by paying taxes.    
Prospect theory also explains the occurrence of the disposition effect, which is the tendency for investors to hold on to losing stocks for too long and sell winning stocks too soon. The most logical course of action would be to hold on to winning stocks in order to further gains and to sell losing stocks in order to prevent escalating losses.    
When it comes to selling winning stocks prematurely, consider Kahneman and Tversky's study in which people were willing to settle for a lower guaranteed gain of $500 compared to choosing a riskier option that either yields a gain of $1,000 or $0. This explains why investors realize the gains of winning stocks too soon: in each situation, both the subjects in the study and investors seek to cash in on the amount of gains that have already been guaranteed. This represents typical risk-averse behaviour.   
The flip side of the coin is investors that hold on to losing stocks for too long. Like the study's subjects, investors are willing to assume a higher level of risk in order to avoid the negative utility of a prospective loss. Unfortunately, many of the losing stocks never recover, and the losses incurred continued to mount, with often disastrous results.



Overconfidence

Overconfidence defines as “an overestimation of the probabilities for a set of events by Mahajan, J. (1992). Operationally, it is reflected by comparing whether the specific probability assigned is greater than the portion that is correct for all assessments assigned that given probability.” J. Michailova (2010) tests the overconfidence bias among the gender with the help of questionnaire of 50 questions. She concludes that there is no significant difference among expressed overconfidence by both the genders and they did not appear to be associated with overconfidence.

Overconfidence causes people to be correct in their judgments far less often than they think they are. The more often investors’ predictions come true, the more overconfident they become. Overconfidence often enforces overoptimism and an illusion of control in investors’ minds. Overoptimistic investors underrate their ability to deal with event they cannot control, as exemplified by the case of Nick Leeson, the former derivatives

broker without formal investor training whose unsupervised and unauthorized speculative trading on the Singapore International Monetary Exchange (SIMEX) caused Barings Bank *−* the United Kingdom’s oldest investment bank *−* to collapse so spectacularly . As Belsky and Gilovich point out, overoptimistic investors tend not to learn from their failures.

“In this most basic form, Overconfidence can be summarized as unwarranted faith in one’s intuitive reasoning, judgments, and cognitive abilities” (Pompian, 2006). Psychologists have determined that Overconfidence causes people to overestimate their knowledge, underestimate risks, and exaggerate their ability to control events. The concept of Overconfidence derives from a large body of cognitive psychological experiments and surveys in which subjects overestimate both their own predictive abilities and the precision of the information they have been given. People are poorly calibrated in estimating probabilities—events they think are certain to happen are often far less than 100 percent certain to occur. In short, people think they are smarter and have better information than they actually do (Pompian, 2006).

According to Shefrin (2000), Overconfidence “pertains to how well people understand their own abilities and the limits of their knowledge” Individuals who are overconfident about their abilities tends to think they are better than they actually are. The same applies to knowledge. Individuals who are overconfident about their level of knowledge tend to think they know more than they actually do. Overconfidence does not necessarily mean that individuals are ignorant or incompetent. Rather, it means that their view of themselves is better than is actually the case. A common trait among investors is a general overconfidence of their own ability when it comes to picking stocks, and to decide when to enter or exit a position. These tendencies were researched by Odean (1998) and it was found that traders that conducted the most trades tended, on average, to receive significantly lower yields than the market. Furthermore, psychologists have determined that overconfidence causes people to overestimate their knowledge, underestimate risks, and exaggerate their ability to control events. Specific security selection is a highly difficult undertaking. Interestingly this type of activity is precisely the task at which people exhibit the greatest overconfidence (Nofsinger, 2001).

Barber and Odean (2001) partitioned investors based on gender and, based on the previous psychological research fact that men are more overconfident than women, tested the theory that overconfident investors trade excessively. They document that men trade 45% more than women, and find that men’s net returns were cut by 2.5% a year while it was 1.72% for women, in data gathered from 1991 through 1997. 17

Fagerström (2008) conducted a study to investigate overconfidence and over optimism in the market and factors that affect human beings in decision making when it comes to investing and analyzing. The scientific method of the research is a quantitative back-testing exercise method based on historic data taken from IBES, Institutional Brokers’ Estimate System. The data taken is a summary of consensus expected growth of profits for the companies at S&P500 for the upcoming 12 months, compared with the realized outcome for the period February 1986 to April 2008. The results showed that analysts of the S&P 500 were exaggerated by the problems of over confidence and the over optimistic biases. It also confirms theory of Anchoring and Herding.

Financial Cognitive Dissonance

As individuals, we attempt to reduce our inner conflict (decrease our dissonance) in one of two ways: 1) we change our past values, feelings, or opinions, or, 2 we attempt to justify or rationalize our choice. This theory may apply to investors or traders in the stock market who attempt to rationalize contradictory behaviours, so that they seem to follow naturally from personal values or viewpoints. Goetzmann and Peles (1993) explain the cognitive dissonance. According to them, an individual try to reduce his/her inner conflict by changing their past values, feelings or opinion or he/she attempt to justify his/her choices.

**Behavioural finance** focuses on the psychological aspects of investing. Specifically, it studies how our emotions affect financial decision making. As investors we take decisions based on data analysis and judgement of risk. However, the natural qualities of the brain also influence us. Subconsciously we apply rational and emotional reasons to justify our actions. Such reasoning is often based on subjective perceptions, not on objective observations, leading intelligent and well informed individuals to the wrong decisions.

In **behavioural finance** this phenomenon is referred to as cognitive dissonance. It occurs when we have two conflicting beliefs in our minds. For example, we’ll buy a stock and upon receiving new information that contradicts our original view, we manipulate or ignore the new knowledge to diminish the conflicting views in our mind.

The new information contradicts what we already know or believe and as a consequence we feel a discomfort (dissonance). The concept is similar to a situation with confirmation bias, we tend to seek out information that confirm our original position. We invent, modify or rationalize our thoughts to eliminate the dissonance…

We’re always going to make mistakes when predicting the future, however, we can minimize damage by paying close attention to the phenomenon of cognitive dissonance. Of course, as investors aware of **behavioural finance** principles, we re-evaluate positions and views and are open to changing them as new data come to light.

A reliable and effective way of implementing **behavioural finance** in your investment strategy is presented by the [SentiTrade](http://www.sentitrade.de/) market sentiment indicator. It reveals the movement of German market psychology and allows you to optimize trading in DAX traded index funds, futures, certificates and options.

A cognitive [bias](http://en.wikipedia.org/wiki/Bias) is a pattern of deviation in judgment. Whereby, inferences of other people and situations may be drawn in an illogical fashion. Individuals create their own “subjective social reality” from their perception of the input. An individual’s construction of social reality, not the objective input, may dictate one’s behaviour in the social world . Thus, cognitive biases may sometimes lead to perceptual distortion, inaccurate judgment, illogical interpretation, or what is broadly called [irrationality](http://en.wikipedia.org/wiki/Irrationality).

Some cognitive biases are presumably adaptive. Cognitive biases may lead to more effective actions in a given context (e.g. Gigerenzer & Goldstein, 1996). Furthermore, cognitive biases enable faster decisions when timeliness is more valuable than accuracy, as illustrated in [heuristics](http://en.wikipedia.org/wiki/Heuristics_in_judgment_and_decision_making) . Other cognitive biases are a “bi-product” of human processing limitations, resulting from a lack of appropriate mental mechanisms ([bounded rationality](http://en.wikipedia.org/wiki/Bounded_rationality)), or simply from a limited capacity for information processing .

A [continually evolving list](http://en.wikipedia.org/wiki/List_of_biases_in_judgement_and_decision_making) of cognitive biases has been identified over the last six decades of research on human judgment and decision-making in [cognitive science](http://en.wikipedia.org/wiki/Cognitive_science), [social psychology](http://en.wikipedia.org/wiki/Social_psychology), and [behavioural economics](http://en.wikipedia.org/wiki/Behavioral_economics). Cognitive biases are important to study because “systematic errors” highlight the “psychological processes that underlie perception and judgement” (Tversky & Kahneman,1999, p.582). Moreover, Kahneman and Tversky (1996) argue cognitive biases have efficient practical implications for areas including clinical judgment .

Bias arises from various processes that are sometimes difficult to distinguish. These include information-processing shortcuts ([heuristics](http://en.wikipedia.org/wiki/Heuristics_in_judgment_and_decision_making)), mental noise and the mind's limited information processing capacity, emotional and moral motivations, or social influence.

The notion of cognitive biases was introduced by [Amos Tversky](http://en.wikipedia.org/wiki/Amos_Tversky) and [Daniel Kahneman](http://en.wikipedia.org/wiki/Daniel_Kahneman) in 1972 and grew out of their experience of people's [innumeracy](http://en.wikipedia.org/wiki/Numeracy#Innumeracy), or inability to reason intuitively with the greater [orders of magnitude](http://en.wikipedia.org/wiki/Orders_of_magnitude). Tversky, Kahneman and colleagues demonstrated several [replicable](http://en.wikipedia.org/wiki/Reproducibility) ways in which human judgments and decisions differ from [rational choice theory](http://en.wikipedia.org/wiki/Rational_choice_theory). Tversky and Kahneman explained human differences in judgement and decision making in terms of heuristics. Heuristics involve mental shortcuts which provide swift estimates about the possibility of uncertain occurrences (Baumeister & Bushman, 2010, p.141). Heuristics are simple for the brain to compute but sometimes introduce “severe and systematic errors” (Tversky & Kahneman, 1974, p.1125).

For example, the representativeness heuristic is defined as the tendency to “judge the frequency or likelihood” of an occurrence by the extent of which the event “resembles the typical case” (Baumeister & Bushman, 2010, p.141). The “Linda Problem” illustrates the representativeness heuristic (Tversky & Kahneman, 1983). Participants were given a description of the target person Linda which implies Linda could be a feminist, as she is interested in discrimination and social justice issues (see Tversky & Kahneman, 1983). Participants are asked whether they think Linda is a “a) bank teller” or a “b) bank teller and active in the feminist movement”. Participants often select option “b)”. Tversky and Kahneman (1983) termed participants choice as a “conjunction fallacy”; whereby participants chose option b) because the description relates to feminism. Moreover, the representativeness heuristic may lead to errors such as activating stereotypes and inaccurate judgements of others (Haselton et al., 2005, p.726).

Alternatively, critics of Kahneman and Tversky such as [Gerd Gigerenzer](http://en.wikipedia.org/wiki/Gerd_Gigerenzer) argue that heuristics should not lead us to conceive of human thinking as riddled with irrational cognitive biases, but rather to conceive rationality as an adaptive tool that is not identical to the rules of [formal logic](http://en.wikipedia.org/wiki/Formal_logic) or the [probability calculus](http://en.wikipedia.org/wiki/Probability_calculus).. Nevertheless, experiments such as the “Linda problem” grew into the heuristics and biases research program which spread beyond academic psychology into other disciplines including medicine and political science.

The Zurich Axioms by Max Gunther 1985

What the Axioms Are and How They Came to Be. Consider the puzzle of Switzerland. This ancestral home of mine is a rocky little place about half the size of Maine. It has not one inch of seacoast. It is one of the most mineral-poor lands on earth. It possesses not a drop of oil to call its own, barely a bucket of coal. As for farming, its climate and topography are inhospitable to just

about everything.

It has stayed out of European wars for 300 years, chiefly because, in all that time, there has never been an invader who really wanted it. Yet the Swiss are among the most affluent people in the world. In per capita income they rank with the Americans, West Germans, and Japanese. Their currency is among the world's soundest.

How do the Swiss do it?

They do it by being the world's cleverest investors, speculators, and gamblers. Many people, probably most, want to win without betting. This is an entirely understandable wish. There is nothing reprehensible about it. Indeed, many of our hoariest old Work Ethic teachings urge it upon us. We are told that risk-taking is foolish. A prudent man or woman places no bets beyond those that are required by the unalterable basic terms of human existence. The well-lived life is a nose-tothegrindstone

life, perhaps somewhat dull but safe. A bird in the hand is worth two in the bush

Well, everybody understands the trade-offs. If you have a philosophical bias against betting, you will find little that is useful to you in this book -- unless, of course, it changes your mind. But if you do not mind taking reasonable risks -- or better, if you enjoy risk, as the Swiss do -- then this book is for you. are all about risk and its management. If you study the Axioms with the diligence they deserve, they can enable you to win more of your bets than you ever thought possible.

The Axioms apply, in short, to any situation in which you put money at risk in order to

get more money.

All of life is a gamble, as every adult knows. Many people, probably most, are unhappy

with this fact and spend their lives figuring out how to place as few bets as possible. Others, however, take the opposite route, and among these are the Swiss. Not all Swiss men and women display this trait, of course, but a large number do enough, certainly, to allow for generalizations about the Swiss national character.

The Swiss did not become the world's bankers by sitting in dark rooms chewing their fingernails. They did it by facing risk head-on and figuring out how to manage it. The Swiss, amid their mountains, look around at the world and find it full of risk. They know it is possible to cut one's personal risks to a minimum -- but they also know that if you do that, you abandon all hope of becoming anything but a face in the crowd.

To make any kind of gain in life -- a gain of wealth, personal stature, whatever you define as "gain" -- you must place some of your material and/or emotional capital at risk. That is the law of the universe. Except by blind chance, it cannot be circumvented. No creature on earth is excused from obedience to this pitiless law.

To become a butterfly, a caterpillar must grow fat; and to grow fat, it must venture out where birds are. There are no appeals. It is the law.

The Swiss, observing all this, conclude that the sensible way to conduct one's life is not to shun risk but to expose oneself to it deliberately. To join the game; to bet. But not in the caterpillar's mindless way. To bet, instead, with care and thought. To bet in such a way that large gains are more likely than large losses. To bet and win. Can this be done? Indeed. There is a formula for doing it. Or perhaps "formula" is the wrong word, since it suggests mechanical actions and a lack of choice. A better word might be "philosophy." This formula or philosophy consists of twelve profound and mysterious rules of risk-taking called "The Zurich Axioms".

Be warned: The Axioms are somewhat startling when you first encounter them.They are not the kind of investment advice most counselors hand out. Indeed, they contradict some of the most cherished clichés of the investment-advice business.

The most successful Swiss speculators pay scant attention to conventional investment advice. They have a better way.

The term "Zurich Axioms" was coined by a club of Swiss stock and commodity plungers who collected around Wall Street after the Second World War.

The list of rules evolved gradually. It grew shorter, sharper, tidier, and more useful

as time went on. Nobody remembers who coined the term "Zurich Axioms," but that

is the name by which the rules came to be known and are still known.

The Axioms have not changed very much in the last several years. They have stopped

evolving. As far as anybody knows, they are now in their final form: twelve Major

Axioms and sixteen Minor Axioms.

Their value seems to me incalculable.Sure sign of fundamental verity. They are rich in secondary and tertiary layers of meaning, some coldly pragmatic, some verging on the mystical. They are not just a philosophy of speculation; they are guideposts for successful living.

They have made a lot of people rich.

Major Axiom 1- On Risk

Worry is not a sickness but a sign of health. If you are not worried, you are not risking enough.

Minor Axiom 1-

Always play for meaningful stakes.

Minor Axiom 2-

Resist the allure of diversification.

Major Axiom 2- On Greed

Always take your profit too soon.

Minor Axiom 3

Decide in advance what gain you want from a venture, and when you get it, get out.

Major Axiom 3- On Hope

When the ship starts to sink, don't pray. Jump.

Minor Axiom 4-

Accept small losses cheerfully as a fact of life. Expect to experience several while

awaiting a large gain.

Major Axiom 4- On Forecast

Human behavior cannot be predicted. Distrust anyone who claims to know the future,

however dimly.

Major Axiom 5- On Patterns

Chaos is not dangerous until it begins to look orderly.

Minor Axiom 5-

Beware the Historian's Trap.

Minor Axiom 6-

Beware the Chartist's Illusion.

Minor Axiom 7-

Beware the Correlation and Causality Delusions.

Minor Axiom 8-

Beware the Gambler's Fallacy.

Major Axiom 6-

Avoid putting down roots. They impede motion.

Minor Axiom 9-

Do not become trapped in a souring venture because of sentiments like loyalty and nostalgia.

Minor Axiom 10-

Never hesitate to abandon a venture if something more attractive comes into view.

Major Axiom 7-

A hunch can be trusted if it can be explained.

Minor Axiom 11-

Never confuse a hunch with a hope.

Major Axiom 8- On Religion and Occult

It is unlikely that God's plan for the universe includes making you rich.

Minor Axiom 12-

If astrology worked, all astrologers would be rich.

Minor Axiom 13-

A superstition need not be exorcised. It can be enjoyed, provided it is kept in its place.

Major Axiom 9-

Optimism means expecting the best, but confidence means knowing how to handle the worst. Never make a move if you are merely optimistic.

Major Axiom 10-

Disregard the majority opinion as it is probably wrong.

Minor Axiom14-

Never follow speculative fads. Often, the best time to buy something is when nobody

else wants it.

Major Axiom 11- On Stubborness

If it doesn't pay off the first time, forget it.

Minor Axiom 15-

Never try to save a bad investment by "averaging down."

Major Axiom 12- On Planning

Long-range plans engender the dangerous belief that the future is under control. It is important never to take your own or other people's long-range plans seriously.

Minor Axiom 16-

Shun long-term investments.

# Literature Review

Dr. P G K Murthy & Divyang Joshi(2012) , Concluded financial world has been changed greatly since last 20 years. Individual investors have started to participate actively in the investment activities. It has become very crucial to understand the investors’ behaviour for their investment decision. This study examines the investors’ behaviour with the help of different behavioural finance theories viz. overconfidence, disposition effect, conservatism, cognitive dissonance, rationality and regret theory. A sample survey of 130 investors from the Anand, Petlad and Khambhat (Cities of Gujarat, Anand District) was conducted during February to April 2012 with the help of structured questionnaire. The study found that investors are irrational with different investment options, investors were found overconfident. The findings also support the disposition effect theory and regret theory.

The paper tends to examine the Indian investors’ behaviour. Six main cognitive biases namely Rationality, over confidence, Disposition Effect, Conservatism, Cognitive Dissonance and Regret Theory were used to check the investors’ behaviour. The best manner to explore the investors’ behaviour is to interact directly with the investors and try to extract their opinion. So, the questionnaire survey technique was adopted and questions based on these psychological biases were asked. The responses collected through the questionnaire were analyzed and hypothesized. The findings support the rationality, disposition effect and theory of regret concepts of behavioural concept. But findings do not support the overconfident, conservatism and cognitive dissonance concepts.

Siby Joseph K & Abeymon Francis (2008), Identified the determinants of investment behaviour and their relative importance in shaping the behaviour of individual investors. Market participants have relied for a long time on the notion of efficient markets and rational investment behaviour when making financial decisions. However, the idea of fully rational investors always maximizing their utility and demonstrating perfect self-control is not realistic and the market inefficiency in the form of anomalies and irrational investor behaviour have been observed more frequently during the past decades. The results obtained from the study suggest that the behaviour of individual investors is irrational to a greater extent. Study revealed that individual investors have high level of involvement and overconfidence while they are not much optimistic about the future outlook of market and moreover they have an aversion to risk.

The research makes a pertinent revelation that the level of investment knowledge significantly leverages the returns on the investments. From the calculated correlation analysis data it can be observed that 0.096 point change in knowledge boosts investors return expectation by 1 point. Investors having extensive investment knowledge has the return expectation of multifold when compared to other knowledge categories and the correlation analysis between the occupation of investor and the level of risk assume shows that there is a negative correlation between these two variables, analysis shows that a 1 point change in occupation will lead to negative change of 0.053 in the level of risk taken by the investors.

Jusso Letho(2010), found evidence of disposition effect and market timing attempts by the investors. The results indicate that investors actively increased the weight of equities in their portfolios during the period. Some of the investors appeared to have increased the share of risky assets considerably more than others. The main characteristics of those investors included risk-averse risk profile and high trading activity. His main finding of this study is that investors seem to clearly ignore the length of the investment horizon in their allocation decisions. Investors overweight equities in short horizons and underweight them in long horizons. The finding supports previous research on the myopic behaviour of investors. Previous research finds that investors make investment decisions on much shorter intervals than their investment horizon would suggest.

Dr. Arifur Rehman Shaikh, Dr. Anil B. Kalkundarikar in 2011 found that since the economic liberalization there is an increase in number of investment avenues available for retail investors, depending upon their risk appetite they can chose between bank deposits, government / private bonds, shares and stocks, exchange traded funds (ETF), mutual funds, insurance, derivatives, gold, silver, currencies, real estate, etc. Most of the retail investors’ primary objective of investment is to earn regular income and expected rate of return differs from individual to individual based on their level of market knowledge and risk taking ability. The present paper assesses the behaviour of retail investors in Belgaum district of Karnataka state and it reveals that knowledge level significantly leverages the returns on the investments and there is a negative correlation between the occupation of retail investor and the level of risk. This has been identified on the basis of cross analysis by applying Correlation analysis.

Society for Capital Market Research & Development(2004) studied a massive amount of primary data specially collected for the purpose of creating a deeper understanding of the household investors’ problems, needs and changing investment preferences, specially with regard to capital market instruments.

The major strands of our analysis may now be brought together in order to derive a broad picture about the emerging situation and its implications for policymaking and regulation.

Special attention has been given to bring out the concerns of investors by using a variety of questions. The three most\ important and persistent worries of household investors have been identified as (a) too much volatility of stock market prices, (b) too much price manipulation and (c) deficient corporate governance.

Dr.Hayat M.Awan & Shanza Arshad(2012), explores the factors that investors value while making investment decisions regarding mutual funds and type of behaviour they exhibit. Findings-Investment in mutual funds is somewhat not very much risky as investment in stock market. Mutual fund schemes are designed for smaller investors. Major findings are that investor age group and cities have different impact on fund selection schemes but income, education level and occupation has no effect. Attributes like past performance of fund, reputation of company, withdrawal facility, Company services towards investor have greater impact on decision making. Investors are overconfident in term that they have selected best scheme. Investors are risk averse, exhibit representativeness, status quo bias, and are conservative. Investors consider that losses in investment are due to incorrect recommendations of family and friends and gains are due to better result of investing companies. Image conscious investors are more inclined towards sponsor related services than professional investors.

Mika Pirneskoski(2002), examined the behaviour of Finnish private investors in the Helsinki Stock Exchange. Our aim is to classify investors with homogenous behavioural patterns into clusters in order to gain a better overview of the Finnish private investor structure using a unique data set available from Finnish Central Securities Depository. In addition, we try to establish a linkage between behavioural patterns and demographic characteristics of the investors using existing financial explanations. We find that the Finnish private investors form a homogeneous investor mass, but seem not to exhibit rational market behaviour. Moreover, most investors are very passive and hold small and poorly diversified portfolios.

T. C. THOMAS & G. RAJENDRAN (2010),undertook a study to understand the relationship between model developed by Thomas Bailard, David Biehl and Ronald Kaiser (BB&K) five-way model and investment choices of individual investors. Findings of the study show that all five dimensions of the BB&K model are significantly related to preferences of investments made by various investors. Investment choices as per the BB&K five ways model is derived using Delphi technique. All the five BB&K personalities namely Adventurer, Celebrity, Individualist, Guardian and straight Arrow has shown their respective behaviour as per BB&K model in investment decisions.

D.Kandavel(2011), studied that mutual funds have emerged as an important segment of financial marketsand so far have delivered value to the investors. It has grown by leaps and bounds in lastcouple of years. But no industry can flourish without a proper regulatory mechanism in the place. These initiatives would help towards making the Indian mutual fund industry more vibrant and competitive. Since, the need of study has been aroused in order to seethe factors influencing the retail investors to prefer investment regarding the mutual funds in Puducherry. The study is based on the formulation of the following null hypotheses: There is no significant relationship among the acceptance level of the retail investors belonging to different demographic profile towards factors influencing to invest in mutual funds. In order to study the factors influencing the retail investors to prefer investment in mutual funds in Puducherry, chi square test, analysis of one-way variance, student t-test, analysis of co-efficient of variation, multiple regression analysis, and percentage analysis have been employed. Chi square test was employed to measure the association between the demographic profile of the respondents and their satisfaction with investment in mutual funds and type of fund preferred. The present study looks at the small investors purchase behaviour does not have a high level of coherence due to the influence of different purchase factors. If the study provokes the authority concerned to take some positive measures for expanding the scope of mutual funds investment

S. Umamaheswari & Dr. M. Ashok Kumar(2013), wrote that investment is part of your overall financial planning. If you have some savings, you may want to invest them to maximize your return. Smart investments are not a matter of luck, but a result of careful planning. Investor attitude analysis is a study made on the demographics and psychographics of the investor considering the parameters like age, gender and income groups and also some psychological parameters that will attract the investor towards that particular investment. This analysis describes why an investor will opt a particular investment and the motive behind the investment and other objectives of investment. Demographic and psychographic factors Demographic: Statistical socio-economic characteristics or variables of a population, such as age, sex, education level, income level, marital status, occupation, religion, birth rate, death rate, average size of a family, average age at marriage. A census is a collection of the demographic factors associated with every member of a population. Psychographic: This includes Activity, Interest, and Opinion (AIO) Attitudes Values of an investor when he looks at a particular investing option.

Ryota Inaishi, Kaoru Toya, Fei Zhai, and Eisuke Kita in July 15, 2010 wrote a paper on Behavioural finance theory has been presented to explain the phenomena not explainable by conventional finance theory based on efficient market hypothesis from the investor psychology. They focused on overconfidence – an important psychological bias –, and analysed the effect of overconfident investor behaviour in stock market using multiagent simulation. We found that, based on the increase in overconfident market investors, market dealing increases and rising trends occur more often. An analysis of the relationship between overconfidence and rising trends shows that rising trends make investors even more overconfident.

David Dreman, Stephen Johnson, Donald MacGregor and Paul Slovic in March 2001 wrote a report investors sentiments Steep declines in the value of publicly traded stocks in the first quarter of 2001 left many market observers speculating whether investor sentiment had undergone a significant and negative change, and whether investors would subsequently flee stocks in favor of less volatile investment options. A survey study of investor expectations and confidence was conducted in late March 2001 to capture investor sentiment and compare it with similar measures taken in surveys conducted in 1998 during a period of rapid market incline. The surprising results are that there are only minor differences in investor sentiment in terms of: (a) confidence in the long and intermediate performance of the stock markets; (b) composition of stocks versus bonds in their portfolios; (c) the intention to buy on the dips; (d) the amount of risk investors plan to undertake. The high level of investor confidence observed in 2001 (in spite of a severe drop in market value) is potentially accounted for by psychological processes that influence investor judgment. These processes include reliance on image-driven affective evaluations of common stocks that contribute to excessive optimism.

Robert R. Prechter, Jr in 2001 wrote a paper on Unconscious Herding Behaviour as the Psychological Basis of Financial Market Trends and PatternsHuman herding behaviour results from impulsive mental activity in individuals responding to signals from the behaviour of others. Impulsive thought originates in the basal ganglia and limbic system. In emotionally charged situations, the limbic system’s impulses are typically faster than rational reflection performed by the neocortex. Experiments with a small number of naïve individuals as well as statistics reflecting the behaviour of large groups of financial professionals provide evidence of herding behaviour. Herding behaviour, while appropriate in some primitive life-threatening situations, is inappropriate and counterproductive to success in financial situations. Unconscious impulses that evolved in order to attain positive values and avoid negative values spur herding behaviour, making rational independence extremely difficult to exercise in group settings. A negative feedback loop develops because stress increases impulsive mental activity, and impulsive mental activity in financial situations, by inducing failure, increases stress. The interaction of many minds in a collective setting produces super-organic behaviour that is patterned according to the survival-related functions of the primitive portions of the brain. As long as the human mind comprises the triune construction and its functions, patterns of herding behaviour will remain immutable.

James E. Hunton, Ruth Ann McEwen and Sudip Bhattacharjee in 2001 wrote a report on Toward an Understanding of the Risky Choice Behaviour of Professional Financial Analysts. Several studies have reported inefficiencies and/or biases in analysts’ability to incorporate new information into their earnings forecasts. We propose that an important psychological factor associated with optimistic earnings forecasts is the propensity of analysts to engage in risky choice behaviour as described by prospect theory. Furthermore, the motivational incentives faced by analysts may exacerbate risky choice behaviour during forecast revision, thereby magnifying overestimates of earnings. Sixty professional financial analysts were asked to issue a first quarter and then an annual EPS forecast of a company. The analysts were randomly assigned to two initial forecast accuracy conditions that indicated their initial forecast earnings was 1) essentially the same as actual earnings, or 2) substantially higher than actual earnings. Analysts were also assigned to one of three motivational incentive conditions indicating the analyst and brokerage firm would 1) have no future contact with the forecast firm, 2) begin to follow the forecast firm, or 3) establish an underwriting relationship with the forecast firm. The results indicate that analysts who perceived a loss function due to the inaccuracy of prior earnings forecasts tended to choose riskier prospects in subsequent forecast revisions than analysts who perceived their prior earnings forecasts to be accurate. These riskier prospects translate into greater overestimates of earnings. Furthermore, while the average risk attitude of the analysts was optimistic, higher levels of motivational incentives were associated with greater risk-seeking behaviour by the analysts who perceive a loss function. It appears that the motivational incentives inherent in brokerage firms can exacerbate the risky choice behaviour of financial analysts during forecast revision These findings support the utility of incorporating both cognitive and motivational factors into the prediction of analyst behaviour.

Hoffmann, Shefrin and Pennings (2010) analyze how systematic differences in investors’ investment objectives and strategies affect the portfolios they select and the returns they earn. The analyses in this study draw on transaction records of a sample of clients (65,325 individualaccounts with over nine million trades from January 2000 until March 2006), from the largest online broker in The Netherlands. The data were obtained through an online questionnaire. The results might be useful for policy makers. It is found that investors who rely on fundamental analysis have higher aspirations and turnover, take more risks, are more overconfident, and outperform investors who rely on technical analysis. Our findings provide support for the behavioural approach to portfolio theory and shed new light on the traditional approach to portfolio theory.

Chandra (2008) explored the impact of behavioural factors and investor’s psychology on their decision-making, and to examine the relationship between investor’s attitude towards risk and behavioural decision-making. The research was based on the secondary data. Through this research, the author finds that unlike the classical finance theory suggests, individual investors do not always make rational investment decisions. The investment decision-making is influenced, largely, by behavioural factors like greed and fear, Cognitive Dissonance, heuristics, Mental Accounting, and Anchoring. These behavioural factors must be taken into account as risk factors while making investment decisions.

Chira, Adams and Thornton (2008) aimed at studying the cognitive biases and heuristics, which, the business students are subjected to. The main purpose of the study was to look at how influenced the students are, by biases, heuristics, and framing effects. The behavioural survey was administered to a sample of sixty-eight students at Jacksonville University in USA during November 2007 by administering a questionnaire and collecting empirical evidence about both undergraduate and graduate business students’ own perceptions of bias. The findings concluded that students are less disposed to make the mistake of being overly confident and optimistic when there is more objectivity involved in making the assessment. Students did not display illusion of control tendencies and a tendency to be subject to the familiarity heuristic.

Sairafi, Selleby and Stahl (2008) in their study ‘Behavioural Finance- a Student Perspective’ examined the characteristics of investment interested business students and their decision-making process and choices from the perspective of behavioural finance. The research holds an abductive approach and is based on qualitative data. Data collection was done through an Internet-based questionnaire. In the study, herd behaviour was found to be the most evidentbehavioural factor. This paper found that the behaviour of respondents in the chosen population was best described as “student behaviour”; a somehow irrational behaviour explained by the learning process in which business students exist.

Cipriani and Guarino (2008) studied herd behaviour in a laboratory financial market with financial market professionals. The study combines the advantage of the controlled experiment with that of observing the behaviour of professionals, who are engaged in the day-by-day activity of trading, pricing and analyzing financial assets. This study compares two treatments, one in which the price adjusts to the order flow so that Herding should never occur, and one in which event uncertainty makes Herding possible. In the first treatment, subjects herd seldom, in accordance with both the theory and previous experimental evidence on student subjects. In the second treatment, the proportion of Herding decisions increases, but not as much as theory suggests; moreover, contrarianism disappears altogether.

Waweru, Munyoki and Uliana (2008) surveyed the institutional investors at the Nairobi Stock Exchange. The work investigated the role of behavioural finance and investor psychology in investment decision making. The study established that behavioural factors such as Representativeness, Overconfidence, Anchoring, and Gamblers’ Fallacy, Availability, Loss Aversion, Mental Accounting and Regret Aversion affected the decisions of institutional investors operating at the Nairobi Stock Exchange.

Maheran, Muhammed and Ismail (2008) intended to investigate the relationship between investment decision making of an investor and their rationality in investing in the Malaysian capital market. The findings of the study indicate that the economic condition and frame of references influence investor decision-making behaviour. The study concluded that Malaysian investors are partially rational in their decision-making.

Cianci (2008) in her study conducted an experiment with 78 graduates as substitutes for real investors and results suggested that investors made higher relevance ratings and lower investment attractiveness ratings while provided with simultaneous negative information in comparison with sequential negative information(consistent with phenomena of multiple loss aversion and loss buffering). Investors’ relevance and attractiveness ratings were higher when positive information was provided sequentially (consistent with gain savoring). The study categorized investors as current and prospective. It was examined how they evaluate positive and negative information presented sequentially or simultaneously aimed to determine whether these results can be generalized to apply to investment related information and whether investor status affects this evaluation.

Grou and Tobak (2008) studied the behavioural patterns exhibited by investors in risk situations, which offered multiple choices. Two behavioural effects known as illusion of control and ambiguity aversion were studied. Through a total of eight experiments in which there were 196 student participants, conducted at the Catholic University of Brazil was shown that investors tend to exhibit these phenomena while making financial risk decisions. Decisions made by students showed that they had the illusion of control- where they thought they have better control over random events than they actually had, if there was any. However, they were not willing to pay a slight price to take advantage of this control they felt they had. To test ambiguity aversion, students were made to choose between known and unknown distributions in four experiments under various settings. Results showed that invested proportions were significantly higher in known distributions. Even though students exhibited ambiguity aversion, not many were willing to pay a price to reduce or eliminate the ambiguity

Oehler et al(2008) in their study analyze the composition of 102 funds whose assets exceed EUR100 Million in each year, actively managed by five biggest German mutual fund companies by hand collecting data from annual reports in the period 2000-2003 and come up with convincing empirical evidence of home biased portfolio selection in this duration. Three possible reasons for this behaviour are listed: lower transaction costs, better hedging possibilities and advantageous information asymmetries. They find that mutual funds that are sold to private investors show high home-biased composition, but these funds invest heavily in equities from other European countries (“they term it as Europe bias”), larger funds showed more home bias than smaller and medium sized funds; and portfolio comprised by funds with global investment strategies rarely exhibits home bias, while portfolios with geographically focuses strategies deviate from optimal portfolio composition. They try to find if the local bias is driven by private investors or fund managers and results indicate that home bias are driven more by private investor demand rather than by mutual fund managers. They have also mentioned that the home bias in 2000-2003 is significantly lower than what was seen in the data from 1990s.

Dominique Diouf, Laval University, Quebec (QC), Canada in 2010, studied on the choices, motivations and behaviour of investors consist of a segmentation focused on socio-demographic characteristics such as age, income, education level etc. Such approaches seem to simplify, even mutilate, reality by aggregating data about observable variables and considering investors as homogeneous groups. These perspectives are often inspired by a scientific approach that consists of separating to better understand the observed phenomena. By considering individual as a «homo economicus», that is to say, a rational and autonomous individual who makes decisions motivated by material gains, these studies fail to recognize all the complexity that shapes human behaviour. Even though more researchers attempt to explore other factors such as those related to psychological aspects or social values, it should be noted that they do not always take into account the multidimensional nature of the observed phenomena. This paper argues that to understand the behaviour and choices of investors as regards SRI, we must consider social investors as complex individuals and also take into account the influence that the institution may exercise (thanks to the role of SRI advisors and the other strategies for promoting socially responsible investment). We must also adopt a more open approach by understanding the characteristics and behaviours of individual social investors in relation to those of conventional investors. Our research builds on the theory of complexity framework. According to this theory, the truth must be thought of as a system where there is inter-influence between the whole and the parts. In this perspective, the individual must not only be seen as rational and autonomous, but more as an individual aggregation of overlapping identities. Our research provides evidence from focus Desjardins Fund, with data gathered by Desjardins from online surveys. We subjected the data to bivariate and multivariate analysis. This qualitative methodology is complimented by a series of 10 semi-structured interviews with managers, analysts and advisors. The results show that while demographic characteristics still remain important in understanding the behaviour and attitudes of social investors, it is their social values, environmental, social and governance (ESG) issues, financial return considerations and the role played by the institution that are significantly associated with socially responsible investment of the portfolio. Our research highlights the complexity surrounding the phenomenon of SRI and has several implications both in terms of theory and practice.

Review of Literature shows that how retail investor’s personal characteristics influence their various investment choices. If a common theme is present in this literature, it is that personal characteristics influence investors’ perception of risk and their willingness to assume risks. In turn the perception of risk determines investment behaviour of retail investors. However, a prevailing question left unanswered is the extent to which individual’s personal characteristics influence their intentions about investing. The expected utility approach of Von Neumann and Morgenstern (1947) has provided the foundation for the primary view of risk in economics and finance for many years. The main concept in their model is that the maximization of expected utility is the sole factor in making decisions. Markowitz (1952) proposes a two-criterion approach when an investor is faced with the desire for higher returns but not wanting the uncertainty of returns, which investor perceives as risk. The literature has developed into two schools of thought as researchers have sought to explain the choices investors make about risk within their investments. One group of scholars has used demographic features that relate the significance of gender, ethnicity, wealth, income, age and variety of other factors to the explanation of investment management decisions. The other group has its foundations in psychology, using investors’ psychological characteristics to explain choices that are made concerning investment decisions.

Although an interesting array of demographic characteristics have been used to explain what drives the investment behaviour of individuals, the discussion continues in the literature concerning the psychological antecedents that would accompany this human behaviour. A variety of studies have attempted to explore the psychological explanations for investor behaviour. In the demographic studies, the implications of gender are mostly perceived by various researchers are key in explaining the behaviour of investors. Barber and Odean (2001), Hallahan, Faff and McKenzie (2004), Bajtelsmit and Bernasek (1996), Worthington (2006), Felton, Gibson and Sanbonmatsu (2003), Bajtelsmit, Bernasek and Jinakoplos (1999), Hariharan, Chapman and Domian (2000) and Oslen and Cox (2001) have concluded that gender plays a key role in risk aversion. Filbeck, Hatfield and Horvath (2005) used the

Myers-Briggs Type Indicator to assess risk tolerance differences between people with different personality characteristics. From the discrete personality groupings in the Myers-Briggs, the researchers are able to establish behavioural linkages to risk tolerance of individual investors. Their findings confirm that personality type does explain some aspects of investment behaviour. Read and Loewenstein (1995) studied diversification bias in the context of consumer choices. French and Poterba (1991) estimate the domestic ownership share of the world’s five largest stock markets in 1990: US 92.2%, Japan 95.7% and Germany 79%. Goetzmann and Kumar (2001) examine the diversification of investors with respect to demographic variables of age, income and employment. Kahneman D and Riepe M.W (1998) focus on biases in beliefs & preferences of which financial intermediaries should be aware and provide recommendations on how to avoid them or mitigate their harmful effects of biases. Keller C and Siegrist M (2006) analysed the influence of financial risk attitude and values-related money and stock market attitudes. Odean T (1998) identified that a particular class of investors sell winners more readily than losers. This is in spite of alternative rational motivations are controlled for these investors continue to prefer selling winners and holding losers. Shiller R.J. emphasized the very importance of conversation in the contagion of popular ideas about financial markets. Shefrin (2000) in the ‘Beyond Greed and Fear’ explained the Psychology of individual investors. Lo et al. (2005) explained that the lack of correlation between trading performance and personality traits. Goldberg and Von Nitzch (2001) explained a personal experience of a day trader who goes through many emotional stages during various stages like profits and losses cycles.

Arrow (1964) and Pratt (1964) have shown that an investor witha reasonable wealth has a marginal utility schedule with high elasticity and therefore has higher risk tolerance than her less wealthy counterparts. A range of empirical studies, e.g. Friedman & Savage (1948) suggest that the elasticity of utility is at its highest for rich people, but not for ultra rich. This implies that at first the utility function is concave but then reshapes into a convex function only to return to concave form after a certain level of wealth. Second, there is empirical evidence, e.g. Bodie & Samuelson (1989), to support the idea that young investors with high future income have a high tendency to hold their wealth in rather risky assets as they can recoup their losses through increased work in the future. Third, the last point is the most ambiguous of these three. There is empirical evidence, e.g. Lewellen, Lease & Schlarbaum (1977), to show that elderly investors tend to invest in less volatile safer assets than their younger counterparts. On the other hand, Samuelson (1969) suggests that under isoelastic marginal utilities investors would have the same risk tendency throughout their life, i.e. the age of an investor should not affect one’s risk aversion at any part of her life.

The life cycle hypothesis of Modigliani & Brumberg (1954) and Friedman’s (1957) permanent income hypothesis state that one’s consumption at any life cycle is dependent on expected resources, labour income, as well as inherited wealth, over one’s lifetime. This implies to rather stable consumption rate throughout one’s life, as households would typically save during their productive years and respectively live on those savings during retirement or periods of unemployment. In these two studies, however, the idea of different investment objectives was not taken into account. This would imply that on the basis of Modigliani’s & Brumberg’s and Friedman’s theories we cannot draw any conclusions about the behaviour of investors of different age groups. Multiple objectives of investors have been studied by e.g. Solow (1987), Barlow, Brazer & Morgan (1966) and Thaler (1980). These studies show that investor objectives depend not only on current and expected income, but also on retirement plans, willingness to leave bequests, education, and precaution for potential emergencies, to name a few. To support multiple objectives theory Katona (1960) observed that savings objectives are related to consumption needs under varying horizons and uncertainty over investor’s life cycle. Furthermore, Potter (1971) provides evidence to support the multiplicity of objectives, but his study involved only identifications of objectives to hold one particular asset type, i.e. the common stocks. The effect of socio-economic factors on investor objectives have been studied by e.g. Lewellen et al. (1977) and Baker & Haslem (1974). Lewellen et al. suggest that elderly investors were more interested in a stable dividend income rather than substantial capital gains. Furthermore, they noticed that investors with more initial wealth were more likely to be interested in long-term goals. Equivalently Baker & Haslem’s study shows how sensitivity to dividend yield, capital appreciation and risk is dependent on socio-economic factors. They noticed that risk sensitivity was mostly influenced by age, sex, marital status, education and current income in the respective order of significance. This has also been verified by recent empirical studies that we shall go through later in the chapter. Baker & Haslam’s study also gives further evidence on Lewellen et al’s view of elder investors being more interested in a stable dividend yield rather than capital gains. Gender and marital status sensitivity on investor objectives have been studied in detail by Haynes & Helms (1990, 1992) and Lease, Lewellen & Schlarbaum (1976). Haynes & Helms suggest that the composition of portfolio is indifferent for married couples and single men. They also argue that men and married couples have a higher tendency on allocating their wealth in real estates, common stocks and corporate bonds, whereas single women preferred to hold less risky government bonds. Lease et al. had similar findings in their earlier study as they suggest that especially elderly single women were more conservative and dividend driven, holding more diversified portfolio than any other socio-economic group. Baker & Haslem’s ( 1984) study gives further evidence to support different objectives for males and females indicating women’s greater emphasis on dividend yield and price stability.

Probably the most studied investor characteristic’s effect on asset holding is the effect of wealth on investor behaviour. Nearly every study examines that particular relationship in addition with other things being analysed. The most common result is a positive correlation between one’s wealth and the ownership of risky assets. E.g. Cohen, Lewellen, Lease & Schlaurbaum (1975) suggest that risky asset holdings increase in line with the increase in wealth, whilst other factors, e.g. sex, age and income, were kept constant. More recent study to confirm this relation was carried out by Ramaswami, Srivastava & McInish (1992). They conclude that income and net wealth have a positive effect on holdings of riskier assets.

The relationship between education and portfolio selection has been studied by Lease et al. (1976) and Barlow et al. (1966). Lease et al. report that highly educated investors tend to prefer more diversified portfolios than the less educated ones. This result is further supported by Barlow et al. who show that households headed by professional employees with high

education have higher preference for current yield low risk ratio than their less educated counterparts. The information level of different educational groups may explain these results. More educated investors are likely to be more aware of the stock market and the way it operates. Therefore, they know that portfolio risk can be reduced in great amount with good portfolio diversification without lowering the portfolio return.

Most academic literature provides evidence that retail investors rarely beat the market or even the institutional investors. In addition, retail investors’ level of sophistication is often questioned. E.g. Black (1986), De Long et al. (1990) and Lee et al (1991) provide evidence that their investments decisions are often driven by liquidity demand and/or psychological reasoning unrelated to the underlying security values. Furthermore, they seem to hurt their portfolio performance by trading too much, holding undiversified portfolios, exhibiting home bias and as presented earlier selling winning stocks too early and holding losing stocks for too long. (E.g. Blume and Friend (1975) and Grinblatt & Keloharju (2001).) Grinblatt and Keloharju (2000) report that Finnish households act as contrarians, buying losers and selling winners. In addition, they underperform compared to “sophisticated” investors, namely foreign investors, Finnish finance and insurance institutions, during the sample period.

Barber and Odean (2002) report that active and wealthy young men, who switched from phone-based to online trading during 1992-1995, increased their trading activity, traded more speculatively and eventually performed below par. What makes it interesting is that prior to the switch they beat the market by 2 percent annually. However, there is also strong evidence amongst the academic literature that some retail investors actually perform superiorly compared to the market. Barber and Odean (2000) show that the top-performing quartile of the retail investors outperforms the market by 6 percent per annum. In addition, Ivkovich and Weisbrenner (2005) and Ivkovich et al. (2005) note that they generate high returns by exhibiting home-bias and individuals with underdiversified portfolios outperform those with diversified portfolios. Furthermore, Kaniel et al. (2005) document that stocks heavily bought by retail investors earn abnormal positive returns during the following month. Finally, Coval et al. (2005) report that top-performing decile of retail investors buy stocks that earn daily abnormal returns of 1.2 – 1.5 percent during the following week. Correspondingly the bottom-performing decile loses approximately 1.2 percent a day during the same time. Their results are robust to risk adjustments, small stock removal etc. They also present a trading strategy exploiting information in investors’ trades that earns 0.5 percent risk-adjusted daily return. According to academic literature lack of trading plan and overtrading can be caused by behavioural biases. Many traders seem to trade “on the fly” without a proper trading plan, because they think they can outsmart the market and the other traders. They ride the wave and normally land in the sand, because they are overconfident. Overconfidence is a well-documented phenomenon in the psychological literature as well as in modern finance. The overconfidence literature is regarded to be motivated by the differences of opinion literature from the 1980’s. Varian (1989) generalises the mean-variance framework with diverse information of Grossman (1976) to allow for different prior probabilities. Each investor has a subjective a priori distribution for the value of a risky asset, the distributions are assumed to be normal, but to have different means. Varian finds that the trading volume is solely caused by the differences of opinion. The equilibrium net trading volume is therefore dependent on the deviation of her opinion about the mean from the average opinion. The larger the deviation from the average, the larger the trading volume will be. Bar-Tal, Sarid, and Kishon-Rabin (2001) state that the phenomenon of overconfidence is defined as the difference between mean reported confidence in the chosen answer and the percentage of items answered correctly. If this difference is positive, participants are said to exhibit overconfidence; if the difference is negative, this implies under-confidence. In most studies about overconfidence, participants have been asked to predict outcomes of events or to answer multiple choice questions that tested general knowledge. Each item had two possible answers. Participants chose the answer they believed to be more likely and assigned probability of, or confidence in, the correctness of the chosen answer.

Furthermore, Lichtenstein and Fischhoff (1977) have shown that overconfidence is influenced by item difficulty. This is called the "hard/easy"- effect, according to which overconfidence is most pronounced for hard questions, those that are answered correctly by relatively few people. Overconfidence typically diminishes and may even turn to underconfidence for very easy items, questions that almost everyone answers correctly. The overconfidence phenomenon has been replicated many times (Bauman, Deber, & Thompson, 1991; Braun & Yaniv, 1992) and in different cultures (Yates, Lee, & Shinotsuka, 1996). The phenomenon persists even when incentives for appropriate confidence are provided (Fischhoff & Macgregor, 1982). This persistence has led theorists to believe that the phenomenon is a fundamental feature of human psychology. More evidence on the existence of overconfidence is givenby its occurrence throughout different professional fields. E.g. lawyers, managers, investment bankers and engineers have beenfound to exhibit overconfidence in their decision makingprocesses and judgements, see e.g. Wagenaar and Keren (1986), Russo and Schoemaker (1992), Stael von Holstein (1972) and Kidd (1970) for further information. However, Gigerenzer, Hoffrage, and Kleinbolting (1991) suggested that the phenomenon of overconfidence is actually an artefact of the experimental setting, occurring in response to the experimenter's choice of questions, which are usually difficult and misleading. An example of a question used in such experiments of Girerenzer et al. is "Which city is farther north? (a) New York or (b) Rome." Gigerenzer et al. claimed that to answer such questions, participants use diagnostic cues, cues that distinguish between the two response- alternatives, and when asked to indicate their confidence in their answer, they do so for the relationship between that cue and the criterion. Because the questions selected for the experiment are tricky, such a calculation leads to overconfidence. Indeed, they showed that random selection of questions from a knowledge domain familiar to the participants eliminates the overconfidence bias. Harris and Raviv (1993) assume that investors have homogenous a priori beliefs and receive the same public information. Investors however interpret the information differently and differences of opinion are formed. The heterogeneous interpretation is explained to be caused by the differences in the likelihood function when updating probabilities. Kandel and Person (1995) believe that investors have different a priori beliefs and that their valuation of an asset is the sum of two different terms, the liquidation value of the risky asset and an error term. Different investors have different beliefs about the mean value of the error term, and therefore their valuation of the asset must also be different. Kreinin (1959) reports that investors with optimistic view of future economy and of their personal financial situation are more likely to hold more volatile common stock portfolios than those with more pessimistic expectations. The recent studies include Odean (1998, 1999) and Barber & Odean (2000, 2001). These studies analyse the level of investors’ self-confidence and its effect on portfolio performance. Psychological evidence, e.g. Lundeberg, Fox and Punćochaŕ (1994), shows that men tend to be more overconfident than women. In addition, people tend to be more overconfident in tasks that are from moderately difficult to extremely difficult and correspondingly underconfident in easy tasks. We are sure that we can conclude that investing is at least moderately difficult, which would suggest that investors are likely to be overconfident about it. Odean’s and Barber & Odean’s results can be concluded in the following manner. Male investors tend to be more overconfident in the stock market than female investors as was suggested by psychological studies. Overconfidence about own investment abilities decrease utility received from trading. And finally, as a result, the most overconfident investors, i.e. those investors who trade the most, have the worst portfolio performance. Shefrin & Statman (1985) introduced the concept of disposition effect, which can be defined as investors’ tendency to hold on to losses too long and realise gains too soon. However, the roots of this phenomenon lie in the prospect theory introduced by Kahneman and Tversky (1979) and mental accounting framework by Thaler (1980, 1985). The availability of accountlevel transaction data, e.g. Odean (1998) has made the disposition effect a well-documented behavioural pattern among investors. The prospect theory can be presented as a two-stage process. In the first stage, a decision maker evaluates e.g.investment opportunities in terms of potential gains and losses relative to a certain reference point. In the latter stage, the decision maker faces an S-shaped value function, which is defined over gains and losses relative to the wealth level rather than to an absolute one. The S-shaped value function is concave in the gains region, inferring risk aversive behaviour, and convex in the loss region, inferring risk-seeking behaviour. The mental accounting framework provides information on how individual decision makers view uncertain monetary choices. Decision makers can view their choices in a broader or narrower account. E.g. a stock holder may evaluate her gains/losses on the portfolio level, i.e. in a broader frame, or she may evaluate her losses/gains on an individual stock level, i.e. narrower frame. However, it must be noted that any investor holding more than one stock in her portfolio has in fact multiple open mental accounts.

Several experimental, e.g. Weber and Camerer (1998), Thaler, Tversky, Kahnemann and Schwartz (1997), and empirical studies show consistence evidence about the existence of the disposition effect. However, there is also evidence questioning the true nature of it, e.g. Kaustia (2004). After the pioneering evidence by Shefrin and Statman (1985), followed by Odean (1998), the amount of disposition effect literature has increased rapidly. Grinblatt and Keloharju (2001) report disposition effect among both individual and institutional investors. They show that the major determinant of both investor types’ selling decision is their reluctance to realiselosses.

Although the available experimental evidence shows that greater investor sophistication seems to decrease susceptibility to the disposition effect, professional investors are far from being uninfluenced by it. Locke & Mann (2000) use the futures market data, and report that all traders hold losers longer than they do winners. Furthermore, they find that the least successful traders hold the losers for the longest, and vica versa for the most successful traders. In addition, Shapira & Venezia (2001) and Coval & Shumway (2000) report consistent evidence about the disposition effect in the Israeli market and among the market makers in the Chicago Board of Trade respectively. To summarise, the current evidence shows that the disposition effect is substantial yet subject to variations across investor groups and that the nature of it is not yet thoroughly understood. Kaustia (2003) and (2009) criticises the use of prospect theory as an explanation for disposition effect. The more recent paper shows that the propensity to sell jumps at zero return, but is then fairly constant in the region of losses and correspondingly constant or even increasing in the region of gains. Furthermore the paper finds no evidence that the phenomenon is caused by after-tax portfolio rebalancing, belief in mean-reversion or target prices.

Reinforcement is a widely accepted psychological phenomenon first brought to public knowledge by Ivan Pavlov in the 1920’s. Dinsmoor (2004) points out that Pavlov’s definition of reinforcement was strengthening of already-learned weakening response instead of current definition of selecting and strengthening new behaviour. Later, Skinner (1957) articulated the major theoretical constructs of reinforcement and behaviourism. Skinner’s early work was mainly theoretical, which is the primary reason for slow adoption in the academia for his theories during that time. However, e.g. Ferster (1967) and Baer & Wolf (1970) conducted theoretical research in that field. The first reinforcement learning models in the economic research include e.g. Cross (1973), Arthur (1991) and Roth & Erev (1995). The hybrid model by Camerer & Ho (1999) has implications for our model, as their model allows for the reinforcement of actual as well as forgone payoffs. They suggest that the subjects might actually weigh these two types of payoffs in different manner. In addition, some stock market anomalies have been explained by biased learning, e.g. Barberis & al. (1998) and Gervais & Odean (2001). Even though there is a vast empirical literature on reinforcement as well as Bayesian learning, the empirical literature on how investors actually learn, or do they learn, is somewhat limited. Feng & Seasholes (2005) have studied the effect of investor sophistication and trading experience on behavioural biases found in the stock market. They discover that neither sophistication nor trading experience alone eliminate disposition effect. However, together sophistication and trading experience seems to eliminate the reluctance to realise losses. Correspondingly, Nicolosi, Peng & Zhu (2009) report that portfolio returns improve with account tenure and trade quality also increases with experience. Thus, according to them investors learn from their own investment history and seem to make adjustments to their future trading based on that information, which leads to higher investment performance. Seru, Shumway & Stoffman (2007) investigate the effect of trading experience on the disposition effect and trading performance. They show that more experienced investors are less likely to suffer from the disposition effect and their trading performance is better. In addition, they show that investors as a group tend to learn partly by attrition, but individual level learning is also important. However, they use completely different type of return measure, namely next year’s return, whereas we are interested in the net return associated with individual trades. Furthermore, List (2003) and Dhar & Zhu (2006) show that experience plays a significant role in eliminating judgement errors such as endowment and disposition effect. Linnainmaa (2006) provides somewhat contradicting evidence to the existing literature as he argues that less sophisticated investors learn to exit the stock market better than their more sophisticated counterparts. This might be one possible explanation for the relationship between experience and positive market performance.

Kaustia & Knüpfer (2008) find a strong positive link between actual IPO returns and future IPO subscription activity. This is a strong finding supporting positive reinforcement, as personally experienced good returns are an important factor determining future activity in their study. Furthermore, they state that investors participating in their first IPO and experiencing a positive return are twice as likely to participate in the next offering compared to investors with cold first IPO. This is a long-term phenomenon as there is a 26 percentage unit difference in the subscription activity of the hot and cold IPO groups by the tenth IPO offering. They suggest that this is due to the primary effect long-recognised in marketing literature and analysed by Bereby-Meyer & Roth (2006) in strategic games. There is a vast experimental literature providing support for reinforcement. Camerer & Ho (1999) argue that their test subjects give actual payoffs twice the weight given to forgone payoffs. Charness & Levin (2005) report that roughly half of the decisions of their subjects violate Bayes’ rule and confirm that Bayesian’ and reinforcement learning lead to different choices. Finally, Erev & Roth (1998) find that their simple oneparametric reinforcement learning model outperforms equilibrium predictions for all values of the parameter. Psychological and neurological studies also confirm the existence of reinforcement learning, e.g. Huettel & al. (2002) and Knutson & Peterson (2004). Feng & Seasholes (2005) study the effect of investor sophistication and trading experience on behavioural biases found in the stock market. They discover that neither sophistication nor trading experience alone eliminate disposition effect. However, together sophistication and trading experience seems to eliminate the reluctance to realise losses. Correspondingly, Nicolosi, Peng & Zhu (2009) report that portfolio returns improve with account tenure and trade quality also increases with experience. Thus, according to them investors learn from their own investment history and seem to make adjustments to their future trading based on that information, which leads to higher investment performance. In our setting we assume that experience helps investors to learn from their personal investments history and thus the profitability of earnings announcement day trades increases with account tenure.

L.C.Gupta (1991) argues that designing portfolio for a client is much more than merely picking up securities for investment. The portfolio manager needs to understand the psyche of his client while designing his portfolio. According to Gupta, investors in India regard equity, debentures and company deposits as being in more or less the same risk category and consider including all mutual funds, including all equity funds, almost as safe as bank deposits. K.S. Chalapati Rao, M.R. Murthy and K.V.K Ranganathan (1999) in their research article “Some aspects of the Indian Stock Market in the post liberalization period” evaluates that as a part of the process of economic liberalization, the stock market has been assign an important place in financing the Indian corporate sector. Besides enabling mobilizing resources for investment, directly from the investors, providing liquidity for the investors and monitoring and disciplining company management are the principal functions of the stock market. This paper examines the development in the Indian stock markets during the nineties in terms of these three roles.

Kevin James (2000), in his research article “The Price of Retail Investing in the UK” evaluates the financial wealth services provided by investment funds in UK, the study identifies that the retail investors largely delegate the management of their wealth to investment funds. These funds in turn charge retail investors for the portfolio and risk management services they provide, sparing retail investors the burdensome task of performing these various services themselves. So in order to choose a sensible fund (a fund that meets his or her requirements), a retail investor must be able to ascertain the services provided and the price charged by each of the funds he or she may consider.

Dr. K Santi Swarup (2003) in her research article “Measures for improving common investor confidence in Indian primary market a survey”, concentrates on the decisions taken by the investors while investing in primary markets, the study indicates that the sample investors give importance to their own analysis as compared to brokers advice. They also consider market price as a better indicator than analyst recommendations. The study also identifies factors that are affecting primary market situation in India. Issue price, information availability, market price after listing and liquidity emerge as important factors. This study suggests that investors need to be assured of some return and current level of risk associated with investment in the market is very high. They have had bad experience in terms of lower market price after listing and high issue price. Accordingly number of measures in terms of regulatory, policy level and market oriented were suggested to improve the investor confidence in equity primary markets. However, this paper does not highlight the measures for improving investor confidence in secondary market.

C. S. Shylajan and Sushama Marathe (2006) in their research article “A study of attitudes and trading behaviour of stock market investors”, identify the major factors responsible for determining the attitudes and trading behaviour of stock market investors. Based on their shared investing attitude and behaviour, the stock market investors are classified into two categories i.e. aggressive investors and non aggressive investors.

John Graham and Alok Kumar (2006) in their study “Do dividend clienteles exist? evidence on dividend preferences of retail investors” evaluates portfolio holdings of retail investors of older and low income category, this study suggests that these investors prefer dividend paying stocks, the study also highlights the trading behaviour of retail investors and indicates that the investor trades around dividend events are consistent with clientele behaviour. Further, it also points out that old and low income investor exhibits abnormal buying behaviour following dividend announcements.

Keynes was the pioneer in the field of studying the saving behaviour of people (Keynes 1936).

He identified as many as eight different motives for saving. The list starts from precautionary saving and includes motives such as improvement of living standards and the feeling of independence to do things. His list was later replenished by Browning and Lusardi (1996) who added the down-payment motive, which means accumulation of assets to buy something expensive, such as a house or a car. Numerous studies have examined the importance of different motives to save after Keynes (1936). Katona (1975) find that in 1960’s in the U.S. people mainly saved to have buffer in case of sudden expenditures or emergencies, for retirement, for their children and to buy a house or durable goods. Interestingly, only few said they were saving to earn additional income or to leave an inheritance. Kotlikoff (1989) later find that approximately 30% of household saving in the U.S. can be explained by precautionary saving motives, particularly for old age.

Mental accounting (Thaler, 1980) assumes that people categorize and frame their assets into separate groups depending on the source and use of assets. Ritter (2003) studied mental accounting and found that people tend to separate their decision-making when they should rather combine the different aspects in order to maximize their utility. According to the traditional expected utility theory people maximize their wealth and utility as a whole.

However, in their everyday life people and investors like to separate their money according to what it is spent on and where it has come from. For example, people might save money by buying cheap food and avoiding higher quality ingredients when at grocery store but then go and spend much more on the same ingredients when eating at a restaurant.

According to Thaler and Shefrin (1988) the main categories of mental accounting are current income, current wealth and future income. All of these are treated and valued in a different way in people’s minds. For example, people often avoid spending their future income in beforehand even if the income was certain. Mental accounting can explain the tendency of people to on one hand keep their money on deposit accounts and on the other hand use credit for consumption at the same time. According to Shefrin and Statman (1984), also the popularity of dividends among investors can be explained with mental accounting. Investors like to use dividends in consumption rather than investing the money back to the stock market and thus receiving higher cumulative returns in the future.

Narrow framing (Hirshleifer, 2001) is a phenomenon closely related to mental accounting.

Narrow framing causes investors to be unable to see their investments as a portfolio but rather as a collection of different investments. Investors consider their investments as separate articles and the gains and losses incurred from the investments are considered independent of each other. This can explain the strong feelings of regret in case of a bad investment. Because of the mental separation of assets, investors fail to take into consideration the correlation between the different investments. This in turn may affect the way investors perceive the total risk level of their wealth.

Rabin and Thaler (2001) describe mental accounting as a tendency for people to follow and estimate their financial transactions. Therefore investors observe the return and risk involved with the different parts of their wealth as separate matters, independent of each other. Thus high correlations between different assets can be easily left out of notice. Rabin and Thaler (2001) also notice that mental accounting affects the investors’ attitude towards risk.

According to the traditional utility theory people are risk-neutral in small scale gambles because a rational person considers the risk from the perspective of her total utility. From this perspective the gamble is relatively small considering the total utility. However, empirical research has found that people do care about small gambles and act irrationally in such situations. If the person does not understand the magnitude of the risk relative to the weighted risk of her total wealth, taking the small gamble may seem like a bigger risk than it really is. Prospect theory was first introduced by Kahneman and Tversky (1979) as an alternative to the traditional expected utility theory when explaining the human behaviour. However, several papers in behavioural finance have found (e.g. Grinblatt and Keloharju 2001a; Odean 1999) that past experiences and for instance past gains and losses do affect investors’ future preferences.

Tversky and Kahneman (1981) introduce the decision frame. It portrays the decision making situation when there are several different alternatives all with different outcomes, actions and possibilities. The person making the decision has to form a picture of all of them. The theory has two decision making stages: (1) editing and (2) evaluation. People analyze the situation and the alternatives by identifying which options are identical and set a reference point. They consider the outcomes that are lower than this reference point as losses and the ones that are higher as gains. In the evaluation stage they evaluate the options that have been modified in their minds and then choose the one that gives the highest utility.

De Bondt (1998) find that the outcome of the decision is greatly affected by the actual decision making process. In decision making process the opinions and assumptions of the decision maker play a major role. Framing problem is closely related to the decision making process and it means that depending on how the option in a decision making situation is presented the answer can be completely different. So by presenting the same option in different ways can alter the decision the person makes. Tversky and Kahneman (1981) find that when presented with two problems with different options people separate the problems even when the outcomes of the problems might be interconnected. But if the problems were combined and presented at the same time the order of preference would be different.

Classical example of the framing problem is to present alternatives to problems framed as either losses or gains. For example, a financial loss can be seen as it is without any compensation or it can be considered as an expense that one has to take in order to receive higher gains in the future (Tversky and Kahneman 1981). Another famous example by Tversky and Kahneman (1981) is the Asian disease problem where presenting the same situation in two different ways (saving people or letting people die) gives dramatically different responses. In general, framing can take place whenever and wherever. For instance, depending on whether a payment that will be raised after some period, is called either as discounted price at the moment (positive framing) or as a penalty fee if not paid quick enough (negative framing), has an effect on human behaviour. (Gächer et al. 2009) The power of negative framing relates to the utility function of the prospect theory and the risk aversive behaviour of people.

Framing has at least two important implications for an investor. Firstly, as explained earlier, when two decisions are framed as separate matters the person making the decision may fail to see the combined effect of them. Therefore, investor can be persuaded to buy some fancy financial instrument that seems perfect when observed independently. However, when considered as part of the investor’s whole portfolio the product can turn out to be a bad investment due to high correlation with other assets in the portfolio or for some other reason. Secondly, investors can be very prone to the opinions and advice given by their advisors.

Investors like all humans are susceptible to the way the matters are presented to them. Thus if the advisor does not bring up in the conversation some risks or fees that are related to the product, the investor may end up doing a worse decision than without the advice. Advisors can choose to present material, for example past performance charts that have been chosen in a self-serving manner, in order to convince the investor of some product. Also investors who decide intuitively rather than analytically are more vulnerable to framing (Steul 2006).

Individuals have been found to create ways to facilitate decision-making in difficult situations. Benartzi and Thaler (2001) discovered that individuals often use the “1/n” rule of thumb when allocating their assets into different investments. This takes place when investors are given alternatives and they cannot decide the optimal allocation. The easiest way to allocate the money then is to just divide it evenly between the options. This is when framing and the role of the investment advisor is emphasized. Investment advisor can deliberately limit the product universe to few different products that are presented to the customer.

Knowing that the customer cannot decide the allocation the money is likely to be divided evenly between the products that were already chosen by the advisor.

Heuristics are also certain kinds of rules of thumb. Next I introduce the two most relevant heuristics in this research: representativeness heuristic and availability heuristic. Tversky and Kahneman (1974) found that people tend to generalize matters and make assumptions often on very little grounds. Representativeness heuristic means that individuals expect small samples to represent a larger population (Sample size neglect). People make decisions based on the available data and the estimated probability of the hypothesis.

Probabilities are based on their previous experiences and knowledge about the matter. One of the main cognitive biases that is caused by this heuristic is the neglect of base rates. It means that people tend to focus on the evidence that seem important but considering true probabilities of events it is not. Thus individuals let certain matters that stick out to stray them away from rational thinking. For investors this may become relevant for instance in situations when they focus on the short-term historical returns of an investment product and fail to consider the long-term returns. Therefore, investors may regard a six-month performance of an investment product to represent also the expected future risk-return relationship. The availability heuristic was also discovered by Tversky and Kahneman (1974) in their research about individuals’ tendencies to form assumptions when making decisions.

Availability heuristic means that people assume some event to be more probable than some other when the event has taken place quite recently or is just more easily brought to mind.

People also fall victims of presumed association, which means that they tend to assess wrongly the likelihood of two events occurring together. Overall, when the event is in fresh memory it seems like it is more probable to take place than some other event, even if this was not true. Kahneman and Tversky (1983) tested this heuristic by asking people to recall English words that end with “ing” and words that have the letter “n” as the second last in a word. When people were asked to estimate which kind of words were more common they would say that the ones that end with “ing”. However, there are of course a lot more of those words that have “n” as the second last because all the “ing” words are also included in this group. The point is that those ones with just the “n” are a lot harder to bring to mind. Also investors are more certain that a downward trend can take place in the market if they have experienced it by themselves before. This may appear as pessimistic expectations about future returns and risk aversive behaviour. This is why older people who have seen several ups and downs in the market may display more risk aversion than younger investors.

Loss aversion refers to the finding made by several researchers (e.g. Tversky and Kahneman, 1992; Kahneman, Knetsch and Thaler, 1990) in empirical tests that people are more sensitive to decreases in their wealth than to increases. These studies have found that losses are weighted about twice as strongly as gains. Therefore, the disutility of losing 100€ is about twice the utility of gaining 100€. This effect is depicted in the Prospect theory by the curvilinear shape of the utility graph. The main difference to the traditional Expected Utility Theory is that the value function measures gains and losses, not absolute wealth. People estimate their losses and gains based on some reference value, which is often not the same as zero. Reference point can be any value that the individual uses as a benchmark when trying to find out whether he has gained or lost something. As can be seen in the Figure 1, there is a kink at the origin of the curve making the curve convex in the domain of losses and concave in the domain of gains. When moved to the left in the curve, the loss of value is higher than a similar move to the right would give as a gain. The curve becomes almost flat at both ends when the losses or gains get large enough. When the losses become large enough individuals tend to become more risk seeking and try to break even. The same happens in the domain of gains. When the gains become large enough the marginal utility of additional gain decreases.

Individuals have also been found to overweight events with small probabilities and this also affects the experienced utility. For instance, people may buy lottery tickets and insurances where the probability of event is extremely low, but at the same time they are very conservative with their investments. Interestingly, people are risk-averse with moderate probability gains and small probability losses whereas with moderate probability losses and small probability gains they are more risk seeking.

Benartzi & Thaler (1995) and Thaler, Tversky, Kahneman & Schwartz (1997) have investigated a phenomenon called myopic loss aversion. Benartzi and Thaler (1995) offer this as an explanation to the famous Mehra and Prescott’s (1985) equity premium puzzle. The equity premium puzzle refers to the historical difference in the returns between equities and a risk-free asset, such as T-bills in the US. The puzzle about the equity premium is that it has been very large historically. Myopic loss aversion is a combination of investors’ high sensitivity to losses and tendency to evaluate their wealth frequently. Investors are said to have distinguished between the actual investment horizon and the frequency that the wealth is being monitored. Therefore, an investor who evaluates the value of his investments on a yearly basis behaves as if the investment horizon was only one year, regardless of the initial length of the investment horizon. Because of this, individuals tend to focus more on the returns than on the consumption and therefore the return variability plays a larger role in their minds than it should. According to Benartzi and Thaler (1995) investors are not willing to accept the variability of the returns even if the short-run returns had not any effect on consumption. To compensate the return variability they require higher premium from equities.

Thaler et al. (1997) tested the myopic loss aversion with investors and made some interesting findings. In their experiments, individuals who displayed myopic loss aversion were more willing to accept risks if they evaluated their investments less often. Investors who received most frequently feedback about their investments took least risk and earned the least money.

Thaler et al (1997) stress that as the defined contribution pension plans are becoming more popular and people are pushed to take responsibility of allocating their pension savings by themselves, myopic loss aversion may affect these decisions significantly. They show that the decisions made by these investors may vary considerably depending on how their investment opportunities are described and the manner and frequency with which they receive feedback of their returns. This is a current topic also in Finland at the moment. There is strong pressure to give individuals more responsibility about their own retirement savings. Myopic loss aversion is also particularly important topic for this research because it may explain some of the results of this study. Loss aversion is also connected to behavioural bias called regret avoidance.

Regret avoidance refers to a fact that individuals who make decisions that turn out badly have more regret when the decision has been more unconventional. For instance, buying a portfolio of stocks that turns down is not as painful when the stocks were blue-chip companies’ than when the stocks were some unknown star-up firm’s. This is because the losses on the blue-chip stocks can be blamed on bad luck rather than bad decision-making and cause less regret. (Bodie, Kane & Marcus, 2005) Omission bias refers to a tendency of individuals to consider unwanted results of actions as more negative than unwanted results of inaction (omission). People would rather let things happen than be an active decision maker in a difficult situation, even when the result will be worse if no decision is made. Omission bias could be described as maintaining the status quo, an irrational barrier to change. It is a situation of omission against commission. Bazerman, Baron & Shonk (2001) argue that in the United States alone, twice the amount of lives could be saved out of those waiting for an organ donation, if the donation was considered as a default for those eligible to donate. Johnson and Goldstein (2003) find that countries that consider the organ donation as a default have donation rates of 86 to 100 percent, as opposed to the figures in the U.S. of 4 to 28 percent.

However, omission bias can also be a positive thing for an investor. It can protect the investor from making bad decisions in times of strong uncertainty about the future and help to stick to the initial investment plan. This is what may explain the popularity of regular saving agreements. It is much easier to sleep at nights when the individual does not have to make the decision about investing every month but can let the automatic subscriptions keep rolling regularly. This way the investor not only takes care of the diversification over time but also decreases the potential amount of regret that might occur in case the investment performed badly. This kind of timing strategy where the person invests some fixed amount periodically is also called dollar cost-averaging.

Anchoring refers to the tendency of individuals to anchor on some piece of information when faced with a decision-making situation. People develop estimates by starting from this piece of information, an anchor, and adjusting from it to yield a final answer (Epley & Gilovich, 2001; Epley 2004). However, people do not adjust enough their answer away from the initial anchor. This happens when the anchor is developed by the decision maker himself. According to Mussweiler & Strack (1999) the existence of an anchor leads people to consider information that is consistent with the anchor instead of considering information that is inconsistent with the anchor. This happens even though the inconsistent information may be more relevant for the decision-making situation. This kind of behaviour where people try to look for information that is consistent with the anchor, takes place when the anchor is set externally instead of developing it by the decision maker him self.

Tversky & Kahneman (1974) tested the bias with people and found that even when the test persons knew that the anchor was totally random and unrelated to the actual question it still had a dramatic effect on the decisions of these persons. Bazerman (2006) considers yearly salary increases that are based on some growth percentage as a good example of the anchoring effect. The anchor here is the last year’s salary. So even though all the employees were treated fairly by giving everyone an increase of 5% it does not mean that the relative levels of salaries are fair. The level of the new salary depends on last year’s salary. For investors the anchoring bias may be particularly difficult to handle. It is a bias that is present in all decision-making situations. People may discard rational thinking when making investment decisions and rely too heavily on past information that is not relevant considering the future performance of an investment. Therefore it may feel tempting to consider the past performance of investments as a prediction of the future. Ritter (2003) found evidence of stock investors estimating the future performance of stock market based on the performance of the market during the last 100 days. The more conservative the investors are, the slower their opinions and estimates change. Anchoring may also explain why investors like to set some technical target prices for their investments. It is quite often that you hear someone saying that when a certain stock drops under or breaks through a certain price level the person says to buy or sell the stock. This of course does not make any sense unless there is some more in depth valuation related reason behind for the action. However, it is easier to anchor the price to some exact number and then adjust the decision making according to that. One case where anchoring effect may also occur is when at the time of making the investment, the investor has been shown the estimated average future return for the asset class. This is considered as an anchor that the investor compares the return of the investment to. When it comes to decisions concerning portfolio allocations, the allocation suggested by the bank may act as an anchor that the investor relates to.

Anchoring is closely related to a phenomenon called reference dependency, which was introduced earlier in the chapter about Prospect theory. Reference dependency is the tendency of people to compare their current status to some reference point. For investors some clear reference points may be the purchase price of an investment or the price that has prevailed fora long time for some investment. Kaustia (2003) found evidence of investors considering the break-even price of a stock after direct and indirect fees as the reference point. However, there may be situations where the reference point is set based on the expected return or the return hoped for.

Disposition effect is a behavioural bias found by Shefrin and Statman (1985). It refers to the tendency of investors selling too quickly shares whose prices have increased and hold on for too long to shares that have dropped in value. The reason for this is that people do not want to recognize the losses but do want to recognize the gains they have made. By selling the shares whose value has dropped the investor would have to admit that he made a bad investment. As long as the losses are not recognized they exist only in theory.

However, this kind of behaviour is not very rational. It is much more tax efficient for the investor to sell the shares that have dropped in value because then those losses can be deducted from the gains that are possibly made later on. According to Constantinides (1983, 1984) the volume of the recognized losses should increase towards the year-end. Also gains should be recognized when they have been made with shares that have high volatility and the gains are believed to be long-term.

The effect can be explained with many of the previously introduced concepts in behavioural finance. The purchase price is often considered as the reference point for the investment. When the share price then drops below this level it causes a lot of regret and bad feeling for the investor. He becomes loss aversive and does not want to admit the bad investment decision. Shefrin & Statman (1985) explain the disposition effect with mental accounting.

People find it uncomfortable to “close the account” in negative. It causes feelings of regret to them.

There is evidence of strong variation in the trading volumes of stocks (Grinblatt & Keloharju, 2001), mutual funds (Quill, 2001), and certain derivatives (Heath et al. 1999) that is caused by the disposition effect. These studies find that the trading volumes increase in bull market and decrease in bear market. In bull market, investors are more likely to sell their shares with gain relative to their reference point (e.g. purchase price or previously prevailed price level). In bear market the shares are more likely to be at a lower price level than the reference value and so investors do not want to realize their losses.

Odean & Barber (2001) among others studied the tendency of investors to be overconfident when investing in stock market. They stress that overconfidence is particularly important to recognize when investing because the tendency has been found to come up in decisionmaking situations that are particularly challenging and when it is hard to get proper feedback.

Males especially tend to be more confident than females in these kinds of situations (Lundberg et al. 1994; Prince, 1993). Overconfidence has been also considered to explain the trading activity of investors. Odean & Barber (2001) find males to be a lot more active in trading even though this did not help them achieve higher returns in the end. Several studies have found overconfidence to be harmful to investors because it is likely to lead to badly diversified portfolios and decrease the expected return due to trading.

Overall, investors tend to be overconfident about their ability to predict future market movements. Investors also interpret the information differently depending on their point of view. For instance Daniel et. al (1998) find that on average investors overreact on information signals produced by themselves and under react on signals coming from the market. It has also been suggested that investors do not learn from their mistakes because they take the credit on successions but blame it on outside effect when they do not succeed (Taylor & Brown, 1988). This again only strengthens the overconfidence. Overconfidence may show as a tendency of certain investors to trade more actively and deviate more from the bank’s allocation than others. Past successes also may reinforce the behaviour, making these investors take more risk in their investments that is recommended. The evidence from most research papers on age and risk tolerance suggest that older people

are on average more risk averse than younger people (e.g. McInish, 1982; Alanko, 2009). This is supported by the concept of life cycle investing which was introduced earlier in this study. According to the principles of life cycle investing people should gradually decrease the riskiness of their investment portfolio toward retirement because the saved money is meant to be used to provide extra income on top of the public pension. The tolerance for higher return and value variability is mitigated by shifting the allocation to safer asset classes. Donkers et al. (2001) studied risk aversion in a large survey with Dutch households and found that age affects negatively the willingness to take risk. Dohmen et al. (2005) studied the relation of age and willingness to take risk with a German sample group. They also found evidence for risk aversion increasing with age. However, the effect was stronger in sports and leisure than in financial matters. Riley and Chow (1992) suggest that risk aversion decreases with age until 65 years is reached and starts decreasing again after that. Hallahan et al. (2004) also find support for the non-linear relationship between age and risk tolerance by adding age squared as an independent variable into their regressions. Very recent studies about Finnish investors’ risk tolerance also support the view that risk aversion increases with age. This finding has been made by Haarala (2008) in her study with 10.000 Finnish investors and Alanko (2009) in his very extensive study including risk profiles and true asset allocations of over 85.063 Finnish bank customers. Halko and Kaustia (2009) also find evidence for negative correlation between age and willingness to take risk in their Finnish sample.

# Objective

The primary objective of the study was to understand the behaviour of investors with the help of different behavioural finance theories. The theoretical concept of different behaviour finance theories like overconfidence, disposition effect, conservatism, cognitive dissonance, rationality and regret theory were used to understand the investors’ behaviour. How these behavioural theories affect the investment decision making process in investors and how much bearing these theories have on investors with respect to their age. Does age play a part to how these financial behavioural theories affect the investors.

# Rational Of the Topic

The aim of the study is to investigate the of retail investors in Mumbai with respect to age, and how the age affects the investor viz. rational, overconfidence, disposition effect, conservatism, cognitive dissonance, rationality and regret theory

# Hypothesis

* Hypothesis 1:- 60% investors above age of 35yrs are Rational
* Hypothesis 2: 60% investors below the age group 35yrs are rational
* Hypothesis 3: 60% investors above the age group 35yrs are overconfident
* Hypothesis 5 : 60% of investor above age of 35yrs are affected by disposition effect
* Hypothesis 6 : 60% of investor below age of 35yrs are affected by disposition effect
* Hypothesis 7: 60% investor above the age of 35 yrs are conservative
* Hypothesis 8: 60% investors below the age of 35 yrs are conservative.
* Hypothesis 9: 60% investor above the age of 35 yrs are affected by cognitive dissonance
* Hypothesis 10: 60% investor below the age group of 35 yrs are affected by cognitive dissonance
* Hypothesis 11: 60% investors above the age group are regret investor
* Hypothesis 12: 60% investor below the age 35yrs are regret investor.

# Population

Retail investors: Individual investors who buy and sell securities for their personal account, and not for another company or organization in Mumbai.

Sample size, the study was conducted by surveying 100 investors, 50 were above the age of 35 years old and 50 were below the age group of 35 yrs. The human behaviour cannot be predicted accurately so the confidence level was taken at 93%. The sample was drawn as per convenience.

For the survey respondent must be the person who invests in the Stock Market. Convenient sampling method is used for data collection. The questionnaires were filled out through personnel meeting with the investors.

# Questionnaire

Q-1. You have Rs 10,000 for making investment in the following options. Which option would you select?

1. 30% probability to earn 5000 Rs
2. 40% probability to earn 4000 Rs

Q-2. What was high made by NIFTY 50 in 2012?

1. 5825
2. 5750
3. 5900

How much confident are you? \_\_\_\_\_\_%

Q-3. You bought share A for Rs 350 which is currently being sold @ Rs400 and stock B, for Rs 500 which is also currently being sold @ Rs400. You are in need of money. Which Stock would you like to sell?

1. Stock A
2. Stock B

Q-4. From your holdings, for specific company there are rumours that company is in Problem, what will you do?

1. Indifferent
2. Maintain position/ keep investing.
3. Reduce/ sell half of the share.
4. Sell all shares and liquidate position.

Q-5. Your friend had purchased RIL @ price of Rs 1200 and it goes high up to Rs 2500. Now due to uncertainty price goes down to Rs 700. Your friend bares big loss. Do you think this was...?

1. A mistake
2. A bad luck

Q-6. During your investment experience, what contribution has been made by following factors which led you towards loss?

|  |  |  |
| --- | --- | --- |
| no | Particular | Contribution % |
| 1. | Broker Advice |  |
| 2. | Friend Advice |  |
| 3. | Own Analysis |  |
| 4. | Suggestions by TV and News |  |
| 5. | Your Intuition |  |
|  | Total | 100% |

Q-7. Your broker advises you to sell all shares from your portfolio and invest in hotel and agriculture sectors which were not the part of your investment. Your strategy will be...

1. Indifferent
2. Think and analyses recommendation
3. Sell half and invest as per advice
4. Sell all and follow the advice

Q-8. You are having following stocks in your portfolio. You are in need of 150,000 Rs. Which stock would you like to sell?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| No. | Company | Purchase  Quantity | Purchase  Price | Current  Mkt.price | Profit/Loss  Per share | Hold/sell |
| 1 | RIL | 100 | 1600 | 700 | -900 |  |
| 2 | L&T | 100 | 800 | 1200 | 400 |  |
| 3 | NTPC | 100 | 75 | 175 | 100 |  |
| 4 | HUL | 100 | 190 | 390 | 200 |  |
| 5 | AIRTEL | 100 | 800 | 400 | -400 |  |

Q-9. How good your analysis is proved for investment as compared to other investors?

1. I am extremely good
2. I am good
3. Same like other
4. I am not good
5. I am not extremely good

Q-10. You have Rs 10000 for making investment in the following options. Which option would you select?

1. 10% probability to loose 1000
2. 20% Probability to loose 700 Rs

Q-11. What do you think is the role of intuition (your internal feeling) while deciding about purchasing a stock?

1. No Effect
2. Little effect
3. High effect

Q-12. What was rate of GDP in 2011-12?

1. 5.8%
2. 5.3%
3. 6.25%

How much confident are you? \_\_\_\_\_\_%

Q-13. In the period of higher volatility in stock market, which group of stock would you prefer to sell?

1. The one which earn profit.
2. The one which earn loss.

Q-14. From your holdings of different companies’ share, there is positive news for specific company. What will do?

1. Indifferent
2. Maintain position/keep investing
3. Increase/purchase half of share
4. Sell other half and invest in news specific company

Q-15. During your investment experience, what contribution has been made by following factors which led you towards profit?

|  |  |  |
| --- | --- | --- |
| no | Particular | Contribution % |
| 1. | Broker Advice |  |
| 2. | Friend Advice |  |
| 3. | Own Analysis |  |
| 4. | Suggestions by TV and News |  |
| 5. | Your Intuition |  |
|  | Total | 100% |

General information:

Name of respondent:

Age: years

Gender: Male female

Occupation :

1. Professional
2. Business
3. Service
4. Other :

|  |  |
| --- | --- |
| Question number | Behavioural theory |
| 1,10,11 | Rationality |
| 2,9,12 | Over confidence |
| 3,8,13 | Disposition effect |
| 4,14 | Conservatism |
| 7 | Cognitive dissonance |
| 5,6,15 | Regret theory |

# Procedure & Data Collection

The questionnaire was formed with 15 questions. Each question starts with a particular scenario or situation that may happen in the stock market. Then the respondents were offered a set of responses, which generally observed at a time of decision making. The questions were arranged in the following sequence to get proper understanding of investors’ behaviour and response.

# Data Analysis & Interpretation

Hypothesis 1:- 60% investors above age of 35yrs are Rational

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Qno | Rational option | Rational investor | Irrational investor | total |
| 1 | Option 2 | 27 | 23 | 50 |
| 10 | Option 1 | 29 | 21 | 50 |
| 11 | Option 1 | 9 | 41 | 50 |

Here in question-1, investors who supposed to be rational would like to select option 2 because compare to option 1 option 2 is profitable. In analysis 27 investors select option 2nd it show that 54% investors are rational and 23 investors selected 1st option it means 45% investors are irrational.

In question-10, under the rationality assumption of expected utility theory investors have to choose option 1 because option 1 offered loss of Rs.100 and option 2 loss of Rs.140. 29 investors select option 1st it show that 58% investors are rational and 21 investors select option 2nd it means 42% investors are irrational.

In question no. 11 As per Rationality theory of behaviour finance, intuition of investors is not playing any role in deciding or taking decision. The investors who are Rational they select option 1, that contain “no effect” of intuition and who are irrational investors they select option 2 & 3, these contain “little effect” and “high effect”. 9 investors select option 1 means 18% investors are rational on the other hand 41 investors who select option 2 & 3 means 82% investors are irrational.

N=50, x=22,

p^=22/50 =0.44, p=.60 q=.40 @=7% confidence level = 93%

Zcal = P^-p/(p.q/n)0.5

= 0.44-0.60/ (.60\*.40/50)0.5

= -0.16/0.0429

Zcal= -3.72

Zcal < Ztab, H0 is rejected and it can be concluded that less than 60% of investor above age group of 35 are rational.

Hypothesis 2: 60% investors below the age group 35yrs are rational

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Qno | Rational option | Rational investor | Irrational investor | Total |
| 1 | Option 2 | 30 | 20 | 50 |
| 10 | Option1 | 27 | 23 | 50 |
| 11 | Option1 | 2 | 48 | 50 |

Here in question-1, investors who supposed to be rational would like to select option 2 because compare to option 1 option 2 is profitable. In analysis 30 investors select option 2nd it show that 60% investors are rational and 20 investors selected 1st option it means 40% investors are irrational.

In question-10, under the rationality assumption of expected utility theory investors have to choose option 1 because option 1 offered loss of Rs.100 and option 2 loss of Rs.140. 27 investors select option 1st it show that 54% investors are rational and 23 investors select option 2nd it means 46% investors are irrational.

In question no. 11 As per Rationality theory of behaviour finance, intuition of investors is not playing any role in deciding or taking decision. The investors who are Rational they select option 1, that contain “no effect” of intuition and who are irrational investors they select option 2 & 3, these contain “little effect” and “high effect”. 2 investors select option 1 means 4% investors are rational on the other hand 48 investors who select option 2 & 3 means 96% investors are irrational.

N=50, x=20

p^= 20/50=0.40, p=.60 q=.40 @=7%, confidence level = 93%

Zcal = P^-p/(p.q/n)0.5

= 0.40-0.60/ (.60\*.40/ 50)0.5

= -0.20/0.0429

Zcal = -4.66

Z cal < Ztab H0 is rejected it can be concluded that less than 60% investor below the age group of 35 yrs are rational

Hypothesis 3: 60% investors above the age group 35yrs are overconfident

|  |  |  |  |
| --- | --- | --- | --- |
| Less confident | Not over confident | Overconfident | total |
| 3 | 24 | 23 | 50 |
| 5 | 19 | 26 | 50 |
| 2 | 28 | 20 | 50 |

In question 2, 9 and 12 questions were asked and also asked for their confidence for their answers. If investor gives wrong answer and give above 70% confidence level then, he/she was considered overconfident. If investor gives correct answer with less than 50% confidence level, it was considered less confident. And investor gives correct answer with above 50% confidence or wrong answer with below 70% confidence level was categorized as not over confident.

N=50 x=23

p^=23/50=0.46, p=.60 q=.40 @=7%, confidence level = 93%

Zcal = P^-p/(p.q/n)0.5

= 0.46-0.60/ (.60\*.40/ 50)0.5

= -0.14/0.0429

Zcal =-2.02

Zcal < Ztab, H0 is rejected it can be concluded that less than 60 % of the investor above the age group of 35yrs are overconfident.

Hypothesis 4: 60% investors below the age group 35yrs are overconfident.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Qno | Less confident | Not over confident | Overconfident | Total |
| 2 | 9 | 23 | 18 | 50 |
| 9 | 6 | 21 | 23 | 50 |
| 12 | 5 | 30 | 15 | 50 |

In question 2, 9 and 12 questions were asked and also asked for their confidence for their answers. If investor gives wrong answer and give above 70% confidence level then, he/she was considered overconfident. If investor gives correct answer with less than 50% confidence level, it was considered less confident. And investor gives correct answer with above 50% confidence or wrong answer with below 70% confidence level was categorized as not over confident.

N=50, x=19

p^= 19/50= 0.38 p=.60 q=.40 @=7%, confidence level = 93%

Zcal = P^-p/(p.q/n)0.5

= 0.38-0.60/ (.60\*.40/ 50)0.5

= -0.22/0.0429

Zcal = -5.12

Z cal < Ztab Ho is rejected it can be concluded that less than 60% investor below the age group of 35 yrs are overconfident.

Hypothesis 5 : 60% of investor above age of 35yrs are affected by disposition effect

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Qno | Option for disposition effect | Disposition effect | No disposition effect | total |
| 3 | 1 | 39 | 11 | 50 |
| 8 | 2,3,4 | 46 | 4 | 50 |
| 13 | 1 | 42 | 8 | 50 |

The disposition effect means sell the winner too soon and hold the looser too long. To check the disposition effect 3 questions were formed in a case form. Investors were asked about their decision for holding or selling winning stock and looser stock. The investors who prefer to sell winning stock and ready to hold looser stock were categorized as investors affected by disposition effect.

In question no.3, 39 investors opted for option 1, i.e 78% of investors are affected by disposition effect, while 11 investors selected option 2, means 22% investors are not affected by disposition effect.

In question no.8, 46 investor selected option 2,3,4 , it mean 92% of investors are affected by disposition effect, while 4 investors opted for option 1 and 5 which means that 8% investors are not affected by disposition effect.

In question no.13, 42 investors selected option no 1, which means that 79% of investors are affected by disposition effect, while 8 investors choose option 2, means 21 % investors are not affected by disposition effect.

Based on the data collected from questions 3,8 and 13; 84% of investors are affected by disposition effect.

N=50 x=42

p^=42/50=0.84, p=.60 q=.40 @=7% confidence level =93%

Zcal = P^-p/(p.q/n)0.5

= 0.84-0.60/ (.60\*.40/50)0.5

=0.24/0.0429

Zcal = 5.59

Zcal > Ztab H0 is accepted, it means 60% investor above the age of 35yrs are affected by disposition effect.

Hypothesis 6 : 60% of investor below age of 35yrs are affected by disposition effect

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Qno | Option for disposition effect | Disposition effect | No disposition effect | total |
| 3 | 1 | 43 | 7 | 50 |
| 8 | 2,3,4 | 47 | 3 | 50 |
| 13 | 1 | 44 | 6 | 50 |

The disposition effect means sell the winner too soon and hold the looser too long. To check the disposition effect 3 questions were formed in a case form. Investors were asked about their decision for holding or selling winning stock and looser stock. The investors who prefer to sell winning stock and ready to hold looser stock were categorized as investors affected by disposition effect.

In question no.3, 43 investors opted for option 1, i.e 86% of investors are affected by disposition effect, while 7 investors selected option 2, means 14% investors are not affected by disposition effect.

In question no.8, 47 investor selected option 2,3,4 , it mean 94% of investors are affected by disposition effect, while 3 investors opted for option 1 and 5 which means that 6% investors are not affected by disposition effect.

In question no.13, 44 investors selected option no 1, which means that 88% of investors are affected by disposition effect, while 6 investors choose option 2, means 12 % investors are not affected by disposition effect.

Based on the data collected from questions 3,8 and 13; 90% of investors are affected by disposition effect.

N=50, x=45

p^=45/50=0.9, p=.60 q-.40 @=7% confidence level =93%

Zcal = P^-p/(p.q/n)0.5

= 0.9-0.60/ (.60\*.40/50)0.5

=0.3/0.0429

Zcal = 6.99

Z cal > Ztab Ho is accepted; ; it means 60% investor below the age of 35yrs are affected by disposition effect.

Hypothesis 7: 60% investor above the age of 35 yrs are conservative.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Q no | Option for conservatism | Conservative investor | Non conservative investor | total |
| 4 | 1&2 | 29 | 21 | 50 |
| 14 | 3&4 | 37 | 13 | 50 |

Conservative is simply means traditional. Conservative investors believe in past information. They are very slow to accept any new information that available in market regarding particular stock. Here, in question 4 and 14 particular case was given for their investment and asked about their decision regarding current investment. From the table it can observe that at the time of negative news (Question 4) investors were less conservative compared to positive news (Question 14).

In question no.4, 29 investors selected option 1&2 it means 58% investors are conservative, while 21 investors selected option 3&4 it means 42% are non conservative.

In question no.14, 37 investors selected option 3&4 which means 74% of investors are conservative, while 13 investors selected option 1&2 which means 26% investors are non conservative.

Based on the data collected form question no. 4 and 14 it can be concluded that 60% of investors are conservative.

N=50, x=33

p^= 33/50= 0.66, p=.60 q-.40 @=7% confidence level =93%

Zcal = P^-p/(p.q/n)0.5

= 0.66-0.60/ (.60\*.40/50)0.5

= 0.06/0.0429

Zcal =1.39

Zcal > Ztab Ho is accepted and it can be concluded that 60% of investors above age group of 35 yrs are conservative.

Hypothesis 8: 60% investors below the age of 35 yrs are conservative.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Q no | Option for conservatism | Conservative investor | Non conservative investor | total |
| 4 | 1&2 | 21 | 29 | 50 |
| 14 | 3&4 | 15 | 35 | 50 |

Conservative is simply means traditional. Conservative investors believe in past information. They are very slow to accept any new information that available in market regarding particular stock. Here, in question 4 and 14 particular case was given for their investment and asked about their decision regarding current investment. From the table it can observe that at the time of negative news (Question 4) investors were less conservative compared to positive news (Question 14).

In question no.4, 21 investors selected option 1&2 it means 42% investors are conservative, while 29 investors selected option 3&4 it means 58% are non conservative

In question no.14, 15 investors selected option 3&4 which means 30% of investors are conservative, while 35 investors selected option 1&2 which means 70% investors are non conservative.

Based on the data collected from the question no. 4 and 14, it can be concluded that 34% of investors are conservative.

N=50, x=18

p^= 18/50= 0.36, , p=.60 q-.40 @=7% confidence level =93%

Zcal = P^-p/(p.q/n)0.5

= 0.36-0.60/ (.60\*.40/50)0.5

= -0.24/0.0429

Zcal = -5.59

Zcal < Ztab Ho is rejected and it can be concluded that less than 60% of investor below the age group of 35 yrs are conservative

Hypothesis 9: 60% investor above the age of 35 yrs are affected by cognitive dissonance

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Q no | Option for cognitive dissonance | Cognitive dissonance | Non cognitive dissonance | total |
| 7 | 3&4 | 24 | 26 | 50 |

Cognitive Dissonance investors believe in changing their portfolio or change their investment patterns to support their financial decision or support new information that is given by faithful resources. The investors were asked to sell all stocks from portfolio and invest that money in another industry. 24 investors select options 3 or 4 so it is said that 48% investors are Cognitive Dissonance investors. They are ready to change in investment pattern to support financial information that available in market. 26 investors select options 1 or 2 that mean 52% investors are non cognitive dissonance investors that means they are stick to their past experience and investment (Conservatism).

N=50, x=24

p^=24/50= 0.48, , p=.60 q-.40 @=7% confidence level =93%

Zcal = P^-p/(p.q/n)0.5

=0.48-0.60/ (.60\*.40/50)0.5

= -0.12/0.0429

Zcal= -2.79

Zcal < Ztab Ho is rejected it means less than 60% investor above age group of 35yrs are affected by cognitive dissonance

Hypothesis 10: 60% investor below the age group of 35 yrs are affected by cognitive dissonance

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Q no | Option for cognitive dissonance | Cognitive dissonance | Non cognitive dissonance | total |
| 7 | 3&4 | 38 | 12 | 50 |

Cognitive Dissonance investors believe in changing their portfolio or change their investment patterns to support their financial decision or support new information that is given by faithful resources. The investors were asked to sell all stocks from portfolio and invest that money in another industry. 38 investors select options 3 or 4 so it is said that 76% investors are Cognitive Dissonance investors. They are ready to change in investment pattern to support financial information that available in market. 12 investors select options 1 or 2 that mean 24% investors are non cognitive dissonance investors that means they are stick to their past experience and investment (Conservatism).

N=50, x=38

p^=38/50= 0.76 , p=.60 q-.40 @=7% confidence level =93%

Zcal = P^-p/(p.q/n)0.5

=0.76-0.60/ (.60\*.40/50)0.5

= 0.16/0.0429

Zcal= 3.72Zcal > Ztab Ho is accepted it means 60% investors below the age group of 35yrs are affected by cognitive dissonance

Hypothesis 11: 60% investors above the age group are regret investor.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Qno | Option for regret | Regret % | No regret % | Total |
| 5 | 1 | 53.84% | 46.16 | 100% |
| 6 | 2&5 | 37.5% | 62.5% | 100% |
| 15 | 2&5 | 41.96% | 58.04% | 100% |

In stock market we found regret as that in order to avoid the regret of pain people try to justify their bad investment decisions by putting responsibility on some other reference point. In other words in profit situation they give credit to themselves and on the other hand in loss situation they give credit for this situation to other like their broker advice or friend advice or suggestion by TV or News Papers. In question 5 investors offer credit to friends’ mistake compare to bad luck. In question 6 investors give credit to others for their losses but in question 15 investors give credit to self for their profit. It supports the theory of Regret.

In question no.5 27 investors i.e. 54%, offered credit to friend’s mistake compare to 23 investors i.e. 46% who credited it to friend’s bad luck.

. In question 6, 19 investors i.e. 38% gave credit to others for their losses.

In question 15, 21 investors i.e. 42% gave credit to self for their profit.

Based on the data collected in question no. 5,6 and 15 it can be concluded that 54% investors were regret investors. . In question 6 investors give credit to others for their losses but in question 15 investors give credit to self for their profit. It supports the theory of Regret.

N=50, x=27

P^= 27/50= 0.54 p=.60 q=.40 @=7% confidence level = 93%

Zcal = P^-p/(p.q/n)0.5

= 0.54-0.60/ / (.60\*.40/50)0.5

= -0.06/0.0429

Zcal= -1.39

Zcal > Ztab Ho is accepted; it means 60% investors above the age group of 35 yrs are regret investor.

Hypothesis 12: 60% investor below the age 35yrs are regret investor.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Qno | Option for regret | Regret % | No regret % | Total |
| 5 | 1 | 56.34% | 43.66 | 100% |
| 6 | 2&5 | 43.96% | 56.04 | 100% |
| 15 | 2&5 | 37.55% | 62.45 | 100% |

In stock market we found regret as that in order to avoid the regret of pain people try to justify their bad investment decisions by putting responsibility on some other reference point. In other words in profit situation they give credit to themselves and on the other hand in loss situation they give credit for this situation to other like their broker advice or friend advice or suggestion by TV or News Papers. In question 5 investors offer credit to friends’ mistake compare to bad luck. In question 6 investors give credit to others for their losses but in question 15 investors give credit to self for their profit. It supports the theory of Regret.

In question no.5 28 investors i.e. 56%, offered credit to friend’s mistake compare to 22 investors i.e. 44% who credited it to friend’s bad luck.

. In question 6, 22 investors i.e. 44% gave credit to others for their losses.

In question 15, 19 investors i.e. 38 % gave credit to self for their profit.

Based on the data collected in question no. 5,6 and 15 it can be concluded that 56% investors were regret investors. . In question 6 investors give credit to others for their losses but in question 15 investors give credit to self for their profit. It supports the theory of Regret.

N=50, x=28

P^= 28/50= 0.56 p=.60 q=.40 @=7% confidence level = 93%

Zcal = P^-p/(p.q/n)0.5

= 0.56-0.60/ / (.60\*.40/50)0.5

= -0.04/0.0429

Zcal = -0.93

Zcal > Ztab Ho is accepted; it means 60% investors below the age group of 35 yrs are regret investor.

# Research Methodology

The study will have a descriptive research design. Primary data will be used. Primary data will be gathered using a structured questionnaire which will be presented to individual retail investors.

# Tools & Technique

Likert Scale: A Likert scale is a psychometric scale commonly involved in research that employs questionnaires. It is the most widely used approach to scaling responses in survey research, such that the term is often used interchangeably with rating scale, or more accurately the Likert-type scale, even though the two are not synonymous. The scale is named after its inventor, psychologist Rensis Likert. Likert distinguished between a scale proper, which emerges from collective responses to a set of items (usually eight or more), and the format in which responses are scored along a range. Technically speaking, a Likert scale refers only to the former. The difference between these two concepts has to do with the distinction Likert made between the underlying phenomenon being investigated and the means of capturing variation that points to the underlying phenomenon When responding to a Likert questionnaire item, respondents specify their level of agreement or disagreement on a symmetric agree-disagree scale for a series of statements. Thus, the range captures the intensity of their feelings for a given item. A scale can be created as the simple sum questionnaire responses over the full range of the scale. In so doing, Likert scaling assumes that distances on each item are equal. Importantly, "All items are assumed to be replications of each other or in other words items are considered to be parallel instruments" (p. 197). By contrast modern test theory treats the difficulty of each item (the ICCs) as information to be incorporated in scaling items.

Z-Test: A Z-test is any statistical test for which the distribution of the test statistic under the null hypothesis can be approximated by a normal distribution. Many statistical tests can be conveniently performed as approximate Z-tests if the sample size is large or the population variance known. If the population variance is unknown (and therefore has to be estimated from the sample itself) and the sample size is not large (n < 30), the Student t-test may be more appropriate.

T- Test: A *t*-test is any statistical hypothesis test in which the test statistic follows a Student's *t* distribution if the null hypothesis is supported. It is most commonly applied when the test statistic would follow a normal distribution if the value of a scaling term in the test statistic were known. When the scaling term is unknown and is replaced by an estimate based on the data, the test statistic (under certain conditions) follows a Student's *t* distribution.

# Suggestion/Recommendations/Conclusion

This research tends to study the behaviour of investors in Mumbai with respect to age(investors above the age of 35yrs and investors below the age of 35 yrs), mainly based on six cognitive biases named Rationality, Overconfidence, Disposition effect, Conservatism, Cognitive dissonance and Regret theory.

The best manner to explore the investors behaviour is to interact directly with the investors and extract their opinion. So, the questionnaire survey technique was adopted and questions based on these cognitive biases were asked. The responses collected through the questionnaire were analysed and hypothesized.

The findings with respect to investors above the age of 35yrs support the rationality, disposition effect, conservatism and regret theory concepts of behavioural. While the findings do not support the overconfidence and cognitive dissonance in investors above the age of 35yrs

The findings with respect to investors below the age of 35 yrs support the rationality, disposition effect, cognitive dissonance and regret theory concepts of behavioural. But the findings do not supports the overconfidence and conservatism in investors below the age of 35yrs old.

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