Directorate of Distance Education

UNIVERSITY OF JAMMU
JAMMU

SELF LEARNING MATERIAL

OF

BEHAVIOURAL FINANCE

COURSE NO : FE-316	**UNIT : I-IV**
M.COM. IIIRD SEMESTER	**LESSON NO. : 1-20**

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M.COM. IIIRD SEMESTER

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DIRECTORATE OF DISTANCE EDUCATION
UNIVERSITY OF JAMMU
M.Com. Third Semester (NCBS)
Behavioural Finance

Course : M.Com.-FE 316   **Max. Marks : 100 Marks**

Credit : 4   **External : 80 Marks**

Time : 3.00 Hrs.   **Internal : 20 Marks**

(Syllabus for the examinations to be held in Dec. 2020, 2021, 2022)

OBJECTIVE : The purpose of this course is to introduce the student to the new field of behavioural finance. Students will deal with major implications of human psychology for financial decision-makers and for financial markets. Upon completion of this course, students will be able to have a good understanding of the major concepts and topics of behavioural finance.

UNIT-I   : RATIONAL MARKETS HYPOTHESIS AND   PAGE NO.
**   THE CHALLENGE OF BEHAVIOURALISTS   6-71**

Introduction to behavioural finance; Intellectual underpinnings; The rise of the rational markets hypothesis; Impact on wall street and the corporate; The challenges of behaviouralists; Synthesis and future horizons.

UNIT-II   : FOUNDATION OF RATIONAL FINANCE   72-138

Expected utility theory, Modern portfolio theory, Capital asset pricing model (CAPM); Efficient markets hypothesis; Agency theory; The influence of psychology.

UNIT-III : FOUNDATIONS OF BEHAVIOURAL FINANCE   139-217
**   (Heuristics and Biases)**

How the human mind works-the two systems; Familiarity and related heuristics; Representativeness and related biases; Anchoring; Irrationality and adaptation; Hyperbolic discounting.

UNIT-IV : PROSPECT THEORY AND MENTAL ACCOUNTING   218-284

Error in Bernoulli's theory; Prospect theory; SPA theory, Framing; Mental Accounting; Emotional factors and social forces-substance of emotion, theories of emotion, evolutionary perspective on emotions, types and dimensions of emotions, emotional style, emotions and investing, social inlfuence, social influence on investment and consumption.

BOOKS RECOMMENDED

1.   Chandra, P. (2017), Behavioural Finance, Tata Mc Graw Hill Education, Chennai (India).

2.   Ackert, Lucy, Richard Deaves (2010), Behavioural Finance; Psychology, Decision Making and Markets, Cengage Learning.

3.   Forbes, William (2009), Behavioural Finance, Wiley.

4.   Kahneman, D. and Tversky, A. (2000). Choices, values and frames. New York : Cambridge Univ. Press.

5.   Shefrin, H. (2002), Beyond Greed and Fear; Understanding Behavioural Finance and Psychology of investing. New York; Oxford University Press.

6.   Shleifer, A. (2000). Inefficient markets; An introduction to Behavioural Finance. Oxford Univ. Press.

7.   Thaler, R. (1993). Advances in Behavioral Finance. Vol. I. New York, Russell Sage Foundation.

8.   Thaler, R. (2005). Advances in Behavioural Finance. Vol. II. New York; Princeton University Press.

NOTE FOR PAPER SETTING

The paper consists of two sections. Each section will cover the whole of the syllabus without repeating the question in the entire paper.

Section A : It will consist of eight short answer questions, selecting two from each unit. A candidate has to attempt any six and answer to each question shall be within 200 words. Each question carries four marks and total weightage to this section shall be 24 marks.

Section B : It will consist of six essay type questions with answer to each question within 800 words. One question will be set atleast from each unit and the candidate has to attempt four. Each question will carry 14 marks and total weightage shall be 56 marks.

MODEL QUESTION PAPER

BEHAVIOURAL FINANCE

Duration of examination : 3hours   **M. Marks: 80**

SECTION A

Attempt any six questions. Each question carries 4 marks. Answer to each question should be within 200 words.

1. Discuss the concept of Behavioural Finance.

2. Explain various challenges being faced by behaviouralists.

3. What do you understand by Expected Utility Theory?

4. Briefly discuss agency theory and agency cost.

5. Give a brief note on hyperbolic discounting.

6. Describe how human mind works with the two systems.

7. What are errors in Bernoulli's theory?

8. Discuss the concepts of mental accounting and mental budgeting.

SECTION B

Attempt any four questions. Each question carries 14 marks. Answer to each question should be within 800 words.

1. Explain the nature, scope and applications of behavioural finance. Also, discuss the evolution of rational markets.

2. Discuss modern portfolio theory and its assumption. Also, explain the importance of MPT for risk management.

3.   Elucidate CAPM in detail. State its components and implications.

4.   Explain the concept of representativeness and anchoring. Also, discuss the biases related with representatives.

5.   Discuss in detail the key tenets of prospect theory.

6.   What are emotions? Discuss in detail the theories and dimensions of emotions.

RATIONAL MARKETS HYPOTHESIS AND THE CHALLENGE OF BEHAVIOURALISTS

INTRODUCTION TO BEHAVIOURAL FINANCE

STRUCTURE

1.1   INTRODUCTION

Since the mid-1950s, the field of finance has been dominated by the traditional finance model developed by the economists of the University of Chicago. The Central assumption of the traditional finance model is that the people are rational. Standard Finance theories are based on the premise that investor behaves rationally and stock and bond markets are efficient. As the financial economists were assuming that people (investors) behaved rationally while making financial decisions, psychologists have found that economic decisions are made in an irrational manner, so they challenge this assumption of standard finance. Cognitive error and extreme emotional bias can cause investors to make bad investment decisions, thereby acting in irrational manner. Since the past few decade, field of Behavioural finance has evolved to consider how personal and social psychology influence financial decisions and behaviour of investors in general. The finance field was reluctant to accept the view of psychologists who had proposed the Behavioural finance model. Behavioural finance was considered first by the psychologist Daniel Kahneman and economist Vernon Smith, who were awarded the Nobel Prize in Economics in 2002.This was the time when financial economist started believing that the investor behaves irrationally. Human brains process information using shortcuts and emotional filters even in investment decisions. It is an attempt to explain how the psychological dimensions influence investment decisions of individual investor, how perception influences the mutual funds market as a whole. It is worth exploring whether field of psychology helps investor to make more reasonable investment decisions.

Behavioural finance is a concept developed with the inputs taken from the field of psychology and finance. It tries to understand the various puzzling factors in stock markets to offer better explanations for the same. These factors or abnormalities were initially termed as market anomalies, as they could not be explained in the Neo-classical framework. To answer the increased number and types of market anomalies, a new approach to financial markets had emerged- the Behavioural finance. Behavioural finance is defined as the study of the influence of socio-psychological factors on an asset's price. It focuses on investor behaviour and their investment decision-making process.

1.2 OBJECTIVE

After studying this lesson, you will be able to understand :

• the concept of Behavioural finance

• the scope of Behavioural finance

• the application of Behavioural finance

• objectives of Behavioural finance

1.3 CONCEPT OF BEHAVIOURAL FINANCE

Behavioural Finance (BF) is the study of investors' psychology while making financial decisions. It is the study of the influence of psychology and sociology on the behaviour of financial practitioners and the subsequent effect on market. According to Behavioural finance, investors' market behaviour derives from psychological principles of decision-making to explain why people buy or sell stock. Behavioural finance focuses upon how investor interprets and acts on information to take various investment decisions. Behavioural finance can be explained as modern finance in which it seeks the reasons of stock market anomalies by justifying them with explanation of various biases that the investor has while taking investment decisions. Behavioural finance is an add-on paradigm of finance, which seeks to supplement the standard theories of finance by introducing behavioural aspects to the decision-making process. Behavioural finance deals with individuals and ways of gathering and using information. At its core, behavioural finance analyses the ways that people make financial decisions. Behavioural finance seeks to understand and predicts systematic financial market implications of psychological decision processes. In addition, it focused on the application of psychological and economic principles for the improvement of financial decision-making. Behavioural finance is the combination of psychology, sociology and finance.
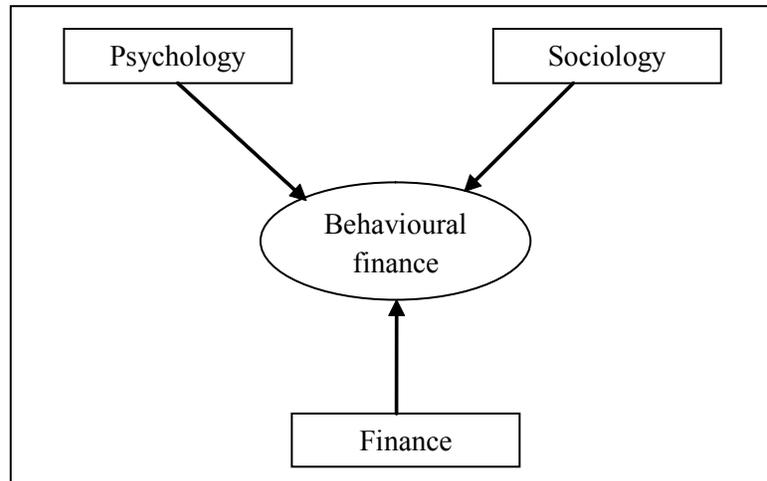
Figure 1.1: Concept of Behavioural finance

In addition behavioural finance also places emphasis on investor's behaviour leading to various market anomalies. Investors fall prey to their own and sometimes others' mistakes due to the use of emotions in financial decision-making. For many financial advisors, BF is still an unfamiliar and unused subject.

Sewell has defined Behavioural finance as "the study of the influence of psychology on the behaviour of financial practitioners and the subsequent effect on markets".

Linter has defined Behavioural finance as "study of how human interprets and act on information to make informed investment decisions".

According to Shefrin, "Behavioural finance is the application of psychology to financial behaviour – the behaviour of investment practitioners."

Thus, Behavioural finance can be described in the following ways:

• Behavioural finance is the integration of classical economics and finance with psychology and the decision making sciences.

• Behavioural finance is an attempt to explain what causes some of the anomalies that have been observed and reported in the finance literature.

- Behavioural finance is the study of how investors systematically make errors in judgment or 'mental mistakes'.

Behavioural finance is defined as the field of finance that proposes psychological based theories to explain stock market anomalies. Within the Behavioural finance it is assumed that the information structure and the characteristics of market participants systematically influence individual's investment decisions as well as market outcomes.

➢ **Assumptions of Behavioural Finance:**

- **Loss aversion**: Loss aversion is a tendency in Behavioural finance where investors are so fearful of losses that they focus on trying to avoid a loss more so than on making gains i.e. for them it is better to avoid a loss of ₹ 500 than to gain ₹ 500.

- **Bounded rationality**: The manner in which human being behave, limits the irrationality.

- **Denial of risk**: They may know statistical odds but refuse to believe these odds.

1.4 NATURE OF BEHAVIOURAL FINANCE

Behavioural finance is not just a part of finance but is broader and wider in scope and includes insights from Behavioural economic, psychology and microeconomic theory. In the process of making financial investments, investors often have difficulty while choosing the most economic option because of the impact of his/her various psychological and mental filters. When an investor asks for guidance from an agent or a professional in the field of finance, their behaviour may also be influenced by market information or strategies of other agents or professionals.

Behavioural finance can be defined as open-minded finance. The main theme of traditional finance is to avoid all possible effects of the personality and mindset of an individual. But anomalies and biases existing in the real world are explained with the help of behavioural finance to explain the reasons for the same. As per

standard finance theories, investors should be rational in their approach but behavioural finance helps in explaining the normal behaviour of investors.

Behavioural finance, as a subject, can be better discussed if we divide it into two branches which are as follows:

1)   Micro Behavioural Finance

2)   Macro Behavioural Finance

     1.   **Micro Behavioural Finance (BFMI):** This branch deals with the behaviour of individual investors. In BFMI, we compare irrational investors to rational investors, as observed in the rational/classical economic theory. These rational investors are also known as "homo economicus" or the rational economic man.

     2.   **Macro Behavioural Finance (BFMA):** Unlike micro behavioural finance (BFMI), which deals with the behaviour of individuals, macro behavioural finance deals with the drawbacks of the efficient market hypothesis. Efficient market hypothesis is one of the models in conventional finance that helps us understand the trend of financial markets. Macro behavioural finance also addresses the limitations of Portfolio Principles of Markowitz, the Capital Asset Pricing Model (CAPM), Theory of Sharpe, Linter, Black and the Option-Pricing Theory of Black, Scholes and Merton.

BEHAVIOURAL FINANCE AS A SCIENCE OR AN ART

Behavioural Finance as a Science

Whether behavioural finance should be regarded as a science or not depends on how we define science. To put it simply, science is a systematic and scientific way of (i) observing, (ii) recording, (iii) analysing and (iv) interpreting any event.

The field of behavioural finance has taken inputs from standard finance only, which is a systematic and well-designed subject based on various theories. The

theories of standard finance also help in justifying the price movements and trend of stocks (Fundamental Analysis), the direction of markets (Technical Analysis), construction, revision and evaluation of investor portfolios (Markowitz Model, Sharpe's Performance Index, Treynor's Performance Index, various formula plans of portfolio revision). Hence, on the basis of this discussion behavioural finance can be justified as a science.

Behavioural Finance as an Art

Art as a subject is entirely different from science. In science, we work according to the rule of thumb whereas in art we create our own rules. Art helps us to use theoretical concepts in the practical world. While executing the theories and concepts of standard finance too, certain modifications and aberrations in the theories take place. These aberrations are because of the effect of the psychology of different users.

Behavioural finance focuses on the reasons that limit the theories of standard finance and also the reasons for market anomalies created. It also provides guidance to investors to identify themselves better by providing various models of human personality. Once investors get to know the limitations and also the remedies of their mental set up, they tend to plan their finances better.

Behavioural finance provides various tailor-made solutions to the investors to be applied in their financial planning, hence it can be justified as an art of finance in a more practical manner.

1.5 SCOPE OF BEHAVIOURAL FINANCE

The scope of behavioural finance can be visualized by examining its role in investment decision-making if individuals as well as corporate. The scope areas of behavioural finance are discussed as follows:

a. **To understand the reasons of market anomalies:** Though standard finance theories are able to justify the stock market to a great extent, still there are many market anomalies that take place in stock markets, including creation of bubbles, the effect of any event, calendar effect

on stock market trade etc. These market anomalies remain unanswered in standard finance but behavioural finance provides explanation and remedial actions to various market anomalies.

b. **To identify investor's personality:** An exhaustive study of behavioural finance helps in identifying the different types of investor personality. Once the biases of the investor's actions are identified, by the study of investor's personality, various new financial instruments can be developed to hedge the unwanted biases created in the financial markets.

c. **To enhance the skill set of investment advisors:** This can be done by providing better understanding of the investor's goals, maintaining a systematic approach to advise, earn the expected return and maintain a win-win situation for both the client and the advisor.

d. **Helps to identify the risks and develop hedging strategies:** Because of various anomalies in the stock markets, investments these days are not only exposed to the identified risks, but also to the uncertainty of the returns.

e. Behavioural finance provides explanation to various corporate activities.

1.6 OBJECTIVES OF BEHAVIOURAL FINANCE

Some specific objectives of behavioural finance have been summarized as follows:

1. To review the debatable issues in standard finance and to protect the interests of stakeholders in volatile investment scenario.

2. To examine the relationship between theories of standard finance and Behavioural finance and to analyse the influence of biases on the investment process because of different personalities playing in the investment market.

3. To examine the various social responsibilities of the subject.

4. To discuss emerging issues in the financial world.

5. To discuss the development of new financial instruments, which have been developed because of the need of hedging the conventional instruments against various market anomalies.

6. To familiarize themselves with trend of changes over the years across various economies.

7. To examine the contagion effect of various events.

8. An effort towards more elaborated identification of investor's personality.

9. More elaborate discussions on optimum asset allocation according to age, sex, income and unique personality of investors.

1.7 APPLICATION OF BEHAVIOURAL FINANCE

Behavioural finance actually equips finance professionals with a set of new lenses, which allows them to understand and overcome many proven psychological traps that are present involving human cognition and emotions. This includes corporate boards and managers, individual and institutional investors, portfolio managers, analysts, advisors, and even policy makers. Behavioural traps exist and occur across all decision spectrums because of the psychological phenomena of heuristics and biases. These phenomena and factors are systematic in nature and can move markets for prolonged periods. It applies to:

1. Investors

2. Corporations

3. Markets

4. Regulators

5. Educations

Behavioural finance and investment decisions:

Decision making is a complex process which can be defined as a process of choosing a particular alternative among a number of possible courses of actions

after careful evaluation of each. Most crucial challenges to investors is to make investment decision, having a difference in their profile, like demographic factors, socio economic factors, educational levels, age, gender, and race.

Given the run up in stock (capital) market in 2004 to the end of 2007 and subsequent downturn of financial market, understanding irrational investor behaviour is as important as it has ever been. In present scenario behavioural finance has become an integral part of decision making process due to its influence on performance of investment stock market as well as mutual funds.

Most critical issue is market participant cannot behave rationally always, they deviate from rationality and expected utility assumption, while really making investment decisions. So, behavioural finance help investors as well as market participants to understand biases and other psychological constraint in their interplay in market.

1.7.1 Behavioural Biases that Influence Investment Decisions

a. **Denial:** Most of the times investors do not want to believe that the stock they have held since ages has become under-performing or they need to sell it off. They are in a constant state of denial. Even through the said asset brings the overall return of the portfolio down, investors are reluctant to part with it.

b. **Information processing errors:** Often referred to as the heuristic simplification, information-processing error is one of the biases of investor psychology. These people use the simplest approach to solve a problem rather than depending on logical reasoning. Heuristic simplification can be detrimental to the investing decisions. This is done by omitting crucial information to reduce complexity and processing only part information. Such an approach can lead to flawed decisions which can be dangerous to the stock market.

c. **Emotions:** Most of the behavioural anomalies stem from extreme emotions of the investors. This happens when investors do not make decisions with an objective mind and only tend to respond to their

biases. Misconceptions, misinterpretations, risk-aversion, past experiences all combine to block the logical bent of mind and exposes the investment decisions to possibilities of risk and losses.

d.   **Loss Aversion:** The risk-taking ability of each investor is different. Some are conservative in their approach while others believe in taking calculated risks. However, among the conservative investors are few who fear losses like anything. They may be aware about the potential gains from an asset class but are intimidated by the prospects of incurring even a short-term loss. In short, their excitement for gains is much less than their aversion towards losses. Needless to say these investors miss out on quite a few fruitful investments.

e.   **Social influence/herd mentality:** Herding is quite an infamous phenomenon in the stock markets and is the result of massive sell offs and rallies. These investors do not put in deep research behind their decisions and only follow the sentiment of the crowd whether positive or negative. Whether it was the tech-bubble in the early 90s, the subprime crisis in 2008, the Eurozone crisis in 2010 or the recent banking sector scams in India, the market has seen huge sell-offs. Most of them weren't even warranted.

f.   **Framing:** According to the Modern Portfolio Theory, an investment cannot be evaluated in isolation. It has to be viewed in the light of the entire portfolio. Instead of focusing on individual securities, investors should have a broader vision of wealth management. However, there are investors who single out assets or a particular investment for evaluation. This is viewing at things through a "narrow frame". This may lead to losses. Investors need to look at the holistic picture and evaluate with a "wider frame".

g.   **Anchoring:** Many a time investors hold on to a particular belief and refuse to part ways with it. They "anchor" their beliefs to that notions and have difficulty in accepting any new piece of information related to the subject. This is true in cases wherein a real estate or

pharmaceutical company is involved in a legal battle or bank has been involved in a scam. This negative information is received with greater intensity, so much so that no other piece of positive information can neutralize its effect.

1.8 APPROACHES TO DECISION-MAKING IN BEHAVIOURAL FINANCE

Behavioural finance advocates two approaches to decision-making:

- **Reflexive** – Following your gut feeling and inherent beliefs. In fact this is your default option.

- **Reflective** – This approach is logical and methodical, something that requires a deep thought process.

The more investors rely on reflexive decision-making, the more exposed they are to behavioural biases like self-deception biases, heuristic simplification, excess emotions and herding. Behavioural finance is an in depth study on these patterns and is creating a crucial place for itself among investors and investment managers.

To mitigate against reflexive decision-making, it's important to set up processes. Consider setting up processes that guide you through a logical decision-making approach and therefore help mitigate the use of reflexive decision making.

1.9 TRADITIONAL FINANCE AND BEHAVIOURAL FINANCE

The key difference between "Traditional Finance" and "Behavioural Finance" are as follows:

- Traditional finance assumes that people process data appropriately and correctly. In contrast, behavioural finance recognises that people employ imperfect rules of thumb (heuristics) to process data which induces biases in their belief and predisposes them to commit errors.

- Traditional finance presupposes that people view all decision through the transparent and objective lens of risk and return. Put differently, the form (or frame) used to describe a problem is inconsequential. In

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contrast, behavioural finance postulates that perceptions of risk and return are significantly influenced by how decision problem is framed. In other words, behavioural finance assumes frame dependence.

- Traditional finance assumes that people are guided by reasons and logic and independent judgment. While, behavioural finance, recognises that emotions and herd instincts play an important role in influencing decisions.

- Traditional finance argues that markets are efficient, implying that the price of each security is an unbiased estimate of its intrinsic value. In contrast, behavioural finance contends that heuristic-driven biases and errors, frame dependence, and effects emotions and social influence often lead to discrepancy between market price and fundamental value.

- Traditional finance views that price follow random walk, though prices fluctuate to extremes, they are brought back to equilibrium in time. While behavioural finance views that prices are pushed by investors to unsustainable levels in both direction. Investor optimists are disappointed and pessimists are surprised. Stock prices are future estimates, a forecast of what investors expect tomorrow's price to be, rather than an estimate of the present value of future payment streams.

1.10 SUMMARY

Behavioural finance is the study of the influence of the psychological factors on financial markets evolution. In other words, financial markets inefficiency is analysed in the light of the psychological theories and perspectives. Behavioural finance is a relatively recent and high impact paradigm which provides an interesting alternative to classical finance. The classical finance assumes that capital markets are efficient, investors are rational and it's not possible to outperform the market over the long-term.

Behavioural finance represents a revolution in financial theory. The combination of financial theory with other social sciences resulted in the appearance of behavioural finance. This is a relatively young and promising field of modern finance which has registered remarkable progress in the last decades.

1.11 GLOSSARY

1. **Finance:** Finance is a term broadly describing the study and system of money, investments, and other financial instruments.

2. **Behavioural Finance:** Behavioural finance is the study of the influence of psychology on the behavior of investors or financial analysts.

3. **Framing:** Framing is a cognitive heuristic in which people tend to reach conclusions based on the 'framework' within which a situation was presented.

1.12 SELF ASSESSMENT QUESTIONS

Q1. What do you mean by behavioural finance?

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Q2. What are the various objectives of behavioural finance?

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Q3. Define behavioural biases.

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Q4. What are the approaches to decision making in behavioural finance?

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1.13 LESSON END EXERCISES

Q1.   What is behavioural finance and its assumptions?

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Q2.   Explain the nature, scope and application of behavioural finance?

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Q3.   How behavioural finance is different from traditional finance?

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1.14 SUGGESTED READINGS / REFERENCES

➢   Chandra, P. (2017). *Behavioural Finance*. Tata Mc Graw Hill Education, Chennai (India).

➢   Singh. S., & Bahl.S (2015). *Behavioural Finance*. Vikas Publishing House, Noida (India).

➢   Sulphey, M.M. (2014). *Behavioural Finance*. PHI Learning, Delhi.

➢   Ackert, L. F., & Deaves, R. (2010). *Behavioural Finance: Psychology, Decision Making and Markets*. Cengage Learning.

➢   Sewell, M. (2007). Behavioural finance. *University of Cambridge*, 1-14.

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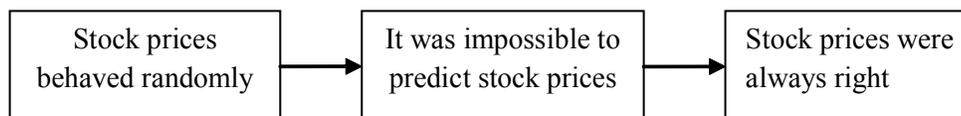# RATIONAL MARKETS HYPOTHESIS AND THE CHALLENGE OF BEHAVIOURALISTS

INTELLECTUAL UNDERPINNINGS AND THE RISE OF THE RATIONAL MARKETS HYPOTHESIS

STRUCTURE

2.1 INTRODUCTION

In October 2008, Alan Greenspan, the most influential central banker ever, admitted that he erred in understanding how the world works, "That's precisely the reason I was shocked, because I had been going for forty years or more with considerable evidence that it was working exceptionally well." During these forty years, the notion that financial markets were rational held sway and profoundly influenced public policy. The faith in the wisdom of financial markets led to an explosion of new financial instruments and increasing financialisation of the global economy. Celebrating this development, Alan Greenspan commented, "These instruments enhance the ability to differentiate risk and allocate it to those investors most able and willing to take it." While the notion that financial markets knew a lot has been around since the days of Adam Smith, the 20th century version of rational market theory was more precise and more extreme. It ran as follows:

Stock prices behaved randomly	→	It was impossible to predict stock prices	→	Stock prices were always right

This oversimplification of rational markets was found useful, so useful that it took a life of its own. In some ways, the story of rational markets hypothesis was intertwined with the resurgence of pro-market ideology after World War II. But the rational markets hypothesis was not, at its core, driven by a political ideology. Rather, it was a scientific proposition, derived from a vigorous mid-century fervour for objective, mathematical, and statistical analysis of financial markets.

From mid-1960s the rational markets hypothesis gained ascendance and increasingly dominated public debate, government decision-making, and private investment policy up to 2008. As J.M. Keynes had written long back, "The ideas of economists and political philosophers, both when they are right and when they are wrong, are more powerful than is commonly understood." He further added, "Indeed the world is ruled by little else. Practical men, who believe themselves to be quite exempt from any intellectual influences, are usually the slaves of some defunct economist." This chapter surveys the developments in finance from the early 20th century to the present and traces the rise of rational markets hypothesis.

2.2 OBJECTIVE

After studying this lesson, you will be able to understand :

•   the concept of intellectual underpinnings and

•   the rise of rational market hypothesis.

2.3 INTELLECTUAL UNDERPINNINGS

The two main schools of thought in economics in the early 20th century were neoclassicists and institutionalists. While neoclassical economists viewed economics as the study of rational individuals maximising utility, institutionalists took a broader view and recognised the role of institutions and customs. Irving Fisher was a leader of neoclassical economics and Wesley Mitchell a pioneer of institutionalists. Neoclassical economists build their theories through a process of deduction and institutionalists develop their findings through induction. Irving Fisher's book "The Nature of Capital and Income" published in 1906, hailed as "one of the principal building blocks of all present day economic history," established his international reputation. As Justin Fox put it, "He is perhaps not the father, but certainly a father of modern Wall Street." Irving Fisher was fascinated by the concept of equilibrium (in which competing influences balanced each other) which was crucial to the early development of chemistry and physics. Since equilibrium analysis lends itself naturally to mathematical treatment (all it takes is just an equal sign), it appealed to the mathematically inclined Fisher. His doctoral dissertation was the most sophisticated mathematical treatment yet of economic equilibrium, which Paul Samuelson lauded as "the greatest doctoral dissertation in economics ever written." Deeply influenced by physical sciences, Fisher also designed and built a contraption of interconnected water-filled cisterns that he referred to as "the physical analogue of the ideal economic market." By the way, Adam Smith's notion of an "invisible hand" that steered selfish individuals toward producing socially beneficial results had hinted toward the concept of economic equilibrium. In the early 1930s, John von Neumann, a Hungarian mathematician, wrote a paper on the mathematics of economic equilibrium which significantly reshaped the discussion of the subject. This perhaps provided the impetus to Kenneth Arrow

and John Debreu to develop a far more logically consistent and mathematically sophisticated version of economic equilibrium. The Arrow-Debreu model provided an elegant mathematical proof of the existence of Adam Smith's invisible hand. More importantly, it allowed for uncertainty. To achieve equilibrium under uncertainty, they assumed the existence of "complete" securities market. A complete securities market is a market in which you can bet on or insure against every possible future state of the world. For example, you can enter into a contract which says that if Brazil wins the 2022 World Cup in Soccer, you would be willing to give a seminar on 'Advances in Behavioural Finance' to the doctoral students of IIM Bangalore, provided the NDA is in power at the Centre in India. A "complete" securities market, however, does not exist in the real world and Arrow spent the rest of his academic career in exploring the consequences of the divergence between economic reality and economic theory.

2.4 THE RISE OF THE RATIONAL MARKETS HYPOTHESIS

The excitement generated by the Arrow–Debreu model and other theoretical breakthroughs of the era was contagious. It spread to almost every branch of economics, including the recalcitrant discipline of finance. The seminal developments in finance were:

- Modern corporate finance

- Portfolio theory and capital asset pricing model

- Random walk and efficient markets hypothesis

2.4.1 Modern Corporate Finance: Until the late 1950s, finance was taught in business schools as a mix of common sense, institutional practices, judgment, and tradition that had very little to do with economics. This separation could be traced to the philosophy of Harvard Business School, set up in 1908, where its founding fathers were convinced that the new school should emphasise the practical, eschew academic theories, and rely on "case method" of teaching which it imported from Harvard Law School. Things, however, began changing in the late 1950s. The task of reshaping the study of finance in the image of modern mathematical economics

was begun by two conventional economists, Franco Modigliani and Merton H. Miller, who worked at Carnegie Tech's new business school set up in early 1950s. Carnegie Tech (renamed CMU in 1967) had overhauled its engineering education in the 1940s to lay emphasis on scientific and mathematical rigour in place of the traditional rule-of-thumb trade school instruction. It planned to do the same for management education and hired promising young economists, operations research experts and Behavioural scientists.

Franco Modigliani and Merton H. Miller (M&M) wrote two seminal papers in which they developed mathematical theories based on rational behaviour and argued that the 'capital structure' policy and the 'dividend' policy of the firm did not matter under certain ideal conditions (no taxes, etc.). Incidentally, both Franco Modigliani and Merton H. Miller became Nobel laureates in economics. In the words of Robert Merton, another Nobel laureate in economics: "The Modigliani–Miller work stands as the watershed between 'old finance,' an essentially loose connection of beliefs based on accounting practices, rules of thumb and anecdotes, and modern financial economics, with its rigorous mathematical theories and carefully documented empirical studies." M&M, however, did not figure out how to calculate the cost of capital. In their celebrated 1958 paper, they said that the calculation of cost of capital "must be deferred to a subsequent paper."

2.4.2 Portfolio Theory and Capital Asset Pricing Model: Operations research— the use of mathematical and statistical theory for decision making— originated in the 1930s in the United Kingdom to solve military problems. It soon spread across the Atlantic and played a crucial role in helping the Allies win World War II. After the end of the war, operations research (OR) efforts were directed to peacetime uses, such as stock market investing. In 1952, Harry Markowitz, a graduate student at Chicago, published his landmark paper in which he developed an approach to portfolio selection that optimally balanced risk and return and laid the foundation for a new, quantitative approach to finance. Harry Markowitz developed an approach that helps an investor to achieve his optimal portfolio position. Hence, the portfolio theory, in essence, has a normative character as it prescribes what a rational investor should do. For this seminal work, he received the Nobel prize in economics.

William Sharpe and others asked the follow-up question: If rational investors follow the Markowitzian prescription, what kind of relationship exists between risk and return? Essentially, the capital asset pricing model (CAPM) developed by them is an exercise in positive economics. It is concerned with two key questions:

- What is the relationship between risk and return for an efficient portfolio?

- What is the relationship between risk and return for an individual security?

The CAPM, in essence, predicts the relationship between the risk of an asset and its expected return. This relationship is very useful in two important ways. First, it produces a benchmark for evaluating various investments. For example, when we are analysing a security we are interested in knowing whether the expected return from it is in line with its fair return as per the CAPM. Second, it helps us to make an informed guess about the return that can be expected from an asset that has not yet been traded in the market. For example, how should a firm price its initial public offering of stock? Although the empirical evidence on the CAPM is mixed, it is widely used because of the valuable insight it offers and its accuracy is deemed satisfactory for most practical applications. No wonder, the CAPM is a centerpiece of modern financial economics and William Sharpe, its principal originator, was awarded the Nobel prize in economics. Incidentally when Sharpe submitted his paper to the *Journal of Finance*, it received a chilly response and one reviewer pointed out that the assumptions underlying the model were absurdly unrealistic. Undeterred, Sharpe resubmitted the paper citing Milton Friedman's influential paper '*Methodology of Positive Economics*' in which he argued persuasively that the value of a model depends not on the realism of its assumptions, but on the validity of its conclusions.

Milton Friedman, a Nobel laureate in economics, the author of the influential paper 'Methodology of Positive Economics,' was the most outstanding monetary economist of the 20th century and an ardent votary of free markets. A leader of the Chicago School of Economics (which dominated the world of economics for

almost half a century), Friedman was deeply influenced by the book *The Road to Freedom* written by Frederick Hayek, his senior at Chicago University.

2.4.3 Random Walk and Efficient Markets Hypothesis: In 1953, Maurice Kendall, a distinguished statistician, presented a somewhat unusual paper before the Royal Statistical Society in London. Kendall examined the behaviour of stock and commodity prices in search of regular cycles. Instead of discovering any regular price cycle, he found each series to be "a wandering one, almost as if once a week the Demon of Chance drew a random number… and added it to the current price to determine the next week's price." Put differently, prices appeared to follow a random walk, implying that successive price changes are independent of one another.

In 1959, two highly original and interesting papers supporting the random walk hypothesis were published. In one paper, Harry Roberts showed that a series obtained by cumulating random numbers bore resemblance to a time series of stock prices. In the second paper, Osborne, an eminent physicist, found that the stock price behaviour was similar to the movement of very small particles suspended in a liquid medium—such movement is referred to as the Brownian motion.

A random walk means that successive stock prices are independent and identically distributed. Therefore, strictly speaking, the stock price behaviour should be characterised as a submartingale, implying that the expected change in price can be positive because investors expect to be compensated for time and risk. Further, the expected return may change over time in response to change in risk.

Inspired by the works of Kendall, Roberts, and Osborne, a number of researchers employed ingenious methods to test the randomness of stock price behaviour. By and large, these tests have vindicated the random walk hypothesis. Indeed, in terms of empirical evidence, very few ideas in economics can rival the random walk hypothesis.

One of the most important economists of all time, Paul Samuelson was, as he liked to say, "the last generalist in economics." While financial market studies were just a side activity for him, his intervention was crucial to the triumph of the

random walk. When the empirical evidence in favour of the random walk hypothesis seemed overwhelming, the academic researchers asked the question: What is the economic process that produces a random walk? Paul Samuelson, the consummate economic theorist, provided the answer in his paper, "Proof That Properly Anticipated Prices Fluctuate Randomly," published in the spring 1965 issue of *Industrial Management Review*.

Eugene Fama came to Chicago as an MBA student in 1960. Prior to that he had studied at Tufts University where he crunched numbers for a stock market newsletter published by one of his professors. With this experience he was attracted by the random walk work of Harry Roberts, a statistics professor. Fama stayed on for his doctorate under the tutelage of Merton H. Miller. His 1964 doctoral dissertation laid out the clearest explanation yet of why stock prices behave randomly. According to Fama, stock prices did not behave randomly because news relevant to stock prices occurred randomly or investors' opinions were randomly distributed along a bell curve. Rather, "sophisticated traders"—fundamentalists and chart readers—would profitably exploit any non-random patterns in the market and, in the process, make them go away. That meant chart-reading successes were necessarily fleeting. However, this was not necessarily true of what he called "superior intrinsic value analysts." Fama wrote, "In a dynamic economy, there will always be new information which causes intrinsic values to change over time. As a result, people who can consistently predict the appearance of new information and evaluate its effects on intrinsic values will usually make larger profits than people who do not have this talent."

Existence of enough "superior analysts" would, Fama said, "insure that actual market prices are, on the basis of all available information, best estimates of intrinsic values." Fama called this state of affairs "efficient market." While economists used this term earlier to denote a well functioning market, it had never been defined quite this way. Fama wrote, "In an efficient market, the actions of many competing participants should cause the actual price of a security to wander randomly about its intrinsic value."

After finishing his dissertation in 1964, Fama became a faculty at the Graduate School of Business (GSB), University of Chicago, and was joined by a whole new crowd of quantitatively oriented, computer-savvy students who were beginning to make waves. Michael Jensen, Myron Scholes, and Richard Roll were amongst the most prominent of them.

Jensen, Scholes, and Fama pioneered an approach that became known as "event study" to test how quickly the market reacted to new information relating to events such as stock splits, mergers and acquisitions, corporate earnings announcements. Numerous such studies established beyond reasonable doubt that financial markets did a wonderful job of reflecting new information.

Merrill Lynch and CRSP: In 1946, Louis Engels, the head of advertising and marketing for Merrill Lynch, composed one of the great print advertisements of all time. It was titled "What everybody ought to know… About the Stock and Bond Business." Running more than six thousand words and taking a full page in the New York Times, it answered questions such as "What Do Stocks Cost?" and "How Do You Do Business with a Broker?" The phenomenal response to the ad prompted a publisher to ask Engels to write a book on the subject. So Engels wrote How to Buy Stocks which sold more than four million copies.

In 1960, Engels wanted to run an ad claiming that stocks were good investments for ordinary investors, but Securities Exchange Commission (SEC), the regulatory body in the US, told Engels that such a claim could be made only with proper evidence to support it. Engels called his alma mater GSB, University of Chicago for advice and spoke to James Lorie. After consulting with a few colleagues, Lorie suggested that a study of long-term stock returns was in order. Engels agreed and Merrill Lynch funded the Center for Research on Security Prices, which came to be known popularly by its acronym, CRSP (pronounced "crisp"). James Lorie headed the centre and chose Lawrence Fisher as his deputy. Fisher embarked on the herculean task of compiling thirty-five years of price and dividend data on every stock ever traded on NYSE. After more than three years of painstaking work, they reported in January 1964 that, over the period 1926-

1960, stocks earned an average return of 9 per cent. They went further and found that randomly generated portfolios performed as well as mutual funds-put more colourfully, monkeys with darts could match the performance of mutual funds. This was indeed a revelation. As Business Week reported:

"For a sizable area of Wall Street-mutual funds, security analysts, investment advisers and the like—the study should prove unsettling. Everybody in this area makes his money, to one degree or another, by selling his skill to less expert."

In a speech at the twenty-fifth anniversary of the New York Society of Security Analysts in 1962, Benjamin Graham said, "Neither the Financial Analysts as a whole nor the investment funds as a whole can expect to 'beat the market,' because in a significant sense they (or you) are the market."

He continued, sounding somewhat like a Chicago economist:

"Analysts do in fact render an important service to the community in their study and evaluation of common stocks. But this service shows itself not in spectacular results achieved by their individual selections but rather at fixing at most times and for most stocks of a price level which fairly represents their comparative values, as established by the known facts and reasonable estimates about the future."

2.5 SUMMARY

The efficient-market hypothesis (EMH) is a theory in financial economics that states that asset prices fully reflect all available information. A direct implication is that it is impossible to "beat the market" consistently on a risk-adjusted basis since market prices should only react to new information. It was developed by Eugene Fama who argued that stocks always trade at their fair value, making it impossible for investors to either purchase undervalued stocks or sell stocks for inflated prices. As such, it should be impossible to outperform the overall market through expert stock selection or market timing, and that the only way an investor can possibly obtain higher returns is by chance or by purchasing riskier investments.

The three variants of the hypothesis are "weak", "semi-strong", and "strong" form. The weak form of the EMH claims that trading information (levels and

changes of prices and volumes) of traded assets (e.g., stocks, bonds, or property) are already incorporated in prices. The semi-strong form of the EMH claims both that prices incorporate all publicly available information (which also includes information present in financial statements, other SEC filings etc.). The strong form of the EMH additionally claims that prices incorporate all public and non-public (insider) information, and therefore even insiders cannot expect to earn superior returns (compared to the uninformed public) when they trade assets of which they have inside information.

2.6 GLOSSARY

1. **Random Walk:** A random walk means that successive stock prices are independent and identically distributed.

2. **Efficient Market Hypothesis:** The efficient-market hypothesis (EMH) is a theory in financial economics that states that asset prices fully reflect all available information.

3. **Corporate Finance:** Corporate finance is an area of finance that deals with sources of funding, the capital structure of corporations, the actions that managers take to increase the value of the firm to the shareholders, and the tools and analysis used to allocate financial resources. The primary goal of corporate finance is to maximize or increase shareholder value.

2.7 SELF ASSESSMENT QUESTIONS

Q1. Define random walk.

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Q2. What is rational market hypothesis?

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Q3. What do you understand by intellectual underpinning?

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2.8 LESSON END EXERCISES

Q1. Portfolio theory and capital asset pricing model helps in developing rational markets. Comment.

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Q2. Discuss the evolution of random walk and rational market hypothesis.

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Q3. Discuss the beginning of modern corporate finance as exemplified by the works of Franco Modigliani and Merton H. Miller.

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2.9 SUGGESTED READINGS / REFERENCES

➢ Chandra, P. (2017). *Behavioural Finance*. Tata Mc Graw Hill Education, Chennai (India).

➢ Singh. S., & Bahl.S (2015). *Behavioural Finance*. Vikas Publishing House, Noida (India).

➢ Sulphey, M.M. (2014). *Behavioural Finance*. PHI Learning, Delhi.

➢ Ackert, L. F., & Deaves, R. (2010). *Behavioural Finance: Psychology, Decision Making and Markets*. Cengage Learning.

➢ Sewell, M. (2007). Behavioural finance. *University of Cambridge*, 1-14.

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RATIONAL MARKETS HYPOTHESIS AND THE CHALLENGE OF BEHAVIOURALISTS

IMPACT ON THE WALL STREET AND THE CORPORATE

STRUCTURE

3.1 Introduction

3.2 Objectives

3.3 Impact on Wall Street and the Corporate

    3.3.1 Emergence of Index Funds

    3.3.2 Development of Risk-Adjusted Performance Measurement

    3.3.3 Rise of Derivatives

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3.4 Summary

3.5 Glossary

3.6 Self Assessment Questions

3.7 Lesson End Exercises

3.8 Suggested Readings / References

3.1 INTRODUCTION

The term '*Wall Street*' is used as a collective name for the financial and investment community, which includes stock exchanges, large banks, brokerages,

securities, and underwriting firms. Wall Street is a street located in the lower Manhattan section of New York City that is the home of the New York Stock Exchange or NYSE. Wall Street didn't become famous for being America's financial center until the Buttonwood agreement was signed, which eventually formed the New York Stock and Exchange Board.

After World War I, Wall Street, and New York City surpassed London to become the world's most significant financial center. Today, Wall Street remains the home of several important financial institutions. The New York Stock Exchange is still found on Wall Street, as is the American Stock Exchange, and several banks and brokerages.

While Wall Street often refers to the global finance and investment community, it is often compared and contrasted to Main Street. The term *Main Street* is often used as a metaphor for individual investors, small businesses, employees, and the overall economy. Main Street is a common name for the principal street of a town where most of the local businesses are located.

Today, Wall Street is used as an umbrella term to describe the financial markets and the companies that trade publicly on exchanges throughout the U.S. Although Wall Street is an important location where a number of financial institutions are based, the globalization of finance has led to many financial institutions being established around the world.

In India, Dalal Street is an area in downtown Mumbai that houses the Bombay Stock Exchange (BSE) – the largest stock exchange in India – and other reputable financial institutions. It received the name Dalal Street after the Bombay Stock Exchange moved to the area in 1874 and became the first stock exchange recognized by the Indian Government. The literal translation of Dalal in Marathi is a broker or intermediary. Today, Dalal Street is a metonym for the entire Indian financial sector much like Wall Street in the United States. Dalal Street is used by Indian investors in the same way as Wall Street is referenced in the United States. It's the location of a major stock exchange where large amounts of money flow through each day.

3.2 OBJECTIVE

After studying this lesson, you will be able to trace :

• the development of index funds

• risk adjusted measures and

• the rise of derivatives.

3.3 IMPACT ON WALL STREET AND THE CORPORATE

The lesson that it is futile to try to beat the market had profound impact on Wall Street and the corporates. In particular, it led, directly or indirectly, to the following:

• Emergence of index funds

• Development of risk-adjusted performance measurement

• Rise of derivatives

• Acceptance of the shareholder value principle

3.3.1 Emergence of Index Funds

The Massachusetts Investors Trust (MIT) marked the beginning of the modern mutual fund industry. The MIT was set up as an open-ended mutual fund, owned by those who put money into it. So, it was run as a non-profit entity whose board was answerable to the fund's investors. Other funds that followed MIT were actually controlled by for-profit investment advisers, though they came under the rubric 'mutual.'

As the mutual fund industry grew it became more preoccupied with beating the market. Even though it was becoming harder to do that, thanks to intensifying competition, the money managers were obsessed with doing just that. To beat the market they ignored risk and loaded up on extremely speculative stocks. When the market soared, as it did for the most of 1960s, the speculative stocks rose even more. The aggressive managers attributed their superior performance to their skill. As one of them wrote in the *Financial Analysts Journal*, in 1966: "The improved performance of certain institutions in the management of their funds is the natural outcome of better trained, more energetic, younger men in command."

Old-timers were not convinced. In an article in the following issue of the Financial Analysts Journal, one of the founding members of the Financial Analysts Federation lamented:

"Behind the ever more elaborate formulae for measuring rate of return—and they will become more elaborate as computers become more used—there is one vital problem: How much risk was incurred? By hindsight it makes no difference. More important, it is impossible to quantify. But that vital part in the equation exists and there is no point sweeping it under the rug."

The old guard was right that risk should be considered in measuring performance. The practitioners of quantitative finance offered solutions based on portfolio theory and capital asset pricing model. Three measures were suggested: the Treynor measure, the Sharpe measure, and the Jensen measure.

Initially, these measures did not gain popularity. As the stars of the go-go years of nineteen sixties started faltering, it became evident that their spectacular performance during most of the sixties was because they took hare-brained risks. After adjustment for risk, their performance was nothing to write home about. Jensen and others argued that the average value of the investment advice provided by the mutual fund industry was not just zero, but less than zero.

The mutual fund debacles and the academic research suggested the need for low-cost "unmanaged" mutual funds. While the concept of such a fund was mooted by two Chicago graduate students in 1960, Lipper, a global leader in supplying mutual fund information, was perhaps the first to formally ask the SEC to launch what it called a "stock average fund" that would have thirty Dow stocks. According to Lipper, the SEC did not respond. Perhaps it was not ready for such a strange idea quite yet. Wells Fargo too was interested but could not offer an index fund to retailers for a different regulatory reason. Finally, in 1976, Vanguard, under the leadership of John Bogle, offered the first index fund.

The launch of Vanguard index fund was helped by the literary groundwork laid in the preceding years, in particular, by a book written by Burton Malkiel and an

essay by Paul Samuelson. Burton Malkiel, a Princeton economist, published his book '*A Random Walk Down Wall Street*' in 1973 which popularised the notion of efficient market hypothesis as no other work. It was hailed by Forbes as a classic and Paul Samuelson called it "Dr. Spock of investment." While the first edition of the book couldn't recommend index mutual funds as they didn't exist, yet the book certainly played an important role in making index investing respectable-incidentally, Bogle himself had not read the book before he launched the Vanguard Index Fund. More directly on the subject was a 1974 essay by Paul Samuelson in the Journal of Portfolio Management in which he pleaded for someone, anyone to launch an index fund for small investors. A year later, Charles Ellis, a pension consultant, wrote an article titled, "The Loser's Game," which argued against active management.

One may argue that even without these writings and the efficient market hypothesis, index funds would have been created. But that seems improbable. As Justin Fox put it, "The work of ivory tower scholars had launched a new school of investing, one that would survive and flourish in the decades to come. It was one of the great practical triumphs in the history of social sciences."

3.3.2 Development of Risk-Adjusted Performance Measurement

The imprudence of investors in the 1960s showed up in the 1970s, when neither bonds nor blue chips proved safe, providing a huge scope for the new approach to risk, return, and diversification developed by Harry Markowitz two decades earlier. Called 'modern portfolio theory,' it gained some acceptance in the institutional world of investing and then received a huge boost from Washington.

In response to several corporate bankruptcies that left pensions unpaid, Congress passed a pension-reform legislation in 1974, called The Employee Retirement Income Security Act (ERISA). Prudence was no longer a legal concept based on tradition. It was redefined in conformity with the scientific dictates of modern portfolio theory (MPT).

In MPT, risk is defined as variance and not as a vague, hard-to-quantify thing that can be assessed only judgmentally. As a number, variance is estimated

mainly by looking at past variability. This may appear somewhat odd: While finance scholars argued that future stock price movements cannot be predicted by looking at past stock price movements, they accepted the idea of using past stock volatility to predict future stock volatility.

Perhaps there was a reason. As Fischer Black, a prominent risk engineer of the 1970s, said: "Estimating variances is orders of magnitude easier than estimating… expected returns." There is no economic law that says volatility is predictable; at the same time, there is no economic law that says that volatility is not predictable. As Justin Fox remarked: "If the direction of stock prices could be predicted, there would be free lunch for all. If the volatility could be predicted, that just meant more work for finance professors."

Further, there was empirical evidence that long-run stock price volatility displayed reasonable constancy, despite the leaps and plunges suggested by Benoit Mandelbrot. Based on an examination of a century of stock market data, Barr Rosenberg of UC-Berkeley observed:

"If you cut it in half, basically the variance in the first half and the variance in the second half were the same. That's not by chance. That means that our particular society settles in with a certain amount of surprise being acceptable and indeed interesting. Too much is too much, too little is too little, so that's quite mysterious."

With the ascendance of modern portfolio theory, the demand for quantitative finance services grew. Barr Rosenberg offered "Barr's better betas" (also called "bionic betas") which were more acceptable to money managers than the simpler versions offered earlier. Ibbotson Associates provided data on "equity risk premium."

Armed with Barra's (or some other firm's) measure of a stock's beta and Ibbotson's measure of equity risk premium, one could compute a company's cost of capital. Remember that when Franco Modigliani and Merton Miller launched their assault on old-style finance in the 1950s, they had left the issue of cost of capital unanswered. Later a procedure to do that evolved and it soon became the standard practice for investment bankers, consultants, corporate finance executives, and students.

3.3.3 Rise of Derivatives

Having addressed the big questions of risk and return in the first great wave of quantitative finance from early 1950s to early 1970s, a small band of inquisitive finance professors began the second wave in which they focused on how the prices of different securities related to one another. The quest began with a routine search for a formula for valuing an option on a share of equity stock. While Paul Samuelson had thought about this issue earlier, the real breakthrough occurred when Fisher Black and Myron Scholes developed the now famous Black–Scholes option pricing model that was published in 1973 in the *Journal of Political Economy*, a journal of the University of Chicago. Strange as it may sound, the Chicago economists who ran the journal wondered why they should care about such an obscure and somewhat disreputable financial instrument.

At that time, options were created in an ad hoc manner by brokers and traded over-the counter. All this changed when the Chicago Board Options Exchange (CBOE), the first organised options exchange in the world, was launched in April 1973. It was a rare occurrence in the field of finance when a seminal theoretical breakthrough, the development of Black–Scholes option pricing model, coincided with a major institutional development, the establishment of CBOE.

Robert Merton, a scholar at MIT, figured out a different way of deriving the option pricing formula. Merton's approach, which is mathematically more elegant, set the tone for future work in mathematical finance. Merton and Scholes shared the Nobel prize in economics in 1997—Black died the year before, otherwise he too would have been its co-recipient.

The starting point of Merton's version was that two portfolios with equivalent returns and risk profile should sell for the same price. Otherwise, arbitrageurs would step in and bring about price parity. Franco Modigliani and Merton Miller too had invoked the arbitrage argument in their path-breaking 1958 paper.

In a way, Merton's formula relied only on the efficient working of the market. While CAPM is an economic theory, Merton's formula for option valuation is pure finance. As Stephen Ross put it, "Neoclassical finance is a theory of sharks,

and not a theory of rational homo economicus." Arbitrageurs are the sharks who exploit risk-free opportunities and dissipate them.

Merton-style finance led to a different understanding of risk. In the CAPM, risk could be manipulated and controlled, but not completely eliminated, not even in theory. In the Merton's version of the no-arbitrage model, risk can be eliminated completely by choosing the right combination of securities.

Kenneth Arrow had proposed in the 1950s that economic equilibrium can be achieved in the face of uncertainty, if there are securities available for every possible state of the future. That seemed like a theoretical ideal then. By the mid-1970s, thanks to option-pricing theory, the financial world was moving in that direction, as proclaimed by Stephen Ross, one of Arrow's students. Ross wrote in 1976, "Although there are only a finite number of marketed capital assets, shares of stocks, bonds, or as we shall call them 'primitives,' there is a virtual infinity of options or 'derivative' assets that the primitives may create."

The rise of derivatives for handling a wide-range of risks became one of the great financial stories of the next quarter century.

3.3.4 Shareholder Value

The initial impact of the efficient markets hypothesis was in financial markets and those who made a living from it. Since the stocks traded on the markets represent corporate ownership, the efficient markets hypothesis began to influence corporate America. Before we examine this, let us look at some aspects of corporate governance.

The public limited company, which is owned by a number of shareholders protected with limited liability, has been a major organisational innovation. It allows for efficient sharing of risk among many investors and enables professional managers to run the company.

However, the public limited company gives rise to possible conflicts between managers and shareholders due to the separation of ownership and control. Adam Smith had recognised, very perceptively, the agency problem in his classical work *The Wealth of Nations* published in 1776:

"Like the stewards of a rich man, they (managers) are apt to consider attention to small matters as not for their master's honour, and very easily give themselves a dispensation from having it. Negligence and profusion, therefore, must always prevail, more or less, in the management of the affairs of such a company."

Two centuries later, Michael Jensen and William Meckling provided a formal analysis of the 'agency problem' in their seminal paper titled "Theory of the Firm: Managerial Behaviour, Agency Costs, and Ownership Structure," published in August 1976 issue of *The Journal of Financial Economics.*

The essence of agency problem is that self-interested managers may squander corporate resources over uneconomic, value-destroying projects and activities. This problem is more serious in companies that have substantial free cash flows (free cash flows represent the excess of internal accruals over what is required to undertake profitable NPV – positive projects). Free cash flows tend to be high in mature industries with limited growth projects. On the other hand, in high growth industries where internal accruals are less than what is needed for supporting profitable investment opportunities, managers are less likely to squander resources over uneconomic projects.

Agency costs are borne by the principals and the agents, perhaps more by the latter if the principals are smart. Hence, it is in the interest of the principals as well as the agents to find ways and means of minimising the agency costs.

By the 1920s, corporations had become so important that scholars began to look again at the separation of ownership and control that Adam Smith was concerned with. Adolf Berle Jr. and Gardiner Means researched the subject intensively and published the book *The Modern Corporation and Private Property,* which was hailed as "epoch making." Berle and Means argued that corporations had become so large and powerful that competitive forces alone were not enough to rein them. According to them, the only remedy to control big corporations was to "develop into a purely neutral technocracy, balancing a variety of claims by various groups in the community and assigning to each a portion of the income stream on the basis of public policy rather than private cupidity."

The views of Berle and Means were stated more rigorously in the theory of 'monopolistic competition' advanced by Edward Chamberlin. His argument was that large American corporations could set prices at will and consumers were helpless. So, there was a need to regulate them. Harvard economist John Kenneth Galbraith brilliantly popularised this view in a series of bestselling books such as *The New Industrial State and The Affluent Society* published in the 1950s and 1960s. Galbraith's eloquence was truly impressive. He was perhaps the last great representative of the literary, institutionalist tradition.

The need for regulation, however, was contested by Arron Director, George Stigler, Milton Friedman, and others from the University of Chicago. They argued that regulation was bad and free markets good. Milton Friedman arrogated to himself the task of presenting the ideas of Chicago colleagues to the still largely hostile outside world. When consumer activist Ralph Nader argued that corporations ought to be held to high standards of civic responsibility, Friedman had a different view. He said: "There is one and only one social responsibility of business – to use its resources and engage in activities designed to increase its profits so long as it stays within the rules of the game, which is to say, engages in open and free competition without deception or fraud."

Galbraith's portrayal of a static economic landscape dominated by corporate bosses was fairly true of the 1950s and 1960s. But in 1970s, upstart overseas competitors, helped by the advent of the shipping container (which substantially reduced the cost of transport), challenged American giants. The intense competitive environment that emerged lent credence to the position of Friedman. The Chicago group proved right that even mighty corporations were subject to economic laws and there was hardly any justification in regulating them.

In the process of defending free enterprise, the Chicago group overlooked the separation of ownership and control. After all, Berle and Means were worked up about the corporation because of this, in the first place. Not to worry. Michael Jensen, along with his University of Rochester colleague William Meckling, was getting ready to rescue and reinvent this phenomenon.

Reprising Berle's argument about the separation of ownership and control, Jensen and Meckling gave it a different name "agency costs" and represented it with a set of equations in their seminal article published in 1976. They saw the solution to this problem in the efficient market, not in governmental intervention. Since stock prices "fully reflect all available information," companies whose executives do not act in the interest of shareholders will be penalised with lower stock prices. The stock market performed the job of monitoring managerial behaviour. Such monitoring reduced agency costs and goaded corporations to behave more rationally. As Justin Fox observed: "Jensen and Meckling wanted to rely upon the stock market's collective judgment to resolve conflicts of interest that had plagued scholars, executives, and shareholders for generations."

The precipitous drop in the S&P 500 from 1973 through 1977 clearly signalled that Corporate America had to shape up.

How could executives be made responsive to the verdict of the stock market? One option was to persuade them to create shareholder value and offer suitable incentives for doing so. Alfred Rappaport, Joel Stern, and others emphasised the importance of creating shareholder value and set up consulting practices—such as Alcar, Stern Stewart & Company, Marakon Associates, BCG and Holt Value Associates—to guide companies in creating shareholder value. Concepts and tools such as "shareholder value analysis," "economic value added," "market value added," "cash flow return on investment," and "total shareholder return" became part of finance lexicon and incentive compensation in many companies was linked to shareholder value metrics.

The other option was the market for corporate control. The public opinion on this has always been ambivalent. In the 1950s, takeover specialists, then called "proxyteers," gained prominence on the American corporate scene. New Jersey Senator Harrison Williams was opposed to takeovers. He said, "In recent years, we have seen proud old companies reduced to corporate shells after white-collar pirates have seized control." Corporate managers understandably maintained a strong anti-takeover lobby in Washington. In the meanwhile, most critics of corporate

America—John Kenneth Galbraith, Ralph Nader, and others who came from the political left—were not willing to support Wall Street raiders.

Henry Manne, a legal scholar with interest in corporate governance, became a champion of mergers and takeovers. Scorned in the legal literature because they diminished competition and reduced consumer choice, mergers and takeovers, Manne argued, appear a lot better if you looked at what he dubbed "the market for corporate control" and not just "the market for products." He said, "Only the take-over scheme provides some assurance of competitive efficiency among corporate managers and thereby affords strong protection to the interests of vast numbers of small, non-controlling shareholders." Manne assumed "a high positive correlation between corporate managerial efficiency and the market price of shares of that company." Eugene Fama and others had not yet delivered the "proof" of market efficiency, but Manne could anticipate it. While Senator Williams still got an anti-takeover law passed in 1968, Manne's ideas helped make the final William's Act less draconian than what was initially proposed. It allowed for a launch of a hostile takeover, but with prior warning.

The rise of the junk bond market in the late 1970s fuelled a takeover boom in 1980s. Buyout firms like KKR and lone rangers such as Carl Icahn transformed the corporate landscape with what appeared like great brutality and waste. Many commentators lamented that buyout artists were hurting American competitiveness while Japan and Germany were building their industrial might. Persuaded by their arguments, state legislatures killed the takeover boom.

Michael Jensen, however, was convinced that takeovers were beneficial as they made American economy stronger. With evangelical fervour, he preached the merits of takeovers to the present and future business leaders of America, the most hostile audience possible. He shot into prominence. As Justin Fox wrote, "This stance made him controversial, and about as famous as a business school professor can get. It also made him the intellectual father of what became corporate orthodoxy and even a sort of national creed in the 1990s."

Jensen told the *Times* in 1985, "The takeover market provides a unique,

powerful, and impersonal mechanism to accomplish the major restructuring and redeployment of assets continually required by changes in technology and consumer preferences."

The idea that corporations are meant to be run for the benefit of owners has been there since the dawn of the modern corporation. What was new was the expansive argument of Jensen's worldview. As one leftist critic grudgingly conceded: "The great advantage of Jensenism is that, when combined with an uncritical acceptance of the efficient markets religion, it amounts to a unified field theory of economic regulation: all-knowing financial markets will guide real investment decisions towards their optimum, and with the proper set of incentives, owner managers will follow this guidance without reservation."

3.4 SUMMARY

If the market is efficient, it is not possible to beat the market. The lesson that it is futile to try to beat the market had profound impact on Wall Street and the corporates. In particular, it led, directly or indirectly, to the following: development of index funds, development of risk-adjusted performance measurement, rise of derivatives and acceptance of the shareholder value principle.

The mutual fund debacles and the academic research suggested the need for low-cost "unmanaged" mutual funds. In 1976, Vanguard, under the leadership of John Bogle, offered the first index fund. In the years to come index funds gained in popularity. As Justin Fox put it, "The work of ivory tower scholars had launched a new school of investing, one that would survive and flourish in the decades to come. It was one of the great practical triumphs in the history of social sciences."

The imprudence of investors in the 1960s showed up in the 1970s, when neither bonds nor blue chips proved safe, providing a huge scope for the new approach to risk, return, and diversification developed by Harry Markowitz two decades earlier. Called '**modern portfolio theory**,' it gained some acceptance in the institutional world of investing and then received a huge boost from Washington.

After addressing the big questions of risk and return in the first great wave of

quantitative finance from early 1950s to early 1970s, a small band of inquisitive finance professors began the second wave in which they focused on how the prices of different securities related to one another. Fisher Black and Myron Scholes developed the now famous Black–Scholes **option pricing model** in 1973, the year in which the Chicago Board Options Exchange (CBOE), the first organised options exchange in the world, was also set up-it was a rare occurrence in the field of finance when a seminal theoretical breakthrough coincided with a major institutional development.

Robert Merton, a scholar at MIT, figured out a different way of deriving the option pricing formula. In a way, Merton's formula relied only on the efficient working of the market. As Stephen Ross put it, "Neoclassical finance is a theory of sharks, and not a theory of rational **homo economicus**." Arbitrageurs are the sharks who exploit risk-free opportunities and dissipate them.

In the Merton's version of the no-arbitrage model, risk can be eliminated completely by choosing the right combination of securities. The rise of derivatives for handling a wide-range of risks became one of the great financial stories of the next quarter century.

Since the stocks traded on the markets represent corporate ownership, the efficient markets hypothesis began to influence corporate America. How could executives be made responsive to the verdict of the stock market? One option was to persuade them to create **shareholder value** and offer suitable incentives for doing so.

3.5 GLOSSARY

1. **Homo economicus:** Homo economicus is a financial term that some economists use to describe a rational human being. The term homo economicus, or economic man, is the portrayal of humans as agents who are consistently rational, narrowly self-interested, and who pursue their subjectively-defined ends optimally.

2. **Index Funds:** An index fund is a type of mutual fund with a portfolio constructed to match or track the components of a financial market

index, such as the Standard & Poor's 500 Index (S&P 500). These funds follow their benchmark index no matter the state of the markets.

3. **Derivatives:** A derivative is a financial security with a value that is reliant upon or derived from, an underlying asset or group of assets—a benchmark. The derivative itself is a contract between two or more parties, and the derivative derives its price from fluctuations in the underlying asset.

3.6 SELF ASSESSMENT QUESTIONS

Q1. Discuss the origin of index funds.

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Q2. Discuss the rise of derivatives.

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3.7 LESSON END EXERCISES

Q1. Trace the development of risk-adjusted performance measurement.

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Q2. Explain the impact of efficient market hypothesis on shareholder value principle.

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3.8 SUGGESTED READINGS / REFERENCES

➢ Chandra, P. (2017). *Behavioural Finance*. Tata Mc Graw Hill Education, Chennai (India).

➢ Singh. S., & Bahl.S (2015). *Behavioural Finance*. Vikas Publishing House, Noida (India).

➢ Sulphey, M.M. (2014). *Behavioural Finance*. PHI Learning, Delhi.

➢ Ackert, L. F., & Deaves, R. (2010). *Behavioural Finance: Psychology, Decision Making and Markets*. Cengage Learning.

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RATIONAL MARKETS HYPOTHESIS AND THE CHALLENGE OF BEHAVIOURALISTS

THE CHALLENGES OF BEHAVIOURALISTS

STRUCTURE

4.1   INTRODUCTION

Behavioural finance currently is termed to be a separate field from "Standard finance" which basically refers to the accepted theories that exist currently. The basis of standard finance is the Modern Portfolio Theory and the Efficient Market Hypothesis (Helen and Simon, 2000). As is well known the Modern Portfolio Theory uses the three concepts of expected portfolio return, the deviation of the returns from the expected and the correlation of one stock with the others held in a portfolio. The theme of Efficient Market Hypothesis on the other hand states that the asset and stock market prices reflect the information that is available in the market as well as the individual investor regarding the market movements, the economic movements as well as the regarding the fundamentals of the stock.

These widely held and accepted theories are in stark contrast with the propositions of those of behavioural finance according to which the reasons behind the financial decision making of the investors include the emotional aspects impacting the investor, the mental state of the investor while taking the investment decisions and then most importantly the pattern that the other investors in the market are following in regards to the investment decision making.

4.2   OBJECTIVE

After studying this lesson, you should be able to learn about various challenges being faced by behaviouralists.

4.3   THE CHALLENGE OF BEHAVIOURALISTS

Even when the rationalist model was on the ascent in the world of economics and finance, the not-so rational aspects of human nature began to find its ways into economics. The major challenges emanating from behavioural economics were in the form of:

- Deviation from rationality
- Possibility of beating the market
- Divergence between market prices and fundamental values
- Pervasiveness of irrational forces
- Misleading signals from the market forces

4.3.1 Deviation from Rationality

By the mid-1950s, economists in general accepted von Neumann and Morgenstern's expected utility and Henry Savage's statistical axioms as gospel truth and built their models on these foundations. In 1950s, Herbert Simon, an economics maverick at Carnegie Tech's Graduate School of Industrial Administration (GSIA), who later got Nobel prize in economics, argued that people don't have the brainpower and time to make decisions so they take shortcuts and rules for them. People don't "optimise," but "satisfice" (a combination of "satisfy" and "suffice"). Since Simon was a leading light at GSIA, the economists there listened to him, but chose to ignore him. As Simon wrote in his memoirs, "I heckled the GSIA economists about their ridiculous assumptions of omniscience and they increasingly viewed me as the main obstacle to building 'real' economics in the school."

Simon led a project on decision making process in a paint factory in Pittsburgh, following his "satisficing" approach in which he enlisted fellow faculty member Franco Modigliani and Modigliani's student John Muth. No sooner was the study over, Muth fought back: "It is sometimes argued that the assumption of rationality in economics leads to theories inconsistent with, or inadequate to explain, observed phenomena, especially over time... Our hypothesis is based on exactly the opposite point of view: that dynamic economic models do not assume enough rationality." Muth argued that even though every individual or corporation need not make rational guesses about the future, on average, they were similar to the predictions of the most sophisticated models.

This "rational expectations" hypothesis was akin in spirit to the efficient markets hypothesis, although it had a broader sweep and less evidence to support it. Initially, it went nowhere, but as Keynesian economic policy faltered in the 1970s, several scholars, notably Robert Lucas, propagated it. With amazing rapidity, rational expectation model became the credo at the Chicago Economics Department. Even Paul Samuelson admitted that if compelled to choose between the "two extreme archetypes" of old-style Keynesianism and Lucas's rational expectations, he would choose the latter.

While Herbert Simon's disputes with mainstream economists triggered the

rational expectations hypothesis, Daniel Kahneman and Amos Tversky built upon Simon's ideas to challenge mainstream economics and its reliance on von Neumann and Morgenstern's version of decision making under uncertainty. Daniel Kahneman, a psychologist, felt that human statistical reasoning might not accord with the models used in economics. He along with Amos Tversky began conducting experiments which revealed gaps between the tenets of decision making and actual decision making by even experts. They wrote "People rely on a limited number of heuristic principles which reduce the complex tasks of assessing probabilities and predicting values to simpler judgmental operations. In general, these heuristics are quite useful, but sometimes they lead to severe and systematic errors." Put simply, people follow shortcuts and rules of thumb that sometimes work and sometimes don't.

Kahneman and Tversky argued that von Neumann and Morgenstern's description of decision making under uncertainty was not correct. How do then people really assess uncertain prospects? Kahneman and Tverksy provided the answer in their article on "prospect theory" published in Econometrica, perhaps the most mathematical of the major academic journals in economics. The article was rigorous and filled with equations and hence, appealed to mathematically-inclined economists and the choice of Econometrica turned out to be very propitious as it attracted the attention of economists. As Justin Fox put it, "It had just what it took to become a hit among economists who were getting more and more interested in asking subversive questions but didn't want to lose their chance at tenure by sounding too much like psychologists."

Richard Thaler was the first and most eager among the economists who were deeply influenced by the work of Kahneman and Tversky. Hersh Shefrin, Meir Statman, and Werner De Bondt and a few other adventurous young economists at other schools joined this movement which came to be called behavioural economics, despite its moorings in cognitivenot behavioural-psychology. Among established economists, George Akerlof of UC-Berkeley was probably the most supportive.

In his famous 1954 essay on economic methodology, Milton Friedman dismissed the use of questionnaires (that psychologists employ) and experiments (of hard sciences) for economists. The former were too silly, and the latter not

feasible. Behavioural economics challenged the first judgment and experimental economics sought to overturn the second. Edward Chamberlin of Harvard and his student, Vernon Smith, pioneered the development of experimental economics. In 2002, Vernon Smith shared the Nobel prize in economics with Daniel Kahneman.

The growing body of evidence documenting systematic departure from the dictates of rational economic behaviour prompted a Chicago conference on "the behavioural foundations of economic theory." Stars from both sides of the rationalist divide, including the redoubtable Merton Miller, were present. In his paper, Miller admitted that cognitive psychology might explain why some individual investors and individual corporations might depart from rationality. But finance was not about such explanations. He argued "That we abstract from all these stories in building our models is not because the stories are uninteresting, but because they are too interesting and thereby distract us from the pervasive market forces that should be our principal concern." The market, he asserted, was rational because the "pervasive market forces" pushed security prices toward their correct, fundamental values.

4.3.2 Possibility of Beating the Market

To commemorate the fiftieth anniversary of *Security Analysis*, Columbia Business School hosted a conference in 1984. The book which became the bible of security analysts was conceived in Benjamin Graham's course on security analysis that he taught at Columbia in the late 1920s. To debate the impact of this classic work, the organisers invited two speakers, Warren Buffett, a Graham student and an outstanding value investor, and Michael Jensen, a leader of the Efficient Markets Hypothesis, who had asserted few years earlier that there was "no other proposition in economics which has more solid empirical evidence supporting it than the Efficient Markets Hypothesis."

Jensen explained that extensive academic research had shown that analysis of publicly available data was almost worthless, at least as a means of outperforming the market. The great success of some practitioners of Graham's principles, he argued, could be dismissed as luck. Jensen said, "If I survey a field of untalented analysts, all of whom are doing nothing but flipping coins, I expect to see some

who have tossed two heads in a row and even some who have tossed ten heads in a row."

Popularised by William Sharpe, the coin-flipping analogy has become a staple of MBA education. According to this analogy, if a million people flip a balanced coin, about 500000 will get a head and the balance a tail. Those who get a head continue the game and those who get a tail quit the game. In the second round about 250000 get a head. In the third round about 125000 get a head. By the end of the tenth round nearly 975 people get a head. A straight run of 10 heads may persuade these people to believe that they have great skill in tossing coins. In reality, their success is due to chance not skill. Finance academics believe that the stock market works pretty much the same way: the chance factor will ensure that some investors will have a long streak of successes.

In response to the argument of academics that coin-flipping orangutans would achieve the same result as a bunch of successful investors, Buffett gave a fitting reply: "If you found that 40 per cent came from a particular zoo in Omaha, you could be pretty sure you were on to something. So you would probably go out and ask the zoo-keeper about what he's feeding them, whether they have special exercises, what books they read, and who knows what else."

Expressing admiration for Buffett, Michael Jensen said, "One of the things I came away from that was Warren Buffett was one of the smartest people I've ever met, and wise. He could play on my turf without making mistakes. It's not by accident that he's worth billions."

4.3.3 Divergence between Market Prices and Fundamental Values

In their 1970 book *Predictability of Stock Market*, Clive Granger and Oskar Morgenstern provide a kind of alternate view of the efficient markets hypothesis. Both were big time economists. Clive Granger got the Nobel prize in economics in 2002 for unrelated work and Oscar Morgenstern was the co-author of Neumann-Morgenstern model for decision making under uncertainty, a model that dominated economics and finance.

They did not see the findings on efficient markets hypothesis in the same

light as finance professors. They said that *The Money Game* authored by journalist George A.W. Goodman (Adam Smith) and not some academic journal article provided "probably the most perceptive account of stock market behaviour."

In his book, Goodman devoted an entire chapter on random walk, but rejected it. Instead he argued, "that in the long run future earnings represent present value and that in the short run the dominant factor … was the elusive *Australopithecus*, the temper of the crowd." Clive Granger and Oscar Morgenstern seemed to endorse this view. They wrote, "The random-walk hypothesis did not say that price changes are unpredictable: it says they are not predictable using (linear) combinations of previous price changes. It is conceivable that one could introduce other variables which did have some predictive values."

More importantly, they argued that it was erroneous to believe that stock prices reflected intrinsic values, which according to them "are supposed to reflect fundamentals of their companies, such as capital equipment, inventories, unfilled orders, profits." They went on to say, "Most of these items, and the values attached to them, will hardly fluctuate as fast and as far as stock prices do. It is a subterfuge going back at least to Adam Smith and David Ricardo to say that market prices will always oscillate around the true (equilibrium). But since no methods are developed to separate the oscillations from the basis, this is not an empirically testable assertion and it can be disregarded."

Eugene Fama suggested that the EMH may be tested by seeing if stock price movements conformed to the dictates of a risk-return model like the CAPM.

This, however, is only a relative test. As Justin Fox wrote, "It might reveal whether stock price movements made sense in relation to each other and the overall market, but was no help in showing whether the overall market is correctly priced."

Challenging the EMH, Robert Shiller, a Nobel laureate in economics, argued that the excessive volatility of stock prices could not be explained by fundamental factors. Devising, in effect, a non-event study, he looked at cases where prices moved but nothing of consequence happened.

To argue that stock prices were right because it was hard to predict them

was, according to Shiller, "one of the most remarkable errors in the history of economic thought. It is remarkable in the immediacy of its logical error and the sweep and implication of its consequences."

Lawrence Summers, a Harvard professor, who later became the U.S. Treasury Secretary, was an ally of Shiller. He too, like Shiller, had a flair for combining advanced mathematics and provocative rhetoric. Summers said that it was an 'idiot's market, rather than a 'rational market.' He goaded Fisher Black, a luminary in the world of finance and a leading efficient marketer "How many finance professors are included in the Forbes 400? How many of the people who are there believe that the market is efficient?" Persuaded, Black called Summers' idiots as "noise traders." In his 1985 presidential address to the American Finance Association, aptly titled "Noise", Black said, "Noise makes financial markets possible, but also makes them imperfect." Noise causes prices to diverge from intrinsic values and also makes it impossible to tell what those intrinsic values are. Proposing a diluted version of efficient market, Black said, "We might define an efficient market as one in which price is within a factor of 2 of value, i.e., the price is more than half of value and less than twice value … By definition, I think all markets are efficient almost all of the time. 'Almost all' means at least 90%." Commenting on this, Justin Fox wrote, "It was a loose, pragmatic, Ben Graham-ish definition, befitting a man who a year before had left MIT for a job at Goldman Sachs." As Black observed, "Markets look lot less efficient from the banks of Hudson than the banks of Charles."

Most finance professors ignored the Shiller–Summers attack against the efficient markets, but Robert Merton, a Nobel laureate in economics and Shiller's classmate in graduate school defended the rational markets hypothesis. He argued that instead of asking the question "Why are stock prices so much more volatile than (measured) consumption, dividends, and replacement costs? Perhaps general economists will begin to ask questions like Why do (measured) consumption, dividends, and replacement costs exhibit so little volatility when compared with rational stock prices?"

However absurd it may appear, perhaps science works this way. As Thomas Kuhn put it in his insightful book *The Structure of Scientific Revolutions*, "Normal

science... is predicated on the assumption that the scientific community knows what the world is like. Much of the community's success of the enterprise derives from the community's willingness to defend that assumption, if necessary at considerable cost."

What was Eugene Fama, the father of EMH, doing as this controversy raged? After being a spectator for a while, he came back in a 1991 sequel in which he said, "EMH passed the acid test of scientific usefulness." It was, however, different from saying that the market is perfectly rational or efficient. According to Fama, the lesson from Shiller and Summers was "that irrational bubbles in stock prices are indistinguishable from rational time-varying expected returns. There was no way to be sure that the market was irrationally volatile or not." Perhaps Fama, without repudiating the efficient market theory, shook its foundation in a way no one could have done.

4.3.4 Pervasiveness of Irrational Forces

In 1985, Andrei Shleifer, an MIT graduate student, thought that he had assembled convincing evidence against the efficient markets hypothesis. He discovered that, beginning September 1976 – Vanguard had launched the first retail index a month before that – the new stocks being added to the S&P 500 performed better than the rest of the market. Since nothing had changed about these businesses in terms of their intrinsic value, such things should not happen in an efficient market.

Shleifer presented his findings at the annual meeting of the American Finance Association. Myron Scholes, who was asked to critique the paper, said: "This paper reminds me of my rabbi back in Palo Alto. My rabbi, when he gives his sermon on Saturday, always begins with a little story about something that happened to his family back in the shtetl, and then he generalises from that little episode to some big moral about the whole world. That's what this paper reminds me of. It's rabbi economics."

This criticism ringed like Merton Miller's argument about the need to focus on "pervasive forces" and not anomalous quirks. Shleifer took the criticism seriously and began his quest for pervasive market forces that caused market irrationality.

Shleifer, a prolific researcher, had other interests as well. He published path-breaking articles on corporate governance, the economics of transition (from communism to market economies), and macro-economics. In 1999, he won the John Bates Clark Medal as the top American economist under forty.

Despite his forays into other areas, Shleifer continued his quest for an explanation which was more than 'Rabbi economics.' He was looking for "pervasive forces" rather anomalous quirks. And that pervasive force, according to Shleifer and his co-researcher Robert Vishny was the presence of "noise traders" and the "limits to arbitrage."

The argument of behaviouralists rests on two key assumptions:

1. Some investors—they call them noise traders—are not rational as their demand for risky assets is influenced by beliefs or sentiments that are not fully supported by fundamentals.

2. Arbitrage operation by rational investors tends to be limited as there are risks associated with it.

4.3.5 Misleading Signals from the Market Forces

With enough evidence that stock prices can deviate significantly from their intrinsic value, the argument that financial markets should always set the priorities for corporations and for society lost some of its force.

Michael Jensen, a leading advocate of EMH, realised that overvaluation can trigger organisational forces that destroy value. Some conspicuous examples are Enron, WorldCom, and AOL. Enron and WorldCom struggled to meet expectations baked in their stock prices, manipulated their earnings, and self-destructed. Entertainment conglomerate Time Warner sold itself to a grossly overvalued Internet company, AOL, and destroyed nearly $50 billion of its value.

As Jensen wrote, "Like taking heroin, manning the helm of an overvalued company feels great at first. If you're the CEO or CFO, you're on TV, investors love you, your options are going through the roof, and the capital markets are wide open. But as heroin users learn, massive pain lies ahead."

In order to mitigate the agency problem, Jensen had advocated the use of incentive compensation that aligned the interests of managers with shareholders. As the shareholder value principle spread across corporate America, executive salaries rose. CEO pay rose so sharply that it attracted criticism in the media and from politicians. Surprisingly, a group of scholars, who met at the University of Rochester, defended the rise in executive pay. They reached the consensus "that executive salaries are determined by the market, and that changes in compensation are strongly related to company performance."

But when Jensen and Murphy subsequently analysed fifteen years of CEO pay at 250 big companies, they found to their dismay that there was no correlation between pay and performance. In a *Harvard Business* review article published in 1990, they wrote, "Is it any wonder then, that so many CEOs act like bureaucrats rather than the value – maximising entrepreneurs companies need to enhance their standing in world markets?" These were perhaps the most influential words written by Jensen. CEOs, shareholder activists, compensation consultants, corporate board members, and others agreed that CEOs should be paid for performance.

Incentive compensation in the form of stock options became quite pervasive. However, most of the stock options were poorly designed and had dysfunctional consequences. They rewarded managers for absolute performance, not relative performance; they vested too soon; they motivated managers to manage quarterly earnings to stimulate short-term price increases so that they could cash out their options.

Jensen, a champion of the notion that financial markets knew best and that financial-market based incentives were a key to a more productive world, realised that the missing element in his models of corporate behaviour was integrity. As Justin Fox wrote about Jensen:"Now he was acknowledging that these incentives weren't enough. If market participants failed to follow a particular non-market determined norm integrity markets wouldn't work. The market couldn't govern itself."

4.4   SUMMARY

Even when the **rationalist model** was on the ascent in the world of economics and finance, the not-so rational aspects of human nature began to find its ways into economics. The major challenges emanating from **behavioural economics** were in

the following forms: Deviation from rationality; possibility of beating the market; divergence between market prices and fundamental values; pervasiveness of irrational forces and misleading signals from the market forces.

Herbert Simon, a Nobel laureate in economics, challenged the assumption of rationality. He argued that people don't "optimise" but "**satisfice**" (a combination of "satisfy" and "suffice"). Daniel Kahneman and Amos Tversky built upon Simon's ideas to challenge mainstream economics and its reliance on rationality. There is evidence that superior investors can beat the market, contrary to what EMH (Efficient Market Hypothesis) says.

With enough evidence that stock prices can deviate significantly from their intrinsic value, the argument that financial markets should always set the priorities for corporations and for society lost some of its force.

4.5 GLOSSARY

1. **Behavioural economics:** Behavioural economics is the study of psychology as it relates to the economic decision-making processes of individuals and institutions. It studies the effects of psychological, cognitive, emotional, cultural and social factors on the economic decisions and how those decisions vary from those implied by classical theory.

2. **Arbitrage:** The simultaneous buying and selling of securities, currency, or commodities in different markets or in derivative forms in order to take advantage of differing prices for the same asset. Arbitrage occurs when a security is purchased in one market and simultaneously sold in another market at a higher price, thus considered to be risk-free profit for the trader.

4.6 SELF ASSESSMENT QUESTIONS

Q1.   Who are noise traders?

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Q2. Define intrinsic value.

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4.7 LESSON END EXERCISES

Q1. What are the implications of misleading signals from the market?

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Q2. What are the pervasive irrational forces according to Andrei Shleifer and Robert Vishy?

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4.8 SUGGESTED READINGS / REFERENCES

➤ Chandra, P. (2017). *Behavioural Finance*. Tata Mc Graw Hill Education, Chennai (India).

➤ Singh. S., & Bahl.S (2015). *Behavioural Finance*. Vikas Publishing House, Noida (India).

➤ Sulphey, M.M. (2014). *Behavioural Finance*. PHI Learning, Delhi.

➤ Ackert, L. F., & Deaves, R. (2010). *Behavioural Finance: Psychology, Decision Making and Markets*. Cengage Learning.

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RATIONAL MARKETS HYPOTHESIS AND THE CHALLENGE OF BEHAVIOURALISTS

SYNTHESIS AND FUTURE HORIZONS

STRUCTURE

5.1   Introduction

5.2   Objectives

5.3   Synthesis and Future Horizons

      5.3.1   Alternative Approaches

5.4   Summary

5.5   Glossary

5.6   Self Assessment Questions

5.7   Lesson End Exercises

5.8   Suggested Readings / References

5.1   INTRODUCTION

The future of behavioural finance necessitates that the research areas of behavioural corporate finance and investor psychology develop richer models of financial decision-making behavior. Behavioural corporate finance requires expanding the focus from chief executive officer characteristics to those of the entire top management team, and also involves greater understanding of organizational theory. A greater focus is needed on cross-cultural factors and how they interact with

behavioural influences. Investor psychology needs a more comprehensive theory of the drivers of investor behavior and better data. This need is strong for investor sentiment research, which might offer the most potential to advance understanding of psychological influences on asset pricing.

5.2   OBJECTIVE

After going through this lesson, you should be able to know about the future horizon of behavioural finance and the concerns that are still prevalent in behavioural research.

5.3   SYNTHESIS AND FUTURE HORIZONS

Richard Thaler, a leader of behavioural economics, wrote a regular column for the *Journal of Economic Perspectives*, a publication started in 1987 by the American Economic Association to update increasingly specialised economists on developments in different corners of the discipline. Joseph Stiglitz, one of the founding editors, gave Thaler more space in an "attempt to broaden the horizons of the profession."

Thaler's growing clout made him a prized commodity. GSB, University of Chicago appointed him as a professor of behavioural sciences, because Merton Miller opposed his appointment as a finance faculty. Of course, nothing could stop a professor of behavioural sciences from teaching and writing about finance, which Thaler did. He even began practising finance by co-founding Fuller & Thaler Asset Management which was managing several billion dollars using strategies based "the behavioural edge."

Thaler became a respected, wealthy professor at the school that still regarded itself as the bastion of modern neoclassical finance. The award of Nobel prize in economics to Daniel Kahneman (Thaler's close friend and psychology mentor) and Vernon Smith, an experimental economist, added further legitimacy to Thaler's work.

At a session honouring Irving Fisher during the 1997 meeting of the American Economic Association, Thaler described how the writings of Irving Fisher, the forefather of modern finance, were infused with behavioural reasoning. He said,

"Fisher... helped.. introduce mathematics to economics. Young economists are taught modern concepts (equations, diagrams and the like) but rarely go back and read the surrounding text... . It is time to stop neglecting the words and time to start updating our equations to include these behavioural factors."

Many economists and finance scholars were aware that people sometimes made weird choices. In the U.S., the shift to worker-directed plans, mainly 401(k), revealed how people committed mistakes. The 401(k)ers were prone to "naive diversification" (they spread their investments more or less equally across different funds), were daunted by choice (participation in 401(k) declined with more funds being available), invested a high percentage of their 401(k) assets in their own company's stock, and did not save enough to ensure comfortable retirement, and so on.

To combat the problem of inadequate savings, Thaler and Shlomo Benartzi devised an innovation plan, called SMaRT, a not-quite-acronym for "save more tomorrow." Under this plan, 401(k)ers agree to an automatic increase in their contribution rate when they get pay raise, as a default option. SMaRT plan did improve the average savings rate significantly wherever it was implemented.

The success of SMaRT led to a remaking of the 401(k) along the lines suggested by Behavioural research. Instead of daunting 401(k)ers with a bewildering array of choices, plans were built along a sensible default option in the form of a life-cycle fund, wherein the investment mix changed with age, or a portfolio which is periodically rebalanced along Markowitzian lines. Harry Markowitz, Bill Sharpe, and Roger Ibbotson got involved in such a shift in some way or the other. They came to appreciate the importance of behavioural research. Law makers noticed, too. The Pension Protection Act, 2006, encouraged companies to guide the savings and investment choices of their employees along the behavioural lines.

Thaler joined forces with Chicago law professor Cass Sunstein to apply behavioural ideas to other areas. They called their guided approach "libertarian paternalism," and demonstrated how it could improve Medicare prescription plans, lending regulation, public schools, and marriage. This approach had significant influence. As Justin Fox put it, "Just as the law and economics movement that emerged from Chicago gave intellectual backing to the great deregulation of the

1970s through the 1990s, Sunstein became a leading proponent of a new behavioural law and economics movement that aimed to guide a rethink of law and regulation." When Obama was elected as the President of the U.S. in 2008, he appointed his friend Sunstein as his regulation czar. David Cameron, leader of Conservative Party in U.K., became an outspoken fan of Thaler and Sunstein's work.

While behavioural research passed the test of scientific usefulness, some concerns still remained:

- Politicians and bureaucrats are also people, subject to behavioural flaws. Can they be expected to steer other's decisions?

- The bulk of research in finance still revolves around markets and prices, not individual decisions. Does behavioural theory offer any answers here?

The bounty of behavioural quirks creates a problem. As Merton Miller would say, "There's only one theory of efficient markets... There are hundreds of theories of inefficient markets." Justin Fox put it differently: "One could come up with a plausible- sounding behavioural explanation for just about every market phenomenon. But if they were all different, that didn't amount to much of a theory of market behaviour."

Despite these concerns, behavioural finance is clearly more than just a collection of curiosities, or self-cancelling tendencies. According to behavioural research, the most consistent human trait is overconfidence, which persuades investors to think that they know more about a stock's value than they actually do. Overconfidence explains excess volatility, momentum, and huge trading volumes.

Overconfidence, however, does not provide a theory of asset prices. It only explains why asset prices overshoot their fundamentals, a view that can coexist with efficient markets hypothesis defined somewhat loosely. Fama wrote in 1965, "In an efficient market, the actions of many competing participants would cause the actual price of a security to wander randomly about its intrinsic value." Even behaviourists subscribed to this idea, except that they argued that this wandering can cause discrepancy between security prices and intrinsic values for years on

end. As John Maynard Keynes observed decades ago that the market can remain irrational much longer than investors can remain solvent.

Even Fama and Kenneth French seemed to veer to this when they looked at what would happen in a market with lots of "misinformed" investors in a theoretical paper published in 2007. They wrote, "Offsetting actions by informed investors do not typically suffice to cause the price effects of erroneous beliefs to disappear with the passage of time." They added, "For price to converge to rational values, the beliefs of misinformed investors must converge to those of the informed, so eventually there is complete agreement about old news."

5.3.1 Alternative Approaches

While behaviourists found a lot of holes in the edifice of rational markets finance, they didn't abandon that edifice. They continue to use the equilibrium framework imposed on the field by Irving Fisher a century ago. They still trust Merton Miller's "pervasive forces."

Is equilibrium the best metaphor for economic activity? Economists of Austrian tradition and American institutionalists were not comfortable with equilibrium analysis. However, they were marginalised as their approach lacked the precision and clarity of equilibrium economics—precision that was inspired by 19th century physics.

So something interesting happened when, in the 1980s, the physicists evinced interest in economics again. In the intervening century, revolutionary changes such as the theory of relativity, quantum mechanics, and Heisenberg's principle of uncertainty, had occurred in physics. Many physicists were excited about chaos theory—the study of how simple initial causes led to dramatic consequences.

In 1984, a group of physicists started the Santa Fe Institute for promoting interdisciplinary research in which scholars with diverse backgrounds would explore chaos and complexity—a catchall phrase for all evolving and adaptive phenomena, including the ones that defy prediction. Computer simulation became a favorite research tool at Santa Fe.

In 1987, Santa Fe Institute organised its first conference on 'The Economy as an Evolving Complex System.' At this conference, the interaction between physicists and economists was not very productive. Physicists felt that the economists were not willing to give more weight to irrationality and feedback effects in their models and economists complained of the high brow attitude of physicists. As Steven Durlauf said, "I think overall the physicists didn't have much of an impact. They didn't come up with very interesting models. They had very stupid agents."

Subsequent work by Brian Arthur, an economist, J. Doyne Farmer, a physicist, and others brought greater realism to economic agents. However, so far that work has not really penetrated the mainstream academic work.

Even as they resisted the influence of Santa Fe Institute, economists have been taking steps away from relying more or less exclusively on equilibrium. This is most visible in the study of long-term economic growth, which, by definition, cannot rely on the metaphor of equilibrium. Hence, the subject was somewhat neglected by mathematical economists. Economists are now describing better the dynamics of growth and change, by abandoning the concept of equilibrium while sticking with math. In the new growth theory, the key word is "endogenous"—that which arises from within. Earlier it was assumed that growth was caused by "exogenous" factors. As Justin Fox put it, "Explaining a spurt in economic growth requires a *deus ex machina* such as the discovery of the Americas or the invention of the electric motor. In the new growth theory, the technological drivers of growth are depicted as the result of economic forces and decisions."

Applying the concept of endogenously generated change to explain short-term market fluctuations seems to be a more difficult task. In recent years, some researchers have begun to do just that. Their models are typically populated by rational but half-informed agents who make mistakes, but learn and adapt. As a result, the market never settles down into a stable equilibrium. Instead, it constantly changes and occasionally goes bonkers. "Adaptive market hypothesis," "adaptive rational equilibrium," "efficient learning," and "rational belief equilibria," are a few such market models which are developed by Andrew Lo.

5.4 SUMMARY

The growing recognition of behavioural finance led to some useful practical applications such as SMaRT, an innovative plan to combat the problem of inadequate savings and remaking of the 401(k) plan in the U.S. Richard Thaler and Cass Sunstein joined forces to apply Behavioural ideas to other areas. They called their guided approach "libertarian paternalism," and demonstrated how it could improve Medicare prescription plans, lending regulation, public schools, and marriage.

The bounty of behavioural quirks creates a problem. As Justin Fox put it, "One could come up with a plausible- sounding behavioural explanation for just about every market phenomenon. But if they were all different, that didn't amount to much of a theory of market behaviour."

Despite these concerns, behavioural finance is clearly more than just a collection of curiosities, or self-cancelling tendencies. According to behavioural research, the most consistent human trait is overconfidence.

While behaviourists found a lot of holes in the edifice of rational markets finance, they didn't abandon that edifice. They continue to use the equilibrium framework imposed on the field by Irving Fisher a century ago. Since 1990s, however, economists have been taking steps away from relying more or less exclusively on equilibrium. This is most visible in the study of long-term economic growth. In the new growth theory, the key word is "endogenous"—that which arises from within.

5.5 GLOSSARY

1. **Overconfidence:** Overconfidence is a behavioural bias which means that we tend to overestimate our knowledge, underestimate risks and exaggerate our ability to control events.

2. **Endogenous and Exogenous:** Endogenous risk is the risk generated and reinforced within the financial markets by the interaction of market participants, as opposed to exogenous risk which refers to shocks that come from outside the financial system.

5.6   SELF ASSESSMENT QUESTIONS

Q1.   Write a short note on synthesis and future horizon in behavioural finance.

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Q2.   What is 401(k) plan?

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Q3.   What do you mean by SMaRT?

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5.7   LESSON END EXERCISES

Q1.   What are the concerns that still remain while behavioural research passes the test of scientific usefulness?

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Q2.   What is the alternative to equilibrium as the best metaphor for economics?

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5.8   SUGGESTED READINGS / REFERENCES

➢   Chandra, P. (2017). *Behavioural Finance*. Tata Mc Graw Hill Education, Chennai (India).

➢   Singh. S., & Bahl.S (2015). *Behavioural Finance*. Vikas Publishing House, Noida (India).

➢   Sulphey, M.M. (2014). *Behavioural Finance*. PHI Learning, Delhi.

➢   Ackert, L. F., & Deaves, R. (2010). *Behavioural Finance: Psychology, Decision Making and Markets*. Cengage Learning.

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FOUNDATIONS OF RATIONAL FINANCE

EXPECTED UTILITY THEORY

STRUCTURE

6.1   INTRODUCTION

Finance is concerned with how individuals and organisations acquire and allocate resources over time, taking into consideration the associated risks. While the earlier literature on finance considered psychological influences, since 1950s the field of finance has been dominated by the rational model which assumes individuals are rational and markets are efficient. The rational finance model has led to remarkable advances in the theory and practice of finance.

Expected utility is an economic term summarizing the utility that an entity or aggregate economy is expected to reach under any number of circumstances. The expected utility is calculated by taking the weighted average of all possible outcomes under certain circumstances, with the weights being assigned by the likelihood, or probability, that any particular event will occur.

Expected utility theory is used as a tool for analyzing situations where individuals must make a decision without knowing which outcomes may result from that decision, i.e., decision making under uncertainty. These individuals will choose the action that will result in the highest expected utility, which is the sum of the products of probability and utility over all possible outcomes. The decision made will also depend on the agent's risk aversion and the utility of other agents.

This theory also notes that the utility of money does not necessarily equate to the total value of money. This theory helps explains why people may take out insurance policies to cover themselves for a variety of risks. The expected value from paying for insurance would be to lose out monetarily. But, the possibility of large-scale losses could lead to a serious decline in utility because of diminishing marginal utility of wealth.

6.2 OBJECTIVE

After going through this lesson, you should be able to understand :

- expected utility theory, its assumptions and axioms

- utility function

- expected monetary value

- Daniel Bernoulli's Solution and expected value.

6.3 EXPECTED UTILITY THEORY

Expected Utility Theory (EUT) was propounded by Neumann and Morgenstern (1944). The theory specified the necessary qualities that a rational decision maker requires for the Expected Utility Hypothesis to hold.

According to the EUT, when faced with various actions, the result of each could give rise to more than one possible outcome with different probabilities, and therefore it is normal to rationally identify and determine the values of all possible outcomes and probabilities that will result from each course of action, and multiply

the two to give an expected value. After providing due weightage to the element of risk, the action that may give rise to the highest total expected value would be chosen. Thus, EUT states that decision makers choose between risky or uncertain prospects after comparing their expected utility values. This is done by weighing the sums obtained by adding the utility values of outcomes, multiplied by their respective probabilities. Utility functions help in measuring investor's preferences for wealth, and the level of risk they are willing to take for attaining greater wealth. It is supposed to develop a theory of portfolio optimisation.

6.3.1 Assumptions:

Neumann and Morgenstern (1947) state that according to EUT, investors are:

1. Completely rational
2. Able to deal with complex choices
3. Risk averse and
4. Wealth maximising.

The theory also states that the investor selects the portfolio that maximises expected returns with minimum possible risks. Expected utility measures the relative preference for different levels of total wealth of investors. It is a normative theory that stipulates how individuals should behave while choosing between risky gambles. The theory assumes that the decision makers satisfy a number of assumptions. The practical application of EUT is that in order to maximise utility, individuals assign utility values to competing investment decisions by comparing the size of the benefit with the probability of its occurrence.

Expected utility theory is concerned with people's preferences with respect to choices that have uncertain outcomes (gambles). According to this theory, if certain axioms are fulfilled, the subjective value of a gamble for an individual is the statistical expectation of the values the individual assigns to the outcomes of that gamble.

Certain conditions have to be satisfied for an individual to have rational preferences. To understand these conditions, let us introduce some notation. Suppose an individual is faced with a choice between two outcomes, A and B. The symbol > indicates strong preference, thus A > B means that A is always preferred to B. The symbol - indicates indifference so that A - B means the individual values the

two outcomes equally. Finally, the symbol ? suggests weak preference, so that A ? B means that the individual prefers A or is indifferent between A and B.

1.3.1.1 The von Neumann-Morgenstern Axioms

According to expected utility theory, the following axioms define a rational decision maker. These axioms are referred to as von Neumann-Morgenstern axioms as they were laid down by John von Neumann and Oskar Morgenstern.

a) **Completeness:** The individual has well defined preferences and can always choose between any two alternatives:

- Axiom: For every A and B either A > B or A - B or A < B.

 In words, the individual either prefers A to B, or is indifferent between A and B, or prefers B to A.

b) **Transitivity:** As an individual decides according to the completeness axiom, the individual also decides consistently.

- Axiom: For every A, B and C with A ? B and B ? C we must have A ? C.

 In words, if the individual prefers, A to B, and B to C, then he must prefer A to C.

c) **Independence:** If two gambles are mixed with a third one, the individual will maintain the same preference order as when the two are presented independently of the third one.

- Axiom: Let A, B and C be three lotteries with A ? B, and let t ? (0, 1); then t A + (1 - t) C > t B + (1 - t) C

d) **Continuity:** When there are three lotteries (A, B, C) and the individual prefers A to B and B to C, then it should be possible to mix A and C in such a manner that the individual is indifferent between this mix and the lottery B.

- Axiom: Let A, B and C be lotteries with A ? B ? C; then there exists a probability p such that p A + (1 - p) C is equally good as B.

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e) **Omission of Irrelevant Alternatives:** The individual ignores irrelevant alternatives in deciding between alternatives. For example, in evaluating two (or more) alternatives, the individual ignores outcomes that occur with equal probability under both alternatives being considered.

f) **Frame Independence:** The individual cares only about outcomes and the probabilities with which they occur and not how they are presented or bundled.

❖ **Utility Maximisation**

Utility reflects the satisfaction derived from a particular outcome - ordinarily an outcome is represented by a "bundle" of goods. The utility function, denoted as $u(*)$ assigns numbers to possible outcomes such that preferred choices are assigned higher numbers. Suppose you have to choose between two sandwiches plus one chocolate bar or one sandwich plus two chocolate bars. If you prefer the latter, it means that:

$u(1$ sandwich, 2 chocolate bars$) > u(2$ sandwiches, 1 chocolate bar$)$

Note that numerical values have not been assigned to $u(*)$ so far. This is because the ordering of outcomes by a utility function is what really matters. A rational individual will consider all possible bundles of goods that satisfy his budget constraint and then choose the bundle that maximises his utility.

When only a single good is being considered, then ranking under certainty is simple. Given the principle of non-satiation, the more the better. As an example, consider the utility of wealth. Mathematically, the utility of wealth can be defined in various ways. One of the mathematical functions commonly used is the logarithmic function. This means that the utility derived from wealth w is $u(w) = \ln(w)$. Table 6.1 shows the utility of wealth as per the logarithmic function.

Table 6.1: Logarithmic Utility of Wealth

Wealth (in Rs. 10,000)	$u(w) = \ln(w)$
1	0
2	0.6931
5	1.6094
7	1.9459

10	2.3026
20	2.9957
30	3.4012
50	3.9120
100	4.6052

Figure 6.1 represents this utility function graphically. Note that as wealth increases, the slope of the utility function gets flatter.
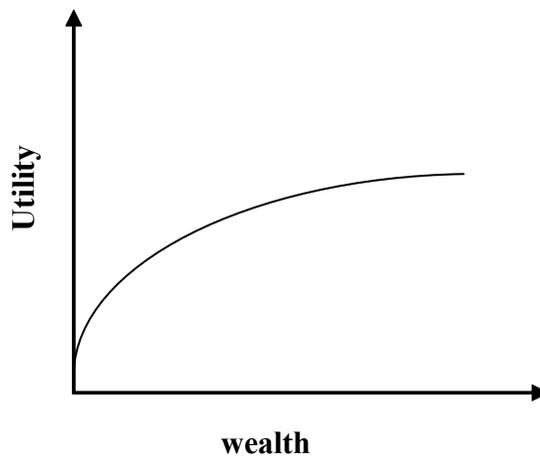
Figure 6.1 Utility Function

❖ **Expected Monetary Value**

So far we ignored uncertainty. In the real world, however, there is a great deal of uncertainty about outcomes. How should one decide when faced with risky gambles? Economists, mathematicians, and philosophers, have long pondered over this question. This section looks at how their thinking evolved over time.

For long, mathematicians had assumed that gambles are assessed by their expected monetary value (EMV). For example, the EMV of a gamble which pays 10,000 with a probability of 0.70 and 1000 with a probability of 0.3 is:

0.7 x 10,000 + 0.3 x 1,000 = 7300

In 1713, Nicholas Bernoulli exposed the weakness of the EMV criterion. He asked what is the value of a gamble that pays two pounds if you toss a coin and it comes up head once, or four pounds if it comes up heads twice in a row, or eight pounds if it come up heads thrice in a row, so on and so forth? The expected value of such a gamble is:

$$(1/2 \text{ x } 2) + (1/4 \text{ x } 4) + (1/8 \text{ x } 8) + ... = 1 + 1 + 1 \ ... = ?$$

This seems crazy because no one would pay that much for such a gamble.

❖ **Daniel Bernoulli's Solution**

Daniel Bernoulli, a younger cousin of Nicholas Bernoulli, suggested a solution to that problem 25 years later in 1738 and published it in the *St. Petersburg Journal* (that is why it was called St. Petersburg paradox). Daniel suggested that the solution to the paradox was simply that further increments in expected wealth don't increase utility in the same proportion. Put differently, expected wealth has diminishing marginal utility. This means that the utility function is concave as shown in Figure 6.1.

Daniel Bernoulli pointed out that people do not evaluate gambles by their EMV. He observed that most people abhor risk and hence, choose a sure thing that is less than expected value. In effect, people are willing to pay premium to avoid the uncertainty. His reasoning was simple: people's choices are based on psychological values of outcomes (utilities) and not dollar values. The psychological value of a gamble is the average of the utilities of various possible outcomes, each weighted by its probability; it is not the weighted average of possible dollar outcomes.

Daniel Bernoulli argued that diminishing marginal value of wealth is what explains risk aversion. Here is an example of diminishing marginal value of wealth.

Table 6.2: Diminishing Marginal Value of Wealth

Wealth (million)	1	2	3	4	5	6	7
Utility (units)	10	18	25	31	36	40	43

You can see that adding 1 million to a wealth of 1 million yields an increment of 8 units of utility, but adding 1 million of wealth to a wealth of 6 million adds only 3 units of utility.

Consider the following choice:

Have 4 million with certainty ? Utility: 31

Equal chance to have 2 million or 6 million ? Utility: (18 + 40)/2 = 29

The expected value of the "sure thing" and the gamble are the same (4 million) but the utility of the "sure thing" is more.

Daniel Bernouilli offered a solution to the famous "St. Petersburg paradox." More important, his analysis of risk attitudes in terms of preferences for wealth is still part of economic analysis even after almost 300 years.

❖ **Expected Utility**

Developed by John von Neumann and Oskar Morgenstern, expected utility theory attempts to define rational behaviour in face of uncertainty. It is a *normative theory* as it prescribes how people should behave rationally. A *positive theory*, on the other hand, describes how people actually behave.

Expected utility theory is really a theory that deals with risk, not uncertainty. A risky situation is one where the possible outcomes are defined with well-defined probabilities associated with them. An uncertain situation is one where you cannot assign probabilities or define the list of possible outcomes.

For all practical purposes, decision-making under risk is concerned with wealth. Suppose there are two states of the world. If the first state occurs your wealth will be Rs. 1,000,000 and if the second state occurs your wealth will be Rs. 5,000,000. The probabilities associated with these two levels of wealth are 0.3 and 0.7. In formal terms, a prospect is a series of wealth outcomes, with well-defined probabilities associated with them. The above prospect, let us call it P1, can be represented in the following format.

P1 (0.3, Rs. 10,00,000 , Rs. 50,00,000)

When there are two outcomes, as in the above case, the first number is the probability of the first outcome (the probability of the second outcome will be the complementary probability), and the next two numbers represent the two possible

outcomes. If only one rupee figure is given, as in P(0.4, Rs. 15,00,000), it means that the second outcome is "o".

How is the expected utility of a prospect calculated? The expected utility of a prospect is calculated as follows:

$$u(P) = \sum_{i=1}^{n} p_i u(O_{i,})$$

where $u(P)$ is the expected utility of the prospect, p_i is the probability associated with the ith possible outcome, O_i is the ith possible outcome, and $u(O_i)$ is the utility of O_i.

To illustrate, the expected utility of P_1 is:

$u(P_1) = 0.3u\,(10,00,000) + 0.7\,\,u(50,00,000)$

If the utility of wealth is defined by a logarithmic function, the expected utility of P1 is:

$u(P_1) = 0.3\,(4.6052) + 0.7\,(6.215) = 1.382 + 4.351 = 5.733$

Expected utility is order-preserving (i.e. ordinal), so it can be used to rank risky alternative. For a given individual, it is also cardinal, in the sense that it is unique up to a positive linear transformation.

❖ **Risk Attitude**

There is ample evidence that, in general, people are risk averse. However, they are willing to assume risk, if they are compensated for the same. Suppose stocks A and B offer the same expected return, but stock B is riskier than stock A. If you are like most people, you would choose stock A. To invest in stock B, you will ask for a higher expected return so that you are compensated for bearing higher risk.

The risk attitude of a person is reflected in his utility function. Going back to P1, we find that the expected value of wealth is:

$E(W) = 0.3(10,00,000) + 0.7\,(50,00,000) = 38,00,000 = E(P_1)$

It may be noted that the expected value of wealth is the same as the expected value of the prospect. The utility of this expected value of wealth is:

u [E(W)] = ln [38,00,000] = u [E(W)] = ln [380] = 5.940

The expected utility of the prospect, $u(P_1)$, as we saw before is 5.733. So, in this case, we find that:

u [E(W)] > $u(P_1)$

Thus, if a person's utility of wealth is described by a logarithmic function, he would prefer the expected value of a prospect to the prospect itself. Such as person dislikes risk and we say that he is risk-averse.

In general, if a person has a concave utility function as shown in Figure 6.1 (logarithmic utility function, is an example of a concave utility function), he is risk-averse. For such a person,

u [E(P)] > u(P)

A risk-averse person would have the expected value of the prospect with certainty rather than take a gamble for an uncertain outcome.

A risk-averse person would be willing to sacrifice something for certainty. The certainty equivalent of a prospect is the certain level of wealth which makes the decision make indifferent between the prospect and that certain level of wealth. The certainty equivalent of P1, given the logarithmic utility function, is Rs. 30,88,900. As Figure 6.3 shows, a wealth of 308.89 (in Rs. 10,000s) provides a utility that equals the expected utility of P1.
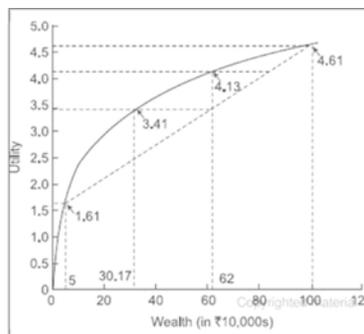
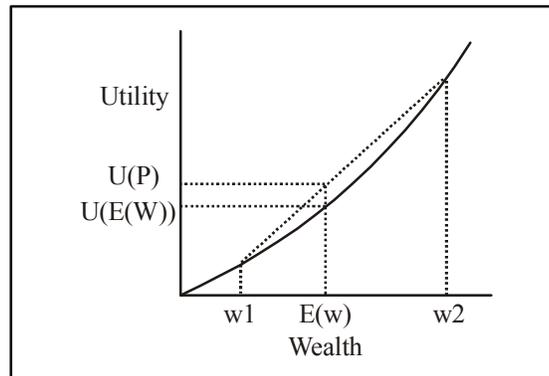**Figure 6.3: Utility Function of a Risk-averse Individual**

u [308.89] = $u(P_1)$ = 0.3 (4.6052) + 0.7 (6.215) = 5.733

Thus, in this case the decision maker considers a certain amount of Rs.30,88,900 as equivalent to P_1.

Generally, people are risk-averse, but some people like risk. Such people are called risk seekers. The utility function of a risk seeker is convex, as in: $u[P] > u[E(P)]$

This means that the utility of prospect is greater than the utility of the expected value of the prospect. Figure 6.4 shows the utility function of a risk seeker. Thus, a risk seeker would prefer a gamble on an uncertain outcome rather than take the expected value of the prospect with certainty.

Finally, some people are risk-neutral—they lie between risk averters and risk seekers. They care only about expected values as risk does not matter to them. For a risk-neutral individual: $u[E(P)] = u[P]$

Figure 6.4: Utility Function of a Risk Seeker

For a risk-neutral individual, the utility of the expected value of the prospect is equal to the expected utility of the prospect. This means that the utility function for a risk-neutral individual is a straight line as illustrated in Figure 6.5. In our previous example, a risk-neutral individual would be indifferent between a prospect with a 30% chance of wealth of Rs.10,00,000 and 70% chance of wealth of Rs.50,00,000 and a wealth of Rs.38,00,000 with certainty.
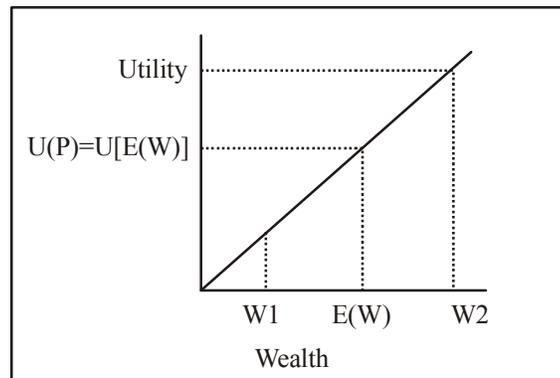
Figure 6.5: Utility Function for a Risk-neutral Individual

6.4   SUMMARY

Expected utility theory is concerned with people's preferences with respect to choices that have uncertain outcomes (gambles). According to this theory, if certain axioms are fulfilled, the subjective value of a gamble for an individual is the statistical expectation of the values the individual assigns to the outcomes of that gamble.

Developed by John von Neumann and Oskar Morgenstern, expected utility theory attempts to define rational behaviour in face of uncertainty. It is a *normative theory* as it prescribes how people should behave rationally. A *positive theory*, on the other hand, describes how people actually behave.

This is a theory which estimates the likely utility of an action – when there is uncertainty about the outcome. It suggests the rational choice is to choose an action with the highest expected utility.

6.5   GLOSSARY

1.   **Utility:** Utility refers to the total satisfaction received from consuming a good or service.

2.   **Risk averse:** A risk averse investor is an investor who prefers lower returns with known risks rather than higher returns with unknown risks. A risk averse investor avoids risks. Such investors like to invest in government bonds, debentures and index funds.

6.6 SELF ASSESSMENT QUESTIONS

Q1. What is a utility function?

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Q2. State the von Neumann-Morgenstern axioms.

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Q3. How is the expected utility of a prospect calculated?

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Q4. Discuss the weakness of the expected monetary value (EMV) criterion.

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6.7 LESSON END EXERCISES

Q1. Explain expected utility theory with its assumption and various axioms.

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Q2. Discuss Daniel Bermoulli's solution or the St. Petersburg paradox.

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Q3. Describe the utility functions of a person who is risk-averse, or risk-loving or risk neutral.

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6.8   SUGGESTED READINGS / REFERENCES

➢ Chandra, P. (2017). *Behavioural Finance*. Tata Mc Graw Hill Education, Chennai (India).

➢ Singh. S., & Bahl.S (2015). *Behavioural Finance*. Vikas Publishing House, Noida (India).

➢ Sulphey, M.M. (2014). *Behavioural Finance*. PHI Learning, Delhi.

➢ Ackert, L. F., & Deaves, R. (2010). *Behavioural Finance: Psychology, Decision Making and Markets*. Cengage Learning.

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FOUNDATIONS OF RATIONAL FINANCE

MODERN PORTFOLIO THEORY

STRUCTURE

7.1 INTRODUCTION

The expected utility theory says that in the face of uncertainty individuals maximise the utility expected across possible states of the world. For a financial asset, like an equity stock, that has innumerable possible outcomes, it is not a manageable proposition. However, if we assume that investors are risk averse and investor preferences can be defined in terms of the mean and variance of returns, it is possible to quantify the tradeoff between risk and return. This is what the modern portfolio theory and the capital asset pricing model do.

Modern portfolio theory argues that an investment's risk and return characteristics should not be viewed alone, but should be evaluated by how the investment affects the overall portfolio's risk and return. This section discusses the modern portfolio theory and the following chapter reviews the capital asset pricing model.

7.2 OBJECTIVE

After going through this lesson, you will be able to understand :

- the importance of modern portfolio theory

- assumptions of MPT

- different concepts of MPT and its criticism.

7.3 MODERN PORTFOLIO THEORY

Portfolio theory, originally proposed by Harry Markowitz in the 1950s, was the first formal attempt to quantify the risk of a portfolio and develop a methodology for determining the optimal portfolio. The introduction of modern portfolio theory has led to a mathematical explanation of the expression "don't put all your eggs in one basket". One of the most fundamental conclusions in Markowitz portfolio choice theory is that rational investors should not choose assets only because of their unique properties such as the expected return and variance, but should also consider the co-variation between the different assets. As the number of assets in a portfolio increases, the covariance increasingly makes up a greater part of an individual assets contribution to the total risk of a portfolio. Basically, what MPT says is that, it is not enough to take only one particular asset's risk and return under consideration but rather investing in several assets with low correlations

towards each other. This will give the portfolio advantages of diversification. He was the first person to show quantitatively why and how diversification reduces risk. Hence, the relevant objective in the MPT concept is to chose the right combination (or proportions) of these assets to the optimal portfolios.

7.4 ASSUMPTIONS OF MPT

Modern Portfolio Theory relies on the following assumptions and fundamentals that are the key concepts upon which it has been constructed:

1. Investors ask for maximizing the expected return of their total wealth.

2. All investors have the similar expected single period investment horizon.

3. All investors are risk-averse, which means that they only will accept a higher risk if they are compensated with a higher expected return.

4. Investors base their entire investment decision on the expected return and risk.

5. Investors prefer higher returns to lower returns for a given level of risk.

Some other assumptions:

- For buying and selling securities there are no transaction costs. There is no spread between bidding and asking prices. No tax is paid, its only risk that plays a part in determining which securities an investor will buy.

- An investor has a chance to take any position of any size and in any security. The market liquidity is infinite and no one can move the market. So that nothing can stop the investor from taking positions of any size in any security.

- While making investment decisions the investor does not consider taxes and is indifferent towards receiving dividends or capital gains.

- Investors are generally rational and risk adverse. They are completely aware of all the risk contained in investment and actually take positions based on the risk determination demanding a higher return for accepting greater volatility.

- The risk-return relationships are viewed over the same time horizon. Both long term speculator and short term speculator share the same motivations, profit target and time horizon.

- Investors share identical views on risk measurement. All the investors are provided by information and their sale or purchase depends on an identical assessment of the investment and all have the same expectations from the investment. A seller will be motivated to make a sale only because another security has a level of volatility that corresponds to his desired return. A buyer will buy because this security has a level of risk that corresponds to the return he wants.

- Investors seek to control risk only by the diversification of their holdings.

- In the market all assets can be bought and sold including human capital.

- Politics and investor psychology have no influence on market.

- The risk of portfolio depends directly on the instability of returns from the given portfolio.

- An investor gives preference to the increase of utilization.

- An investor either maximizes his return for the minimum risk or maximizes his portfolio return for a given level of risk.

- Analysis is based on a single period model of investment.

Based on these assumptions, most of which are pretty much common sense, when comparing a single asset or a portfolio of assets, only assets or portfolios with the highest expected return at the same or lower risk level are considered as efficient.

Versijp in 2011 adds the following assumptions for modern portfolio theory to our list.

1. Investors prefer more over less (no satiation)

2. Investors dislike risk (risk-aversion)

3. Traders maximize utility, and do so for 1 period

4. Utility is a function of expected return and variance and nothing else

5. There is no distortion from inflation

6. All information is available at no costs

7. All investments are infinitely divisible and last one which should be on our assumption list for proper analysis

8. The unit of measurement contains a constant purchasing power.

Of course this list is not the best representation of reality, but allows us to do valuable analysis. Investors are also rational so they will always prefer more to less, i.e. investors will not invest in a portfolio if there consists a second portfolio with a more favorable risk return profile. Security markets are efficient, as new information enter markets information is quickly reflected in the assets prices. Assets are therefore literally re-priced as soon as new information hit the market. MPT also uses standard deviation (volatility) as a proxy for risk.

Another assumption of the MPT is that there are no limits on the size of positions taken when investing and investors can take any position they want. Investors don't think about taxes when making investments decisions and are indifferent between receiving dividends or capital gains. Investors also don't have to think about transaction costs. Investors as a group also look at the risk-return relationship over the same time horizon. All assets, including human capital can be traded on the market and politics and investor psychology have no effect on the markets. MPT further assumes that returns are normally distributed and that historical average of returns corresponds to expected returns.

7.5 CENTRAL CONCEPTS OF MARKOWITZ'S MODERN PORTFOLIO THEORY

In 1952, Harry Markowitz presented an essay on "Modern Portfolio Theory" for which he also received a Noble Price in Economics. His findings greatly changed the asset management industry, and his theory is still considered as cutting edge in portfolio management.

There are two main concepts in Modern Portfolio Theory, which are:

1. Any investor's goal is to maximize return for any level of risk

2. Risk can be reduced by creating a diversified portfolio of unrelated assets

7.5.1 Maximize Return - Minimize Risk

Return is considered to be the price appreciation of any asset, as in stock price, and also any Capital inflows, such as dividends. In general Standard Deviation is a fair measure of risk as we want a steady increase and not big swings which might possibly end up as loss. Risk is evaluated as the range by which an asset's price will on average vary, known as Standard Deviation. If an asset's price has 10% deviation from the mean and an average expected return of 8% you may observe returns between -2% and 18%.

In a practical application of Markowitz Portfolio Theory, let's assume there are two portfolios of assets both with an average return of 10%, Portfolio A has a risk or standard deviation of 8% and Portfolio B has a risk of 12%. As both portfolios have the same expected return, any investor will choose to invest in portfolio A as it has the same expected earnings as portfolio B but with less risk.

It is important to understand risk; it is a necessary concept, as there would be no expected reward without it. Investors are compensated for bearing risk and, in theory, the higher the Risk, the higher the Return.

Going back to our example above it may be tempting to presume that Portfolio B is more attractive than Portfolio A. As portfolio B has a higher risk at 12%, it may obtain a return of 22%, which is possible but it may also witness a return of -2%. All things being equal it is still preferable to hold the portfolio that has an expected range of returns between +2% and +18%, as it is more likely to help you reach your goals.

7.5.2 Diversified Portfolio & the Efficient Frontier

Risk, as we have seen above, is a welcomed factor when investing as it allows us to reap rewards for taking on the possibility of adverse outcomes. Modern Portfolio Theory, however, shows that a mixture of diverse assets will significantly reduce the overall risk of a portfolio. Risk, therefore, has to be seen

as a cumulative factor for the portfolio as a whole and not as a simple addition of single risks.

Assets that are unrelated will also have unrelated risk; this concept is defined as correlation. If two assets are very similar, then their prices will move in a very similar pattern. Two ETFs from the same economic sector and same industry are likely to be affected by the same macroeconomic factors. That is to say, their prices will move in the same direction for any given event or factor. However, two ETFs (Exchange Traded Funds) from different sectors and industries are highly unlikely to be affected by the same factors.

This lack of correlation is what helps a diversified portfolio of assets have a lower total risk, measured by standard deviation than the simple sum of the risks of each asset. Without going into any detail, a bit of math might help to explain why.

Correlation is measured on a scale of -1 to +1, where +1 indicates a total positive correlation, prices will move in the same direction par for par, and -1 indicates the prices of these to stocks will move in opposite directions. If correlation between all ETF pairs is 1, then it would seem reasonable that the total risk of the portfolio is equal to the sum of the weighted standard deviations of each individual ETF. Whereas a portfolio where the correlation of asset pairs is lower than 1 must lead to a total risk that is lower than the simple sum of the weighted standard deviations.

The magic of building different pairs is that by different combination it is possible to achieve basically every risk to return combination, even different from the risk to return level of the single components.

- **Markowitz Efficient Frontier**

The concept of Efficient Frontier was also introduced by Markowitz and is easier to understand than it sounds. It is a graphical representation of all the possible mixtures of risky assets for an optimal level of return given any level of risk, as measured by standard deviation.
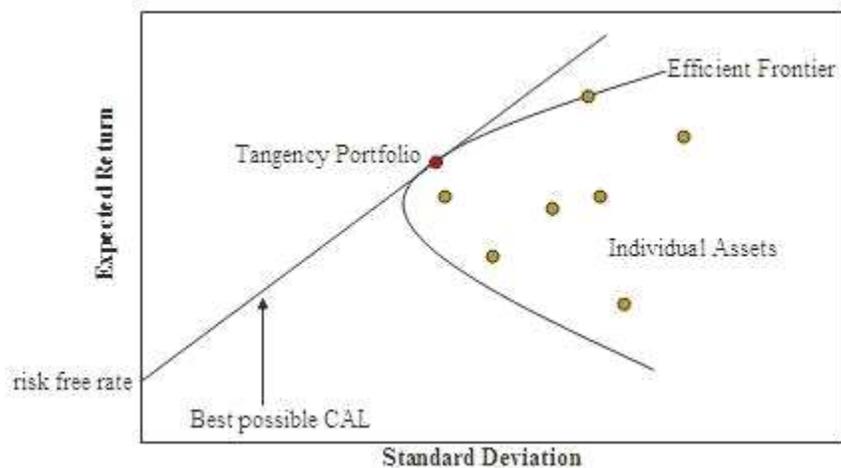
Figure 7.1: Markowitz Efficient Frontier

The chart above shows a hyperbola showing all the outcomes for various portfolio combinations of risky assets, where Standard Deviation is plotted on the X-axis and Return is plotted on the Y-axis.

The Straight Line (Capital Allocation Line) represents a portfolio of all risky assets and the risk-free asset, which is usually a triple-A rated government bond.

Tangency Portfolio is the point where the portfolio of only risky assets meets the combination of risky and risk-free assets. This portfolio maximizes return for the given level of risk.

Portfolio along the lower part of the hyperbole will have lower return and eventually higher risk. Portfolios to the right will have higher returns but also higher risk.

7.6 IMPORTANCE OF MPT FOR RISK MANAGEMENT

The theory is of vital importance when it comes to financial risk management. It is vastly used by portfolio managers while developing investment diversification strategies. MPT proves to be highly advantageous and highly appreciated among investors, as the results of its implication lead to portfolio optimization with either the same expected return with less risk than before or a higher expected return with the same level of risk.

The theory is an essential tool when it comes to avoiding financial ruin, as traders cannot simply rely on a single investment for financial stability. Through diversifying one's investments among several asset classes, containing options, bonds, stocks, futures contracts or precious metals, the probability of undergoing financial blow will be reduced even if one or two investments suffer.

Modern Portfolio Theory has played an essential role in the further development of portfolio trading methods, as well as their management as of today. One of the achievements in this sphere that has reached its perfection, providing investors and traders with all the required conditions to get the highest profit with the lowest risk is GeWorko Method. The Method is based on the already well-worked out principles of portfolio theory, meanwhile, representing quite a new approach and range of opportunities in the financial markets.

It is the first in its kind when it comes to opportunities and created conditions for effective trading and risk management. GeWorko Method, based on NetTradeX platform, allows any trader, investor to realize diverse trading strategies, by allowing to combine assets of their choice and create unique personal instruments. Multiple strategies become possible alongside with investment diversification, through using hundreds of assets of different classes, offered on the platform. It is possible to conduct a thorough retrospective market analysis, as well as use vast technical analysis tools. All these features are oriented towards the investors' benefits and make it possible to make a profit through minimizing the risk of loss.

7.7   CRITICISM OF MODERN PORTFOLIO THEORY

Being widely and popularly used by investment institutions, Modern Portfolio Theory still has been subjected to various criticisms.

- The assumptions made by Markowitz have been criticized due to research findings in other fields of study, particularly within behavioural economics. The behavioural economists have proven that the assumption on "investors' acting rationally" is wrong.

- In the same way the studies carried out in the area of behavioural finance, have challenged the idea that all investors have exact idea of potential returns, as normally the expectations of investors are biased.

- The opinion that investors do not need to pay any taxes or transaction costs does not hold true.

- The assumption that investors can buy securities of any size is claimed not to be practical, since some securities have the minimum order sizes, and securities cannot be bought or sold in fractions.

- Besides, investors have a credit limit which does not allow them to lend or borrow unlimited amounts of shares.

- The critics also challenge the idea that the actions of investors do not have an influence on the market; it is claimed incorrect, as great amount of sale and purchase of separate securities has an impact on the price value of the security or related securities.

- Besides, the correlations between assets are never stable and fixed; they tend to change together with the changes in the universal relations, existing between fundamental assets.

- Furthermore, the theory does mathematical calculations on expected values, based on past performance to measure the correlations between risk and return. However, experienced investors consider past performance not to be a guarantee of future performance. Taking into account only past performances leads to overpassing newer circumstances, maybe not having existed during the time when the historical data were compiled.

7.8   SUMMARY

Portfolio theory, originally proposed by Harry Markowitz in the 1950s, was the first formal attempt to quantify the risk of a portfolio and develop a methodology for determining the optimal portfolio. Prior to the development of portfolio theory, investors dealt with the concepts of returns and risks somewhat loosely.

Modern portfolio theory (MPT) is a theory on how risk-averse investors can construct portfolios to optimize or maximize expected return based on a given level of market risk, emphasizing that risk is an inherent part of higher reward. According to the theory, it's possible to construct an "efficient frontier" of optimal portfolios offering the maximum possible expected return for a given level of risk.

7.9   GLOSSARY

1.   **Diversification:** Diversification is a risk management strategy that mixes a wide variety of investments within a portfolio. The rationale behind this technique is that a portfolio constructed of different kinds of assets will, on average, yield higher long-term returns and lower the risk of any individual holding or security.

2.   **Portfolio:** A portfolio is a grouping of financial assets such as stocks, bonds, commodities, currencies and cash equivalents, as well as their fund counterparts, including mutual, exchange-traded and closed funds.

3.   **Efficient Frontier:** The efficient frontier is the set of optimal portfolios that offer the highest expected return for a defined level of risk or the lowest risk for a given level of expected return.

7.10 SELF ASSESSMENT QUESTIONS

Q1.   Define portfolio.

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Q2.   What is Markowitz efficient frontier?

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Q3.   How is the risk and return of a portfolio measured?

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7.11 LESSON END EXERCISES

Q1.   What is an efficient portfolio?

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Q2.   Discuss modern portfolio theory and its assumption. Explain the importance MPT for risk management.

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Q3.   What does happen to the efficient frontier when there is an opportunity for riskless lending and borrowing?

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Q4.   An investor's goal is to maximize return for any level of risk. Comment on this statement. Discuss some criticism of MPT.

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7.12 SUGGESTED READINGS / REFERENCES

➢   Chandra, P. (2017). *Behavioural Finance*. Tata Mc Graw Hill Education, Chennai (India).

➢   Singh. S., & Bahl.S (2015). *Behavioural Finance*. Vikas Publishing House, Noida (India).

➢   Sulphey, M.M. (2014). *Behavioural Finance*. PHI Learning, Delhi.

➢   Markowitz, H. M. (1991). Foundations of portfolio theory. *The journal of finance*, *46*(2), 469-477.

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FOUNDATIONS OF RATIONAL FINANCE

CAPITAL ASSET PRICING MODEL (CAPM)

STRUCTURE

8.1 INTRODUCTION

Harry Markowitz developed an approach that helps an investor achieve his optimal portfolio position. Hence, portfolio theory, in essence, has a normative character as it prescribes what a rational investor should do.

William Sharpe and others asked the follow-up question: If rational investors follow the Markowitzian prescription, what kind of relationship exists between risk and return? Essentially, the capital asset pricing model (CAPM) developed by them is an exercise in positive economics. It is concerned with two key questions:

- What is the relationship between risk and return for an efficient portfolio?

- What is the relationship between risk and return for an individual security?

The CAPM, in essence, predicts the relationship between the risk of an asset and its expected return. This relationship is very useful in two important ways. First, it produces a benchmark for evaluating various investments. For example, when we are analysing a security, we are interested in knowing whether the expected return from it is in line with its fair return as per the CAPM. Second, it helps us to make an informed guess about the return that can be expected from an asset that has not yet been traded in the market. For example, how should a firm price its initial public offering of stock?

Although the empirical evidence on the CAPM is mixed, it is widely used because of the valuable insight it offers and its accuracy is deemed satisfactory for most practical applications. No wonder, the CAPM is a centerpiece of modern financial economics and William Sharpe, its principal originator, was awarded the Nobel prize in economics.

8.2 OBJECTIVE

After going through this lesson, you should be able to learn about :

- CAPM and its assumptions

- component of CAPM and

- implications of CAPM.

8.3 CAPITAL ASSET PRICING MODEL

The capital asset pricing model was developed in mid-1960s by three researchers William Sharpe, John Lintner and Jan Mossin independently. Consequently, the model is often referred to as Sharpe-Lintner-Mossin capital asset pricing model.

Capital Asset Pricing Model (CAPM), which appeared in the early 1960s, is an extension of the Portfolio Theory and is based on certain assumptions about the way investors make investment decision. Pioneers of CAPM include Sharpe (1963, 1964) and Lintner (1965). Capital Asset Pricing Model is a theoretical model for pricing individual security. It helps in determining the appropriate rate of return for an asset that is to be added to a diversified portfolio, given the risk of that particular asset. The core idea of this model is that investors need to be compensated for the time value of money and market specific risk.

The model describes the expected return for all assets and portfolios of assets in the economy. As per the model, the difference in the expected returns of any two assets can be related to the difference in their betas, b. The higher the value of b, higher would be the risk of the security and the consequent expected return. According to the model, each security is expected to provide a return that is commensurate with its level of risk, measured in b. This is applicable not just for individual securities, but to all portfolios— efficient or inefficient. It is possible to determine the expected return on any security or portfolio if the b is known. The biggest advantage of CAPM is that it could solve the burden of arduous mathematical calculation put forth by MPT.

A security may offer more returns than the expected return, making it more attractive. There may also be other securities that offer less return than the expected return, thereby making it less attractive. The model states that the only important ingredient that determines expected returns is the systematic risk. All unsystematic risks can be eliminated through diversification, and an investor can expect to be rewarded only through the bearing of systematic risk.

8.4 ASSUMPTIONS OF CAPM

The CAPM is based on the following assumptions:

1.   Investors are risk averse.

2. Security returns are normally distributed.

3. The utility function of investors is quadratic.

4. Investors have homogeneous expectations - they have identical subjective estimates of the means, variances, and covariances among returns.

5. Investors can borrow and lend freely at a riskless rate of interest.

6. The market is perfect: there are no taxes; there are no transactions costs; securities are   completely divisible and the market is competitive.

7. The quantity of risky securities in the market is given.

Looking at these assumptions, one may feel that the CAPM is unrealistic. However, the value of a model depends not on the realism of its assumptions, but on the validity of its conclusions. Extensive empirical analysis suggests that there is a lot of merit in the CAPM.

8.5   ELEMENTS/COMPONENTS OF CAPM

8.5.1 Capital Market Line

In our discussion of portfolio theory, we learnt that rational investors would choose a combination of R_f and S (S represents the point on the efficient frontier of risky portfolios where the straight line emanating from R_f is tangential to the efficient frontier). If all investors attempt to purchase the securities in S and ignore securities not included in S, prices of securities would be revised. On the one hand, prices of securities included in S would rise and hence, their expected returns will fall. This would shift S, along with other points which share securities with S, downward. On the other hand, prices of securities not included in S will fall, leading to an increase in their expected return. Consequently, points representing portfolios in which these securities are included will shift upward. As this process continues, the efficient frontier of risky securities will flatten as shown in Figure 8.1. Finally, the set of prices reached would be such that every security will enter at least one portfolio on the linear segment KML. Of course, the market portfolio would itself be a point on that linear segment.
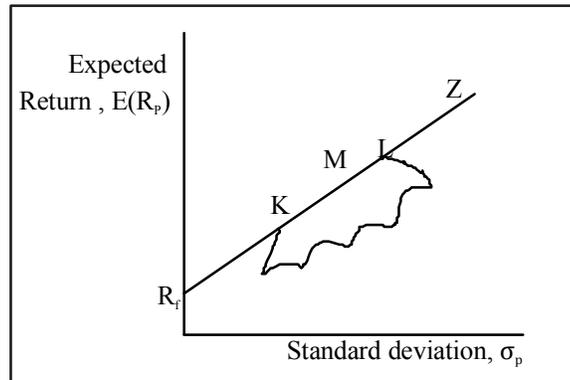
Figure 8.1: Adjustment of the Efficient Frontier

Portfolios which have returns that are perfectly positively correlated with the market portfolio are referred to as efficient portfolios. Obviously, these are portfolios that lie on the linear segment.

For efficient portfolios (which includes the market portfolio), the relationship between risk and return is depicted by the straight line $R_f MZ$. The equation for this line, called the capital market line (CML), is:

$$E(R_j) = R_f + \lambda \sigma j$$

where $E(R_j)$ is the expected return on portfolio j, R_f is the risk-free rate, λ is the slope of the capital market line, and σ_j is the standard deviation of portfolio j.

Given that the market portfolio has an expected return of $E(R_M)$ and standard deviation of σ_M, the slope of the CML can be obtained as follows:

$$\lambda = \frac{E(R_M) - R_f}{\sigma_M},$$

where λ, the slope of the CML, may be regarded as the "price of risk" in the market.

8.5.2 Security Market Line

As discussed above, as far as efficient portfolios are concerned, there is a simple linear relationship between expected return and standard deviation. What

about individual securities and inefficient portfolios? Typically, the expected return and standard deviation for individual securities will be below the CML, reflecting the inefficiency of undiversified holdings. Further, such points would be found throughout the feasible region with no well-defined relationship between their expected return and standard deviation. However, there is a linear relationship between their expected return and their covariance with the market portfolio. This relationship, called the security market line (SML), is as follows:

$$E(R_i) = R_f + \left(\frac{E(R_M) - R_f}{\sigma_M^2} \right) \sigma_{iM} \qquad \qquad ...(1)$$

where $E(R_i)$ is the expected return on security i, R_f is the risk-free return, $E(R_M)$ is the expected return on market portfolio, δ_M^2 is the variance of return on market portfolio, and σ_{iM} is the covariance of return between security i and market portfolio.

In other words, the SML relationship says:

Expected return on security i = Risk-free return + (Price per unit of risk) Risk

The price per unit of risk is:

$$\frac{E(R_M) - R_f}{\sigma_M^2}$$

The measure of risk is: σ_{iM}

In Eq. (1), the risk of a security is expressed in terms of its covariance with the market portfolio, σ_{iM}.

Can we find a standardised measure of risk? Fortunately, we can find a standardised measure of systematic risk, popularly called beta (G), by taking advantage of the relationship

$$\beta_i = \frac{\sigma_{iM}}{\sigma_M^2}$$

which reflects the slope of a linear regression relationship in which the return on security i is regressed on the return on the market portfolio.

Thus, the SML is popularly expressed as

$$E(R_i) = R_f + [E(R_M) - R_f] \beta_i$$

In words, the SML relationship says:

Expected return on security i = Risk-free return + Market risk premium x Beta of security i.

The SML which reflects the expected return-beta relationship is shown in Figure 8.2. Note that the slope of the SML is the market risk premium.

Assets, which are fairly priced, plot exactly on the SML. Under-priced securities plot above the SML, whereas over-priced securities plot below the SML. The difference between the actually expected return on a security and its fair return as per the SML is called the security's alpha, denoted by α.

SML, validates the claim that systematic risk is the only important ingredient in determining expected returns and that non-systematic risk plays no role. In other words, the investor gets rewarded for bearing systematic risk. It is not total variance of returns that affects expected returns but only that part of variance in return that cannot be diversified away. If investors can eliminate all non-systematic risk through diversification, there is no reason they should not be rewarded in terms of higher return for bearing it.
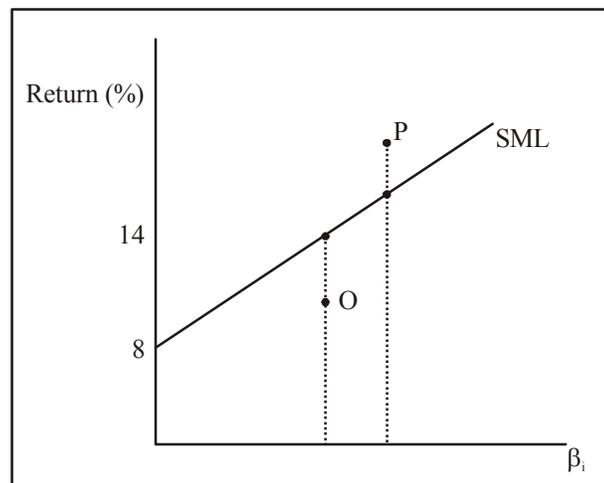
Figure 8.2: The Security Market Line

➢ **Importance :**

The CAPM is the most widely used risk return model. Its popularity may be attributed to the following factors:

- Some objective estimate of risk premium is better than a completely subjective estimate or no estimate.

- CAPM is a simple and intuitively appealing risk-return model. Its basic message that "diversifiable risk does not matter is accepted" by nearly every one.

- While there are plausible alternative risk measures, no consensus has emerged on what course to plot if beta is abandoned. As Richard Brealey and Stewart Myers say: "So the capital asset pricing model survives not from a lack of competition but from a surfeit".

The situation perhaps may change as additional evidence is gathered in favour of arbitrage pricing model and operational guidelines for applying that model are developed further. As of now, however, the CAPM appears to be the model of choice in practice.

8.6 IMPLICATIONS OF CAPM

(i)   The CAPM has asset pricing implications because it tells what required rate of return should be used to find the present value of an asset with any particular level of systematic risk (beta). In equilibrium, every asset's expected return and systematic risk coefficient should plot as one point on the CAPM. If the asset's expected rate of return is different from its required rate of return, that asset is either under priced or overpriced. This implication is useful only if the beta coefficients are stable over time. However, in reality, the betas of assets do change with the passage of time as the assets' earning power changes. The job of security analyst is, thus, to find the assets with dis-equilibrium prices, because it will be profitable to buy under priced assets and sell short the overpriced assets.

(ii)   With the help of CAPM, every investor can analyse the securities and determine the composition of his portfolio. Since, there is a complete agreement among investors on the estimates of expected return, variances and covariances and risk free rate, efficient set of portfolio should be the same for all the investors. Since all the investors face the same efficient set, the only reason they choose different portfolios is that they have different indifference curves. An indifference curve is the locus of all possible portfolios that provide the investor with the same level of expected utility. Expected utility will increase as one moves from lower indifference curve to a higher indifference curve. But on the same indifference curve, any point on the curve gives the same utility. Such curves are positively sloped and convex for risk averters, concave for risk seekers and horizontal for risk neutral investors. Thus, different investors will choose different portfolios from the same efficient set because they have different preference towards risk and return. It implies that each investor will spread his funds among risky securities in the same relative proportion adding risk free borrowing or lending in order to achieve a personally preference overall combination of risk and return. This feature of CAPM is often referred to as separation theorem.

(iii)   Another important implication is that no security can in equilibrium have a tangency to touch, either axis on risk return space. If an investor has zero proportion in such securities, the prices of these would eventually fall, thereby causing the expected returns of these securities to rise until the resulting tangency portfolio has a non-zero proportion associated with it. Ultimately everything will be balanced out.

When all the price adjustments stop, the market will be brought into equilibrium, subject to the following conditions:

(a)   Each investor will like to hold a certain positive amount of each risky security.

(b)   The current market price of each security will be fixed at a level where the number of shares demanded equals the number of shares outstanding.

(c)   The risk free rate will be fixed at a level where the total amount of borrowings will be equal to the total amount of money lent.

As a result, in equilibrium the proportion of the tangency portfolio will correspond to the proportion of the market portfolio. The market portfolio is a portfolio consisting of all the securities where the proportion invested in each security corresponds to its relative market value. Where the

$$\frac{\text{Relative market}}{\text{value of a security}} = \frac{\text{Aggregate value of the security}}{\text{Sum of aggregate market values of all the securities}}$$

The market portfolio plays a very important role in the CAPM because efficient set consists of an investment in the market portfolio coupled with a desired amount of either risk free borrowing or lending. Tangency portfolio is commonly referred to as the market portfolio.

(iv)   For any individual investor, security prices and returns are fixed, whereas the quantities held can be altered. For the market as a whole, however, these quantities are fixed (at least in the short run) and prices are variable. As in any competitive market, equilibrium requires the adjustment of each security's price till there is consistency between the quantity desired and quantity available. Therefore, is but reasonable and logical that historical returns on securities should be examined to determine whether or not securities have been priced in equilibrium as suggested by the CAPM.

8.7   LIMITATIONS OF CAPM

Though the CAPM has been regarded as a useful tool for both analysts of financial securities and financial managers, it is not without critics. The CAPM has serious limitations in the real world, discussed as follows:-

(i)   One of the main limitations of CAPM is that it is impossible to test the model's validity due to problems in defining market portfolio.

(ii) Another limitation is that the theoretical grounds on which it is based cannot stand up to empirical scrutiny.

(iii) It is also suggested that b is not the only risk that mattered.

(iv) The CAPM is based on expectations about the future. Expectations cannot be observed but we do have access to actual returns. Hence empirical tests and data for practical use tend to be based almost exclusively on historical returns.

(v) Beta (systematic risk) coefficient is unstable, varying from period to period depending up on the method of compilation. They may not be reflective of true risk involved. Due to the unstable nature of beta it may not reflect the future volatility of returns although it is based on the post history. Historical evidence of the tests of Beta showed that they are unstable and they are not good estimates of future risk.

(vi) CAPM focuses attention only on systematic (market related) risk. However, total risk has been found to be more relevant and both types of risk appear to be positively related to returns.

(vii) Investors do not seem to follow the postulation of CAPM and do not diversify in a planned manner.

(viii) The analysis of SML is not applicable to the bond analysis, although bonds are a part of the portfolio of the investors. The factors influencing bonds in respect of risk and return are different andnbe risk of bonds is rated and known to investors.

Thus, it can said that the applicability of CAPM is broken by the less practical nature of this model as well as complexity and difficulty of dealing with beta values.

8.8 SUMMARY

The Capital Asset Pricing Model (CAPM) is a model that describes the relationship between the expected return and risk of investing in a security. It shows that the expected return on a security is equal to the risk-free return plus

a risk premium, which is based on the beta of that security. CAPM is based on the idea that investors demand additional expected return (called the risk premium) if they are asked to accept additional risk.

Although the empirical evidence on the CAPM is mixed, it is widely used because of the valuable insight it offers and its accuracy is deemed satisfactory for most practical applications. No wonder, the CAPM is a centerpiece of modern financial economics and William Sharpe, its principal originator, was awarded the Nobel prize in economics.

8.9 GLOSSARY

1. **Systematic risk:** These are market risks—that is, general perils of investing—that cannot be diversified away. Interest rates, recessions, and wars are examples of systematic risks.

2. **Unsystematic risk:** Risk that is peculiar to a specific firm and can be diversified away is called unsystematic risk.

8.10 SELF ASSESSMENT QUESTIONS

Q1. Discuss the assumptions underlying the CAPM.

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Q2. Define systematic and unsystematic risk.

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Q3. Differentiate between capital market line and security market line.

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8.11 LESSON END EXERCISES

Q1. Describe capital asset pricing model. State its importance and implications.

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Q2. Discuss the capital market line and the security market line in detail.

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Q3. State the limitations of CAPM.

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8.12 SUGGESTED READINGS / REFERENCES

➢ Chandra, P. (2017). *Behavioural Finance*. Tata Mc Graw Hill Education, Chennai (India).

➢ Khan, M. Y., & Jain, P. K. (2018). *Financial Management.* McGraw-Hill Education.

➢ Singh. S., & Bahl.S (2015). *Behavioural Finance*. Vikas Publishing House, Noida (India).

➢ Sulphey, M.M. (2014). *Behavioural Finance*. PHI Learning, Delhi.

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FOUNDATIONS OF RATIONAL FINANCE

EFFICIENT MARKET HYPOTHESIS (EMH)

STRUCTURE

9.1 INTRODUCTION

The Efficient Markets Hypothesis (EMH) that was proposed in the 1960s reached its height of dominance in the academic circles in the 1970s. Efficient Market Hypothesis is the cornerstone of modern financial theory. The pioneer of EMH was Eugene Fama. In his 1970 article entitled 'Efficient Capital Markets', Fama states that it is impossible to beat the market as financial markets are efficient regarding the distribution of information.

Benjamin Friedman refers to efficient markets hypothesis as a "credo," a statement of faith and not a scientific proposition.

For most financial economists, however, the efficient markets hypothesis is a central idea of modern finance that has profound implications.

9.2 OBJECTIVE

After studying this lesson, you should be able to know about :

- efficient market hypothesis and its assumptions
- random walk
- forms of efficiency
- misconceptions about EMH and criticism.

9.3 EFFICIENT MARKETS HYPOTHESIS

Efficient-market hypothesis (EMH) is a theory in financial economics that states that asset prices fully reflect all available information. A direct implication is that it is impossible to "beat the market" consistently on a risk-adjusted basis since market prices should only react to new information.

The efficient-market hypothesis was developed by Eugene Fama who argued that stocks always trade at their fair value, making it impossible for investors to either purchase undervalued stocks or sell stocks for inflated prices. As such, it should be impossible to outperform the overall market through expert stock selection or market timing, and that the only way an investor can possibly obtain higher returns is by chance or by purchasing riskier investments.

There are three variants of the hypothesis: "weak", "semi-strong", and "strong"

form. The weak form of the EMH claims that trading information (levels and changes of prices and volumes) of traded assets (e.g., stocks, bonds, or property) are already incorporated in prices. If weak form efficiency holds then technical analysis cannot be used to generate superior returns. The semi-strong form of the EMH claims both that prices incorporate all publicly available information (which also includes information present in financial statements, other SEC filings etc.). If semi-strong form efficiency holds then neither technical analysis nor fundamental analysis can be used to generate superior returns. The strong form of the EMH additionally claims that prices incorporate all public and non-public (insider) information, and therefore even insiders cannot expect to earn superior returns (compared to the uninformed public) when they trade assets of which they have inside information.

For most financial economists, however, the efficient markets hypothesis is a central idea of modern finance that has profound implications.

9.3.1 Random Walk and Search for Theory

In 1950s, pioneering work done by distinguished statisticians and physicists, such as Maurice Kendall, Harry Roberts, Osborne and others, found that stock prices behaved like a random walk.

A random walk means that successive stock prices are independent and identically distributed. Therefore, strictly speaking, the stock price behaviour should be characterised as a submartingale, implying that the expected change in price can be positive because investors expect to be compensated for time and risk. Further, the expected return may change over time in response to change in risk. In short, random walk theory proclaims that stocks take a random and unpredictable path that makes all methods of predicting stock prices futile in the long run.

Search for Theory: When the empirical evidence in favour of the random walk hypothesis seemed overwhelming, the academic researchers asked the question: What is the economic process that produces a random walk? They concluded that the randomness of stock prices was the result of an efficient market. Broadly, the key links in the argument are as follows:

- Information is freely and instantaneously available to all the market participants.

- Keen competition among market participants more or less ensures that market prices will reflect intrinsic values. This means that they will fully impound all available information.

- Prices change only in response to new information that, by definition, is unrelated to previous information (otherwise it will not be new information).

- Since new information cannot be predicted in advance, price changes too cannot be forecast. Hence, prices behave like a random walk.

9.3.2 Efficient Market

Fama defined Efficient Market as, "A market where there are large numbers of rational profit maximisers actively competing, with each trying to predict future market values of individual securities, and where important current information is almost freely available to all participants".

In other words, an efficient market is one in which the market price of a security is an unbiased estimate of its intrinsic value. Note that market efficiency does not imply that the market price equals intrinsic value at every point in time. All that it says is that the errors in the market prices are unbiased. This means that the price can deviate from the intrinsic value but the deviations are random and uncorrelated with any observable variable. If the deviations of market price from intrinsic value are random, it is not possible to consistently identify over or under-valued securities.

The EMH is so called as it was assumed that the capital market is efficient in processing information. This hypothesis is based on the idea that security prices are rationally determined. Changes occur in the stock price as a result of a change in the company, industry or economy. The information about these changes would alter the stock price immediately and there would be a shift to a new level. This movement can be either upward or downward, and is dependent on the type of information. It is argued that the shift in speculative stock prices always incorporates the best information and knowledge about fundamental values and the prices change only because of good and sensible information. Any further change in price of the stock will be based on other new pieces of information which was hitherto not available. Thus, any change in the price of a stock, which constantly seeks equilibrium, is totally independent of earlier or future changes. Further, the current price fully reflects all available information about the stock.

The hypothesis says that the market for a stock is efficient if its price is always equal to its intrinsic value. The intrinsic value of a stock is the present value of cash flows that the stock can reasonably be expected to generate (for example dividends). The EMH is also concerned with the speed with which information is incorporated into the security prices. It is also believed that the past price sequence has the information about the future price movements too. Thus, by studying the pattern of price movements and trading accordingly, it is possible to earn appropriate returns. However, it may take several days or weeks before the impact of any new information can be assessed. This can lead to the price being volatile for a number of days before it adjusts to a new level. This also provides an opportunity to earn further returns. The instance of the S& P 500 stock index beating the overall market by about 60 per cent to 80 per cent of the time has been quoted by proponents of EMH to substantiate the efficiency of the hypothesis.

9.4   ASSUMPTIONS of EMH

Three basic theoretical arguments form the basis of EMH. They are as follows:

1.   Investors are rational and hence securities are valued rationally.

2.   Careful account of all available information is taken by everyone before making investment decisions. Each decision is related to internal consistency and has to be made in a systematic way so that it is in agreement with one another.

3.   The decision maker always pursues his or her self-interest. The accumulation and processing of information and the formation of expectations occur efficiently, yielding possible outcomes (of total wealth) and corresponding possibilities.

A few other arguments, in addition to the above, include:

1.   Though some investors may not be rational, their trades are random, and thus cancel each other out without much effect on the overall prices.

2.   Irrational investors are met in the market by rational ones who are willing to take chances, thereby eliminating mispricing.

9.5   FORMS OF EFFICIENCY

The EMH considers efficiency in three different forms based on the type of information. The details of the various forms of efficiency are provided in Table 9.1.

Table 9.1: Various forms of efficiency

No.	Form	Description
1.	Weak	Information regarding the past sequence of security movements is dealt with
2.	Semi-strong	Information that is publicly available is dealt with
3.	Strong	Deals with all forms of information— public, private and inside

Rationality can mean that agents receive new information so as to update their beliefs correctly. Based on their beliefs, agents make choices about securities that are normatively acceptable.

The exposition of EMH is displayed in Figure 9.1. The EMH has been subjected to a number of tests ever since it was propounded by Fama. The tests got a boost with the evolution of a new methodology known as Event Study. In Event Study, a sample of similar events that occurred in different companies at various points of time is obtained.
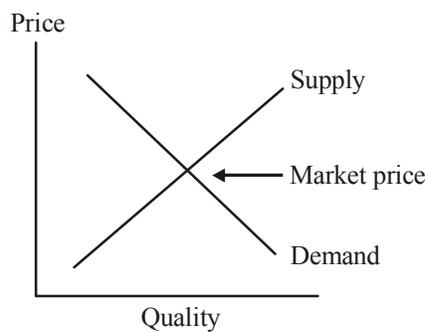
Figure 9.1 Tradition exposition of the efficient markets hypothesis.

The average impact of these events on the stock price is then determined. Results indicated that the outcome depended on the efficiency of the market and

the anticipation of the event by the market. Further, in consistence with the semi-strong form of market efficiency, many studies established that markets reacted quickly to new information. Studies on the performance of professional investors pointed towards the strong form or market efficiency.

The two main assumptions regarding finance theory so far discussed can be summarised as follows:

1. Market participants are rational: Market participants aim at maximisation of positive function or utility, and minimisation of a negative function— cost or risk. They are well-informed and are capable of processing fresh data correctly and rapidly.

2. Financial markets are efficient: The financial assets are perfect substitutes, and their current prices reflect all the available information accurately. The price is equal to the fundamental or intrinsic value, and is equal to the discounted sum of expected future cash flow. Due to this, financial assets can neither be overvalued nor undervalued. They are always traded at their fair values.

9.6 MISCONCEPTIONS ABOUT THE EFFICIENT MARKETS HYPOTHESIS

The efficient markets hypothesis has often been misunderstood. The common misconceptions about the efficient markets hypothesis are stated below along with the answers meant to dispel them.

Misconception	Answer
The efficient markets hypothesis implies that the market has perfect forecasting abilities.	The efficient markets hypothesis merely implies that prices impound all available information. This does not mean that the market possesses perfect forecasting abilities.

As prices tend to fluctuate, they would not reflect fair value.	Answer Unless prices fluctuate, they would not reflect fair value. Since the future is uncertain, the market is continually surprised. As prices reflect these surprises, they fluctuate.
Inability of institutional portfolio managers to achieve superior investment performance implies that they lack competence.	In an efficient market, it is ordinarily not possible to achieve superior investment performance. Market efficiency exists because portfolio managers are doing their job well in a competitive setting.
The random movement of stock prices suggests that the stock market is irrational.	Randomness and irrationality are two different matters. If investors are rational and competitive, price changes are bound to be random.

9.7   CRITICISM OF EMH

The EMH has been criticised on several counts. Some of the criticisms are as follows:

1.   In EMH it is assumed that investors make decisions based on the rational expectations. According to this hypothesis, all investors make investment decisions based on the same expectations. This notion has been questioned by many. For it is pure common sense that security markets and trading would not be possible if all investors had the same level of expectations. Trading in stocks take place just because one investor creates a sales position based on his or her expectation that prices of the stock would drop. The buyer in turn buys on the pretext that prices of the particular stock would increase. Thus occurs trading in a particular stock.

2. The assumption of EMH that all participants have equal access to information is also questionable, as it is most unlikely.

3. Similarly, the US stock market crash in October 1987, followed by the unexplained increase of real estate prices during the period 2000 to 2005, the high degree of volatility experienced in the markets during 2008, etc., are all instances that have cast serious apprehensions on the rational behaviour of investors. These apprehensions made experts and researchers to focus their attention on the impact of human emotions, like greed, biases, irrational decision making, etc., on investment decisions. They considered the influence of human emotions on decision making to be a definite possibility. Thus, experiences and studies pointed towards the fact that investors neither behave rationally nor consider all the available information in the process of decision making.

4. Market imperfections like delay in information and transaction costs are unexplained.

5. Efficient market hypothesis deals with absolute price changes but not the relative price changes of the stocks.

6. Random movement of stock prices does not indicate the direction of movement.

9.8 SUMMARY

A market theory that evolved from a 1960's by Eugene Fama, the efficient market hypothesis states that at any given time and in a liquid market, security prices fully reflect all available information. The EMH exists in various degrees: weak, semi-strong and strong, which addresses the inclusion of non-public information in market prices. This theory contends that since markets are efficient and current prices reflect all information, attempts to outperform the market are essentially a game of chance rather than one of skill.

One of the major implications of an efficient market is that current prices change immediately as new information becomes available. For example, suppose that Intel were to announce they had invented a new way to manufacture computer

chips that would make computers run ten times faster at half the cost, but that it would take at least a year to implement in all their manufacturing plants. An efficient market implies that the stock price would increase immediately when the information is available — not a year from now when the technology is implemented or even later when extra profits are received. In effect, the EMH says that stocks respond immediately to the NPV of new information.

9.9   GLOSSARY

1.   **Efficient Market:** Market where all pertinent information is available to all participants at the same time, and where prices respond immediately to available information. Stock markets are considered the best examples of efficient markets.

2.   **Random Walk:** Random walk means that changes in stock prices have the same distribution and are independent of each other. Therefore, it assumes the past movement or trend of a stock price or market cannot be used to predict its future movement.

3.   **Intrinsic Value:** Intrinsic value refers to the value of a company, stock, currency or product determined through fundamental analysis without reference to its market value. It is also frequently called fundamental value.

9.10 SELF ASSESSMENT QUESTIONS

Q1.   What is an efficient market?

_____

_____

_____

Q2.   What is random walk?

_____

_____

_____

Q3.   Discuss the various forms of efficiency.

    _____

    _____

    _____

9.11 LESSON END EXERCISES

Q1.   Explain efficient market hypothesis. State its assumptions along with the critical evaluation of the EMH.

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    _____

    _____

Q2.   Discuss the misconceptions surrounding the efficient market hypothesis.

    _____

    _____

    _____

Q3.   What is the economic process that produces a random walk?

    _____

    _____

    _____

9.12 SUGGESTED READINGS / REFERENCES

➢   Chandra, P. (2017). *Behavioural Finance*. Tata Mc Graw Hill Education, Chennai (India).

➢   Singh. S., & Bahl. S (2015). *Behavioural Finance*. Vikas Publishing House, Noida (India).

➢   Sulphey, M.M. (2014). *Behavioural Finance*. PHI Learning, Delhi.

➢   *https://www.investopedia.com/terms/e/efficientmarkethypothesis.asp*

➢   *https://en.wikipedia.org/wiki/Efficient-market_hypothesis*

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FOUNDATIONS OF RATIONAL FINANCE

AGENCY THEORY AND THE INFLUENCE OF PSYCHOLOGY

STRUCTURE

10.1 INTRODUCTION

Agency theory was developed by Jensen and Meckling (1976). They suggested a theory of how the governance of a company is based on the conflicts of interest between the company's owners (shareholders), its managers and major providers of debt finance. Each of these groups has different interests and objectives. The shareholders want to increase their income and wealth. Their interest is with the returns that the company will provide in the form of dividends, and also in the value of their shares. The managers are employed to run the company on behalf of the shareholders. However, if the managers do not own shares in the company, they have no direct interest in future returns for shareholders, or in the value of the shares and the major providers of debt have an interest in sound financial management by the company's managers, so that the company will be able to pay its debts in full and on time.

Jensen and Meckling defined the agency relationship as a form of contract between a company's owners and its managers, where the owners (as principal) appoint an agent (the managers) to manage the company on their behalf. Agency theory suggests that the prime role of the board is to ensure that executive behaviour is aligned with the interests of the shareholder-owners. Otherwise, self-interested managers will use their superior information to line their own pockets.

10.2 OBJECTIVE

After going through this lesson, you should be able to learn about :

- agency theory
- agency cost
- agency conflicts and
- psychological influences.

10.3 AGENCY THEORY

Agency theory is a principle that is used to explain and resolve issues in the relationship between business principals and their agents. Most commonly, that relationship is the one between shareholders, as principals, and company executive, as agents. Agency Theory is a management and economic theory that explains the various relationships and areas of self-interest in companies. Put another way,

agency theory describes the relationship between principals and agents as well as the delegation of control.

Roger G. Schroeder, M. Johnny Rungtusanatham and Susan Meyer Golstein, in their 2011 article, "Operations Management in the Supply Chain: Decisions and Cases" stated that Agency theory also explains how best to organize relationships in which one party, called the "principal," determines the work and in which another party, known as the "agent," performs or makes decisions on behalf of the principal.

In proprietorships, partnerships, and cooperative societies, owners are actively involved in management. But in companies, particularly large public limited companies, owners typically are not active managers. Instead, they entrust this responsibility to professional managers who may have little or no equity stake in the firm. There are several reasons for the separation of ownership and management in such companies:

- Most enterprises require large sums of capital to achieve economies of scale. Hence it becomes necessary to pool capital from thousands or even hundreds of thousands of owners. It is impractical for many owners to participate actively in management.

- Professional managers may be more qualified to run the business because of their technical expertise, experience, and personality traits.

- Separation of ownership and management permits unrestricted change in owners through share transfers without affecting the operations of the firm. It ensures that the 'know-how' of the firm is not impaired, despite changes in ownership.

- Given economic uncertainties, investors would like to hold a diversified portfolio of securities. Such diversification is achievable only when ownership and management are separated.

While there are compelling reasons for separation of ownership and management, a separated structure leads to a possible conflict of interest between managers (agents) and shareholders (principals). Though managers are the agents of shareholders, they are likely to act in ways that may not maximise the welfare of shareholders.

In practice, managers enjoy substantial autonomy and hence have a natural inclination to pursue their own goals. To prevent from getting dislodged from their position, managers may try to achieve a certain acceptable level of performance as far as shareholder welfare is concerned. However, beyond that their personal goals like presiding over a big empire, pursuing their pet projects, diminishing their personal risks, and enjoying generous compensation and lavish perquisites tend to acquire priority over shareholder welfare.

Agency theory assumes that the interests of a principal and an agent are not always in alignment. The lack of perfect alignment between the interests of managers and shareholders results in **agency costs** which may be defined as the difference between the value of an actual firm and value of a hypothetical firm in which management and shareholder interests are perfectly aligned.

To mitigate the agency problem, effective monitoring has to be done and appropriate incentives have to be offered. Monitoring may be done by bonding managers, by auditing financial statements, by limiting managerial discretion in certain areas, by reviewing the actions and performance of managers periodically, and so on.

Incentives may be offered in the form of cash bonuses and perquisites that are linked to certain performance targets, stock options that grant managers the right to purchase equity shares at a certain price, thereby giving them a stake in ownership, performance shares given when certain goals are achieved, and so on.

The design of optimal compensation contract depends on several factors such as the extent to which the actions of managers are observable, the degree of informational asymmetry between managers and shareholders, the differences in the time horizons of managers and shareholders, the differences in the risk tolerance of managers and shareholders, and the adequacy of performance metrics.

Good corporate governance, including optimal compensation contract design, is important for maximising the value of the firm and optimising the allocation of capital in the economy.

10.3.1 Special Considerations in Agency Theory

Agency theory addresses disputes that arise primarily in two key areas: A difference in goals or a difference in risk aversion.

For example, company executives may decide to expand a business into new markets. This will sacrifice the short-term profitability of the company in the expectation of growth and higher earnings in the future. However, shareholders may place a priority on short-term capital growth and oppose the company decision.

Another central issue often addressed by agency theory involves incompatible levels of risk tolerance between a principal and an agent. For example, shareholders in a bank may object that management has set the bar too low on loan approvals, thus taking on too great a risk of defaults.

10.3.1.1 Agency Costs

Agency costs refer to the conflicts between shareholders and their company's managers. Suppose a shareholder, a principal, wants the manager, the agent, to make decisions that will increase the share value. Managers, instead, would prefer to expand the business and increase their salaries, which may not necessarily increase share value. In a publicly held company, agency costs occur when a company's management, or agent, place their own personal financial interests above those of the shareholder or principal.

Agency costs can be either:

i.   Those incurred if the agent uses the company's resources for his own benefit.

ii.   The cost of techniques that principals use to prevent the agent from prioritizing his interests   over shareholders' interests.

To prevent the agent from acting to benefit himself, shareholders, or principals, may offer financial incentives to keep shareholders' interest as the top priority. "This typically means paying bonuses to management if and when share price increases or by making the management's salary partial shares in the company". Such incentives are an example of agency costs. If the incentive plan works, these agency costs will be lower than the cost of allowing the management to act in their own interests.

Agency costs are important because although they are difficult for an account to track, they are just as difficult to avoid. This is because principals and agents can have very different motivations.

10.3.1.2 Agency Conflicts

Implied in the fact that agents and principals have very different motivations, is the fact that conflicts can easily arise because of those differing goals. These causes of agency problems can arise because of differences between the goals or desires between the principal and the agent. Put another way, agency problems arise because of the inherent conflict of interests between agents and principals.

"Agency theory assumes both the principal and the agent are motivated by self-interest. This assumption of self-interest dooms agency theory to inevitable inherent conflicts. Thus, if both parties are motivated by self-interest, agents are likely to pursue self-interested objectives that deviate and even conflict with the goals of the principal".

Agency problems, also known as "**principal-agent problems** or asymmetric information-driven conflicts of interest," are inherent in corporate structures. This conflict arises when separate parties in a business relationship, such as a corporation's managers and shareholders, or principals and agents, have disparate interests. Principals hire agents to represent principals' interests. Agents, working as employees, are assumed and obligated to serve the principal's best interests. Problems occur when the agent begins serving different interests, such as the agent's own interests. Thus, conflict occurs between the interests of principals and agents when each party has different motivations, or incentives exist that place the two parties at odds with each other.

10.3.2 Resolving Agency Conflicts

Companies use several methods to avoid agency conflicts, including monitoring, contractual incentives, soliciting the aid of third parties or relying on other price systems.

1. **Creating incentives for employees:** If agents are acting in their own interests, changing incentives to redirect these interests may be beneficial for principals. "For example, establishing incentives for achieving sales

quotas may result in more sales people reaching daily sales goals. If the only incentive available to sales people is hourly pay, employees may have an incentive discouraging sales". Companies would do well to create incentives that encourage hard work on projects that benefit the company. This will motivate more employees to act in the business's best interest. By aligning agent and principal goals, agency theory attempts to bridge the divide between employees and employers created by the principal-agent problem.

2. **Using standard principal-agent models:** Financial theorists, corporate analysts and economists create principal-agent models to spot and minimize costs. For example, most agency experts try to design contracts that can align the incentives of both parties – the agent(s) and principal(s) – in a more efficient manner. Unfortunately, such contracts result in unintended consequences. Using a much-used cliche, the principal-agent model seeks to help companies and investors create a win-win situation.

3. **Using agency theory, itself:** Agency theorists use written contracts and monitoring, to avoid agency problems. For example, Apple Inc. in 2013 began requiring senior executive employees and board of directors members to own stock in the company. This move was intended to align executive interests with those of shareholders as management was no longer benefited from actions that harm shareholders because members of management were themselves, investors. As in the principal-agent models, Apple sought to create a win-win situation for principals and agents.

4. **Using the market for corporate control:** The most frequent example of market discipline for corporate managers is the hostile takeover, in which bad managers damage shareholders' interests by failing to realize a corporation's potential value. The solution is to provide an incentive for better management to take over and improve operations. Even better: Giving new management a stake in the company, through equity shares for example, would help align the interest of management, the agents, and the investors, the principals.

10.4 THE INFLUENCE OF PSYCHOLOGY

Psychological influences, which have been brushed aside by the rational model of finance, seem to matter. Hence, in recent decades many researchers have looked at how human psychology shapes financial decision-making and financial markets. The efforts of these researchers have led to the emergence of behavioural finance, a relatively new field.

According to behavioural finance, investor's behaviour in market depends on psychological principles of decision making, which explains why people buy and sell investments. It focuses on how investors interpret information and act on information to implement their financial investment decisions. In short psychological process and biases influences investors decision making and influence the market outcomes

The votaries of the rational model have, however, criticised behavioural finance as it lacks a unified theory. But, such criticism, cannot detract from the need to recognise the importance and relevance of psychology in understanding the behaviour of investors, finance practitioners, managers, and financial markets. This need was recognised decades ago by John Maynard Keynes, regarded by many as the most influential economist of twentieth century. Here is a passage from his seminal work *The General Theory of Employment, Interest, and Money*, published in 1936.

"If I may be allowed to appropriate the term speculation for the activity of forecasting the psychology of the markets, and the term enterprise for the activity of forecasting the prospective yield of assets over their whole life, it is by no means always the case that speculation predominates over enterprise. As the organisation of investment markets improves, the risk of the predominance of speculation does, however, increase. In one of the greatest investment markets in the world, namely, New York, the influence of speculation (in the above sense) is enormous. Even outside the field of finance, Americans are apt to be unduly interested in discovering what average opinion believes average opinion to be; and this national weakness finds its nemesis in the stock market."

While the theory that currently dominates finance teaching provides a useful framework for thinking about finance problems, it has its limitations. So, it should

be taught less inflexibly and more pragmatically. As Robert Shiller put it, "For me, alternative views that must be incorporated into our teaching include those promoted by the other social sciences: psychology, sociology, political science, and anthropology. For me, maintaining a proper perspective on alternative views means also incorporating historical analysis. For me, too, we must also keep in view that fundamental importance of institutions, our established organisation practices, and laws- and remind our students that these must be taken into account before judging any economic model."

10.4.1 Psychological Tendencies Affecting Financial Decision-Making and Financial Markets

Behavioural finance is informed by three strands of psychology. First is cognitive or behavioural psychology, where the focus is upon how our minds undertake the requisite calculations required to maximize wealth. The second is emotional responses to the intensity of trading, where the focus is on decision-making. The third is social psychology, which recognises the need to find acceptance and even encouragement of our acts.

Cognitive biases describe the innate tendencies of the human mind to think, judge, and behave in irrational ways that often violate sensible logic, sound reason or good judgment. The average human – and the average investor – is largely unaware of these inherent psychological inefficiencies, despite the frequency with which they arise in our daily lives and the regularity with which we fall victim to them. Following are the most common psychological tendencies, chosen for both their prevalence in human nature and their relevance to investing in the financial markets:

1. **Anchoring**

   Also referred to as focalism, anchoring is the tendency to be over-influenced by the earliest information presented to us when making decisions, thereby allowing oneself to be driven to a decision or conclusion that is biased towards that initial piece of information. This earliest piece of information is known as the "anchor," the standard off of which all other alternatives are judged. Thus, subsequent decisions

are made not on their own, but rather by adjusting away from the anchor.

For example, in price negotiations over a used car, the first price offered by the salesman sets the anchor point, from which all subsequent offers are based. By offering an initial price of, say, $30,000, a used-car salesman anchors the customer to that price, implementing a bias towards the $30,000 level in the subconscious of the other party. Even if the $30,000 offer is significantly above the true value of the car, all offers below that level appear more reasonable and the customer is likely to end up paying a higher price than he or she originally intended.

2. Loss Aversion and the Endowment Effect

First demonstrated by prominent psychologists Amos Tversky and Daniel Kahneman, the concept of loss aversion refers to the human tendency to strongly prefer decisions that allow us to avoid losses over those that allow us to acquire gains. Many studies on loss aversion commonly suggest that the human perception of loss is twice as powerful as that of gain. This forms the basis of what is known as Prospect Theory, a behavioural economics concept that describes the way in which people choose between probabilistic alternatives that involve risk. At its core, Prospect Theory shows that a loss is perceived as more significant than an equivalent gain.

The endowment effect describes the human tendency to place greater value on a good that we own than that which we place on an identical good that we do not own.

It is easy to see how these tendencies can influence an investor. Loss aversion has a distinct impact on our risk tolerance both before and after executing a trade. Combined with other cognitive biases, our tendency to steer away from loss can lead to denial as losses build in a poor position, for example, causing us to ignore weakening positions in an attempt to diminish their emotional impact. Similarly, if the endowment effect leads us to ascribe greater value to a security simply

because we feel a sense of ownership over it, then that emotional attachment can lead to clouded judgment when the time comes to sell.

3. **The Framing Effect**

    The framing effect describes our tendency to react to, judge, or interpret the exact same information in distinctly different ways depending on how it is presented to us, or "framed" (most commonly, whether the information is framed as a loss or as a gain). People tend to avoid risk when information is presented in a positive frame but seek risk when information is presented in a negative frame.

    It is no secret that investors in the financial markets are under a constant barrage of information from all different sides - bullish, bearish, and everything in between. The exact same information can be framed by multiple sources in many different ways, biasing your interpretation of it. As you filter the stream of news and financial data that comes your way, consider the manner in which those numbers, statistics or reports are framed and think about the impact that their presentation has on the opinions they lead you to form.

4. **Confirmation Bias**

    Confirmation bias is the tendency to overweight, favour, seek out, exaggerate or more readily recall information or alternatives in a way that confirms our preconceived beliefs, hypotheses or desires, while simultaneously undervaluing, ignoring or otherwise giving disproportionately less consideration to information or alternatives that do not confirm our preconceived beliefs, hypotheses or desires. This inherent flaw in our cognitive reasoning leads to misconstrued interpretations of information, errors in judgment, and poor decision making.

    The effects of confirmation bias have been shown to be much stronger for emotionally-charged issues or beliefs that are deeply entrenched. In addition to overvaluing information that confirms our preexisting beliefs, confirmation bias also includes our tendency to interpret ambiguous

evidence as supporting existing positions, even if no true relationship exists. In short, this concept says that individuals are biased towards information that confirms their existing beliefs and biased against information that disproves their existing beliefs, leading to overconfidence in our opinions and our decisions even in the face of strong contrary evidence.

As an investor in the financial markets, it can be difficult to maintain a separation between informed estimates or expectations and emotional judgments based on hopes or desires. By causing us to overweight information that confirms such hopes or desires, confirmation bias can affect our abilities to make sound assessments and form well-reasoned opinions about, for example, a stock's upside potential. Awareness of our natural biases towards confirming information and, perhaps more importantly, our biases against disproving information is the first step in combating the unwanted effects of confirmation bias.

5. Hindsight Bias

Hindsight bias describes our inclination, after an event has occurred, to see the event as having been predictable, even if there had been little to no objective basis for predicting it. This is the psychological tendency that causes us, after witnessing or experiencing the outcome of even an entirely unforeseeable event, to exclaim "I knew it all along!"

6. The Sunk Cost Fallacy

The sunk cost fallacy rests on the economic concept of a sunk cost: a cost that has already been incurred and cannot be recovered. While theoretical economics says that only future (prospective) costs are relevant to an investment decision and that rational economic actors therefore should not let sunk costs influence their decisions, the findings of psychological and Behavioural finance research show that sunk costs do in fact affect real-world human decision making. Because of our tendencies towards Loss Aversion and other cognitive biases, we

fall victim to the sunk cost fallacy, which describes our irrational belief that sunk costs should be considered a legitimate factor in our forward decision making when, in fact, their consideration often leads us towards inefficient outcomes.

In an investment setting, the consequences of the sunk cost fallacy can be more severe. As the share price of a security falls, investors often begin to employ the logic that "I've already lost $XXX, it's too late to sell now." As prices keep falling further and losses grow, the investor's commitment to the sunk cost continues to escalate. "Now I've lost $XXXXX, there's no way I can sell now. It has to come back eventually. I'll just hold on to it." Improper or irrational considerations of sunk costs can lead to poor decisions that continue to spiral out of control, simply because of an incorrect perception of an expense that is irrecoverable.

7.   The Gambler's Fallacy

The gambler's fallacy, also known as the Monte Carlo Fallacy, is the mistaken tendency to believe that, if something happens more frequently than "normal" during a period of time, it must happen less frequently in the future, or that, if something happens less frequently than "normal" during a period of time, it must happen more frequently in the future. This tendency presumably arises out of an ingrained human desire for nature to be constantly balanced or averaged. In situations where the event being observed or measured is truly random (such as the flip of a coin), this belief, although appealing to the human mind, is false.

The gambler's fallacy is, rather obviously, most strongly associated with gambling, where such errors in judgment and decision making are common. It can, however, arise in many practical situations, including investing. Winning and losing trades are in many ways similar to the flip of a coin and thus subject to the same psychological biases. If an investor has a series of losing trades, for example, he or she can begin to erroneously believe that, since the statistics feel unbalanced, his or

her probability of making a profitable trade increases. In reality, the probability of his or her next trade being profitable is unaffected by previous losses.

8. **The Hot-Hand Fallacy**

The hot-hand fallacy is the mistaken belief that an individual who has experienced success with a random event has a greater chance of continuing that success in subsequent attempts. This cognitive bias is most frequently applied to gambling (where individuals in games such as blackjack believe that the luck they have randomly stumbled upon is actually a "hot hand" and will continue indefinitely) and sports such as basketball (where "hot" shooters see a spike in confidence after making multiple shots in a row, fueling a belief that the trend will continue throughout the rest of the game). While previous success at a skill-based athletic task, such as making a shot in basketball, can change the psychological behavior and future success rate of a player, researchers continue to find little evidence for a true "hot hand" in practice. Similar to what was discussed with the gambler's fallacy, individuals often have trouble processing or believing statistically-acceptable deviations from the average, causing them to assume that forces other than normal statistics must be at play. As an investor, a series of winning trades can induce risky overconfidence one's "hot hand" of the moment, leading to errors in judgment and poor decision making.

9. **The Money Illusion**

In economics and behavioural finance, the money illusion describes the tendency to think of currency in nominal terms rather than in real terms. In other words, humans commonly consider money in terms of its numerical or face value (nominal value) instead of considering it in terms of its real purchasing power (real value). Because modern currencies have no intrinsic value, the real purchasing power of money is the only true (and rational) metric by which it should be judged.

Still, humans often struggle to do so because, derived from all the complex underlying value systems in both domestic and international economies, the real value of money is constantly changing. In the financial markets, many average investors commonly ignore the real value of their currency when valuing their investments or interpreting their appreciation, leading to incorrect perceptions of value and past performance.

10.5 SUMMARY

Agency theory is a principle that is used to explain and resolve issues in the relationship between business principals and their agents. The lack of perfect alignment between the interests of managers and shareholders results in **agency costs** which may be defined as the difference between the value of an actual firm and value of a hypothetical firm in which management and shareholder interests are perfectly aligned.

To mitigate the agency problem, effective monitoring has to be done and appropriate incentives have to be offered. Monitoring may be done by bonding managers, by auditing financial statements, by limiting managerial discretion in certain areas, by reviewing the actions and performance of managers periodically, and so on.

Incentives may be offered in the form of cash bonuses and perquisites that are linked to certain performance targets, stock options that grant managers the right to purchase equity shares at a certain price, thereby giving them a stake in ownership, performance shares given when certain goals are achieved, and so on.

This evidence suggests that psychological influences, which have been brushed aside by the rational model of finance, seem to matter. Hence, in recent decades many researchers have looked at how human psychology shapes financial decision-making and financial markets. The efforts of these researchers have led to the emergence of behavioural finance, a relatively new field.

10.6 GLOSSARY

1. **Agency cost:** Agency costs are the costs of having an agent to make decisions on behalf of a principal. It can be defined as the 'value loss'

to shareholders that arises from the divergence of interests between the shareholders and the company's management.

2.   **Sunk cost:** It is a cost that has already been incurred and cannot be recovered.

10.7 SELF ASSESSMENT QUESTIONS

Q1.   What is agency cost?

_____

_____

_____

Q2.   How Agency Theory Works?

_____

_____

_____

Q3.   What are agency conflicts? How can they be resolved?

_____

_____

_____

10.8 LESSON END EXERCISES

Q1.   Discuss agency theory. How does it work?

_____

_____

_____

Q2. Discuss the influence of psychology on finance.

_____

_____

_____

Q3. Discuss various psychological tendencies that affect financial decision-making and financial markets.

_____

_____

_____

10.9 SUGGESTED READINGS / REFERENCES

➤ Chandra, P. (2017). *Behavioural Finance*. Tata Mc Graw Hill Education, Chennai (India).

➤ Singh. S., & Bahl.S (2015). *Behavioural Finance*. Vikas Publishing House, Noida (India).

➤ Sulphey, M.M. (2014). *Behavioural Finance*. PHI Learning, Delhi.

➤ *https://www.investopedia.com/terms/a/agencytheory.asp*

➤ *https://portal.abuad.edu.ng/lecturer/documents/ 1508187226AGENCY_THEORY.pdf*

♣

FOUNDATIONS OF BEHAVIOURAL FINANCE

(HEURISTICS AND BIASES)

STRUCTURE

11.1 INTRODUCTION

The neoclassical models in economics and finance assume that the typical decision maker has all the information and unlimited cerebral capacity. He considers all the relevant information and comes up with an optimal choice under the given circumstances using a process called "constrained optimisation". To illustrate this, let us consider portfolio theory developed by Harry Markowitz for which he was awarded the 1990 Nobel prize in economics. This theory assumes that investors can analyse the universe of securities, estimate expected returns and variances for all securities as well as co-variances among all securities, define their utility indifference curves for risk and return and choose the optimal portfolios that maximise their utility. In the real world, people make decisions with inadequate and imperfect information and have limited cognitive capacity. They rely on heuristics which can lead to biases. A heuristic is a crude rule of thumb for making judgments about probabilities, future outcomes, and so on. A bias is a tendency towards making judgmental errors. The heuristic and biases approach studies the heuristics people employ to form judgements and the associated biases in those judgments. Some biases stem from specific heuristics. Availability (the tendency to form judgments based on information which is readily available) and representativeness (the tendency to rely on stereotypes) are examples of such biases. Although some biases are associated with specific heuristics, other biases stem from a variety of factors such as overconfidence, unrealistic optimism and the illusion of control.

11.2 OBJECTIVES

After going through this lesson, you will be able to understand :

(i) How the mind works.

(ii) How the mind explores various heuristics and biases.

11.3 HOW THE HUMAN MIND WORKS : THE TWO SYSTEMS

For the past several decades, psychologists have studied intensively how the human mind works. They believe that there are two systems in the mind. Psychologists Keith Stanovich and Richard West refer to them as System 1 and System 2. System 1 operates automatically and rapidly. It requires little or no effort and is not amenable to voluntary control whereas System 2 is effortful, deliberate and slow. It requires mental activities that may be demanding in nature including complex calculations. As Daniel Kahneman puts it, "The operations of System 2 are often associated with the subjective experience of agency, choice and concentration."

When we think of ourselves, we identify ourselves with System 2, and think that we form beliefs and make choices in a conscious and deliberate manner. But in reality, System 1, where impressions and feelings originate effortlessly, provides the main inputs for the explicit and deliberate choices of System 2. We can think of the two systems as agents with their individual abilities, limitations and functions.

Here are some examples of the automatic activities attributable to System 1, in the order of complexity.

- Detect that one object is nearer than another.
- Discern friendliness in a voice.
- Answer 2 + 1 = ?
- Drive a bicycle on an empty road.
- Comprehend simple sentences.

All these mental events occur automatically and require practically no effort. Some of the capabilities of System 1 are innate skills that we share with other animals such as perceiving the world around us, recognizing objects and avoiding losses. Other capabilities of System 1 are fast and automatic, acquired through prolonged practice. The knowledge relating to these mental events is stored in memory and accessed effortlessly.

System 1 is sometimes called the X-system. It is essentially the emotional approach to decision-making. As James Montier puts it, "The X-system is actually the

default option, so all information goes first to the X-system for processing. It is automatic and effortless. The judgments made by the X-system are generally based on aspects such as similarity, familiarity and proximity (in time)." He further added, "Effectively, the X-system is a quick and dirty 'satisfying' system, which tries to give answers that are approximately (rather than precisely) correct. In order for the X-system to believe that something is valid, it may simply need to wish that it were so."

Most of the times we are likely to rely on System 1 (Or X System) which can be well understood with the help of following conditions which increase the likelihood of depending on System 1 :

- The problem is complex and ill-structured.

- Goals are ill-defined and changing.

- Information is ambiguous, incomplete and changing.

- Decisions depend on interaction with other's pressure.

- The stress is high because of high stakes or time pressure.

Investment decisions seem to have one or more of these characteristics and are likely to be guided by System 1. While the activities of System 1 normally run on an automatic pilot and are involuntary, the operations of System 2 require attention and voluntary effort. Here are some examples of the operations of the Systems 2.

- Identify the clown in the circus

- Discern the voice of a friend in a crowded and noisy room.

- Walk at a speed faster that is natural for us.

- Control our behaviour in a social situation.

- Count the number of times the letter "A" occurs in a paragraph.

- Compare two refrigerators for overall value.

- Calculate the product of 13 × 37.

- Pick holes in a complex argument.

Since human beings have a limited budget of attention, the effortful activities of System 2 interfere with each other. So, it is difficult or impossible for us to

perform several activities simultaneously. We may not be able to compute the product of 13×37 while trying to park our car in a narrow space. But we can perhaps do several things at once, provided they are easy and undemanding.

11.4 INTERACTION OF THE TWO SYSTEMS

System 1 and System 2 both make intuitive sense that there are some cognitive processes that drive our behaviour of which we are aware and there are other influential processes that we can't explain or verbalize. Therefore, the interaction between the two systems is of utmost importance. Here is a synoptic view of that interaction which clearly helps us in understanding the relation and interaction between the two systems.

1. When we are awake, System 1 and System 2 are both active. System 1 runs in the automatic mode and System 2 is normally in a comfortable 'low-effort mode' which consumes only a fraction of its capacity.

2. System 1 generates impressions and impulses that serve as suggestions for System 2. If approved by System 2, impressions and intuitions convert into beliefs and impulses that translate into voluntary action. Most of the time, this works well : You believe your impressions and act on your desires.

3. When System 1 runs into a problem, as probably happens when you have to multiply 13 by 37, it seeks the support of System 2 for detailed and specific processing. System 2 is activated when an event calls for conscious attention or when you have to monitor your behaviour, it is System 2 that helps you to solve a complex multiplication problem or keeps you polite when you are irritated.

4. Normally, the division of labour between the two systems is highly efficient, as it minimises effort and optimises performance. As Kahneman puts it, "The arrangement works well most of the time because System 1 is generally very good at what it does : its models of familiar situations are accurate, its short-term predictions are usually accurate as well, and its initial reactions to challenges are swift and generally appropriate."

11.5 ILLUSIONS

An illusion is a distortion of the senses which can reveal how the human brain normally organizes and interprets sensory stimulation. Though they distort our perception of reality, they are generally showed by most people and are highly related to System 1 and System 2. To appreciate the autonomy of System 1 and distinguish between impressions and beliefs, look at Exhibit 11.1. The bottom line looks longer than the one above it, but if you measure the two horizontal lines with a ruler they are in fact identical in length. This is an example of optical illusion called Muller-Lyer illusion.

While our System 2 knows that the lines are equal in length, you will still see the bottom lines as longer. Just as there are visual illusions, there are illusions of thought called cognitive illusions which seem difficult to overcome.

As Kahneman puts it, "Because System 1 operates automatically and cannot be turned off at will, errors of intuitive thoughts are often difficult to prevent. Biases cannot always be avoided because System 2 may have no cue to the error." He added, "Even when cues to likely errors are available, errors can be prevented only by the enhanced monitoring and effortful activity of System 2. As a way to live your life, however, continuous vigilance is not necessarily good, and it is certainly impractical." The best we can do is to improve our ability to recognise situations in which such mistakes are likely to occur and try deliberately to avoid such mistakes where the stakes are high. It seems easier to recognise other people's mistakes than our own.

Exhibit 11.1 Optical Illusion

A

B
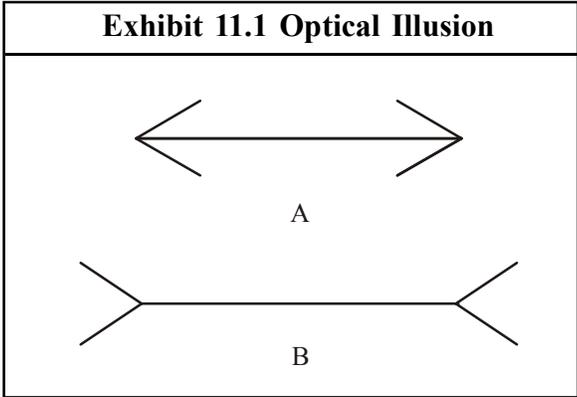
11.6 THE LAZY SYSTEM 2

System 2 allocates attention to the effortful mental activities that demand it, including complex computations. However, System 2 is a lazy controller and doesn't like to expand much effort.

An important function of System 2 is to monitor and control thoughts and actions prompted. To understand it in a better way let us read this puzzle.

●   A bat and a ball cost 2120.

The bat costs 2100 more than the ball.

What is the cost of the ball ?

The number that most probably comes to your mind quickly is 20. It is intuitive and appealing, but wrong. If you do the math, you will find the correct answer to be 10.

Psychological researchers have given the bat-and-ball puzzle to thousands of university students. They were shocked to find that more than 50 percent of students at Harvard, MIT, and Priceton failed to give the correct answer. The rate of failure exceeded 80 per cent at less selective universities. Clearly, these students can solve much more difficult problems, but they are tempted to accept a superficially plausible answer that comes readily to mind. It appears that people are overconfident and tend to rely heavily on their intuition. They, perhaps, find cognitive effort somewhat unpleasant and avoid it if possible. As Kahneman puts it, "The ease with which they are satisfied enough to stop thinking is rather troubling. 'Lazy' is a harsh judgment about the self-monitoring of these young people and their System 2, but it does not seem to be unfair."

11.7 THE ASSOCIATIVE MACHINE

Psychologists believe that our memory and mental model of the world is an associative network or machine in which activity spreads "like ripples in a pond." This can be better explained as under :

Look at the following words :

Travel   Sickness

When you look at these words you experience some unplesant images and memories. Your mind automatically assumes a temporal sequence and a causal connection between the two. The mechanism that causes these mental events is called "the association of ideas".

Furthermore if you hear the word EAT, you are likely to complete the word fragment SO_P as SOUP, but if you hear the word WASH you are likely to complete the word fragment SO_P as SOAP. Psychologists call it as a priming effect. It is an example of how the associative machine works. EAT primes the idea of SOUP and WASH primes the notion of SOAP. This effect is called priming. Therefore, Priming is a technique whereby exposure to one stimulus influences a response to a subsequent stimulus, without conscious guidance or intention.

Priming is not restricted to just concepts and words. Your actions and emotions can be primed by events outside your realm of awareness. In a classic experiment, John Bargh and his associates asked the students of New York University to construct four-word sentences from a set of five words, presented in a scrambled manner. For one group of students, half the scrambled sentences contained words such as *Florida, bald, forgetful, or wrinkle.* After they completed the task, they were asked to go for another experiment in an office down the hall. And this short walk was the central focus of the experiment. Unobtrusively, the researchers measured the time the participants took to get from one end of the corridor to the other. As Bargh had expected, participants who constructed a sentence from words with an elderly theme walked significantly slowly than the others.

Two stages of priming are involved in the "Florida effect." First, the set of words with an elderly theme primes thoughts of old age, even though there is no mention of the word *old.* Second, the thoughts of old age prime a behaviour, walking slowly, which is normally associated with old age. Remarkably all this happens without any awareness. Simple gestures like a smile can unconsciously influence our thoughts and feelings. That is why the common admonition to "be calm and kind" will actually make a person feel calm and kind.
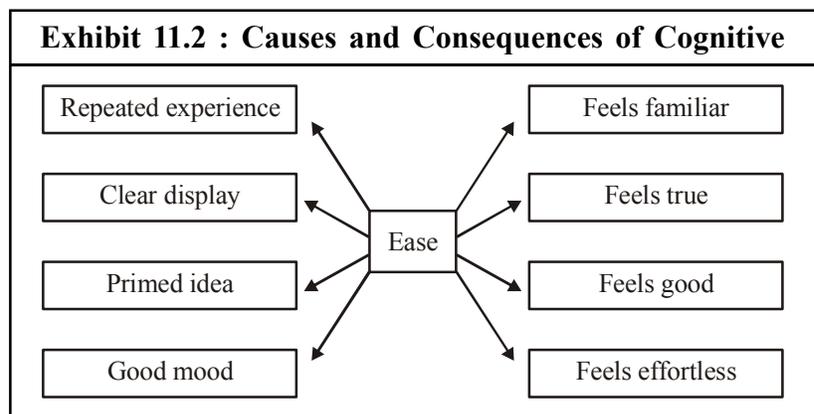
11.8 COGNITIVE EASE

Cognitive ease or fleuency is the measure of how easy it is for our brain to process information. The cognitive ease associated with something will alter

how we feel about it and whether we are motivated to invest our time and effort in it.

When you are conscious and perhaps even otherwise, your brain is engaged in multiple computations which seek to answer several questions : Is anything new happening ? Are things okay ? Should I redirect my attention ? Does the task require more effort ? so on and so forth. It is like a cockpit with a set of dials that show the current values of these variables. System 1 carries out these assessments automatically and one of its functions is to determine whether System 2 has to be pressed into service.

One of the dials measures cognitive ease and it ranges from "Easy" to "Strained." "Easy" indicates that things are okay—there is no major news or threat that calls for redirecting attention or mobilising effort. "Strained" suggests that a problem exists and there is need to mobilise System 2.

Exhibit 11.2 : Causes and Consequences of Cognitive

Repeated experience		Feels familiar
Clear display		Feels true
Primed idea	Ease	Feels good
Good mood		Feels effortless

Cognitive ease is caused when something is displayed clearly or repeated, or primed. It is also induced when you are in a good mood. Conversely, cognitive strain is caused when you read instructions in a poor font, or worded in a convoluted language, or when you are in a peevish mood. The causes and consequences of cognitive ease are displaed in Exhibit 11.2, which is drawn from Kahneman's classic work *Thinking, Fast and Slow.* It is remarkable that a single dial of cognitive ease is linked to a large network of diverse inputs and outputs.

From Exhibit 11.2 it is clear that illusions occur when judgment is based on cognitive ease. As Kahneman puts it, "Anything that makes it easier for the associative machine to run smoothly will also bias beliefs. A remarkable way to make people believe

in falsehood is frequent repetition, because familiarity is not easily distinguished from truth. Authoritarian institutions and marketers have always known this fact."

11.9 JUMPING TO CONCLUSIONS

According to a theory of believing and disbelieving developed by Daniel Gilbert, System 1 is gullible and credulous, whereas System 2 is unbelieving and doubting. When System 2 is otherwise preoccupied, we tend to be very credulous. Empty persuasive messages, such as commercials, tend to influence people more, when they are tired. The confirmatory bias of extreme and unlikely events, the operations of associative memory induce a bias for confirmation. As Kanheman puts it, "Contrary to the rules of philosophers of science, who advise testing hypotheses by trying to refute them. People seek data that are likely to be compatible with the beliefs they currently hold." Jupming to conclusions can be influenced by the following :

i) **Halo Effect :** If you like the policies of the prime minister, you probably like his appearance and voice as well. It is manifestation of a psychological phenomenon called 'exaggerated emotional coherence' or 'halo effect'. You tend to like or dislike everything about a person.

ii) **What You See Is All There Is :** An essential feature of the associative machine is that it excels in constructing the best possible story based on ideas currently activated and it does not (cannot) allow for information it does not have. As Kahneman puts it, "The amount and quality of the data on which the story is based are largely irrelevant. When information is scarce, which is a common occurrence, System 1 operates as a machine for jumping to conclusions." He further added, "Jumping to conclusions on the basis of limited evidence is so important to an understanding of intuitive thinking and comes up so often in the book, that I will use a cumbersome abbreviation for it, WYSIATI, which stands for what you see is all there is." WYSIATI helps in explaining a long and diverse list of biases of judgment and choice.

iii) **Answering an Easier Question :** A remarkable facet of our mental makeup is that we are rarely confounded. True, when we are faced with a question such as $29 \times 83 = ?$, we may be stumped. Ordinarily, however, we have intuitive feelings and opinions about almost everything that we

encounter. As Kahneman puts it, "You like or dislike people long before you know much about them; you trust or distrust strangers without knowing them; you feel an enterprise is bound to succeed without analysing it. "If a satisfactory answer to a hard question is not found quickly, System 1 will find a related question that is easier and will answer it. It calls for the operation of answering one question in place of another substituion."

The idea of substitution is the core of the heuristics and biases approach developed by Daniel Kahneman and Tversky. For example, if someone is asked the question, "How will the economy do six months from now ?" He is likely to substitute that question by : How is the economy doing now ? He will substitute the harder question with an easier question.

iv)   **The Affect Heuristic :** The likes and dislikes of people determine their beliefs about the world. As Kahneman puts it, "Your emotional attitude to such things as irradiated food, red meat, nuclear power, tattoos, or motorcycles drives your beliefs about their benefits and risks. If you dislike any of these things, you probably believe that risks are high and its benefits are negligible." Paul Slovic refers to this phenomenon as Affect Heuristic. People judge an activity or an alternative not just on what they think about it but also on how they feel about it. As Michael Mauboussin puts it, "If they like an activity, they are moved towards judging the risks as low and benefits as high and vice versa. Under this model, affect comes prior to, and directs judgments of risk and benefit." The affect heuristic is an example of substitution. A harder question (How do I think about it ?) is substituted by an easier question (How do I feel about it ?). It seems that the emotional tail wags the rational dog.

So far we described System 2 as a more or less acquiescent monitor that allowed considerable latitude to System 1 or as an active participant in deliberate memory search, complex analysis and choice. In the interplay between the two systems, System 2 was considererd to be the ultimate arbiter. However, in the realm of attitudes, we see a new side of System 2. Kahneman explained, "In the context of attitudes, however, System 2 is more of an apologist for the emotions of System 1 than a critic of those emotions—an edorser rather than an enforcer." It appears that the search for information and arguments is biased in favour of existing beliefs.

11.10 THE LAW OF SMALL NUMBERS

Law of small numbers refers to the incorrect belief held by experts and lay people alike that small samples ought to resemble the population from which they are drawn. Although it holds true for large samples but it is not for small questions. Following example can better explain it.

A telephonic survey of 250 students reveals that 62 per cent support the prime minister. If you are asked to summarise this message in a four-word sentence, you would probably say "youngsters support prime minister." This represents the crux of the story. The sample size (250) and mode of survey (telephonic poll) matter very little. Your summary would be the same if the sample size were 2000. In general, people are not adequately sensitive to sample size.

The belief that small samples closely mirror the population from which they are drawn stems from a tendency to exaggerate the consistency and coherence of what one sees. As Kahneman puts it, "System 1 runs ahead of the facts in constructing a rich image on the basis of scraps of evidence. A machine for jumping to conclusions will act as if it is believed in the law of small numbers."

Tversky and Kahneman wrote an article titled, "Belief in the Law of Small Numbers." They explained that, "intuitions about random sampling appear to satisfy the law of small numbers, which assert that the law of large numbers applies to small numbers as well." Hence, they argued that researchers should regard their "statistical intuitions with proper suspicion and replace impression formation by computation whenever possible."

Most problems in decision making under uncertainty call for drawing inferences on the basis of limited data or observations. How many days or months of data do you need to infer that stock prices behave like a random walk ? How long and how bright must an investor outperform the market to be ordianed as a star ?

We tend to draw inferences about stock price randomness or star status of an investor or almost everything by looking at limited data or evidence that is reasonable. Kahneman and Tversky have documented how easily we convince ourselves that the world is like the small sample that we observe and readily extrapolate past performances into future. People form judgments on the basis of impressions drawn from limited evidence. This "belief in small numbers" motivates many applications of Behavioural finance.

You can discover such a bias in your thought process by doing a small experiment. Write down a sequence of heads and tails you expect when a fair coin is tossed 50 times. Then actually toss a fair coin 50 times and compare the results with your gusses. Most probably you will find that your guesses implied more reversals of runs of heads or tails than what you observe from the actual tosses. This is a manifestation of a well-documented phenomenon called gambler's fallacy which says that bad luck cancels out. Indeed, bad luck cancels out, but this may take some time. While the gambler's fallacy implies that luck will reverse itself soon, there is a converse belief that some gamblers are 'hot' on particular nights when they seem to be on a winning streak. The hot hand notion implies that they will win against the odds.

If such biases were confined only to desperate gamblers affected by greed and delusion, they might not be a cause of much concern. But Kahneman and Tversky found similar biases present amongst participants at academic conferences. So they wrote "acquaintance with formal logic and probability theory does not extinguish erroneous intuitions."

11.11 CAUSE AND CHANCE

We humans are wired to make links between causes and effects. Lewis Wolpert, a renowned biologist, argues that the concept of cause and effect has been a fundamental driver of human evolution. Evolutionarily, it is advantageous to understand the cause—effect relationship. According to Wolpert, the concept of cause-effect relationship, along with language and social interaction led to an increase in size and complexity of the human brain.

In his Faraday lecture, Wolpert expressed eloquently the human desire to close the cause and effect loop :

"Our ancestors must have felt uncomfortable about their inability to control or understand such causeless events, as indeed many do today. As a consequence, they began to construct, as it were, false knowledge. I argue that the primary aim of human judgment is not *accuracy,* but the avoidance of paralyzing uncertainty, We've a fundamental need to tell ourselves stories that make sense of our lives. We hate uncertainty and find it intolerable."

We have a predilection for causal thinking and this makes us prone to commit serious mistakes in assessing the randomness of truly random events. As an example suppose you toss a fair coin six times and note down whether it shows head up or tail up.

The sequence of heads and tails is clearly random because the events are independent of each other. The number of heads and tails in the last few tosses has no effect whatsoever on what shows up in the next toss. Now consider three possible sequences.

$$T \quad T \quad T \quad H \quad H \quad H$$

$$H \quad H \quad H \quad H \quad H \quad H$$

$$T \quad H \quad T \quad T \quad H \quad T$$

Are the sequences equally probable ? The typical intuitive answer is : No. But this answer is wrong. Since the events are independent and both the outcomes H and T are equally likely, any possible sequence of Hs and Ts is as likely as any other. Most people, however, judge THTTHT much more likely than the other two sequences.

Human beings are pattern seekers. We believe that regularities (such as a sequence of six heads) appear not by chance but as a result of causality or of someone's intent. As Kahneman puts it, "Random processes produce many sequences that convince people that the process is not random at all. Assuming causality perhaps had evolutionary advantage. It is part of the general vigilance that we have inherited from ancestors."

Polarised Visions of *Man*

There are two polarised visions of man. One of them is the Utopian Vision associated with Rousseau, Godwin, Thomas Paine and normative economists. They *believe* with rationality we can overcome cultural impediments and we *become* a better human race. We can control our nature and transform it in order to *achieve,* inter alia, happiness and rationality.

The other view is the Tragic Vision of man which holds that *there* are inherent limitations and flaws in the way we think and act. We have to accept this as a fact for any dual or collective action. According to Nassim Taleb, the proponents of this view include Karl Popper (distrustful of anyone who is confident that *he* knows anything with certainty) Frederick Hayek and Milton Friedman (suspicion of government), Adam Smith (intention of man), Herbert Simon (bounded rationality), Amos Tversky and Daniel Kahneman (heuristics and biases), the speculator George Soros. Nassim Taleb, author of the insightful

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book *Fooled by Randomness,* is himself a champion of this view. As *he* said, "We are faulty and there is no need to bother trying to correct our flaws. We are so *defective* and so mismatched to our environment that we can just work around these flaws." He added, "As an empricist, I despise the moralists. I still wonder why they blindly *believe* in ineffectual methods. Delivering advice assumes that our cognitive apparatus rather than our emotional machinery exerts some meaningful control over our actions. We will *see* how modern Behavioural science shows this to be completely untrue."

11.12 MAGICAL THINKING

Magical thinking may be defined as believing that one event happens as a result of another without any plausible link of causation. Put differently, magical thinking attributes causal relationships between actions and events which seemingly cannot be justified by reason and observation. For example : "A black cat has crossed my path, so something bad will happen" or "I got up on the left side of the bed, so it will rain today." In religion, folk religion and superstitious beliefs, it is often believed that a certain ritual, prayer, sacrifice, or *observance of* a taboo will lead to an expected benefit or recompense. Magical thinking may *induce* people to believe that their thoughts per se can bring about effects in the world.

There is a variant of magical thinking called "quasi-magical thinking." People *under the* spell of quasi-magical thinking, act as if they erroneously believe that their action *influences* the outcome, even though they don't really have that belief.

11.13 WISHFUL THINKING

Wishful thinking means forming beliefs and deciding on the basis of what might be pleasing to imagine instead of relying on evidence, rationality or reality. It is a way of resolving conflicts between beliefs and desires. Here is a conspicuous example of wishful thinking : renowned economist Irving Fisher said that, "stock prices have reached what looks like a permanently high plateau, "just a few weeks before the stock market crash of 1929, which was followed by the Great Depression. Psychological studies have consistently shown, that, in general, subjects believe that positive outocmes are more likely than negative outcomes. Some psychologists

believe that positive thinking has a positive influence on behaviour and hence, brings about better results. This is referred to as pymaglion effect, the phenomenon whereby higher expectations induce better performance. For example, if the boss praises his subordinate and expects him to perform better, the subordinate is likely to perform better. A corollary of the Pygmalion effect is the golem effect, a phenomenon whereby lower expectations lead to a decrease in performance. The Pygamlion effect and golem effect are forms of self-fulfilling prophecy.

11.14 BOUNDED RATIONALITY

Bounded rationality is the idea that in a decision making, rationality of individuals is limited by information they have, the cognitive limitations of their mind and finite amount of time they have to make a decision. Perhaps the simplest deviation from the benchmark of full rationality is bounded rationality, introduced by Herbert Simon in 1955, who later got a Nobel prize in economics. Bounded rationality assumes that individuals do not make fully optimal decisions because of cognitive limitations or information-gathering costs.

To cope with complexity, boundedly rational individuals use rules of thumb or heuristics that ensure an acceptable level of performance and, hopefully, do not cause severe bias.

The theory of bounded rationality is a theory of economic decisions making that Simon preferred to call "satisficing," a combination of the words "satisfy" and "suffice." Contrary to what classical economists believed, Simon argued that people do not seek to maximise their benefit from a particular course of action. Due to informational and cognitive limitations, people seek something that is "good enough" or satisfactory. For example, when a person is shopping he will look through things sequentially till he comes across an item that meets his aspiration level and then goes for it.

Simon applied the idea of 'satisficing to organisations as well as to individuals. Managers behave like shoppers. As he wrote, "Whereas economic man maximizes, selects the best alternative from among all those available to him, his cousin, administrative man, satisfies, looks for a course of action that is satisfactory or good enough." He continued, "Because he treats the world as rather empty and

ignores the interrelatedness of all things (so stupefying to thought and action), administrative man can make decisions with relatively simple rules of thumb that do not make impossible demands upon his capacity for thought."

11.15 SUMMARY

The neoclassical models in economics and finance assume that the typical decision-maker has all the information and unlimited cerebral capacity. He considers all relevant information and comes up with an optimal choice under the given circumstances using a process called constrained optimisation. In the real world, people make decisions with inadequate and imperfect information and have limited cognitive capacity. They rely on heuristics which can lead to biases. For the past several decades, psychologists have studied intensively how the human mind works. They believe that there are two systems in the mind. Psychologists Keith Stanovich and Richard West refer to them as System 1 and System 2. System 1 operates automatically and rapidly. It requires little or no effort and is not amenable to voluntary control. System 2 is effortful, deliberate and slow. When we think of ourselves, we identify ourselves with System 2, and think that we form beliefs and make choices in a conscious, deliberate manner. But in reality System 1, where impressions and feelings originate effortlessly, provides the main inputs for the explicit and deliberate choices of System 2. System 1 generates impressions, intuitions and impulses that serve as suggestions for System 2. If approved by System 2, impressions and intuitions convert into beliefs and impulses that translate into voluntary action. Most of the time, this works well. You believe your impressiosn and act on your desires. Normally, the division of labour between the two systems is highly efficient, as it minimises effort and optimises performance. Because System 1 operates automatically and cannot be turned off at will, errors of intuitive thought are often difficult to prevent. Biases cannot always be avoided, because System 2 may have no clue to the error. The best we can do is to improve our ability to recognise situations in which such mistakes are likely to occur and try deliberately to avoid such mistakes where the stakes are high. It seems easier to recognise other people's mistakes than our own. It is clear that illusions occur when the

judgment is based on cognitive ease. As Daniel Kahneman puts it, "Anything that makes it easier for the associative machine to run smoothly will also bias beliefs." According to a theory of believing and disbelieving developed by Daniel Gilbert, System 1 is gullible and credulous, whereas System 2 is unbelieving and doubting. When System 2 is otherwise preoccupied, we tend to be very credulous. The confirmatory bias of System 1 induces uncritical acceptance of suggestions and exaggerates the probability of extreme and unlikely events. WYSIATI i.e., what you see is all there is, helps in explaining a long and diverse list of biases of judgment and choice. How do we generate intuitive opinions on complex matters ? As Kahneman explains, "If a satisfactory answer to a hard question is not found quickly, System 1 will find a related question that is easier and will answer it. I call the operation of answering one question in place of another substitution." The idea of substitution is the core of the heuristics and biases approach developed by Kahneman and Tversky. The likes and dislikes of people determine their beliefs about the world. Paul Slovic refers to this phenomenon as affect heuristic. It appears that the search for information and arguments is biased in favour of existing beliefs. The belief that small samples closely mirror the population from which they are drawn stems from a tendency to exaggerate the consistency and coherence of what one sees. We humans are wired to make links between causes and effects. Lewis Wolpert, a renowned biologist, argues that the concept of cause and effect has been a fundamental driver of human evolution. Evolutionarily it is advantageous to understand the cause-effect relationship. We have a predilection for causal thinking and this makes us prone to commit serious mistakes in assessing the randomness of truly random events.

11.16 GLOSSARY

- **Cognitive Ease :** Also known as cognitive fleuency, cognitive ease is quite simply the ease with which our brain processes information.

- **Magical Thinking :** Magical thinking attributes causal relationship between actions and events which seemingly cannot be justified by reason and observation.

- **Wishful Thinking :** Wishful thinking means forming beliefs and deciding on the basis of what might be pleasing to imagine instead of relying on evidence, rationality, or reality.

- **Illusion :** It is an instance of a wrong or misinterpreted perception of a sensory experience.

11.17 SELF-ASSESSMENT QUESTIONS

Q1. Discuss the two systems in the mind.

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Q2. Explain magical thinking.

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11.18 EXAMINATION ORIENTED QUESTIONS

Q1. Discuss the interaction of the two systems.

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Q2. Discuss the following : the law of small numbers, cause and chance and wishful thinking ?

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11.19 SUGGESTED READINGS

➢ Chandra, P. (2017). Behavioural Finance, Tata Mc Graw Hill Education, Chennai (India).

➢ Ackert, Lucy, Richard Deaves (2010), Behavioural Finance : Psychology, Decision making and Markets, Cengage Learning.

➢ Forbes, William (2009), Behavioural Finance, Wiley.

➢ Kahneman, D. and Tversky, A. (2000), Choices, values and frames. New York, Cambridge Univ. Press.

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FAMILARITY AND RELATED HEURISTICS

STRUCTURE

12.1 INTRODUCTION

People are comfortable with things that are familiar to them. The human brain often uses the familiarity shortcut in making choices. In this section we explore a series of related heuristics that induce people to exhibit preferences unrelated to objective considerations. People are more comfortable with the familiar. They dislike ambiguity and normally look for ways to avoid unrewarded risk. People tend to stick with what they have rather than investigate other options. They put off undertaking new initiatives, even if deep down they know the effort could be worthwhile. All of these point to a tendency to seek comfort.

12.2 OBJECTIVES

After going through this lesson, you will be able to understand :

(i)   The concept of familiarity

(ii)   Different heuristics associated with familiarity.

12.3 FAMILARITY

Familarity is the close knowledge of something. For example, people are more likely to accept a gamble if they feel they have a better understanding of the relevant context, that is, if they feel more competent. Chip Health and Amos Tversky conducted an experiment whose first stage involved a series of general

knowledge multiple choice questions with four options. Each multiple choice question had an associated confidence query, where the options ranged from 100% certainty to 25%. With four possible responses, confidence of 25% indicated pure guessing. Let's say that a particular particpant had a self-assessed confidence rating of 60% (averaged over all questions). She would then be offered a choice of two gambles : one where a payoff was randomly obtained with a 60% probability, and a second where a payoff was received if one of her randomly selected answers was correct.

Exhibit 12.1 Choice of Competence Bet vs. Random Bet as a Function of Judged Probability
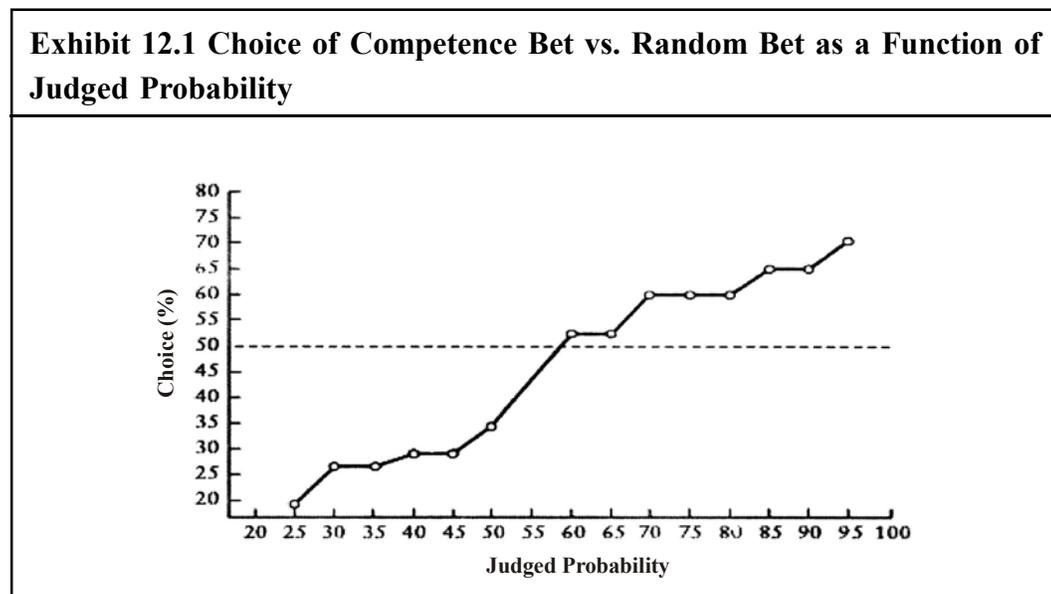

Exhibit 12.1 shows the results. When people felt that they had some competence on the questions, they were more likely to choose a gamble based on this competence rather than a random lottery. This is evidenced by the positive relationship between judged probability of being right on the questions and the percentage choosing the competence bet. It is important to note that whatever the selfperceived level of knowledge, the probability of success on the bet was viewed by participants as identical between the two alternatives (according to their own statements). If, for example, a participant was 50% comfortable in his answers being correct, then the random lottery would have been successful with a 50% probability. If, alternatively, another participant was 75% comfortable in his answers

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being correct, then the random lottery would have been successful with a 75% probability. The logical conclusion is that people have a preference for the familiar.

12.3.1 Financial Behaviour Stemming from Familarity

12.3.1.1 Home Bias

Though preferences are slowly changing in this regard, it continues to be true that domestic investors hold mostly domestic securities—that is, American investors hold mostly U.S. securities; Japanese investors hold mostly Japanese securities; British investors hold mostly U.K. securities; and so on. For example the aggregate market values of the six biggest stock markets in the world, i.e., The united States, as of 1989, had 47.8% of world market capitalization, Japan 26.5%, the U.K. 13.8%, France 4.3%, Germany 3.8%, and Canada 3.8%.2 Nevertheless, a typical U.S. investor held 93.8% in U.S. stocks; a typical Japanese investor held 98.1% in Japanese stocks; and a typical U.K. investor held 82.0% in U.K. stocks. Thus, domestic investors overweight domestic stocks. This behavior is called Bias. Bias towards the home country flies in the face of evidence indicating that diversifying internationally allows investors to reduce risk without surrendering return. This is particularly true since stock markets in different countries are not highly correlated. One reason why investors might hold more domestic securities is because they are optimistic about their markets relative to foreign markets. Using an expected utility maximization approach and historical correlations between markets, French and Poterba estimated what expected returns would have to be in order to justify the observed asset allocation.

12.3.1.2 Distance, Culture and Language

The argument that institutional considerations cause investors to shy away from foreign investments becomes weak if it can be demonstrated that people prefer to invest locally, even within their own country. Gur Huberman reports on a case of such "intra-national" home bias." In 1984, AT&T was forced by the court into a divestiture whereby seven "Baby Bells" were created. These companies were created along regional lines. An example is BellSouth serving the southeastern United States. If people like familiarity, then we would expect a

disproportionate number of a Baby Bell's customers to hold a disproportionate number of shares in the same Baby Bell. Indeed, that is exactly what happened after the divestiture. While we often hear that we should buy locally, from a diversification standpoint, if anything, you are wise to underweight (not overweight) local companies. If the economy of your region fares poorly, this will be bad both for the stock market performance of local companies and the employment prospects of local workers (yourself included). If you work and invest locally, technically speaking, your two income sources are highly correlated. Diversification theory says you should look for income streams that are weakly correlated. For this reason, it would have been better for investors to buy stock in Baby Bells outside their region. In a related study, Mark Grinblatt and Matti Keloharju demonstrate that the preference for familiarity extends to language and culture. In Finland, there are two official languages, Finnish and Swedish. Annual reports are normally published in Finnish or in both official languages, but in a few cases reports are only published in Swedish. It turns out that, after controlling for other relevant factors, Finnish investors prefer companies whose language of publication is Finnish, and Swedish investors prefer companies whose language is Swedish— with bilingual companies being mid-ranked by both groups of investors. Interestingly, culture matters as well. These authors took note of whether CEOs were Finnish or Swedish. Controlling for the language of the company, Finnish speakers prefer Finnish CEOs, and Swedish speakers prefer Swedish CEOs. The lesson seems clear: familiarity, on all levels, "breeds" investment. Moreover, there is evidence that even institutional investors may not be immuned from this tendency.

12.3.1.3 Local Investing and Informational Advtanges

One reason why investors may favor local markets—where local is interpreted as either domestic or close-to-home, but within the same country—is because they may possess, or may feel that they possess, informational advantages. Gains from being geographically close to a company may appear in improved monitoring capability and access to private information. Joshua Coval and Tobias Moskowitz investigated this issue in the context of mutual fund managerial performance. They first established that mutual fund managers, consistent with familiarity bias, tend to favor local investments, that is they tend to buy "firms headquartered within a 100-mile

(or 161-kilometer) radius of their head office. Specifically, they conclude that the average manager invests in companies that are located about 10% closer to him than the average firm he could have held. Further, local equity preference is related to firm size, leverage and output tradability with small levered firms producing goods that are not traded internationally tending to be the ones where local preference comes through strongest. Consider rational motivations for investing locally, one is hedging demand. If you consume local goods at local prices, it can make sense to hedge by investing locally. If locally produced goods are not traded outside the local region, then it is reasonable to talk about local prices. Take haircuts, which are as non-tradable as one gets. If you buy the stock of a local haircutting company, your future haircut consumption, which must be local, is well hedged. The finding that local equity preference is more pronounced among companies whose goods are not traded internationally is consistent with hedging demand. Size and leverage, on the other hand, suggest an information differential explanation, as smaller, levered firms are likely to be ones for which local informational advantage may be stronger. To test this, Coval and Moskowitz investigated whether local preference can generate a boost to performance. As has been discussed previously, most studies indicate that the average actively managed mutual fund has been unable to consistently outperform its benchmark on a risk-adjusted basis. Notably though, Coval and Moskowitz demonstrate a significant payoff to local investing. Fund managers on average earn 2.67% per year more on local investments, while local stocks avoided by managers underperform by 3% per year. Moreover, they find that those who are better able to select local stocks tend to concentrate their holdings more locally. As stocks with high levels of local ownership tend to outperform, and this effect lasts for several months, suggesting those with access to such data could earn excess returns. In other researches, there is an evidence that retail investors take advantage of the opportunity. Reminiscent of the money manager fineing, based on a dataset of retail investors, local investments outperform remote investments by 3.2% per year.

12.3.1.4 Investing in Your Employer or Brands that You Know

There is also abundant evidence that investors overweight the stocks of companies whose brands are familiar or that they work for. As for the first, Laura Frieder and Avanidhar Subrahmanyam looked at survey data on perceived brand

quality and brand familiarity (recognition) and asked whether these attributes impacted investor preferences. To answer this question, they correlated institutional holdings with these factors. Note that high institutional holding in a stock implies low retail holding in that same stock. These researchers found that institutional holdings are significantly and negatively related to brand recognition, but no discernible impact was present for brand quality. The former implies that retail investors have a higher demand for firms with brand recognition, which is consistent with comfort seeking and familiarity. Still, Frieder and Subrahmanyam argue that recognizable brands are associated with companies with more readily accessible information for average investors. They provide a model that shows that investors will, ceteris paribus, demand more of a stock when they have more precise information about the stock. Therefore, in this context as in others, a natural informational advantage may stem from familiarity. As for overweighting companies that one works for, while the same sort of familiarity versus informational advantage debate is possible, the extent to which some investors invest in these companies seems to transcend an informational explanation. Many "employee-investors" put a very high percentage of their investible wealth in their employer's stock, thus foregoing a significant amount of possible diversification. There is evidence that representativeness and related biases induce inappropriate investment decisions. To casual observers it seems obvious that if a company has high-quality management, a strong image, and consistent growth in earnings, it must be a good investment. Students of finance, of course, know better. In valuation, future cash flows are forecasted and discounted back to the present using an appropriate risk-adjusted discount rate. All the aforementioned attributes that make a company a good company should theoretically be reflected in these estimates of future cash flows (including the growth in cash flows) and the risk adjusted discount rate—that is, they should already be impounded in price. Loosely speaking, good companies will sell at high) prices, and bad companies will sell at low prices. But, once the market has adjusted, there is no reason to favor a good company over a bad company, or, for that matter, a bad company over a good company. Quite simply, it is a mistake to think that a good company is representative of a good investment, and yet, that is exactly what people often seem to believe. Further, according to market efficiency "excess returns should be unpredictable".

Nevertheless, as we have noted, there is a tendency to overestimate predictability. In this context then, there may be a tendency to associate past success (which led to high past returns) with likely future returns.

12.4 PERCEPTION, MEMORY AND HEURISTICS

12.4.1 Perception

Perception refers to the way in which something is regarded, understood or interpreted. It is common place for an information-processing model to assume that agents are able to acquire and store costless information without difficulty. Unfortunately, perception, which downloads information to the "human computer," often misreads it. For example, we often "see" what we expect to see. In one experiment, participants were shown a hand of five playing cards, all of which were either hearts or spades. One of the cards was a black three of hearts, but most people missed (or misinterpreted) the error. A common reaction was to be certain that one had seen a normal three of hearts or a normal three of spades. The lesson to be learned is that perception is selective, with expectations strongly conditioning perception. It is also true that people "see" what they desire to see. After a particularly rough football game between Dartmouth and Princeton, a sample of students from the two universities was asked which team had precipitated the excessively physical play. Of the Dartmouth students, only 36% thought that their team had done so. On the other hand, 86% of the Princeton students thought Dartmouth had initiated the bad conduct. Sometimes perception can be distorted in a self-serving fashion. Cognitive dissonance creates a situation where people are motivated to reduce or avoid psychological inconsistencies, often in order to promote a positive self-image. In one experiment, voters in a Canadian election were surveyed either before or after leaving the ballot box. Respondents were more likely to believe that their candidate was the best choice and would be victorious if surveyed after voting rather than before. Apparently there was an unconscious coalescence of actions and views.

12.4.2 MEMORY

Memory is the faculty of the brain by which data or information is encoded, stored and retrieved when needed. It is the retention of information over time for the

purpose of influencing future action. Imprecision multiplies when one tries to recall past perceptions or views, that is, when one remembers. The common view that past experiences have somehow been written to the brain's hard drive and are then retrieved, even if at considerable effort, is not the way our brain works. In fact, memory is reconstructive. One way we know this is that, in an experimental context, when people witness an event and receive misleading information about it, this misinformation is often incorporated into their memory. Memory is not only reconstructive, but also variable in intensity. Have you ever noticed how easily and quickly you can bring to mind certain positive or negative memories (e.g., when you won the million-euro lottery, or when you realized you put the winning ticket in the wash) ?

Since pleasant memories make you happier than unpleasant ones, it is not surprising that we are sometimes prone to "rewriting history." It also makes us feel better to think we have more control over events than we really do, or that we have a good sense of what is likely to happen in the future. The corollary to this is that in the past we also must have had a pretty good sense of what was likely to transpire. In other words, "we knew it all along." This is known as hindsight bias.

12.4.2.1 Framing Effects

Framing effect is a cognitive bias where people decide on options based on whether the options are presented with positive or negative connotations e.g. as a loss or as a gain. Perception and memory are influenced by context, or the frame. This is an important reason why financial decisions are influenced by the frame. People tend to avoid risk when a positive frame is presented but seeks risk when a negative frame is presented. A number of studies have produced corroborating evidence on the importance of the frame for perception and memory. For example, a sports announcer of average height looks short when interviewing a basketball player, but tall when interviewing a jockey. This is known as the "contrast effect." Some perceptual illusions rely on this. The impotance of the frame is also clear in primacy and recency effects. The primacy effect is based on research that shows that if subjects are asked their impressions of someone based on a series of attributes, then what comes first will often dominate. Someone described as "intelligent,

industrious, impulsive, critical, stubborn, envious" generally creates more positive impressions than someone described as "envious, stubborn, critical, impulsive, industrious, intelligent." Since the second series of epithests is the exact transposition of the first series, this suggests that what comes first has greater impact.

12.4.2.2 Ease of Processing and Information Overload

The discussion up to now has suggested that people can have difficulty processing information in certain situations. Interestingly, people seem to prefer situations characterized by ease of processing. Ease of processing amounts to ready understanding. Information that is easier to understand is often viewed as more likely to be true. Difficulty assessing information is exacerbated by the plethora of information at our disposal. While this is obvious enough in some realms—for example, consider how much information is potentially relevant for estimating the value of Microsoft stock—even when the information set seems less cluttered, information overload, a state of confusion and decision avoidance, can still occur. In one experiment, shoppers in a supermarket were presented with free samples of jams and jellies. In the first treatment, a small selection was available for tasting; in the second, a large selection was available. While everyone likes the idea of abundant choice, and indeed the table with the greater selection attracted larger crowds, it was the table with fewer samples that led to the most sales. The likely reason is that the large selection led to information overload, the feeling that the decision was too complicated for immediate action. As we all know from personal experience, procrastination will probably lead to indefinite inaction.

12.4.3 Heuristics

In many cases, delay is not feasible. Decisions need to be made, even if the environment is one of limited attention, information and processing capacity, so shortcuts, or heuristics, are necessary. A heuristic is a decision rule that utilizes a subset of the information set. Since in all virtual cases, people must economize and cannot analysze all contingencies, we use heuristics without even realizing it. Heuristics come in all shapes and sizes. One dichotomy is between those heuristics that are reflexive, autonomic and noncognitive and economize on effort (Type 1); and others, which are cognitive in nature (Type 2). Type 1 heuristics are appropriate

when a very quick decision must be made or when the stakes are low, for example "I choose a hamburger over a hot dog because I usually prefer them". Type 2 heuristics are more effortful and are appropriate when the stakes are higher. In some cases, an initial reaction using a Type 1 heuristic can be overruled or corroborated using a Type 2 heuristic, for example "No, I will choose the hot dog today because it is prepared a bit differently and I like to try new things".

It is likely that heuristics come from the evolutionary forces that have equipped us with a good set to meet the challenges of survival. The connection is not surprising because prospect theory can be viewed as a related set of rules of thumb for making decisions when facing risk. But evolution has not equipped us with the perfect "toolkit" of heuristics because a good set of heuristics is not the same as an optimal set. Evolutionary forces only require that survivors' heruristics are better than those of their rivals. Heursitcs have been part of our toolkit for centuries, while many of the problems that we must deal with in a financial realm are recent, so it should not be surprising that such tools, when used outside of their natural domain, may falter.

12.4.3.1 Examples of Heuristics

Now we will describe some heuristics, beginning with a couple that are clearly autonomic in nature. If you hear a loud sound while walking down the street, your tendency is to move away from it until examination and analysis can be undertaken. There is no thought here : command-and-control is entirely in the primitive emotional recesses of the brain. After a second, of course, you take a look around and ascertain whether the sound is a threat (if a gunshot, let's move even farther away) or an item of curiosity (if a human cannonball at a carnival, let's take a closer look). Another example is in the kitchen. If you look into the refrigerator and an item of food emits an odour that you are not exactly familiar with, the obious reaction is to dispose of the food. There is a reasonable probability that you might become sick if you eat it. The reader will likely agree that both the "move away from the loud sound" and the "avoid eating food with an unfamiliar odour" heuristics make eminently good sense, and there is no difficulty in seeing how these shortcuts have contributed to man's survival. While the heuristics we have discussed so far are autonomic, we now turn

to some heuristics that are cognitive in nature.

One criticism that is levied against traditional models in economics and finance is that they are sometimes formulated as if the typical decision-maker were an individual with unlimited cerebral RAM. Such a decision-maker would consider all relevant information and come up with the best choice under the circumstances in a process known as constrained optimization. Normal humans are imperfect and information requirements are for some models egregious. Take the capital asset pricing model (CAPM), a model famous and important enough that William Sharpe won the 1990 Nobel Prize for Economics Sciences for this contribution. This model assumes that investors are capable of styding the universe of securities in order to come up with all required model inputs. These inputs include expected returns and variances for all securities, as well as covariances among all securities. Only then is the investor able to make appropriate portfolio decisions. This chapter focuses on how people make decisions with limited time and information in a world of uncertainty. It begins in the next section by discussing certain cognitive limitations that may render the expectations of some models unreasonable. Perception and memory are imprecise filters of information, and the way in which information is presented, that is, the frame, influences how it is received. Because too much information is difficult to deal with, people have developed shortcuts or heuristics in order to come up with reasonable decisions. Unfortunately, sometimes these heuristics lead to bias, especially when used outside their natural domains. The most important of these is representativeness in its various mainfestations.

12.5 AMBIGUITY AVERSION

In decision theory and economics, ambiguity aversion, also called as uncertainty aversion, is preference for known risks over unknown risks. An ambiguity averse individual would rather choose on alternative where the probability distribution of outcomes is known over one where the probabilities are unknown.

Consulting Exhibit 12.1 once again, we see that whereas when judged probability was at its highest the clear tendency was to prefer the competence bet, when judged probability was at its lowest the clear tendency was to prefer the random bet.

While familiarity seems to account for the former, the latter is likely due to ambiguity aversion. Take the 35% certain case. The reason the bet with the random payoff is preferred (which pays off 35% of the time) is becuase you know the precise distribution (you will win with 35% probability), but when knowledge is low you really don't know what you know or don't know (which means, while your best guess might be a 35% probability that you answered questions correctly, there is uncertainty that this is the probability of winning the bet).

In the classic demonstration of ambiguity aversion, subjects preferred to bet that a red (or black) ball could be drawn from an urn known to have 50 black balls and 50 red balls, versus the case where subjects were only informed that the urn contained 100 balls of black and red balls in unknown proportions. If one thinks about it, the unconditional probability of success in either case is identical. Ambiguity aversion is driven by the fact that people prefer risk to uncertainty. In Chapter 1 we differentiated risk and uncertainty. Risk exists when we precisely know the probability distribution. In the first case, it is clear that the probability of drawing a red (or black) ball is 50%. Uncertainty exists when we don't know the probability distribution. Although our best guess in the second case is a 50% probability for either color, people are uncomfortable with the inherent uncertainty of the situation.

Some take the view that ambiguity aversion is more an emotional behavior than a heuristic. Indeed it does reflect a tendency for emotions, particularly fear, to influence choice in risky situations. Despite the best intentions of experimenters, there may also be the fear that ambiguity could lend itself to manipulation.

12.6 DIVERSIFICATION HEURISTIC

The diversification heuristic suggests that people like to try a little bit of everything when choices are not mutually exclusive. They tend to diversify more than when making the same type of decision sequentially. A common behaviour among buffet diners is to sample most (if not all) dishes. To concentrate on one or two runs the risk of not liking your selections and/or missing out on a good thing. Such behaviour is similar to that reported by Itamar Simonson, who reports shoppers are more likely to choose a variety of items (e.g., different yogurt flavors)

when they must make multiple purchases for future consumption, versus the case when they make single purchases just prior to each consumption decision.

Simonson argues that certain factors drive such behaviour. First, many people have a hardwired preference for variety and novelty. This preference is much more salient when multiple purchases are made. Second, future preferences embody some uncertainty. "I may slightly prefer raspberry yogurt to strawberry now, but how will I feel in a week ?" Spreading purcahses over different categories reduces risk in the same fashion than spreading your money over different stocks accomplishes the same risk-reduction goal in a well-diversified portfolio. A final motivation for variety-seeking is it makes your choice simpler, thus saving time and reducing decision conflict.

12.7 FUNCTIONAL FIXATION

The market often naively extrapolates current earnings, ignoring a great deal of information in the annual report that suggests that the future earnings may be different from current earnings. This tendency to latch on to a single object in a habitual way is referred to by Behaviouralists "as functional fixedness" (or functional fixation). Functional fixedness leads to a very simplistic approach to a problem. It is seen in analysts who apply a standard multiple to earnings, regardless of the quality of those earnings. Perhaps this is a manifestation of the limited information processing ability of humans. So, when complexity daunts us, we latch on to a summary number like bottom-line earnings for convenience.

12.8 STATUS QUO BIAS AND ENDOWMENT EFFECT

Status quo bias implies that people are comfortable with the familiar and would like to keep things the way they have been. The fear of regret that may follow, if the status quo is altered makes people resistant to change. The endowment effect says that people tend to place greater value on what belongs to them relative to the value they would place on the same thing, if it belonged to someone else. A concomitant tendency is to put too much emphasis on out-of-pocket expenses and too little on opportunity costs.

12.9. SUMMARY

We have a predilection for causal thinking and this makes us prone to commit serious mistakes in assessing the randomness of truly random events. People are comfortable with things that are familiar to them. The human brain often uses the familiarity shortcut in making choices. People have an aversion to ambiguity. According to the diversification heuristic, when choices are not mutually exclusive, people like to try a little bit of everything. This tendency to latch on to a single object in a habitual way is referred to by Behaviouralists as functional fixedness (sometimes called functional fixation).

12.10 GLOSSARY

- **Status Quo Bias :** It implies that people are comfortable with the familiar and would like to keep the things the way they have been.

- **The endowment effect :** It says that people tend to place greater value on what belongs to them relative to the value they would place on the same thing if it belonged to *someone* else.

- **Functional Fixedness :** It is the tendency to latch on to a single object in a habitual way.

- **Framing effects :** Framing effect is a cognitive bias where individuals decide on options based on their profit or loss connotations.

12.11 SELF-ASSESSMENT QUESTIONS

Q1.   What is endowment effect ?

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Q2.   Describe Status quo Bias ?

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12.12 EXAMINATION ORIENTED QUESTIONS

Q1.   Explain the familiarity related heuristics.

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Q2.   What do you mean by diversification heuristic ?

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Q3.   Home Bias has a potential information based explanation. Discuss.

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12.13 SUGGESTED READINGS

➤   Chandra, P. (2017). Behavioural Finance, Tata Mc Graw Hill Education, Chennai (India).

➤   Ackert, Lucy, Richard Deaves (2010), Behavioural Finance : Psychology, Decision making and Markets, Cengage Learning.

➤   Forbes, William (2009), Behavioural Finance, Wiley.

➤   Kahneman, D. and Tversky, A. (2000), Choices, Values and Frames. New York, Cambridge Univ. Press.

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REPRESENTATIVENESS AND RELATED BIASES

STRUCTURE

13.1 INTRODUCTION

In a series of articles, Amos Tversky and Daniel Kahneman identified three key heuristics—namely representativeness, availability and anchoring—that can potentially lead individuals astray. Representativeness and its close cousin, availability, will be the topic of this section, while anchoring will be covered in the next section. Much of this early research on these heuristics and biases is summarized in the opening chapter of Judgment under Uncertainty : Heuristics and Biases. While these heuristics often provide reasonable answers, sometimes they are misapplied. The typical result is probability judgment error : thinking some event is more (or less) likely than it actually is based on a proper understanding of the situation.

Indeed, many financial decisions are based on probability assessment. How likely is it that a particular company will continue to post earnings increases ? What is the probability that interest rates will rise by 100 basis points over the next quarter ? How likely is it that some firm's current round of R&D will bear fruit ? And so on. The problem is that many people have great difficulty understanding probability.

13.2 OBJECTIVES

After going through this lesson, you will be able to understand :

(i)   The meaning of representativeness.

(ii)   Biases related with representativeness.

13.3 REPRESENTATIVENESS AND INNUMERACY

13.3.1 Representativeness

Representativeness refers to the tendency to form judgements based on stereotypes. For example, you may form an opinion about how a student would perform academically in college on the basis of how he has performed academically in school. While representativeness may be a good rule of thumb, it can also lead people astray. For example :

● Investors may be too quick to detect patterns in data that are in fact random.

● Investors may believe that a healthy growth of earnings in the past may be representative of high growth rate in future. They may not realize that there is a lot of randomness in earning growth rates.

- Investors may be drawn to mutual funds with a good track record because such funds are believed to be representative of well-performing funds. They may forget that even unskilled managers can earn high returns by chance.

- Investors may become overly optimistic about past winners and overly pessimistic about past losers.

- Investors generally assume that good companies are good stocks, although the opposite holds true most of the time.

13.3.2 Innumeracy

Innumeracy is the condition when people have difficulty with numbers. They are unfamiliar with mathematical concepts and methods and are unable to use mathematics. In his book Innumeracy : Mathematical Illiteracy and Its Consequences, John Paulos noted that "some of the blocks of dealing comfortably with numbers and probabilities are due to quite natural psychological responses to uncertainity, to coincidence or to how a problem is framed. Others can be attributed to anxiety, or to romantic misconceptions about the nature and importance of Mathematics." Trouble with numbers is reflected in the following :

- People confuse between nominal changes (greater or lesser numbers of actual rupees) and real changes (greater or lesser purchasing power). Economists call this Money Illusion.

- People have difficulty in figuring out the true probabilities. Put differently, the odds are that they don't know what the odds are.

- People tend to pay more attention to big numbers and give less weight to small figures.

- People estimate the likelihood of an event on the basis of how vivid the past examples are and not on the basis of how frequently the event has actually occurred.

- People tend to ignore the base rate which represents the normal experience and go more by the case rate which reflects the most recent experience.

13.4 PROBABILITY MATCHING

It is a decision strategy in which predictions of class membership are proportional to class base rates. It is evidently an intuitive response that can be, but often is not, overriden by deliberate consideration of alternative choices. For example, suppose A invites B to play a game in which A tosses a coin and asks B to guess the outcome (Heads or Tails). If B gusses correctly, he gets ₹ 10, but if he guesses wrongly, he loses ₹ 10. This game is to be played repetitively for many tosses. Since the coin is chosen by A, he can choose a fair coin in which the Probability (Head) = Probability (Tail) = 0.5, or a biased *coin* in which the Probability (Head) > Probability (Tail) or the other way.

Let us assume that, unknown to *B, A* chooses a biased coin in which the Probability (Head) is 0.75 and the Probability (Tail) is 0.25. Since *B* is unaware of this. Initially he is likely to assume that it is a fair coin and guess Head or Tail with equal probability in a somewhat random manner. After a while *B* realises that it is a biased coin with the Probability (Head) being far greater than the Probability (Tail).

What should *B* do when he realises that the coin is highly biased in favour of Head ? If he is a rational person, he should then guess Head for every coin toss. This strategy would maximise his profit.

People sometimes do not behave in this manner. It turns out that when this game is played with subjects in laboratory experiments, they don't guess Head all the time. Even if they know that Probability (Head) = 0.75 and Probability (Tail) = 0.25, they randomise their guesses. And they seem to randomise with approximately the same relative frequency as the underlying probability distribution. Their actual behaviour (guesses) would be something like this : HHHTHHHHTHHHTTHHHHT, while the profit maximising strategy is simply : HHHHHHHHHHHHHHHHHHHH.

What is even more puzzling is that if in the middle of the experiment the coin is replaced with another coin which has Probability (Head) = 0.3 and Probability (Tail) - 0.7, the subject, no sooner he learns about it, will change his behaviour and match that frequency as well. Such behaviour is called probability matching and interestingly, it seems to be common to ants, fish, pigeons, primates and so on.

13.5 CONJUNCTION FALLACY

Also known as Linda problem, conjunction fallacy is a formal fallacy that

occurs when it is assumed that specific conditions are more probable than a single general one. The bias from conjunction fallacy is a common reasoning error in which we believe that two events happening in conjunction is more probable than one of those events happening done. This happens due to probability-related difficulty under which people often have a poor understanding of the difference between simple probabilities (probability of *A*) and joint probabilities (probability of both *A* and *B*). For example, people often think that the probability that they will win a lottery and be happy is higher than the probability that they will just win a lottery. It can be easily shown that such a view is erroneous. Suppose that A denotes winning the lottery and *B* denotes being happy, the corresponding probabilities being Probability (*A*) and Probability (*B*). Exhibit 13.1 uses the Venn diagram to demonstrate that the probability a person being both a lottery winner and a happy person at the same time, that is, Probability (*A n B*), must be less than Probability (*A*), unless all lottery winners are happy. People who make this mistake are prone to the conjunction fallacy.

B can be a class and *A* can be a subset of that class. Or *B* can be a cause and *A* can be a possible consequence of *B*. In the case of the lottery, the image of smiling winners and disappointed losers (the consequence) appears more representative of the class of lottery players (winners and losers) than someone who just wins. So it seems that the probability of being a happy winner is greater than the probability of being a winner.

Exhibit 13.1 Venn Diagram

Lottery winners

Happy people
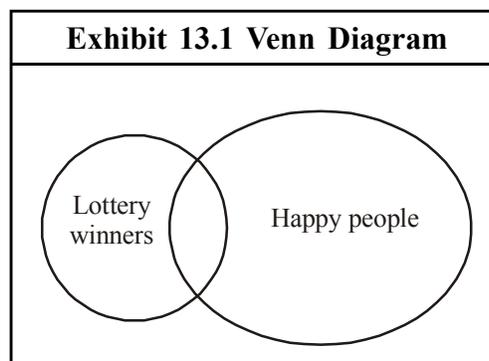
The conjunction fallacy is a variant of representativeness. Due to the representativeness heuristic, probabilities are *evaluated* by *the degree to which B is representative of A, that is by the degree to which B is* similar to *A. If B is* highly

similar to *A, the probability that* B orginates from A is judged too high. By *the same token, if B is not* similar to *A, the probability that* B originates from *A is judged to be very low.*

Uncritical Substitution of Plausibility for Probability

Kahneman describes two scenarios :

(i)   *A massive flood somehwere in* North *America next year* that drowns *more than 1,000 people.*

(ii)   An earthquake in *California sometime next year, leading* to a *flood that drowns* more than 1,000 *people.*

Although its probability is smaller, the California earthquake scenario appears **more** *plausible than the North American scenario. These scenarios were presented to different groups, who were asked to evaluate their probability. Contrary to logic, people considered the probability of the California earthquake scenario (the richer and more detailed scenario) to be higher. As Kahneman says, "This is a trap for forecasters and their clients : adding detail to scenarios makes them more persuasive, but less likely to come true."*

13.6 BASE RATE NEGLECT

Another variant of representativeness is base rate neglect. It is a cognitive error whereby too little weight is placed on base or original rate of possibility. Tversky and Daniel Kahneman conducted an experiment in which they showed the subjects personality sketches allegedly from a group of professionals comprising of engineers and lawyers. In one treatment subjects were told that the group comprised of 70% engineers and 30% lawyers; in another treatment, subjects were told that the group comprised of 30% engineers and 70% lawyers. After the subjects were given information about the professional composition of the group, the following sketch was presented : "Dick is a 30-year old man. He is married with no children. A man of high motivation, he promises to be quite successful in his field. He is well liked by his colleagues."

The sketch was designed to be neutral so that the subjects were not pushed in one direction or the other. When subjects were asked about Dick's profession, about 50% said that Dick was a lawyer and about 50% said the Dick was an engineer. The surprising thing was that this was true in both the treatments. This means that the subjects ignored the base rate (70% engineers in one treatment and 70% lawyers in another treatment). Put differently, the subjects ignored-prior probabilities.

The lawyer/engineer example is an extreme case of base rate neglect. More commonly, however the base rate (prior information) is considered, but not sufficiently. At this juncture, it is helpful to look at what probability theory tells us about how prior and sample information should be optimally combined.

13.7 HOT HAND PEHNOMENON

The Hot hand phenomenon or fallacy is the purported phenomenon that a person who experiences a successful outcome has a greater chance of success in further attempts. While hot hand feels like it happens all the time, academic research has shown this phenomenon to be purely psychological. To understand this let's consider an example from sports. The fictitious John Cash is a mid-level NBA basketball player. Over the year, he has successfully hit 40% of his shots from the floor. Tonight he is hot, though, as he has hit on 80% (8 of 10). The game is down to the wire. John's team is down by a single point with seconds to go and there is time for one more shot. Should his team try to move the ball to John, or to Freddie Munny, who is only 3/10 tonight, but who over the year has hit a team-leading 60% ? In other words, should we bank on the hot hand or just fall back on historical frequencies that have been only negligibly impacted by the game in progress. One can think of the past percentage of successful shots as the base rate. While we can't totally discard the notion that tonight's performance is the beginning of a long-term upward/downward trend for John/Freddie, it is more natural to think that what has occurred during the game is a temporary blip that may or may not have some staying power. Let's suppose for the moment that it is logical to think that it does have some staying power—but only for the short term (which includes the final shot of the game, which is in the very short term). Let's say that B is the probability that John will hit on his next shot. The unconditional probability given his record is 40%. Let's say that A is the event that John hits on 8/10 of his previous 10 shots. Based on

looking at the historical record, this happened 4% of the time. We also need the probability that John has hit 80% of his last 10 shots conditonal on his making the next shot. Let's say that based on history this value is 6%. Now we can work out the probability that John will hit on the final shot of the game :

pr(hit | made 8) = pr(hit) * [pr(made 8 | hit)/pr(make 8)] = .4* (.06/.04) = .6

Indeed, based on our hypothetical numbers, there is a hot hand at work. A similar exercise would have to be undertaken for everybody else on the team (may be some players have not in the past exhibited a hot/cold hand tendency). Then the best move would be to go to the player with the highest probability of scoring conditional on their recent performance. What would base rate underweighting look like here ? It would imply a view that John has a higher than 60% probability of hitting. While the numbers we have assumed suggest that the data-generating process has temporarily shifted in John's favor, it would be possible to be too optimistic about John's chances. While we have "cooked" the numbers to produce a hot hand, one might ask what the reality in basketball is. Thomas Gilovich, Robert Vallone and Amos Tversky address this issue using both real basketball data and people's views about the data. Specifically, they obtained performance data from the Philadelphia 76 years for much of the 1980-1981 season. First, these researchers established that among basketball fans the typical view is that players often have a hot (or cold) hand: 91% of respondents to a survey said they believed that a player has "a better chance of making a shot after having just made his last two or three shots than he does after having just missed his last two or three shots."

13.8 GAMBLER'S FALLACY VS. HOT HAND

While a belief in a hot hand is thinking the conditional distribution should look like the sample, sometimes it seems that people think the reverse—namely that the sample, however small, should look like the population, in the sense that essential features should be shared. Of course for this to make sense, we need to have a fairly strong sense of what the distribution should look like. To illustrate, suppose some friends have been playing poker and Susan, who has been having lots of big hands, sees her stake growing. What are her friends thinking ? Some of her friends might be thinking that she has a hot hand. While such a view may conceivably make sense in the realm of sport (it turned out not to apply for

basketball), it can't make sense with cards, because the reality is that, unless Susan has been employing legerdemain with the deck, the odds of getting more good hands than bad the rest of the night are 50/50—exactly the same is true for her up-to-now luckless friends. Others of her friends perhaps might be thinking that Susan is due for some bad hands, since, after all, in their reasoning, performance has to average out. This equally fallacious view is sometimes called Gambler's Fallacy. The friends who are subject to gambler's fallacy see chance as a self-correcting process. They know that in the long run Susan will get as many bad hands as good. This is called the law of large numbers. Their mistake is in applying it over a small sample, that is, in utilizing the incorrect "law of small numbers." Consider an experiment where gambler's fallacy was documented. A group of subjects were asked the following question : All families of six children in a city were surveyed. In 72 families the exact order of births of boys and girls was GBGBBG. What is your estimate of the number of families surveyed in which the exact order of births is BGBBBB ? If one thinks about it for a minute, it is clear that any ordering is equiprobable. Still, the majority of subjects thought that fewer families would report the second sequence because it just doesn't look random enough.

13.9 OVERESTIMATING PREDICTABILITY

It has been shown that people tend to believe that there is more predictability than is usually the case. For example, when students were asked to predict college GPA on the basis of sense of humour (which is probably uninformative), they tended to believe there was a positive relationship. The mean correlation over all respondents was 0.7. Thus there seems to be a strong predilection to find predictability even when it's unlikely to be present, perhaps because it is comforting to think that we have some control. It is hard for us to accept that some things are inherently almost impossible to predict. Intuitively, one should make forecasts of some variables by appropriately weighting both the overall population mean and the value suggested by the data at hand. If, for example, the average GPA over the relevant population is 3.0 and you believe that humor is uninformative, you should predict a GPA of 3.0 regardless of someone's sense of humor. On the other hand, if you believe there is logically a positive correlation between an input and the magnitude to be forecasted, the greater your belief in the sensitivity of GPA to this input (and the greater the perceived positive correlation), the more you should pay attention to the sample. On the other hand, the more uninformative you believe the sample to

be, the closer you should move in the direction of the mean. Nevertheless, it seems to be the case that people usually understimate true regression to the mean, which is tantamount to exaggerating predictability. In another GPA example, subjects were asked to predict GPA in college from high school GPA of entrants to the college. The high school average GPA was 3.44 (with a standard deviation of 0.36), while the GPA achieved at college was 3.08 (with a standard deviation of 0.40). Two representative students were chosen for illustration purposes : one with a high school GPA of 2.2 and another with a high school GPA of 3.8. Subjects were then asked to predict the college GPA for these two students. Again, the obvious approach is to combine sample and population data. For the lower achiever, this would mean predicting his college GPA as something below 3.08, substantially below if we believe that a student with a low high school GPA is representative of a bad student. The average response was 2.03. In reality, a student of this type had a college GPA of 2.7. Regression to the mean exists because high school marks are very much imperfect predictors of college achievement. Randomness aside, people obviously can change their work habits and weaker students have an incentive to push themselves harder in order to thrive at university. Finally, it is worth nothing that the tendency to underestimate regression to the mean is in a certain sense similar to the base rate underweighting problem that was previously discussed. The reason is that in both cases the sample data at hand are accorded too much weight versus what is known about the underlying population or distribution.

13.10 BAYESIAN UPDATING

Bayesian inference is a method of statistical inference in which Bayes theorem is used to update the probability for a hypothesis. Named after Thomas Bayes, Bayes' theorem addresses the question : How should we modify our belief in the wake of additional information ?

The theorem can be stated as follows : Starting with a provisional hypothesis about the world, we assign it an initial probability referred to as prior probability or simply the prior. After gathering some additional evidence we use Bayes' theorem to recalculate the probability of the hypothesis that takes into account the new evidence. The revised probability is referred to as the posterior probability or simply the posterior. The Bayes' theorem can be used to optimally update probabilities based on the arrival of new information.

As per the Bayes' theorem

$P(B/A) = P(A/B) * [P(B)/P(A)]$

Thus, according to the Bayes' theorem, the probability of event *B*, conditional on event *A*, is equal to the probability of event *A*, conditional on event *B*, multiplied by the ratio of the simple probabilities of event *B* to event *A*.

To illustrate, suppose that the simple probabilities of a rainy day (Rain) and of a dry day (Dry), based on historical information for this time of year, are as follows :

$P(Rain) = 0.3$ and $P(Dry) = 0.7$

You can consult a barometer that predicts the weather fairly well, but not completely accurately. The reliability of the barometer is as follows :

P(Rain Predicted/Rain)	= 0.85
P(Rain Predicted/Dry)	= 0.05

logic behind Bayes' theorem is as follows :

$$P(A \text{ and } B) = P(B \& A) \tag{1}$$

$$P(A) \times P(B/A) = P(B) \times P(A/B) \tag{2}$$

Hence, $\quad P(B/A) = P(AB) \times [P(B)/P(A)] \tag{3}$

(2) also leads to $\tag{4}$

$$P(A/B) = P(B/A) \times [P(A)/P(B)]$$

Put differently, conditional on the fact that it did rain, the barometer predicted the rain 85% of the time; and conditional on the fact that it turned out to be dry, the barometer predicted the rain 5% of the time.

Without looking at the barometer, you know that the best prediction of tomorrow's weather is a 30% chance of rain. How should you adjust this base rate if you know that the barometer (the sample) is predicting rain ? Since the barometer is predicting rain, there is increased probability of rain. More specifically, as per Bayes' theorem :

P (Rain Predicted)   = P (Rain Predicted/Rain)* [P(Rain)/P (Rain Predicted)]

= 0.85 × [0.3/P(Rain Predicted)]

What is the value of P (Rain Predicted) ? Or put differently, what is the probability that the barometer predicts rain ?

P(Rain Predicted)   = P (Rain) × P (Rain Predicted/Rain) + P(Dry) × P(Rain Predicted/Dry)

0.3 × 0.85 + 0.7″ 0.05 = 0.29

Given this value of P(Rain Predicted), we get :

P (Rain/Rain Predicted)= 0.85 × [0.3/0.29] = 0.88

This means that if the barometer is predicting rain, the probability of rain, given how accurate the barometer is, 0.88. Put differently, while the prior probability of rain is 0.3, the posterior probability of rain (given the sample information in the form of barometer reading) is 0.88.

Application of Bayes' theorem to real life, assigning prior probabilities and evaluating evidence, is far more complicated than the above example. "Our intuitions are embedded in countless narratives and arguments and so new evidence can be filtered and factored into the Bayes' probability revision machine in many idiosyncratic and incommensurable ways." People wedded to their priors will try to rescue them from the evidence by using all sorts of ingenous arguments.

Bayes' theorem has made remarkable contributions to advancement of science. It has been used to search for nuclear weapons, devise actuarial tables, determine the false positive rate of mammograms, so on and so forth.

13.11 AVAILABILITY, RECENCY AND SALIENCE BIAS

Sample data are often assigned undue importance compared to population parameters. This tendency is accentuated when the data are easily available. More so, when the event has occurred recently and is salient. People tend to judge the frequency of something by the ease with which instances can be recalled. Like other heuristics of judgement, the availability heuristic substitutes the harder question

(How likely an event is ?) with the easier question. (Have I seen something like this ?)

The Availability Heuristic says that events that can be easily recalled are deemed to occur with higher probability. While ease of recall should depend mainly on frequency, it is influenced by other factors as well. Suppose you ask a group of people whether more words begin with a *k* or have a *k* in the third position. As it is easier to think of words which begin with *k* than words which have a *k* in the third position, people typically say that more words begin with *k*. The reality, however, is that more words have a *k* in the third position relative to those with a *k* in the beginning.

Availability is abetted by two other factors : recency and salience. If something has occurred recently it is likely to be recalled easily. This is referred to as recency bias. Likewise, salience contributes to availability. An event which is reported widely in media is deemed to occur with a higher probability. This is referred to as salience bias.

Two factors abet availability. When something has occurred recently, it is likely to be called to mind more easily. The term that is used here is recency bias. Our earlier discussion of primacy and recency effects is helpful here : recall that, provided events are temporally spaced, what comes last tends to be remembered best. Salience also enhances availability (hence the term salience bias). Consider a plane crash that has just occurred. This event splashed all over the news is vivid and horrifyingly easy to visualize—it is salient. The result of media coverage of this sort of event is that some people will, at least temporarily viscerally, overestimate the probability of a repeat occurrence and as a result may even shy away from air travel. One study investigated salience in a social context. When subjects were shown groups interacting in a simulated work environment, in cases where a woman (or a black) was alone in a committee of six, their actions (whether positive or negative) were remembered better by viewers than when there were two or more of the same gender (or color) on the same committee. Additionally, judgments in a solo context were more extreme (i.e., the person in question either did very well or very poorly rather than somewhat well/poorly).

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13.12 SUMMARY

People have difficulty with numbers. In his book ***Innutneracy : Mathematical Illiteracy and Its Consequences,*** John Paulos noted that some of the blocks to dealing comfortably with numbers and probabilities are due to quite natural psychological responses to uncertainty, to coincidence, or to how a problem is framed. Others can be attributed to anxiety, or to romantic misconceptions about the nature and importance of mathematics." An example of probability-related difficulty is that people often have a poor understanding of the difference between simple probabilities (probability of A) and joint probabilities (probability of both A and B). Another variant of representativeness is base rate neglect. As per the Bayes' theorem :

$$P(B/A) = P(A/B) \times [P(B)/P(A)]$$

Thus, according to the Bayes' theorem, the probability of event B, conditional on event A, is equal to the probability of event A, conditional on event B, multiplied by the ratio of the simple probabilities of event B to event A.

People tend to judge the frequency of something by the ease with which instances can be recalled. Like other heuristics of judgment, the availability heuristic substitutes the harder question (How likely an event is ?) with the easier question (Have I seen something like this ?)

13.13 GLOSSARY

- **Innumeracy :** Represents the condition when people face difficulty while dealing will numbers.

- **Representativeness** refers to the tendency to form judgments based on stereotypes.

- **Gambler's fallacy :** It is the fallacy of maturity of chances, an erroneous belief that if a particular event occurs more frequently than normal during the past it is less likely to happen in future or vice-versa.

- **Base rate neglect :** is a cognitive error whereby very less weight is placed on base rate of probability.

13.14 SELF ASSESSMENT QUESTIONS

Q1. On a sunny day you go to a horse race between only two horses—Hero and Chetak—and in the process of deciding on which to bet. you understand that of the previous 20 races between only these two horses, Chetak had won 8 times and Hero 12 times. You further understand that of the 8 wins of Chetak 6 were on sunny days and it was a sunny day only thrice on any of the days he lost. Determine the probability that Chetak wins on a sunny day.

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Q2. Jasleen follows exponential discounting. Her discount function which represents her preference for money at various points of time is as follows :

$a(t) = 1/(1.06)^t$ for $t = 0, 1, 2...$

Sukhbir, on the other hand, follows hyperbolic discounting. His discount function is as follows

$a(t) = 1$ for $t = 0$

$= 0.90/(1.05)''$ for $t = 1, 2...$

a. What would Jasleen/Sukhbir prefer : Z1.00 today or z 1.14 next year (i.e. at the end of the current year) ? Why ?

b. What would Jasleen/Sukhbir prefer : 1.00 next year or Z1.09 the year after that ? Explain their preferences.

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13.15 EXAMINATION ORIENTED QUESTIONS

Q1. What is Representativeness ?

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Q2. Explain the Bayes' theorem.

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Q3. What is availability heuristic, recency bias and salienfce bias ?

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13.16 SUGGESTED READINGS

➢ Chandra, P.(2017). Behavioural Finance, Tata Mc Graw Hill Education, Chennai (India).

➢ Ackert, Lucy, Richard Deaves (2010), Behavioural Finance : Psychology, Decision making and Markets, Cengage Learning.

➢ Forbes, William (2009), Behavioural Finance, Wiley.

➢ Kahneman, D. and Tversky, A. (2000) Choices, values and frames. New York, Cambridge Univ. Press.

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IRRATIONALITY & ADAPTATION AND HYPERBOLIC DISCOUNTING

STRUCTURE

14.1 INTRODUCTION

While making a quantitative judgment, people are subconsciously anchored to some arbitrary stimulus. Kahneman and Tversky earned out a famous experiment called the "Wheel of Fortune" experiment in 1974 to demonstrate the phenomenon of anchoring. Participants in this experiment were shown the number generated by the Wheel of Fortune and then asked what percentage of African nations were members of the U.N. The answers given by them were influenced by the random number thrown up by the Wheel of Fortune, although it had no relevance whatsoever to the question asked.

When people are asked to estimate something, they usually start with an initial value and adjust it to generate the final estimate. The adjustment, however, is often inadequate. To illustrate this, consider the following product of eight numbers:

1x2x3x4x5x6x7x8

When asked to estimate the final answer to the above product, most people unconsciously multiply the first few numbers in the sequence and then give the answer. In an experimental setting when people were asked this question, the median answer was 512, as against the true answer of 40,320.

The answer changed, however, when the sequence was transposed as follows:

8x7x6x5x4x3x2x1

The median answer in this case was 2,250. While it was an improvement over the earlier estimate it too resulted in a highly insufficient adjustment.

It is strange that people can anchor on completely irrelevant numbers that appear in the problem frame.

More surprisingly, people can anchor on obviously irrelevant numbers that appear in the problem frame. In one demonstration of this, a wheel with numbers 1-100

(which participants were told to view as percentages) was spun. 47 Subjects were then asked whether the percentage of countries from Africa in the U.N. was higher or lower than this number coming from the wheel. The experimenters were more interested in a second question, which was : What is the percentage of countries coming from Africa in the U.N.? Obviously this percentage has nothing to do with the result of the wheel spin, yet its influence was apparent. The median answer was 25 for those seeing 10 from the wheel, while the median answer was 45 for those seeing 65 from wheel. Thus anchoring can occur with obviously meaningless numbers. Sometimes anchors are self-generated. In one experiment, people were asked to estimate four magnitudes. 48 in two cases, the anchor was provided by the experimenter (e.g., typical length of whale, with 69 feet provided as an anchor); in two other cases, an obvious general knowledge anchor was present. One example of the latter was: "When did the second European explorer land in the West Indies?" Since most people know that Columbus was the first European explorer to land in the West Indies and he did so in 1492 (37 of 50 subjects knew this), it is natural to start with 1492 and adjust it upwards. Interestingly, though we have already seen the power of irrelevant anchors, when interviewed afterwards, while 64%-89% said they used the relevant anchor in their estimation, only 12%-14% claimed to do so in the case of irrelevant anchors.

14.2 OBJECTIVES

After going through this lesson, you will be able to understand the concepts of :

(i)   Irrationality

(ii)   Hyperbolic discounting :

14.3 IRRATIONALITY AND ADAPTATION

Much of the previous discussion has been from the "heuristics and biases" tradition whose thrust often seems to be to elucidate cases where heuristics lead people astray and where probability misjudgment occurs. Some have argued that it is not heuristics that are flawed, but rather this particular view of them.

14.3.1 Fast and Frugal Heuristics

Fast and frugal heuristics refer to simple, task specific decision strategies that are part of a decision maker's repertoire of cognitive strategies for solving judgments and decision tasks. Gerd Gigerenzer and like-minded researchers, who have coined

the term fast and frugal heuristics, argue that the purpose of heuristics is to employ a minimum of time, knowledge, and computation in order to make adaptive choices in real-world environments. This approach is in the spirit of so-called bounded rationality, as developed by Herbert Simon, which posits that it is unreasonable to believe that man is capable of the kind of complicated optimization problems that conventional economic models assume. Instead, man "satisfices," which amounts to doing the best that he can under the given circumstances. As it were, our minds have evolved and now possess a number of tricks (or heuristics) for us to make decisions that are reasonable enough. The "fast and frugal" program of research stresses the notion of "ecological rationality," which requires that heuristics match the environment, and the "adaptive toolbox," whereby rational decision-makers seek to employ the right tool at the right time. Further, they argue against the view that complicated full information models are necessarily better than fast-and-frugal heuristics that may only use one or two items of salient information. The former unfortunately often "overfit" in viewing all data as information rather than partly noise. The latter, on the other hand, have been honed by evolution to zero in on "swamping forces." These researchers also criticize the fact that the heuristics and biases program stresses probability mistakes. But does it really matter much if people make probability errors if they are coming up with reasonable decisions given the constraints of their environment?

14.4 RESPONSE

Thomas Gilovich and Dale Griffin in their introduction to Heuristics and Biases: The Psychology of Intuitive Judgment put the heuristics and biases program into historical perspective and respond to its critics. They argue that sometimes people misread this research agenda in associating heuristics with irrationality and "lazy and inattentive minds." Instead, heuristics are far from inherently irrational : they often rely on sophisticated underlying processes, and are normal intuitive responses to questions of likelihood. Nevertheless, they do concede that the agenda of the heuristics and biases program is to pinpoint instances when heuristics, usually because they are used outside of their natural domains, lead to systematic bias. There is a prescriptive side to this as some research effort has been accorded to "debiasing." Further, they argue against the view that heuristics, because they have been honed by many years of evolutionary forces, must be, for this reason, optimal.

14.5 PROSPECT THEORY, HEURISTICS AND BIASES AND EMOTIONS

For pedagogic convenience, we may distinguish between prospect theory, heuristics and biases, and emotions. However, many phenomena that we observe are a manifestation of two or more of these. For example, the status quo bias may be viewed as a manifestation of prospect theory or a heuristic with a potential bias. Likewise, ambiguity aversion has an emotional basis. Indeed, this is true of all heuristics to the extent that they stem from comfort-seeking. Similarly, ambiguity aversion may be viewed as a heuristic with potential for bias or as an expression of an emotion. One can argue that all the heuristics discussed in this chapter are linked in some way to a desire to seek comfort.

14.6 HYPERBOLIC DISCOUNTING

Traditional finance assumes exponential discounting. Exponential discounting is a time-consistent model of discounting, implying that a constant discount rate is assumed across time. This means that valuation falls by a constant factor per unit of delay, irrespective of the total length of the delay.

For an individual with an exponential discount function, the subjective present value of a rupee received in one year is a; of a rupee received in two years is a^2; of a rupee received in three years is a^3; and so on. This means that the ratio of the subjective value of a rupee at some point in time (say t) to its value one period later in the future is as follows:

$$\delta = \delta^l/d^{t+1} = 1 + \infty, \ t > = 0$$

It must be emphasised that this ratio is the same across time, implying that preferences are dynamically consistent.

A number of studies, however, have demonstrated that the assumption of constant discount rate is systematically violated. These studies show that people don't use a constant discount rate across time. Rather they do hyperbolic discounting, in which valuation falls very rapidly for small delay periods, but then falls slowly for longer delay periods.

To understand hyperbolic discounting consider the following scenario. Suppose a person is given a choice between two payments a smaller payment at time t and a

larger payment at time t + 1. When *t* is far off, the person typically prefers the larger payment. But as t nears zero (now), the person is likely to reverse the preference. As a concrete example, a person choose 21150 in two years instead of 21000 a year from now, but the same person will choose 21000 now instead of 21150 one year hence. This means that preferences are not consistent over time. Individuals who display such preferences are described as "present-biased" as they lack self-control.

It may be noted that Adam Smith, father of modem economics, had expounded on self-control in his earlier book ***The Theory of Moral Sentiments*** published in 1759. He portrayed it as a struggle between our "passions" and what he called our 'impartial spectator." As he puts it, "the pleasure which we are to enjoy ten years hence, interests us so little in comparison with that we may enjoy to-day." In 1871, William Jevons, another economics stalwart, modified Smith's observation about myopia, when he observed that the preference for present consumption over future consumption declines over time. It is a failure of willpower, or, as Arthur Pigou, an eminent economist, famously said that it could be a failure of imagination: "Our telescopic faculty is defective and we, therefore, see future failures, as it were, on a diminished scale."

Thus, individuals who use hyperbolic discounting make choices that are inconsistent over time. They make choices today that their future self would not make, despite using the same reasoning. Mathematically, the hyperbolic discounting function behaves as follows:

$$PaH,/33^2H,133^2H$$

Essentially, the discount function shows a steep decline initially, but then looks very similar to an exponential function.

While hyperbolic discounters display standard preferences when they compare money at two different ***future*** points in time, they seem to have a problem.

When one of the sums to be compared is immediate. This is a manifestation of the self-control problem.

In the context of savings, people want to start a savings programme next year, not now. A person who likes the idea of saving a rupee a year from now but is not keen to do it now, has a hyperbolic discounting function.

14.7 HEURISTICS AND BIASES AND FINANCIAL DECISION-MAKING

Familiarity is argued to lead to excessive investment in local and domestic securities. The tendency to overestimate predictability can foster the fallacious view that "good companies are good investments." Once views (faulty or reasonable) are formed, anchoring may lead people to adhere to them too long.

Underestimating regression to the mean can cause one to extrapolate past earnings growth too far into the future. Availability induces investors to concentrate on those securities that are in the news. Recency leads them to purchase hot stocks or funds when there is little evidence that this is wise. The apparent tendency of corporate managers to utilize suboptimal capital budgeting criteria may be linked to a preference for that which is easy to process. In the context of self-directed pensions, the diversification heuristic, when used to select funds, can lead to poor asset allocation decisions. The status quo bias is also deleterious in this regard as it can cause one to be too willing to stick with an inappropriate company default allocation. Information overload may also contribute to an explanation of low pension participation rates.

14.8 HEURISTIC-INDUCED ERRORS

The present lesson adds to the notion of investor error occasioned by the use of heuristics. If many investors are using the same heuristic at the same time, this could be a source of systematic error. One well-known model seeks to explain this phenomena using base rate neglect and anchoring. Another puzzle at the level of the market is the so-called equity premium puzzle, the finding that stocks seem to have historically earned much more relative to bonds than they should have when risk is properly factored in. One proposed explanation for this is ambiguity aversion, which matters here because stock investment entails not just risk in the standard sense, but also uncertainty as to what the true distribution of stock returns actually is.

14.9 OVERCONFIDENCE

Overconfidence is the tendency for people to overestimate their knowledge, abilities, and the precision of their information, or to be overly sanguine of the

future and their ability to control it. It is found that most people most of the time are overconfident is well documented by researchers in the psychology literature. Overconfidence comes in different forms one of them is miscalibration, the tendency to believe that your knowledge is more precise than it really is.

14.10 MISCALIBRATION

In a research setting, overconfidence can be measured in several ways. Miscalibration is the tendency for people to overestimate the precision of their knowledge. A calibration test often works in the following fashion. In a controlled environment, individuals are asked to construct (say) 90% confidence intervals for currently (or soon) knowable magnitudes (such as the height of Mount Everest, or the level of the Dow in a month). Typically, they are found to be miscalibrated, which means their intervals are too narrow. More precisely, if people are asked a large number of (say) x% confidence interval questions—sampling error is reduced by asking a sufficiently large number of questions—then proper calibration implies that about x% of their confidence intervals should contain correct answers to the questions. Or, focusing on a particular question that is asked of a large number of respondents, if the group as a whole is properly calibrated, x% of these individuals should have confidence intervals bracketing the correct answer. The reality turns out to be quite different. A percentage of individuals usually marked below x% produces intervals that bracket the true answer. The same holds at the level of the individual. If someone is asked a series of such questions, as is shown in the calibration test described in the next section, it is commonplace for substantially fewer than x% of the intervals to be "right." In sum, calibration studies find that the confidence intervals that individuals provide are too narrow, resulting in correct answers lying within the confidence ranges less often than an accurate sense of one's limitations would imply. Calibration tests are also operationalized in other ways. For example, sometimes respondents are asked a question and then provided with a menu of answers. This could be a simply true or false option, or a series of multiple choices. In a second stage, people are then asked how sure they are in the correctness of their answers. If someone has (say) an average certainty level of 70%, but she only gets 55% of the questions right, this implies overconfidence. Sometimes people say they are absolutely certain of their answers. In one study, events that individuals

believed to be certain to occur actually occurred only about 80% of the time, while events that they considered impossible occurred about 20% of the time.

14.11 OTHER STRAINS OF OVERCONFIDENCE

Overconfidence manifests itself in other ways in addition to faulty precision of knowledge. Many people unrealistically have the tendency to think that their abilities and knowledge are better than average. Illusion of control causes people to believe that they have more power to exert control over events that is logical. Excessive optimism reflects the feeling that things will be rosier than objective analysis suggests.

14.11.1 Better-than-Average Effect

Some studies have asked people to rate themselves relative to average on certain positive personal attributes such as athletic skill or driving ability and consistent with a better-than-average effect, many rate themselves as above average on those attributes. But, of course, only (slightly fewer than) 50% of the people in any pool can truly be superior. One researcher surveyed a sample of students, reporting that 82% rated themselves in the top 30% of their group on driving safety. 81% factor that facilitates a better-than-average belief is that often the exact definition of excellence or competence is unclear. Naturally enough, people have in the backs of their minds the definition that will make them look best. Take driving, some might see "best" as most adept at steering; others might see it as most competent at anticipating hazard; while still others might see it as being most skillful at weaving back and forth while speeding down the interstate. Both motivational and cognitive mechanisms are likely behind the better-than-average effect. On the motivational side, thinking that you are better than average enhances selfesteem. On the cognitive side, the performance criteria that most easily comes to mind are often those that you are best at.

14.11.2 Illusion of Control

Another strain of overconfidence is called illusion of control. This reveals itself when people think that they have more control over events that objectively can be true. For example, one sees dice players acting as if they can control the outcome of the dice roll, and people actually believe that the risk of infection is partly a function of the character of the person that they are coming into contact

with. In one experiment, students were enrolled to participate in a gambling contest. When subjects entered the room individually, they faced another student who was also to participate, but the latter student was actually a confederate who had been instructed to role play as either "dapper" or a "schnook." The experimenter shuffled cards and gave both the subject and the confederate a card face down. Each was allowed to bet (privately) up to 25 cents per round that his card was higher than his opponent's. Clearly, this is a pure game of chance, with no skill whatsoever involved. Nevertheless, subjects made significantly higher bets (16.25 cents vs. 11.04 cents) when they were facing the "schnook." Perhaps subjects' feelings of superiority induced a mindset that they could influence chance events.

14.11.3 Excessive Optimism

Related to illusion of control is excessive optimism. Abundant empirical investigation has corroborated the existence of this manifestation of overconfidence. Excessive optimism is present when people assign probabilities to favorable/ unfavorable outcomes that are just too high/low given historical experience or reasoned analysis. Examples of such very positive events or very negative events are winning the lottery or dying of cancer. Further, students expect to receive higher marks than they actually do receive, and they overestimate the number of job offers that they will receive. Despite high divorce rates, newlyweds almost universally expect that their marriages will succeed. Subject to so-called planning fallacy, people often think that they can accomplish more than they actually end up accomplishing, and that any costs incurred will be as expected. In reality, many of us fall short of our work goals on a regular basis. And, budget overruns are a common feature of large public projects. The Sydney Opera House, for instance, was supposed to be completed in 1963 at a cost of $7 million. Instead, it was finished 10 years later at a cost of $102 million. Such lack of realism is not without cost. The inability to meet one's goals can lead to disappointment, loss of self-esteem and reduced social regard. Also, time and money can be wasted pursuing goals that are unrealistic. Think of someone enrolling in a program of study that to neutral observers is beyond his capability. Should he fail, a significant amount of time and money will have been wasted, and, because of disappointment, he might be hesitant in the future to strive for other goals that are truly within his grasp.

14.11.4 Being Overconfident in More Than One Sense

Optimism and miscalibration can easily go hand in hand. Let's suppose you are about to bowl with your friends. In standard 10-pin bowling, 300 is the maximum score and 200 is an excellent one. You are feeling buoyant today and boldly predict 225 as your score, with a 90% confidence range of between 200 and 250. Over the years, you have averaged 175, with 90% of your results falling within 50 points of this magnitude (i.e., between 125 and 225). On the basis of your season record, you are excessively optimistic (by 50 points). Moreover, you are miscalibrated, with your confidence interval being only 50% as wide as it should be. Though separating out excessive optimism and miscalibration in this case was straightforward, in reality it is not always easy to tease out the different strains of overconfidence. Returning to the example of someone enrolling in a program of study that is to neutral observers beyond his capability, previously we argued that excessive optimism was the culprit. It may be that the individual knows his limitations, but is confident that he can pull it off this time. On the other hand, he might not know his true level, attributing past failures to factors beyond his control. Indeed, the better-than-average effect might be the problem, as he truly believes that he is sufficiently capable to perform well.

14.11.5 Equally Overconfident

While it may be natural to be unsure of your knowledge in the case of general knowledge, studies have also shown that people can be quite overconfident in their fields of expertise. This has been shown for such occupations as market forecasters, investment bankers, business managers, lawyers and medical professionals. Thus, overconfidence afflicts experts as well as amateurs. There is also evidence that the extent of overconfidence may be a function of demographics. Most reliable is the difference in the degree of overconfidence between men and women, with men tending to be more overconfident than women. Interestingly, the magnitude of the difference depends to a great extent on the tasks that they are asked to perform, with the difference being greater for tasks that are perceived to be "masculine." While we would all like to think that education is an unmitigated good, it appears to have its downside. In a Canadian survey, more educated people were not only more confident than less

educated people in their investment knowledge (which is natural enough), but they were also more overconfident, which means that the gap between their knowledge perception and actual knowledge was greater. Perhaps people should take to heart the words of the Greek philosopher Socrates, who is reputed to have once said, "I know nothing except the fact of my ignorance."

14.11.6 Consistently Overconfident

The fact that overconfidence has a number of manifestations and that there are different ways to measure it, begs the following questions. Are these same metrics getting at the same psychological tendency? Are people consistently overconfident? Is overconfidence, however measured, even a stable psychological construct? Ideally, one might hope that, whatever the actual numerical results of particular tests, if one is overconfident using one test, one should also be overconfident using another approach. This runs out to be not necessarily so, as people have been shown to be sometimes overconfident and sometimes underconfident, depending on the test. If individuals' overconfidence metrics are correlated—in other words, an individual, who is shown to have a high overconfidence rating relative to her peers on one test, is also likely be quite overconfident relative to her peers on another test—this should provide comfort. Research has shown that this is not necessarily the case, either. In fact, sometimes such correlations are very low. Gerd Gigerenzer even argues that overconfidence as demonstrated by calibration tests may be an illusion. His point is that overconfidence can be made to disappear if the questions are reframed. In several experiments, he and collaborators asked respondents a number of either/or questions. For example, which city has more inhabitants, Hyderabad or Islamabad? Then subjects were asked how confident they were in their answer: 50% (a guess), 60%, 70%, 80%, 90%, or 100% (I am sure). This reflects mild overconfidence. In addition, at the end of all questions, subjects were asked how many questions they thought they had successfully answered. In this case, pure frequency judgments could be compared to actual frequencies. The two numerical columns on the right of the table show that, given this applesto-apples comparison, overconfidence seems to disappear. Certainly one must conclude that the manner in which questions are asked, that is, the frame of the experiment, will have an impact on results.

14.12 IS OVERCONFIDENCE AN UNMITIGATED FLAW ?

Overconfidence, particularly excessive optimism, may not be an unmitigated flaw. Research has shown that predictions about the future tend to be more optimistic when there is a low degree of temporal proximity (that is, when one's goal is far off), and when a course of action has been committed to as opposed to the situation where several options are being contemplated. When these conditions are met, being overly optimistic may enhance performance, and studies corroborate this. Still, while performance may sometimes be enhanced, it generally falls short of predictions. Certain defense mechanisms, however, are in place to alleviate disappointment. Specifically, there can be bias in either performance evaluation or in prediction recall, and convenient excuses may suggest themselves. Take a student whose performance on a test has fallen short of personal expectations. He might say to himself: "Well, I did better than the class average anyway (shifting benchmark)"; "My expectation was ridiculously high given the difficulty of the material: I couldn't have been serious (questioning of prediction)"; or "Considering I had a splitting headache from lack of sleep, I think 1 did amazingly well (convenient excuse)." These defense mechanisms, by assuaging disappointment, allow one to go forward with minimal damage to self-esteem and be just as optimistic the next time round.

14.13 LOOKING AHEAD TO FINANCIAL APPLICATIONS

Overconfidence is prevalent in many realms, not the least of which is financial decision-making. For example, in 15 surveys (each with approximately 1,000 respondents) conducted between 1998 and 2000 by the Gallup Organization for UBS PaineWebber, respondents were asked what they expected the rates of return on the stock market and on their portfolios to be in the following 12 months. On average, respondents expected their portfolios to outperform the market—that is, they were excessively optimistic. Interestingly, consistent with the gender effect discussed earlier, men expected their portfolios to outperform by a higher margin than did women. Women, while overconfident, were less so than men. Evidence will be presented that it leads people to trade too much, underdiversify, and take on too much risk. Miscalibration, or believing that one's information and analysis is more precise than it really is, can lead people into a false notion that they can time the market or pick the

next hot stock. Consider how self-attribution bias might work in an investment context. When the market is rising, most stocks will do well, including those that investors select for their portfolios, and most people will take that as an affirmation of their acumen. On the other hand, when their stocks drop in price, they will generally blame it on circumstances over which they had no control— such as the general condition of the market or the economy. Overconfidence may have an impact at the level of markets. A number of models have been formulated that account for such anomalies as momentum and reversal. Some of these models accord an important role to overconfidence and related biases. Evidence will be presented that they are too ready to enter markets, allow cash flows to dictate investment, invest excessively, acquire other companies too readily, and take on too much debt because of excessive optimism and other strains of overconfidence.

Finally, overconfidence may not be an unmitigated negative in the sense that it can lead to performance enhancement. Consider the case of market entry. An individual has decided to start up a small business and has made commitments in this regard. While excessive optimism may have been a negative in the sense that too many people pursue this particular goal given the evidence on small business failure rates, it is helpful in another sense. The belief that success is likely can foster effort and motivation, actually increasing one's probability of success.

14.14 SUMMARY

Gerd Gigerenzer and others look at heuristics more favourably. Heuristics, they argue, help in minimising the time, knowledge and computation required to make adaptive choices in a rapidly changing real world. They have coined the term fast and frugal heuristics. Their approach is akin to the bounded rationality approach developed by Herbert Simon, a Nobel laureate in economics.

Traditional finance assumes exponential discounting. Exponential discounting is a time-consistent model of discounting, implying that a constant discount rate is assumed across time. This means that valuation falls by a constant factor per unit of delay, irrespective of the total length of the delay. Under hyperbolic discounting, valuation falls very rapidly for small delay periods, but then falls slowly for longer delay periods. Overconfidence is the tendency for people to overestimate their knowledge, abilities and the precision of their information or to be overly sanguine of

the future and their ability to control it. The calibration approach is often based on asking people to provide x% confidence intervals. Miscalibration is present when the correct answer falls inside the confidence intervals a percentage of the time marked different from x%. Most people are overconfident most of the time, in the sense that their confidence intervals are too narrow. But sometimes underconfidence occurs, especially for easy questions.

Other strains of overconfidence exist as well. Consistent with the better than-average effect, many people unrealistically have the tendency to think that their abilities and knowledge are better than average. Illusion of control causes people to believe that they have more power to exert control over events than is logical. Excessive optimism reflects the feeling that things will be rosier than objective analysis suggests. Not everyone is equally overconfident. Overconfidence is most prevalent in well-educated males. Some have criticized the ways in which overconfidence has been measured, pointing out that someone can be overconfident using one test, but underconfident using another. Others have argued that overconfidence can disappear if the question is refrained.

14.15 GLOSSARY

- **Exponential discounting :** It is a time-consistent model of discounting, implying that a constant discount rate is assumed across time.

- **Hyperbolic discounting :** Under this, valuation falls very rapidly for small delay periods, but then falls slowly for longer delay periods.

- **Anchoring Bias :** It occurs when people rely too much on pre existing information or first information they find when making decisions.

- **Fast and Fungal Heuristics :** It refer to simple and specific decision strategies. That are part of decision makers cognitive strategies for taking decisions.

14.16 SELF ASSESSMENT QUESTIONS

Q1. Describe the relationship between irrationality and adaptation ?

_____

_____

Q2. What is hyperbolic discounting ?

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_____

_____

14.17 EXAMINATION ORIENTED QUESTIONS

Q1. How hyperbolic discounting is different from exponential discounting ?

Q2. Discuss the strains of overconfidence.

14.18 SUGGESTED READINGS

1. Chandra, P.(2017). Behavioural Finance, Tata Mc Graw Hill Education, Chennai (India).

2. Ackert, Lucy, Richard Deaves (2010), Behavioural Finance: Psychology, Decision Making and Markets, Cengage Learning.

3. Forbes, William (2009), Behavioural Finance, Wiley.

4. Kahneman, D. and Tversky, A (2000), Choices, Values and Frames. New York, Cambridge Univ. Press.

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ANCHORING

STRUCTURE

15.1 INTRODUCTION

In social psychology, attribution theory investigates how people make causal attributions, that is, how they come up with explanations for the causes of actions and outcomes. Certain persistent errors occur. For example, people, when observing others, tend to over-attribute behaviour to dispositional (as opposed to situational) factors. If someone seems to be behaving badly, we naturally believe them to be of bad character, rather than searching out environmental details that may be explanatory. Another manifestation of attribution bias appears to contribute to overconfidence. Self-attribution bias, the tendency for people to attribute successes or good outcomes to their own abilities, while blaming failures on circumstances beyond their control, can lead to an increase in overconfidence. Suppose an overconfident individual observes personal performance outcomes that are logically a combination of external and internal (to the individual) forces. If things go well, the thinking will be that this is because of great ability, skill or knowledge (much more so than an objective consideration of circumstances would warrant) and the result will be an increase in overconfidence. On the other hand, adverse events, being only moderately ascribed to personal forces, will not lead to symmetric (but of opposite sign) revisions in overconfidence. As it were, people "learn" to be overconfident. Closely related to self-attribution bias is hindsight bias, which pushes people into thinking that "they knew it all along." This bias appears to be especially prevalent when the focal event has well-defined alternative outcomes (e.g., an election or the World Cup Final); when the event in question has emotional or moral overtones; or when the event is subject to the process of imagination before its outcome is known. Going hand in hand with hindsight bias is confirmation bias, the tendency to search out evidence consistent with one's prior beliefs and to ignore conflicting data. For example, in one experimental study where both proponents and opponents of capital punishment were exposed to evidence of a mixed nature, belief polarization occurred, with those on each side sifting through the evidence to find support for their prior view.

15.2 OBJECTIVES

After going through this lesson, you will be able to understand about :

(i)   The different biases that interfere with learning.

(ii)   Anchoring

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(iii)   Its relatedness with representativeness

(iv)   Anchoring v/s Herding & Analysts

15.3 ANCHORING

There are two plausible explanations for anchoring : The first is based on uncertainty relating to the true value. When there is uncertainty, the decision-maker adjusts his answer away from the anchoring value until he enters a plausible range. When the uncertainty is greater, the plausible range is wider and hence, the adjustment will be insufficient. This explanation works best for a relevant anchor.

The second explanation is based on cognitive laziness. Since it requires effort to move away from the anchor and people are cognitively lazy, they tend to stop too early. This explanation works best for irrelevant anchors. While focusing on the anchor is easy, movement away from the anchor is effortful, so for this reason people will often stop too early. It may seem odd that obviously irrelevant anchors can have any impact. One possible explanation for this is that the anchor inherent in the problem frame acts as a kind of conscious or subconscious suggestion, leading to stored information consistent with the anchor coming more easily to kind. In this way, memory is "primed," or external search is biased.

15.4 ANCHORING VS. REPRESENTATIVENESS

The Representativeness heuristic is used when making judgments about the probability of an event under uncertainty. When people rely on representativeness to make judgments, they are likely to judge wrongly because the fact that something is more representative does not actually make it more likely.

Underweighting of base rate (a variant of representativeness) and anchoring can at times appear conflicting. While the former says that people are overly influenced by sample information (or case rate), the latter says that people tend to pay insufficient attention to sample data.

To reconcile this conflict, let us consider a hypothetical situation that relates to the idea that people are coarsely calibrated, which means that people see things as black or white and not as shades of grey. Suppose you are planning to take your

family to a park. You listen to a meteorologist on the radio who forecasts a sunny day. Indeed, as you start off to the park, the day is sunny. After a while, some clouds gather. Anchored as you are to your prior view, you ignore the clouds, viewing them as a passing phenomenon. More clouds gather but you console yourself by saying to yourself, "eventually it will turn out to be a sunny day". The sky however, grows even darker. Because of coarse caliberation, you abruptly change your belief and say, "it is now surely going to rain, so let us head back home.

The reality, however, is more complex. At the beginning of the day, the meteorologist had forecasted that it was likely to be a sunny day with some probability of rain. But being coarsely calibrated, you focused on "sunny day" and ignored the possibility of rain. You clung on to this view, despite mounting evidence of potential rain. When the sky turned too dark to ignore, you coarsely transitioned to a view that the probability of rain was 100%, not realising that the dark clouds might blow away. Perhaps the true probability of rain had gone up to 80%. Instead of heading back to home, perhaps you should have remained near the car, ready for a sudden downpour, while resuming you picnic.

15.5 ANCHORING TO AVAILABLE ECONOMIC CUES

15.5.1 An Experimental Study of Real Estate Appraisals

Gregory Northcraft and Margaret Neale investigated whether anchoring might occur in the context of real estate appraisals. Two randomly selected groups of real estate agents were taken to a house and asked to appraise it. They were given the same tour and identical packages of information, which included the house's (purported) list price. The only difference between the two groups was that the first group was given a list price of $65,900, while the second group was given a list price of $83,900, i.e. $18,000 more. Put yourself in the place of the agents. There is always some uncertainty in an appraisal. While you can exclusively use your own expertise and totally ignore the list price, perhaps it should not be surprising that agents were influenced by the list price. Yet, list prices are quite variable and often have a strategic component. The average appraisal price of the first group came in at $67,811, and that of the second group was $75,190. If we

take the mid-point of these values ($71,500.50) as our best estimate of the true appraisal value, the gaps between the two appraisal averages was a full 10%. Clearly, the real estate agents were anchored on the list prices that they were exposed to—despite the fact that only 25% mentioned the list price as one of the factors that they considered.

There is no reason to think that the tendency to anchor is not present in other economic and financial situations. The reality is that anchors in such contexts are likely to be common. All of us anchor on market prices. There is a rational side to this, though, because market prices are consensus estimates of value. But unfortunately this implies some circularity—if everyone is anchored on market price. Any initial value, however "off," would have an influence on the eventual market price. Consider the high valuations of Internet stocks in 1999. Quite a few observers had misgivings about their levels, but many were clever in their ability to justify them.

15.6 ANCHORING VS. HERDING AND ANALYSTS

Herding behaviour refers to how individual decisions are influenced by group behaviour. Since anchoring and herding are closely related, it makes sense at this point to say a few words about herding. There is a social component to herding behavior. In the real estate appraisal experiment, if an agent had been told that a second agent had come up with a certain appraisal, and the first agent's appraisal was pulled towards this value (even taking into account the influence of the list price), this would be an example of herding or following the crowd. Professional financial analysts who publicly estimate value, forecast earnings and make buy/sell recommendations are often said to anchor or herd. Let us briefly consider whether analysts exhibit anchoring and/or herding behavior. One way in which anchoring can be exhibited by analysts is if they are slow to change their initial opinion. This behavior may be the source of certain anomalies. Analysts may herd if some analysts are influenced by the recommendations or earnings estimates of other analysts. There is research indicating that analysts go with the crowd when it comes to recommendation revisions. The evidence for earnings estimates is more mixed, with some of it pointing in the direction of herding and other research suggesting "anti-herding" (i.e., running contrary to the crowd). For example, a recent

study using U.K. data on earnings forecasts is consistent with herding behavior, while another, using German data, is consistent with anti-herding behavior. Note that while herding makes sense because going with the crowd is easy and safe, anti-herding can make sense if you believe you have private information and you want to make yourself visible for the purpose of career advancement.

15.7 FINANCIAL BEHAVIOURS STEMMING FROM REPRESENTATIVENESS

15.7.1 Good Companies Vs. Good Investments

Hersh Shefrin and Meir Statman provide some very revealing evidence. As they report, Fortune magazine has been surveying senior executives on company attributes for a number of years. Executives are asked to assign values between "0" (poor) and "10" (excellent) to each company in their industry for the following items: quality of management; quality of products/services; innovativeness; longterm investment value; financial soundness; ability to attract, develop and keep talented people; responsibility to the community and environment; and wise use of corporate assets. While Fortune reports average scores on all attributes as a proxy for company quality, because 82% of respondents consider quality of management as the most important attribute of a company's quality, these researchers use it as their proxy for company quality. From the first panel, we see that management quality (i.e., good company measure) and value as a long-term investment (i.e., good stock measure) are very highly correlated that is, executives believe that good companies are good stocks. As discussed before, it is important to understand that no company attribute should be associated with investment value: all information on company quality should already be embedded in stock prices so that all companies (good ones and bad ones) are equally good investments (on an ex ante basis). The bottom three regressions (i.e., those in the lower panel) reveal that two firm characteristics, size and the book-to-market ratio, are strongly associated with perceived management quality. Specifically, big companies and those that have low book-to-market ratios (where the latter are considered growth companies) are seen to be good companies. This is not overly surprising. Big companies have often become big because they are good (i.e., well managed), and growth should come from quality. Turn to the last regression in the upper panel. In this regression,

value as a longterm investment is regressed on size, book-to-market, and management quality. As before, the latter strongly impacts perceived investment value.

15.7.2 Chasing Winners

Research has also shown that investors choose securities and investment funds based on past performance. To those with this view, investment performance in the recent past is representative of future investment performance. This form of representativeness is often called recency. Such trend-following, or momentum chasing, has long been a popular strategy, and, coupled with detecting turning points, is at the heart of technical analysis. A survey of individuals from the American Association of Individual Investors reports that more people become bullish if the market has recently turned up. In the context of mutual funds, strong past performance leads to abnormally high inflows of investor money. Trend-following is an international phenomenon. From Japan, the evidence is that stocks that experience increases in individual ownership were past winners. In Canada, a survey of workers managing their own retirement money indicates they are momentum-chasers, rather than contrarians. More specifically, respondents were asked to start their pensions from scratch and allocate money between two stocks, one with an "average return over the last 5 years of 5%," and a second with an "average return over the last 5 years of 15%." Further, they were told that "analysts forecast that both stocks should earn about 10% per year over the next 5 years." Those neutral on future direction would go 50/50 in order to maximize diversification. Momentum-chasers would put more than 50% in the second stock, while contrarians would put more than 50% of their money in the first stock.

15.7.3 AVAILABILITY AND ATTENTION-GRABBING

When information on certain types of events is freely available, people often get the impression that such events are more likely. For example, news reports of violent crime may induce people to revise upward their subjective probabilities of such violent attacks. Brad Barber and Terrance Odean investigated whether information availability impacts the trading behavior of investors. They argue that since attention is a scarce resource and there is a plethora of possible investment opportunities, the transactions of retail investors are 1ikely to be concentrated in stocks where information is freely

available. "Attention-grabbing" is proxied in three ways: news reports on a stock, unusually high trading volume and extreme returns. The latter two factors control for impact since sometimes news might be neutral. While news can be of a positive or negative nature, since individual investors rarely short-sell and normally own only a small subset of stocks, negative news is likely to be ignored, while positive news may attract purchases. On this basis, these researchers suggest that news is likely to lead to net purchases for retail investors. On the other hand, institutional investors are much less likely to be so affected, because in their work they typically consider all the securities in their universe, without requiring any external prompt. Indeed, the empirical evidence is in line with the expectations of Barber and Odean.

An example where experimental subjects, when asked to estimate an uncertain magnitude, anchored their estimates on obviously meaningless red herrings. Anchoring is even more likely to occur when the potential anchor appears prima facie to have economic content.

15.8 SUMMARY

There is a preference for investing close to home. This manifests itself in home-country bias, investing locally within the domestic market, and preferring one's own language and culture. One explanation for home bias is the comfort-seeking associated with familiarity. Another explanation for home bias is informational advantage, a view reinforced by evidence on the efficacy of local investment on the part of money managers and retail investors. Representativeness causes investors to think that good companies are good investments, whereas known positive characteristics should already be impounded in the price of a stock. Because of recency, investors are prone to chasing winning stocks and funds. While there is some evidence of medium-term (3-12 months) momentum, in the longer-term (3-5 years), reversal is the order of the day. Availability bias is evidenced when investors tend to buy stocks that are in the news. Anchoring appears in research showing that real estate appraisals are anchored to list prices.

15.9 GLOSSARY

- **Anchors :** They are ubiquitous in financial markets.

- **Anchoring Bias :** It occurs when people rely too much on pre existing or first hand information they find while making decisions.

- **Representativeness :** Tendency of people to make judgments and pay insufficient attention to sample data.

- **Recency :** Recency is the situation where recent past investment performance represents future investment performance.

15.10 SELF-ASSESSMENT QUESTIONS

Q1. Discuss the relationship between Anchoring and Representativeness.

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_____

_____

Q2. Anchors are ubiquitous in financial markets. Give some examples.

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_____

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15.l1 EXAMINATION ORIENTED QUESTIONS

Q.1. Differentiate the following terms/concepts:

a.   Good company and good stock

b.   Momentum-chaser and contrarian

c.   International diversification and domestic diversification

d.   Anchoring and herding.

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_____

Q.2. In Canada there are two official languages, French and English. Some Canadian corporations are headquartered in Quebec where French is the official language. Most, however, are headquartered outside Quebec where English is dominant. Would you expect Quebecers to invest more in Quebec companies, and non-Quebecers to invest more in companies based outside Quebec? Also, do you think the first language of the CEO might matter in accounting for investor preferences? Explain.

_____

_____

_____

Q.3. In a regression of perceived long-term investment value (LTIV) on size (S), bookto-market (B/M), and management quality (MQ), the following coefficients (all significant) were estimated: LTIV = −.86 + .15 log(S)−.11 log(B/M) + .85MQ.

Discuss what can be learned from this regression.

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_____

Q.4. What is Anchoring ? What explains Anchoring ?

_____

_____

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15.l2 SUGGESTED READINGS

➤ Chandra, P. (2017). Behavioural Finance, Tata Mc Graw Hill Education, Chennai (India).

➢   Ackert, Lucy, Richard Deaves (2010), Behavioural Finance: Psychology, Decision making and Markets, Cengage Learning.

➢   Forbes, William (2009), Behavioural Finance, Wiley.

➢   Kahneman, D. and Tversky A (2000), Choices, Values and Frames. New York, Cambridge Univ. Press.

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PROSPECT THEORY

STRUCTURE

16.1 INTRODUCTION

According to the expected utility theory, the economic agent is rational and selfish and has stable tastes. Psychologists, however, challenge this assumption. They believe that people are neither fully rational, nor completely selfish. Further, their tastes tend to change over time. The two disciplines seemed to be studying

different species which the renowned Behavioural economist Richard Thaler labelled Econs and Humans. As Amos Tversky, a distinguished psychologist famously remarked, "While my colleagues in the economics department study artificial intelligence, we study natural stupidity."

For several years, Daniel Kahneman and Amos Tversky looked at how people make decisions in the pace of risk. They established a dozen facts and several of these were inconsistent with expected utility theory. So, they developed a theory that modified expected utility theory just enough to explain the collection of their observations and called it prospect theory in their seminal paper titled "Prospect Theory : An Analysis of Decision under Risk." Fortunately, the paper was published in *Econometrica* a top ranking quantitatively oriented economics journal where it received a lot of attention from economists and others. The following is the actual abstract of the paper. "This paper presents a critique of expected utility theory as a descriptive model of decision making under risk, and develops an alternative model, called prospect theory. Choices among risky prospects exhibit several pervasive effects that're inconsistent with the basic tenets of utility theory. In particular, people underweight outcomes that are merely probable in comparison with outcomes that are obtained with certainty. This tendency, called certainty effects, contributes to risk aversion in choices involving sure gains and to risk seeking in choices involving sure losses."

While the prospect theory was closely modelled on utility theory, it departed from the latter in fundamental ways. It is a purely descriptive model which seeks to document and explain systematic violations of the axioms of rationality in choices between gambles. The approach taken by prospect theory was in the spirit of a field of psychology called psychophysics founded by Gustav Fechner, a German psychologist, who was obsessed with how mind and matter are related.

16.2 OBJECTIVES

This lesson intends to impart you with better understanding of :

(i)   Mental Accounting

(ii)   Framing and

(iii)   SP/A theory

16.3 ERROR IN BERNOULLI'S THEORY

Bernoulli Theory : To solve St. Peters Bung Paradox, famous mathematician Daniel Bernoulli proposed a theory according to which "a person should not, accept a highly risky investment choice if the potential returns will provide little utility or value." It further states that a person accepts risk not only on the basis of possible losses or gains but also based upon the utility gained from the risky action itself.

Expected Utility Theory : Developed by John Von Neumann and Oskar Mougenstern in 1944. It deals with the analysis of situations where individuals must make a decision without knowing which outcomes may result from that decision; that is, decision making under uncertainity. The individuals will choose the act that will result in highest expected utility being this the sum of products of probability and utility over all possible outcomes. The decision made will also depend on agent's risk aversion and the utility of other agents.

The St. Petersburg Paradox was a question that asked, essentially, why people are reluctant to participate in fair games where the chance of winning is as likely as the chance of losing. Bernoulli's Hypothesis solved the paradox by introducing the concept of expected utility and stating that the amount of utility from playing a game is a significant decision factor in whether or not to participate.

The longevity of the theory of expected utility proposed by Bernoulli is all the more remarkable because it is seriously erroneous. The error in his theory is not in what is states explicitly; rather, it lies in what it ignores or tacitly assumes. To understand this, consider the following scenarios.

Today Ram and Shyam have a wealth of ₹10 million. Yesterday, Ram had ₹5 million and Shyam had ₹15 million.

Is their happiness the same? (Do they have the same utility?)

According to Bernoulli's theory, utility depends on wealth and since Ram and Shyam have the same wealth, they should be equally happy. Your common

sense, however, tells you that today Ram will be elated and Shyam despondent. Thus, Bernoulli's theory must be wrong.

The happiness that Ram and Shyam experience is a function of the recent change in wealth, in relation to the different states of wealth that define their reference points (₹5 million for Ram and ₹15 million for Shyam). As Kahneman puts it, "This reference dependence is ubiquitous in sensation and perception. The same sound will experience as very loud or quite faint, depending on whether it was preceded by a whisper or by a roar."

Here is another example of what Bernoulli's theory misses. Consider Ravi and Geeta:

Ravi's current wealth is $2 million.

Geeta's current wealth is $5 million.

Both of them are offered a choice between a gamble and a sure thing, in lieu of their current wealth, and they have to opt for one of them.

Gamble : It has two equiprobable outcomes: $2 million or $5 million

OR

Sure Things $3 million for sure

As per Bernoulli's analysis. Ravi and Geeta face the same choice: expected wealth of $2 million, if they opt for the gamble or a certain wealth of $3 million, if they opt for the something. Bernoulli would expect Ravi and Geeta to make the same choice assuming that their utility function is the same. However, this prediction is not correct. Bernoulli's theory fails here as it does not allow for the different reference points from which Ravi and Geeta evaluate their options. Imagine yourself to be in Ravi's and Geeta's shoes and are likely to think as follows :

The sure thing of $3 million will increase my wealth (which is currently $2 million) Ravi: by 50 per cent with certainty and this is quite attractive. The gamble provides an equal chance of increasing my wealth to $5 million or gain nothing."

Geeta : "The sure thing of $3 million will decrease my wealth (which is currently $5 million) by 40 per cent with certainty, which is awful. The gamble provides an equal chance of not losing anything or losing 60 per cent of my wealth." Ravi is most likely to choose the "sure thing" whereas Geeta is most likely to choose to gamble." The "sure thing" makes Ravi happy but Geeta miserable. Ravi is happy with the "sure thing because it guarantees an increase of 50 per cent whereas the gamble may mean that he has a 50 per cent chance that he will gain nothing. Geeta does not like the "sure" thing because it means that she will suffer 40 per cent erosion of her wealth. The "gamble" apppeals to her because it offers a 50 per cent chance that she can protect her wealth. Neither Ravi nor Geeta thinks in terms of states of wealth. Ravi thinks of gains, Geeta thinks of losses. While the possible states of wealth they face are the same, the psychological outcomes they assess are entirely different.

Since Bernouilli's model lacks the idea of a reference point, expected utility theory ignores the fact that the outcome that appeals to Ravi is not acceptable to Geeta.

Bernouilli's model can explain Ravi's risk aversion but it cannot, explain Geeta's preference for a gamble. Her risk-seeking behaviour is similar to what is often observed in entrepreneurs and military generals when all the options they face are bad.

You may be wondering why the Bemouilli model survived for so long despite such flows. Kahneman offers an explanation: "I can explain it only by a weakness of the scholarly mind that I have often observed in myself. I call it theory-induced blindness: once you have accepted a theory and used it as a tool in your thinking, it is extraordinarily difficult to notice its flaws."

16.4 PROSPECT THEORY

It is an economics theory developed by Daniel Kahneman and Anos Tversky in 1979 and challenges the expected utility theory. It is the founding theory of Behavioural economics and of Behavioural finance.

The theory describes how individuals assess in an asymmetric manner their loss and gain perspectives and aims to describe the actual behaviour of people.

In the early 1950s, Harry Markowitz, who later got the Nobel prize in economics for his work in finance, proposed a theory in which utilities were assigned to changes of wealth and not to states of wealth. For almost a quarter of a century, this idea did not attract much attention till Daniel Kahneman and Amos Tversky developed a theory which defined outcomes as gains and losses, not as states of wealth. As Daniel Kahneman observed, "Knowledge of perception and ignorance about decision theory both contributed to a large step forward in our research."

In their 1979 Econometrica paper mentioned earlier, Daniel Kahneman and Amos Tversky provided a series of simple but compelling demonstrations of how the predictions of expected utility theory, economists' workhorse model of decision making under risk, are systematically violated by people in laboratory settings. They presented a new theory of risk attitudes, called "prospect theory," which elegantly reflected the empirical evidence on risk taking, including the observed violations of expected utility, which states that the subjective utility helps the entity to evaluate decision making under uncertainty. In 1992, they published a modified version of their theory, called "cumulative prospect theory," which is now typically used.

16.5 KEY TENETS OF PROSPECT THEORY

The key tenets prospect theory are:

(i)   Reference Dependence

(ii)   Diminishing Senstivity

(iii)   Loss Aversion

(iv)   Changes in risk attitude

(v)   Decision weights

(i) Reference Dependence. It can apply to any decision involving risk and uncertainty. In prospect theory, people evaluate outcomes relative to a reference point and then classify gains and losses. The value of a prospect depends on gains and losses relative to reference point, which is usually the status quo. This is termed as reference dependence.

Consider the following decision situations :

Decision Situation 1 : Assume that you are richer by ₹3,000 than you are today, and then choose between P1 (₹1,000) and P2 (0.50, ₹2,000)

Decision Situation 2 : Assume that you are richer by ₹5,000 than you are today, and then choose between P3 (—₹1,000) and P4 (0.5, ₹2,000)

You can see that the two situations are effectively the same. In both of them; the decision is between a certain ₹4,000 and a prospect which has two payoffs, ₹3,000 and ₹5,000, with equal probabilities. Yet, respondents typically choose P1 and P4. This means that in decision situation 1 they shun risk, whereas in decision situation 4, they seek risk. The risk attitude is not the same across gains and losses because what matters to people is not the level of wealth, but the change in wealth. People typically evaluate an outcome in terms of gain or loss, relative to a reference point, which is usually the current wealth. Note that in the above problem, the two decision situations assume different starting wealth position. An important difference between expected utility theory and prospect theory is that the former assumes that people value an outcome based on the final wealth position, regardless of the initial wealth, whereas the latter assumes that people value an outcome in terms of gain or loss relative to a reference point, which is usually the current wealth.

The utility function of a rational person as per expected utility theory is shown in Panel A of Exhibit 16.1. According to this description, higher wealth provides higher satisfaction or "utility," but at a diminishing rate. This results in risk aversion. The increase in utility from a gain of ₹10,000 is less than the decrease in utility from a loss of ₹10,000.

The prospect theory provides an alternative description of preferences. According to prospect theory, utility (referred to as value) depends not on the level of wealth as in Panel A of Exhibit 16.1, but on changes in wealth from current levels as in Panel B of Exhibit 16.

(ii) Diminishing Sensitivity : People value gains and losses accrding to an S-shaped value function as shown in panel B of exhibit 16.1. notice the following features of the value function.

Exhibit 16.1: Expected Utility and Prospect Theory

(A) Utility Function under Expected Utility Theory   (B) Value Function under Prospect
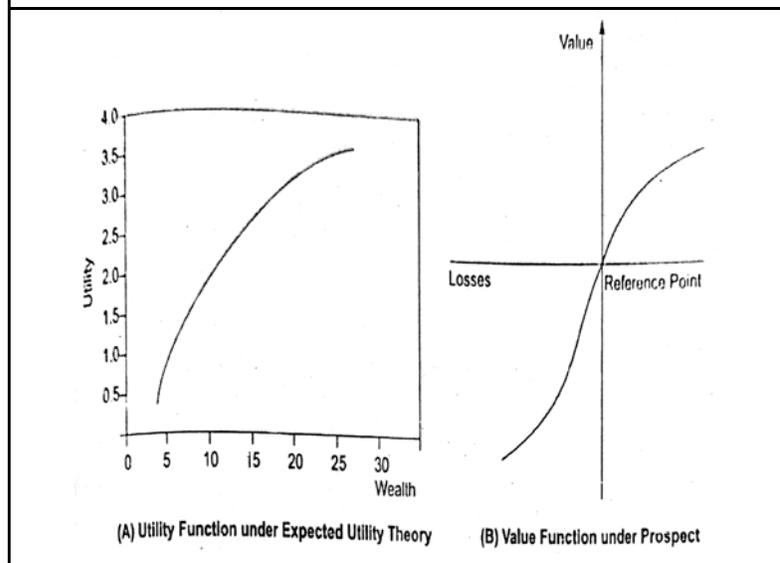
The value function is concave for gains. This means that people feel good when they gain, but twice the gain does not make them feel twice as good. The concavity over gains means that people tend to be risk-averse over moderate probability gains: they prefer a certain gain of ₹ 1000 to a 50 per cent chance of ₹ 2000.

The value function is convex for losses. This means that people experience a pain when they lose, but twice the loss does not mean twice the pain. The convexity (or diminishing sensitivity) over losses means that people tend to be *risk-seeking* over losses: they prefer a 50 per cent chance of losing ₹ 2000 to losing ₹ 1000 for sure. While the convexity of the value function over losses captures an important facet of preference, it ignores another. A person facing a loss that represents a large fraction of wealth tends to be very sensitive, not insensitive, to further losses.

Put simply, people experience diminishing sensitivity to gains/losses. The diminishing sensitivity to changes away from status quo reflects a basic human trait called the Weber-Fechner Law, one of earliest findings in psychology. According to this law, the just noticeable difference in any variable is directly proportional to the magnitude of that variable. If you gain 100 grams in weight, you won't notice it, but if you are buying gold, the difference between 100 grams and 200 grams is obvious.

(iii) Loss Aversion : The value function is steeper for losses than for gains. This means that people feel more strongly about the pain from a loss than the pleasure from an equal gain - about two and half times as strongly, according to Kahneman and Tversky. This phenomenon is referred to as **loss aversion**. It is quite different from risk aversion.

Kahneman and Tversky infer loss aversion from the fact that most people reject the gamble. It is hard to understand this fact in the expected utility framework.

The rupee amounts are so small in relation to typical wealth levels that under expected utility theory, the gamble would be evaluated essentially in a risk-neutral way. Since it has a positive expected value it is attractive. However, for a loss-averse individual, the gamble lacks appeal the pain of losing ₹1,000 far exceeds the pleasure of winning ₹1,100. In the ancient laboratory of evolution sensitivity to losses was perhaps more helpful to survive than appreciation of gains. As psychologist Amos Tversky said, "It would have been wonderful to be a species that was almost insensitive to pain and had an infinite capacity to appreciate pleasure. But you probably wouldn't have survived the evolutionary battle." Over thousands of generations, a "better safe than sorry" reflex has become a deeply ingrained instinct in humans, as it is in other animals. The concept of loss aversion may be explained from a biological and psychological point of view. As Daniel Kahneman puts it, "The brains of humans and other animals contain a mechanism that is designed to give priority to bad news. By shaving a few hundredths of a second from the time needed to detect a predator, this circuit improves the animal's odds of living long enough to reproduce." He further added, "The negative trumps the positive in many ways and loss aversion is one of the many manifestations of the broad negativity dominance."

The brain responds to even symbolic threats. Emotionally loaded bad words (war, crime, disaster) attract attention faster than happy words (love, tranquility, peace). Even if there is no real threat, the mere reminder of a bad event is perceived as threatening.

That we pay more attention to possible losses than gains makes sense. Steven Pinker's book, *How the Mind Works,* quotes social psychologist Timothy

Ketelaar as saying, "as things get better, increases in fitness show diminishing returns: more food is better, but only up to a point. But as things get worse, decreases in fitness can take you out of the game; not enough food and you're dead."

Our aversion to pain also encourages a certain human behaviour to take the most rewarding view of events. We interpret choices and events in ways that make us feel better. We often prefer to hear supporting reasons for our beliefs; think of ourselves as more talented than others and make the best of bad situations.

The concept of loss aversion is perhaps the most significant contribution of psychology to Behavioural economics. Loss aversion is a manifestation of the broad dominance of negativity. As a psychologist puts it, "Bad emotions, bad parents and bad feedback have more impact than good ones and bad information is processed more thoroughly than good. The self is more motivated to avoid bad self-definitions than to pursue good ones. Bad impressions and bad stereotypes are quicker to form and more resistant to disconfirmation than good ones."

It is worth emphasising that the S-shaped curve captures an enormous amount of wisdom about human nature. The upper portion, which reflects gains, has the same shape as the utility of wealth function (in the standard expected utility theory) capturing the notion of diminishing sensitivity. But notice that the lower portion, which reflects losses, also captures diminishing sensitivity. This means that the difference between losing ₹10,000 and 220,000 feels much bigger than the difference between losing ₹100,000 and ₹1,10,000. This is quite different from the standard model in which starting from a given level of wealth, losses are captured by moving down the utility of wealth line, which is a concave line implying that each loss becomes more painful. If a person cares less and less about increase in wealth, then it means that he cares more and more about decrease in wealth.

(iv) Changes in Risk Attitude : Depending on the nature of the prospect, people sometimes display risk aversion and sometimes display risk seeking.

To illustrate this aspect of behaviour imagine that you are presented with the following pair of concurrent decisions situations.

Decision Situation 3 : Choose between P5 (₹ 2400) and P6 (0.25, ₹ 10000)

Decision Situation 4 : Choose between P7 *(₹ 7500)* and P8 (0.75, ₹10000)

In other words, in the first situation you have to choose between a sure gain of ₹2,400 and a 25% chance of gaining ₹10,000. In the second situation, you have to choose between a sure loss of ₹7,500 and a 75% chance of losing ₹10,000.

When such decision situations are presented to respondents in experiments, the respondents typically choose P5 in decision situation 3, which means that they exhibit risk aversion. However, in decision situation 4, the respondents typically choose P8, which means that they exhibit risk seeking. While expected utility theory does not allow for changes in risk attitude like this, prospect theory allows for variations in risk attitude depending on the nature of the prospect.

(v) Decision Weights : In utility theory, people weight outcomes by their objective probabilities p_i but in prospect theory people weight outcomes by transformed probabilities or decision weights n_i. The decision weights are computed using a weighting function 'W' which is a function of objective probability. In Exhibit 16.2 the solid line is the weighting function proposed by Tversky and

Exhibit 16.2 : Weighing Function
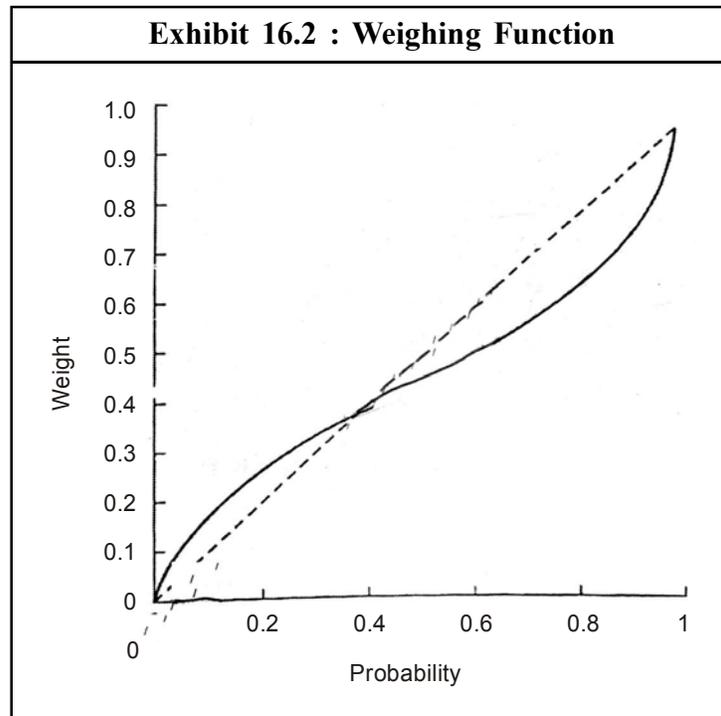
Kahneman, whereas the dotted line (a 45 degree line) represents the objective probabilities used in the expected utility theory. A comparison of the two suggests that the weighting function overweights low probabilities and underweights high probabilities.

It must be emphasised that in cumulative prospect theory, the weighting function applied to cumulative probability — for example, to the probability of gaining at least ₹ 10,000 or of losing ₹ 5000 or more. Note that the weighting function shown in Exhibit 16.2 leads the individual to overweight the *tails* of any distribution. Put differently, it overweights unlike extreme outcomes. Tversky and Kahneman explain this partly from the fact that people like both lotteries and insurance. This means people prefer a 0.001 chance of winning ₹ 10,000 to a certain gain of ₹ 10, but also a certain loss of ₹ 10 to a 0.001 chance of losing ₹ 10,000. It is difficult to explain a coexistence of such behaviours with expected utility. In cumulative prospect theory, the unlikely state of the world in which the individual gains or loses ₹ 10,000 is overweighted in his mind.

16.5.1 Blind Spots of Prospect Theory

We have so far criticised the rational model and expected utility theory and praised the prospect theory. It is time for restoring some balance.

The omission of prospect theory and loss aversion in most introductory texts in economics may seem odd, but it appears that there are good reasons for this. As Daniel Kahneman explains, "The basic concepts of economics are essential intellectual tools, which are not easy to grasp even with simplified and unrealistic assumptions about the nature of the economic agents who interact in markets. Raising questions about these assumptions even as they are introduced would be confusing and perhaps demoralising." Like the expected utility theory, the prospect theory too has its flaws.

In prospect theory it is assumed that the reference point, usually the status quo, has a value of zero. While reasonable, this assumption can lead to some absurd consequences. To illustrate this, Kahneman presents an interesting choice situation. Consider the following gambles.

A.   One chance in a million to win $1 million.

B.   90% chance to win $12 and 10% chance to win nothing.

C.   90% chance to win $1 million and 10% chance to win nothing.

In all the three gambles, winning nothing is a possible outcome and prospect theory assigns the same value to that outcome in all the cases. Since winning nothing is the reference point, its value is zero. In the first two cases, winning nothing is a non-event and assigning it a zero value makes sense. However, in the third case winning nothing is intensely disappointing. Relative to the high probability of winning a large sum, winning nothing will be experienced as a hugely adverse consequence. But prospect theory does not reckon this reality.

16.6 HYPOTHETICAL VALUE AND WEIGHING FUNCTION

Kahneman and Tversky conducted an extensive experiment in which subjects were asked to provide certainty equivalents for a number of prospects presented to them. On the basis of the results of this experiment, Kahneman and Tversky proposed hypothetical forms for the value and weighting functions and also estimated the relevant parameters.

According to the prospect theory, the value function should reflect concavity for gains and convexity for losses and loss aversion. A value function that is consistent with these properties is :

$v(z)$ $0<a<1$ if z 0

$v(z) = -A(-z)^{13}$ $A > 1, 0 < fl < 1$ if $z < 0$

This is a two-part power function. On the basis of their empirical data, Kahneman and Tversky estimated *a* and *3* to be approximately 0.88 each and A to be approximately 2.25. These estimates suggest that losses loom larger than gains in the value function, as shown in Exhibit 16.1, which in fact depicts this particular value function. This may be regarded as the value function of a typical decision maker. The relevant parameters may have higher/lower values for some people.

Thanks to its ability to explain how people make decisions in face of risk,

prospect theory has been quite influential and is considered as an important contribution to economics. In 2002, Daniel Kahneman was given the Nobel prize in economics "for having integrated insights from psychological research into economic science, especially concerning human judgment and decision-making under uncertainty."

16.7 FOUR FOLD PATTERN OF PREFERENCES

According to the expected utility theory developed by John von Neumann and Oscar Niorgenstem, a rational decision maker must conform to the expectation principle which says that values are weighted by their probability. They derived the expectation principle from the axioms of rational choice. They proved that any weighting of uncertain outcomes that was not strictly proportional to probability would lead to inconsistencies. Considered as a monumental achievement, the expected utility theory forms the core of the rational agent model in economics and other social sciences.

Maurice Allais, a Nobel Laureate in Economics, constructed puzzles meant to demonstrate to his guests that they were susceptible to certainty effect which violated the expected utility theory and the axioms of rational choice underlying that theory.

A simplified version of the puzzle that Allais constructed is given below.

In problems, X and Y, which would you choose?

X :   62% chance to win ₹ 480,000 or a 64% chance to win ₹ 460,000

V :   98% chance to win ₹ 480,000 or a 100% chance to win ₹ 460,000

Most people prefer the left hand option in problem X and the right hand option is problem Y. This means they commit a logical error and violates the rule of rational choice.

What explains such behaviour? Two ideas provide an answer:

1. People attach values to gains and losses rather than to actual wealth.

2. People assign decision weights to outcomes that are different from probabilities.

In combination, the above ideas explain a distinctive pattern of preferences that Amos Tversky and Daniel Kahneman called the four-fold pattern. The four fold pattern of preferences is a powerful framework that keeps us to understand how we evaluate prospective gains and losses to make our decisions. It consists of 2 mental effects at play :

(i) **The certainty effect :** People are generally risk averse when they have a high chance of getting a desired outcome.

(ii) **The probability effect :** People tend to give an irrationally high weightage to a desired but improbable outcome.

Exhibit 16.3 : The Four Fold Pattern of Preference

Gains	*Losses*
High Probability (Certainty Effect) • 95% chance to win ₹ 1,000,000 • Fear of disappointment • Risk Averse • Accept unfavourable settlement	• 95% chance to lose ₹ 1,000,000 • Risk Seeking • Reject favourable settlement
Low Probability (Possibility Effect) • 5% chance to win ₹ 1,000,000 • Hope of large gain • Risk Seeking • Reject favourable settlement (e.g. Lottery Ticket)	• 5% chance to lose ₹ 1,000,000 • Fear of large loss • Risk Averse • Accept unfavourable settlement (e.g. Insurance)

This is shown in Exhibit 16.3, winning nothing to change when the alternative is very desirable. As Kahneman admits, "In simple words, prospect theory cannot deal with disappointment. Disappointment and the anticipation of disappointment are real, however, and the failure to acknowledge them is as obvious a flaw as the counter examples that I invoked to criticise Bernoulli's theory."

Further, prospect theory as well as utility theory, ignores the possibility of regret. Both the theories assume that available options in a choice situation are evaluated separately and independently and the option that has the highest value is chosen.

Kahneman argues that this assumption is wrong and gives the following example to demonstrate this :

A. Choose between 90% chance to win $1 million Or $50 with certainty.

B. Choose between 90% chance to win $1 million Or $150,000 with certainty.

While failing to win is disappointing in both the cases, the potential pain is greater in B because if you choose the gamble and lose you will regret your "greedy" choice by foregoing a sure gain of $150,000.

Several models of decision making have been proposed to reflect the emotions of regret and disappointment but they have had less influence than prospect theory. Why ? Kahneman explains : "The emotions of regret and disappointment are real and decision makers surely anticipate these emotions when making choices. The problem is that regret theories make few striking predictions that would distinguish them from prospect theory, which has the advantage of being simpler." He further adds : "Prospect theory was accepted by many scholars not because it is 'true' but because the concepts that it added to utility theory, notably the reference point and loss aversion, were worth the trouble, and they yielded new predictions that turned out to be true. We were lucky."

16.8 SUMMARY

According to the expected utility theory, the economic agent is rational and selfish and has stable tastes. Psychologists, however, challenge this. They believe that people are neither fully rational, nor completely selfish. While the prospect theory was closely modelled on utility theory, it departed from the latter in fundamental ways. It is a purely descriptive model which seeks to document and explain systematic violations of the axioms of rationality in choices between gambles. The longevity of the theory of expected utility proposed by Bernoulli is all the more remarkable because it is seriously erroneous. The error in his theory is not in what is states explicitly; rather, it lies in what it ignores or tacitly assumes. In 1979, Daniel Kahneman and Amos Tversky published a paper titled "Prospect Theory: An Analysis of Decision under Risk," in the journal *Econometrica.* This article provided a series of simple but compelling demonstrations of how the

predictions of expected utility theory, economists' workhorse model of decision making under risk, are systematically violated by people in laboratory settings. They presented a new theory of risk attitudes called "prospect theory," which elegantly reflected the empirical evidence on risk taking, including the observed violations of expected utility. The key tenets of prospect theory are:

- Changes in risk attitude

- Reference dependence

- Diminishing sensitivity

- Loss aversion

- Decision weights

In the ancient laboratory of evolution sensitivity to losses was perhaps more helpful to survive than appreciation of gains.

16.9 GLOSSARY

- **Prospect theory :** elegantly reflects the empirical evidence on risk taking, including the observed violations of expected utility.

- **Loss Aversion :** It is a feeling of pain from loss rather than feeling happy from equal amounts of gain.

- **Four Fold Pattern of Preference :** It is a framework to evaluate prespective gains and losses.

- **Bernouli Theory :** It states that people accept risk not only on the basis of possible losses but also based upon utility gained from them.

16.10 SELF-ASSESSMENT QUESTIONS

Q1. What do you mean by Loss Aversion ?

_____

_____

_____

Q2.   Discuss the four-fold pattern of preferences.

_____

_____

_____

16.11 EXAMINATION ORIENTED QUESTIONS

Q1.   What is the error in Bernoulli Theory?

_____

_____

_____

Q2.   List the key tenets of Prospect Theory.

_____

_____

_____

Q3.   Discuss the Diminishing Senstivity.

_____

_____

_____

Q4.   Discuss the hypothetical value and weighing functions suggested by Kahneman and Tversky.

_____

_____

_____

16.12 SUGGESTED READINGS

➢ Chandra, P. (2017). Behavioural Finance, Tata McGraw Hill Education, Chennai (India).

➢ Ackert, Lucy, Richard Deaves (2010), Behavioural Finance : Psychology, Decision Making and Markets, Cengage Learning.

➢ Forbes, William (2009), Behavioural Finance, Wiley.

➢ Kahneman, D. and Tversky, A. (2000), Choices, values and frames, New York, Cambridge Univ. Press.

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FRAMING, SP/A THEORY AND MENTAL ACCOUNTING

STRUCTURE

17.1 INTRODUCTION

Decision problems can be presented in many different ways, and some evidence suggests that people's decisions are not the same across various presentations. If I ask you if you'd rather have a glass that is half empty or a glass that is half full, virtually everyone would see through this transparent difference in decision frames and say that it doesn't matter. A decision frame is defined to be a decision-maker's view of the problem and possible outcomes. A frame is affected by the presentation mode and the individual's perception of the question as well as personal characteristics. Sometimes frames are opaque, which means that they are trickier to see through. For this reason, when we present a choice problem to a person, a change in frame can lead to a change in decision.

17.2 OBJECTIVES

After reading this lesson, you will be able to understand the concepts of :

(i)   Framing theory

(ii)   SP/A theory

17.3 FRAMING

There can be different ways of presenting a decision problem and it appears that people's decisions are influenced by the manner of presentation. A **decision frame** represents how a decision maker views the problem and its possible consequences.

Framing effect is a cognitive bias in which the brain makes decisions about information depending upon how information is presented. It is often used to influence decision makers and purchases. It takes advantage of tendency for people to view the same information but respond to it in different ways depending on whether a specific option is presented in a positive frame or in a negative frame.

To demonstrate frame dependence, Tversky and Kahneman posed simple problems like the following to their students. The government estimates that 600 people will die due to a deadly outbreak of Asian flu, if nothing is done. To tackle this problem, the government is considering two alternative programmes.

Programme A : Develop a vaccine which can save 200 lives.

Programme B : Develop a vaccine which will stop anyone from dying provided it works. The probability that it will work is one-third. If it doesn't work no one will cured.

When students were asked to choose one of the two programmes 75% of them chose programme A. The risk of seeing all 600 victims die was considered too much to be compensated by the hope that all would be saved.

Kahneman and Tversky reformulated the question and posed it to a different group of students. To tackle the same health problem two choices were offered:

Programme C : Accept that 400 victims of the flu will die.

Programme D : Cure all the 600 victims of the flu with a probability of one-third.

When students were asked to choose between these two options, two-thirds of the students chose programme D. The statement '400 would die' scared most students, even though it has actually the same outcome as that of programme A above, but expressed in more dire terms, it is evident that what matters it is not just what you ask but also how you ask.

17.4 SPA THEORY

SPA theory, a psychologically based theory of choice among risky alternatives, was proposed by Lola Lopes and further developed by Lopes and Oden. Lopes' 1987 article, "The Psychology of Risk : Between Hope and Fear" captures the idea that the emotions of hope and fear influence the choice among risky alternatives. According to SPA theory, people evaluate risky alternatives by using an objective function which has three arguments, viz., security *(S),* potential *(P)* and aspiration *(A).*

Let us consider two decision-makers who are faced with an identical risk, or prospect *D.* However, they experience different degrees of fear. Understandably, the decision maker who experiences more fear will attach greater importance to the probability of unfavourable events, compared to the decision maker who experiences less fear.

In Lopes' framework, the h-function for a person who experiences neither fear nor hope is simply the identity function *h(D) = D.*

For a person who experiences only fear, and no hope, the h-function is strictly convex in *D*. It is flat in the neighborhood of 0 and steep in the neighborhood of I . It may be represented as:

$$h_s(D) = q > 1$$

For a person who experiences only hope, the h-function is strictly concave in D. It may be represented as a power function.

$$h(D) = 1-(1-D), \; p > 1$$

For a person who experiences both fear and hope, the h-function has an inverse-S shape.

Formally, Lopes uses a convex combination of the power functions h_s and h_p to represent the case.

Graphically, the four h-functions are shown in Exhibit 17.1.

Exhibit 17.1 h-functions
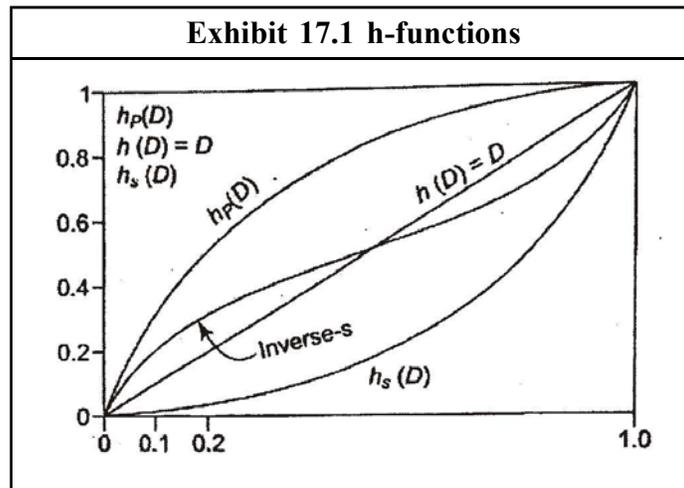
17.5 INTEGRATION VS. SEGREGATION

In the examples given above, the questions were posed to suggest a particular reference point (e.g. lives saved or lives lost). However, in many cases, the decision maker himself chooses the reference point, and whether an outcome is considered as positive or negative will depend on the reference point selected by the decision maker. To illustrate, suppose that Mohan has lost ₹ 24,500 on the horse track

today. He is looking at the possibility of betting another ₹ 500 in the last race of the day on a horse, with 10:1 odds. If his horse wins, his payoff will be ₹ 5,000, but if his horse loses, he will lose another ₹ 500. The reference point that he chooses is very relevant. If he considers the previous losses of ₹ 4,500, the bet of ₹ 500 will enable him to break even if the horse wins, or result in a cumulative loss of ₹ 5,000, if the horse loses. Should he ignore the previous losses of ₹ 4,500 and consider the last race as a fresh bet, the outcome would be either a gain of ₹4,500 (₹ 5,000 — ₹ 500) or a loss of ₹ 500. According to prospect theory, if Mohan takes the first reference point, he is integrating the outcomes of all the bets of the day. Since he is in the domain of losses (of ₹ 4,500) and the last bet provides an opportunity to break even, he will tend to take the risk.

If Mohan takes the second reference point, he is segregating the outcomes of different bets.

In this case, he will tend to shun the risk because the gamble crosses over between a loss and gain and loss aversion bothers him.

The less knowledgeable a person is about an issue, the more easily he is influenced about how it is framed. The British philosopher Herbert Spencer said "I often misused words that generate misleading thoughts." Our preferences are influenced by how a choice is presented.

17.6 MONEY ILLUSION

An important theme of Behavioural finance is frame dependence which holds that differences in form may also be substantive. An example of frame dependence is money illusion. Money illusion, was first discussed by Irving Fisher and later popularized by John Maynard Keynes. Money illusion refers to the failure to perceive that the dollar, or any other unit of money, expands or shrinks in value and exert undue prominence in our decision making. To understand money illusion, let us look at the following questions from a 1997 study by EldarShafir, Peter Diamond and Amos Tversky.

Consider two girls Ann and Barbara, who passed out from the same college a year apart and took up similar jobs. Ann started with a yearly salary of $30,000.

After one year, during which there was no inflation, Ann got a 2 per cent ($600) raise in salary. Barbara too started with an early salary of $30000. After one year, during which there was 4 per cent inflation, Barbara got a 5 per cent ($1500) raise in salary.

As they entered the second year on the job (a) Who was better off economically? (b) Who do you think was happier? and (c) Who do you think was more likely to leave her present job for another job?

Most people think that Ann is better off economically, Barbara is happier, and Ann is more likely to leave her present job for another job. This is somewhat puzzling. Why is Ann less happy and more likely to look for another position, if she is better off economically? According to Shafir, Diamond and Tversky, although people know how to adjust for inflation it is natural for them to think in term of nominal terms. Hence, people's emotional reaction is guided by nominal values, and those seem to be better for Barbara than they do for Ann.

17.7 MENTAL ACCOUNTING

Traditional finance holds that wealth in general and money in particular must be regarded as "fungible" and every financial decision should be based on a rational calculation of its effects on overall wealth position. In reality, however, people do not have the computational skills and will power to evaluate decisions in terms of their impact on overall wealth. It is intellectually difficult and emotionally burdensome to figure out how every short-term decision (like buying a new phone or throwing a party) will bear on what will happen to the wealth position in the long run.

So, as a practical expedient, people separate their money into various mental accounts and treat a rupee in one account differently from a rupee in another because each account has a different significance to them. The concept of mental accounting was proposed by Richard Thaler, one of the brightest stars of Behavioural finance. Mental accounting tends to describe the process whereby people code, categorize and evaluate economic outcomes. It deals with budgeting and categorization of expenditures.

Businesses, governments and other establishments use accounting to track, separate and categorise various financial transactions. People, on the other hand, use a system of mental accounting. The human brain is similar to a file cabinet in which there is a separate folder (account) for each decision, which contains the costs and benefits associated with that decision. Once an outcome is assigned to a mental account, it is difficult to view it in any other way. Mental accounting can influence a person's decisions in unexpected ways as the following example suggests.

Mr. and Mrs. Sharma have saved ₹ 10 lakhs for their daughter's wedding that may take place 3 years from now. The money earns interest at the rate of 9% in a bank fixed deposit account. They just bought a new car for ₹ 6 lakhs on which they have taken a 3 year car loan at 12%

The above example suggests that people often have money in a fixed deposit account (earmarked for a certain purpose) that earns a low rate of interest and yet they borrow money at a high rate of interest for some other purpose.

While money does not come with labels, the human mind puts labels on it. Mr. and Mrs. Sharma labelled their fixed deposit as "daughter's wedding provision" in a separate mental account and did not want to draw on it to finance a car even though it made sense to do that.

17.8 MENTAL BUDGETING

Just the way people use financial budget to monitor and control their spending, the brain uses mental budgets to reflect the psychological benefits and costs in each mental account. As Cheema & Soman put up, "Mental Budgeting is an individual's cognitive form of accountancy to restrain the depletion and also to keep the track of expenditures.

A pay-as-you-go payment system is usually preferred because of the tight match between costs and benefits of the purchase.

When the pay-as-you-go system is not available, things get more complicated. In a study, respondents were asked to choose between the following payment options for a hypothetical purchase of a clothes washer and dryer costing $1200:

A.   Six monthly payments of $200 each before the arrival of the washer and dryer.

B.   Six monthly payments of $200 each during the six months beginning after the arrival of the washer and dryer.

Eighty-four per cent of the respondents chose postponed payment option B. Since the benefits of the washer and dryer is derived over a long period (hopefully years) after their purchase, the choice of option B is consistent with the cost/benefit matching of mental budgeting. Further, option B is consistent with traditional economics because it allows borrowing at 0% interest rate.

In the same study, the respondents were asked two further questions. In the second question they were asked to choose between the following payment options for a hypothetical one-week vacation to the Caribbean costing $1200.

A.   Monthly payments of $200 each during the six months prior to the vacation.

B.   Monthly payments of $200 each in the six months period beginning after the vacation.

Sixty per cent of the respondents chose option A, the prepaid option, an option that is inconsistent with traditional economics. People seem to find a prepaid vacation more pleasurable than one that must be paid for subsequently. If the payment is made earlier, the pain associated with payment is over and hence, the vacation is more pleasurable if payment is to be made later, the pleasure of the vacation diminishes by wondering the much is this pleasure going to cost?"

In the third question, the respondents were asked how they would like to be paid for few weeks of work on the weekends in the next six months before doing the work. Surprisingly, 73 per cent of the respondents said that they would like to be paid after doing work instead of before. Again, this is not consistent with traditional economics as it is violent to the wealth-maximising principle.

The above examples suggest that people are willing to incur monetary costs to facilitate their mental budgeting process. They are willing to accelerate payments

and delay income to match better the emotional costs and benefits, ignoring the time value of money principles.

17.9 SUNK COST EFFECT

Traditional economics assumes that while making a decision, people ignore past costs and consider only the present and future costs and benefits associated with that decision. In reality, however, people routinely consider historical costs when making decisions about the future. Such behaviour is called the sunk-cost effect. It may be viewed as a tendency to continue an endeavour, once an investment of money, time or effort has been made.

There are two dimensions of sunk costs, viz., size and timing. To understand the size dimension consider the following scenario:

You have a ticket to attend a live musical concert by your favourite rockstar. The ticket is worth ₹ 2,000. On the day of the concert there is a big thunderstorm. While you can still attend the concert, the thunderstorm will cause considerable inconvenience.

If you had purchased the ticket for ₹ 2,000, you are likely to go to the concert, but if you had received the ticket for free, you are not likely to go to the concert. When you purchase the ticket for ₹ 2,000, you open a mental account with a ₹ 2,000 cost attached to it. If you do not attend the concert, you have to close the mental account without the benefit of enjoying the concert, resulting in a perceived loss. To avoid the emotional pain of this loss, you are likely to attend the concert. On the other hand, if you receive the ticket for free, you can close the mental account without a benefit or a cost.

To understand the timing dimension of the sunk cost consider the following scenario.

You have long anticipated going to the musical concert by your favourite rockstar. On the day of the concert, there is a thunderstorm. Are you likely to go to the concert if you had purchased the ticket for ₹ 2,000 yesterday or one year ago?

The purchase price of ₹ 2,000 is a sunk cost in both cases, but the timing of the sunk cost seems to matter. You are more likely to go to the concert if you had purchased the ticket yesterday than if you had purchased the ticket last year. As a singer puts it, "The pain of closing a mental account without a benefit decreases over time. In other words, the negative pact of a sunk cost declines over time."

17.10 MENTAL ACCOUNTING AND INVESTING

Mental accounting adversely affects your wealth in two ways. First, it accentuates the disposition effect, which is reflected in the tendency on the part of an investor to sell the winners and ride the losers. You have an aversion to sell a stock because doing so closes the mental account and causes regret. Mental accounting compounds this aversion. With the passage of time, the purchase of the stock becomes a sunk cost. The emotional pain associated with wasting some of the sunk cost on a loser decreases over time. So, you are likely to sell the losing stock later as opposed to earlier. Second, mental accounting affects how we view our investment portfolios. Thanks to mental accounting, we segregate our portfolio into different mental accounts.

17.11 SUMMARY

According to SPA theory, people evaluate risky alternatives by using an observation. A common concept underlying the various contradictions of expected utility is the idea that each decision structured within an ordered mental frames and manipulation of such frames can change a person's decision. To address this shortcoming of expected utility theory, Kahneman and Tversky suggest that investor evaluate prospects in two consecutive steps :

1. *Editing framing stage :* The gamble is initially structured for detailed consideration.

2. *Evaluation stage :* The gambled is evaluated in detail.

Traditional finance holds that wealth in general and money in particular must be regarded as "fungible" and every financial decision should be based on a rational calculation of its effects on overall wealth position. In reality,

however, people do not have the computational skills and will power to evaluate decisions in terms of their impact on overall wealth. So, as a practical expedient, people separate their money into various mental accounts and treat a rupee in one account differently from a rupee in another because each account has a different significance to them. The concept of **mental accounting** was proposed by Richard Thaler, one of the brightest stars of Behavioural finance. Just the way people use financial budgets to monitor and control their spending, the brain uses mental budgets to reflect the psychological benefits and costs in each mental account. Traditional economics assumes that while making a decision people should ignore past costs and consider only the present and future costs and benefits associated with that decision. In reality, however, people routinely consider historical costs when making decisions about the future. Such behaviour is called the **sunk-cost effect.** It may be viewed as a tendency to continue an endeavour, once an investment of money, time, or effort has been made. Mental accounting adversely affects your wealth in two ways. First, it accentuates the disposition effect. Second, mental accounting affects how you view your investment portfolios.

17.12 GLOSSARY

- **Decision frame :** It represents how a decision maker views the problem and its possible consequences.

- **SPA Theory :** According to SPA theory, people evaluate risky alternatives by using an objective function which has three arguments, viz., security (S), potential (P) and aspiration (A).

- **Mental budgets :** It reflects the psychological benefits and costs in each mental account.

- **Sunk Cost Effect :** While making a decision, people ignore past costs and consider only the present and future costs and benefits associated with that decision. In reality, however, people routinely consider historical costs when making decisions about the future. Such behaviour is called the sunk-cost effect.

17.13 SELF-ASSESSMENT QUESTIONS

Q1.   Discuss the SPA theory proposed by Lopes ?

    _____

    _____

    _____

Q2.   What is Sunk Cost Effect ?

    _____

    _____

    _____

17.14 EXAMINATION ORIENTED QUESTIONS

Q1.   Consider the following :

a)   Prospect A (0.80, 25,000, ZO) and Prospect B (0.40, 210,000, ZO). Which one would you choose, Prospect A or B ?

b)   Prospect C (0.00002, 250,000,000) Prospect D (0.00001, 100,000,000). Which one would you choose, Prospect C or D ?

b)   Are your choices congruent with expected utility theory ? Explain.

Q2.   Ravi has the following value function as per prospect theory :

$$v(w) \quad = wt' \qquad \qquad \text{if } w \; 0$$

$$= -2.5 \; (-w)^{0.8} \quad \text{if } w < 0$$

a)   Is Ravi loss averse ? Explain.

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b) Ravi's weighting function is as follows for gains as well as losses :

W(P)– _____

$[P^3 - (1 - P)]^{1/6}$

where $3 = 0.6$

Which of the following prospects should Ravi prefer ?

P3 (0.6, 6000 – 1000)

P4 (0.5, 8000, – 2000)

Q3. Discuss frame dependence.

17.15 SUGGEST READINGS

➢ Chandra, P. (2017), Behavioural Finance, Tata MicGraw Hill Education, Chennai (India).

➢ Ackert, Lucy, Richard Deaves (2010), Behavioural Finance : Psychology, Decision Making and Markets, Cengage Learning.

➢ Forbes, William (2009), Behavioural Finance, Wiley.

➢ Kahneman, D. and Tversky, A. (2000), Choices, values and frames. New York, Cambridge Univ. Press.

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EMOTIONAL FACTORS AND SOCIAL FORCES

STRUCTURE

18.1 Introduction

18.2 Objectives

18.3 Substance of Emotion

18.4 Theories of Emtoion

18.5 Evolutionary Perspective on Emotions

18.6 Types and Dimensions of Emotion

18.7 Summary

18.8 Glossary

18.9 Self-Assessment Questions

18.10 Examination Oriented Questions

18.11 Suggested Readings

18.1 INTRODUCTION

Neoclassical economics assumes that the "economic man" is a rational, self-centered decision maker. We have discussed at length what it means in finance to be a rational decision maker and presented evidence that suggests that real life human beings are irrational in many ways. As eminent Behavioural economist Dan Ariely puts it, in his fascinating book *Predictably Irrational.* "My further observation

is that we are not only irrational, but *predictably irrational–that* our irrationality happens the same way, again and again."

Recent research has shed light on another quality of the economic man which is concerned with self-interested behaivour. Human behaviour is not entirely dictated by material self-interest. It is also influenced by social forces and other-regarding preferences such as fairness and reciprocity.

This chapter reviews some of the psychological findings on emotion to help us in exploring the role of emotions in financial decisions. It also discusses the social forces and other regarding preferences that have a bearing on how people behave.

18.2 OBJECTIVES

This lesson will provide you a better understanding of :

(i)   Emotions

(ii)   Different theories of Emotions

18.3 SUBSTANCE OF EMOTION

Mental states such as happiness, sadness, pride, greed, fear, regret, anger, contempt, surprise and disgust are commonly understood as emotions. But, what exactly is an emotion. Sandra Hockenbury describes an emotion as "a complex physiological state that involves three distinct components : a subjective experience, a physiological response and an expressive response. John Elster argues that an emotion has six observable features :

1. **Cognitive antecedents :** Generally, an emotional response is triggered by a belief. For example, you become angry when someone jumps the queue, gets ahead of you and buys all the remaining tickets and thereby, deprives you of a ticket.

2. **Intentional objects :** Emotions relate to something like a person or situation. For example you are angry with the person who jumped the queue. Often the object of emotion is closely linked to the belief that prompted the emotion. You get angry with the person who jumped the queue because you consider him unfair. It is important to distinguish

between an emotion and a mood. While an emotion relates to something mood is a general feeling not focused on anything in particular.

3. **Physiological Arousal :** Emotions are accompanied by changes in the hormonal and nervous system. When a person is enraged, his blood pressure tends to increase.

4. **Physiological expressions :** Emotions are often characterised by observable expressions associated with how a person functions. When you get angered by the person who jumps the queue, you may raise your voice or clench your fist. Anger may perhaps consistently be associated with these physiological expressions. But these physiological expressions may not be necessarily unique to anger and can stem from very different emotions. For example, a person may raise his voice and clench his fists at a time of celebration or joy.

5. **Valence :** Valence, a psychological term, is used to rate feelings of pleasure and pain. Emotions are typically rated on a scale with a neutral point in the centre and negative and positive feelings at the two end points.

6. **Action tendencies :** Emotions tend to produce action. A person who experiences an emotion often feels the urge, sometimes a compulsion, to act in a certain way. You may feel the urge to give the person who jumps the queue a piece of your mind. Or you may simply restrain your urge and walk away. You may regulate your action tendency in a conscious or unconscious manner.

The above six features define what an emotion is and how it may be differentiated from other mental states.

Emotion may be differentiated from similar constructs like feelings, moods and affect, in the field of affective neuroscience. **Feelings** are subjective representation of emotions. **Moods** are diffused affective states that last much longer and are usually less intense than emotions. **Affect** is a wider term that encompasses emotion, feelings and moods, even though it is commonly used interchangeably with emotion.

Emotions may be negative or positive. Negative emotions are anger, fear, stress, sadness disgust, guilt, hatred, shame, contempt, embarrassment and so on. Positive emotions are gratitude, hope, joy, tranquility, enthusiasm, interest, inspiration, awe, amusement, love and so on. Historically, psychologists have focused primarily on negative emotions and neglect positive emotions. Such a focus may have been motivated by a desire to alleviate suffering. From mid-1990s, a band of psychologists such as Martin Seligman, C. Mihalyi, Barba Fredrickson and others have turned their attention on positive emotions and have found a branch of psychology called positive psychology. Positive psychology promises to improve the quality of life by promoting positive growth in people and society.

18.4 THEORIES OF EMOTION

Philosophers, researchers and psychologists have prosposed different theories to explain the what, why and how behind human emotions. The major theories of emotions may be grouped into two main categories: physiological and cognitive.

A) Physiological Theories

i) James-Lange Theory : Physiological theories suggest that responses within the body cause emotions. One of the best known examples of a physiological theory of emotions is the **James–Lange** theory, independently proposed by psychologist William James and physiologist Carl Lange.

According to this theory, an external stimulus leads to a physiological response which, in turn, leads to an emotional reaction, depending on how the person interprets the physiological response. For example, suppose you see a snake in your backyard and you begin to tremble and conclude that you're frightened ("I am trembling, so I am afraid").

ii) Cannon Bard Theory : Another well known physiological theory of emotions is the **Cannon–Bard** theory of emotions. According to this theory, we feel emotions and physiological reactions (such as trembling and sweating) simultaneously. More specifically, this theory says that both the emotion and physiological reaction occur when the thalamus sends a message to the brain in response to a stimulus.

iii) **Facial Feedback Theory :** Yet another physiological theory is the **facial feedback** theory. According to this theory, facial expressions are not only the results of our emotions but are also capable of influencing our emotions. For example, when we smile, we experience pleasure or happiness. Likewise, when we frown, we experience sadness. As BeppeMicallef-Trigona puts it, "It is the change in our facial muscles that cue our brains and provide the basis of our emotions. Just as there are an unlimited number of muscle configurations in our face, so too are there a seemingly unlimited number of emotions."

B) Cognitive Theories

Cognitive theories argue that thoughts and other mental activities have an important bearing on the formation of emotions. The Schachter Singer theory, also known as the two-factor theory of emotion, is an example of a cognitive theory of emotion. According to this theory, there are two key components of an emotion : physical arousal and cognitive label. This theory says that a mere phsyical arousal is not enough; the person must also identify the arousal in order to feel the emotion.

According to the two-factor theory, when you see a cobra snake in your backyard, the sequence that follows would be much like this.

1.   I see a cobra snake in my backyard.

2.   My heart races.

3.   My rapid heart rate is caused by fear.

4.   I am frightened.

With the two-factor theory recognising the importance of coginition, several theories of thought, judgments or evaluations are emphasised that cognitive activity in the form of thought, judgments or evaluations are essential for an emotion to occur. Richard Lazarus, an important proponent of this view, argued that emotions must have cognitive intentionality. According to this theory, emotion is a disturbance that occurs in the following order.

1. Cognitive appraisal—The individual assesses the event cognitively which motivates the emotion.

2. Physiological changes—The cognitive reaction induces biological changes such as increased heart rate or pituitary adrenal response.

3. Action—The individual feels the emotion and decides how to react.

18.5 EVOLUTIONARY PERSPECTIVE ON EMOTIONS

When we discussed prospect theory, we learnt that it has an evolutionary aspect to it. Emotions seem to be no different. In recent years, some psychologists have drawn contributions to what Charles Darwin made in the latter half of nineteenth century. In his theory of evolution and natural selection, Charles Darwin argued that the traits that survival of a species become the innate characteristics of the species in the long run. Darwin believed that this applied to physical traits as well as emotions.

Based on Darwin's theory of evolution and natural selection, evolutionary theorists argue that our basic emotions have evolved to serve the needs of survival. At times, a situation demands an immediate response, without much deliberation.

According to the evolutionary perspective, the mind is a crowded zoo of evolved, domain-specific programmes, each functionally specialised to solve a different adaptive problem that arose during hominid evolutionary history, such as heart rate regulation, predator vigilance, sleep management, foraging, mate choice or face recognition However, the existence of numerous micro-programmes itself creates an adaptive problem.

As Leda Cosmides and John Toby put it, "Programmes that are individually designed to solve specific adaptive problems could, if simultaneously activated, deliver outputs that conflict with one another, interfering with or nullifying each other's functional products. For example, sleep and flight from a predator require mutually inconsistent actions, computations and physiological states."

To avoid such consequences the mind needs super ordinate programmes that coordinate these individual programmes snapping each into the right configuration at the right time. Emotions are such super ordinate programmes. As Leda Consmides

and John Toby put it, "To behave functionally according to evolutionary standards, the mind's many sub-programme need to he orchestrated so that their joint product at any given time is functionally coordinated, rather than cacophonous and self-defeating. This coordination is accomplished by a set of super ordinate programmes—the emotions or primary emotions : joy, trust, fear, surprise, sadness, anticipation, anger and disgust. Each emotion has a polar opposite as shown below :
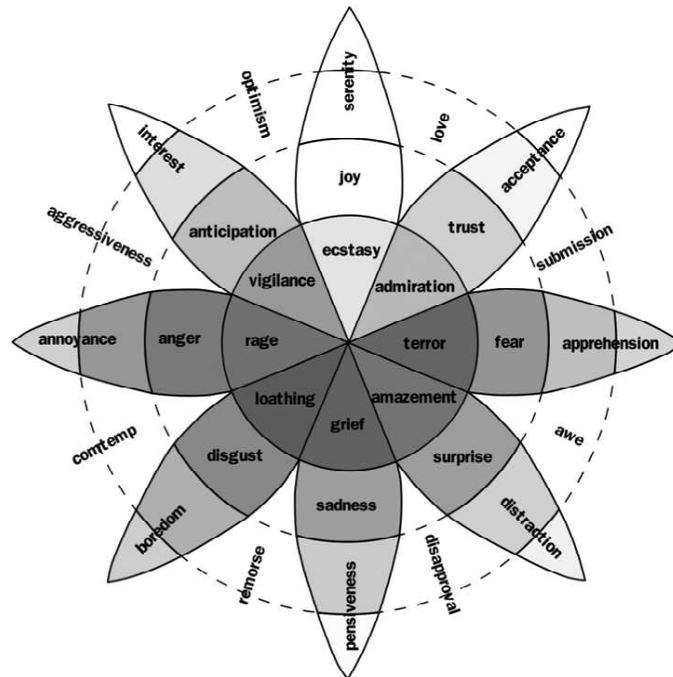
Joy-Sorrow

Fear-Anger

Anticipation-Surprise

Distrust-Trust

Plutchik proposed the wheel of emotions, shown in Exhibit 18.1, in order to illustrate the relationships among emotions. In this wheel, the intensity of emotion increases as one moves towards the centre of the wheel and decreases as one moves outward.

Exhibit 18.1 : Plutchik Wheel of Emotions

18.6 TYPES AND DIMENSIONS OF EMOTIONS

Types of Emotions

There are many different types of emotions that have an inference on how we live and interact with others. At times, it may seem like we are ruled by these emotions. The choices we make, the actions we take and the perceptions we have are all influenced by emotions we are experiencing at any given moment.

Psychologists have also tried to identify the different types of emotions that people experience. The different emotions being felt by people are :

1. Basic Emtoions : During the 1970's, Psychologist Paul Eckman identified six basic emotions that he suggested were universally experienced in all human cultures. The emotions he identified were happiness, sadness, fear, surprise and anger. He later expanded his list of basic emotions to include such things as pride, shame, embarrassment and excitement.

2. Combining Emotions : Psychologist Robert Plutchik put forth a "wheel of emotions" that worked something like colour wheel. Emotions can be combined to form different feelings, much like colours can be mixed to create other shades. According to this theory, the more basic emotions act something like building blocks. More complex, sometimes mixed emotions are blendings of these more basic ones. For example, basic emotions such as joy and trust can be combined to create love.

3. Happiness : Of all the different types of emotions, happiness tends to be the one that people strive for the most. Happiness is often defined as a pleasant emotional state that is characterized by feelings of contentment, joy, gratification, satisfaction and well-being. This type of emotion is sometimes expressed through :

- **Facial expressions :** such as smiling.

- **Body language :** such as a relaxed stance.

- **Tone of Voice :** an upbeat, pleasant way of speaking.

Happiness has been linked to a variety of outcomes including increased longevity and marital satisfaction. Conversely, unhappiness has been linked to things such as lowered immunity, decreased life expectancy, etc.

4. Sadness : Sadness is another type of emotion often defined as a transient emotional state characterized by feelings of grief, disappointment, hopelessness, disinterest and dampened mood. Like other emotions, sadness is something that all people experience from time to time. In some cases, people can experience prolonged and severe periods of sadness that can turn into depression. It can be expressed in a number of ways including :

- Crying

- Dampened mood

- Lethargy

- Quietness

- Withdrawal from others.

5. Fear : Fear is a powerful emotion that can also play an important role in survival. When you face some sort of danger and experience fear, you go through what is known as fight or flight response. Your muscles become tense, your heart rate and respiration increase and your mind becomes more alert, priming your body to either run from the danger or stand and fight. Expressions of this type of emotion can include :

- **Facial expressions :** such as widening the eyes.

- **Body language :** attempts to hide or flea from the threat.

- **Physiological reactions :** such as rapid heartbeat.

6. Disgust : Disgust is another of the original six basic emotions described by Eckman. It can be displayed in a number of ways including :

- **Body language :** turning away from the object of disgust.

- **Physical reactions :** such as vomiting.

- **Facial expressions :** such as wrinkling the nose and curling the upper lip.

This sense of revulsion can orignite from a number of things, including an upleasant smell, taste or sight. Poor hygiene, infection, blood, rot and death can

also trigger a disgust response. People can also experience moral disgust when they observe others engaging in behaviours that they find distasteful, immoral or evil.

7. Anger : Anger can be a particularly powerful emotion characterized by feelings of hostility, agitation, frustration and antagonism towards others. Like fear, anger can play a part in your body's fight or flight response. When a threat generates feelings of anger, you may be inclined to fend off the danger and protect yourself. Anger is often displayed through :

- **Facial expressions :** such as glaring
- **Body language :** such as taking a strong stance or turning away.
- **Tone of voice :** such as yelling.
- **Physiological response :** such as sweating or turning red.
- **Aggressive beahviours :** such as throwing objects.

Anger can become a problem, when it is expressed in ways that are harmful to others. Uncontrolled anger can quickly turn to abuse or violence.

8. Other Emotions : Eckman later added a number of other emotions to his list but suggested that unlike his original six emotions, not all of these could necessarily be encoded through facial expressions. Some of the emotions he later identified included :

- Amusement
- Contempt
- Contentment
- Embarrassment
- Excitement
- Guilt
- Relief
- Shame
- Satisfaction

Emotional experiences may be measured along two dimensions viz., valence (how negative or positive the expereince feels) and arousal (how energizing or enervating the experience feels) Exhibit 18.2 depicts a two-dimensional coordinate map of emotions.

Exhibit 18.2 : Two Dimensions of Emotion
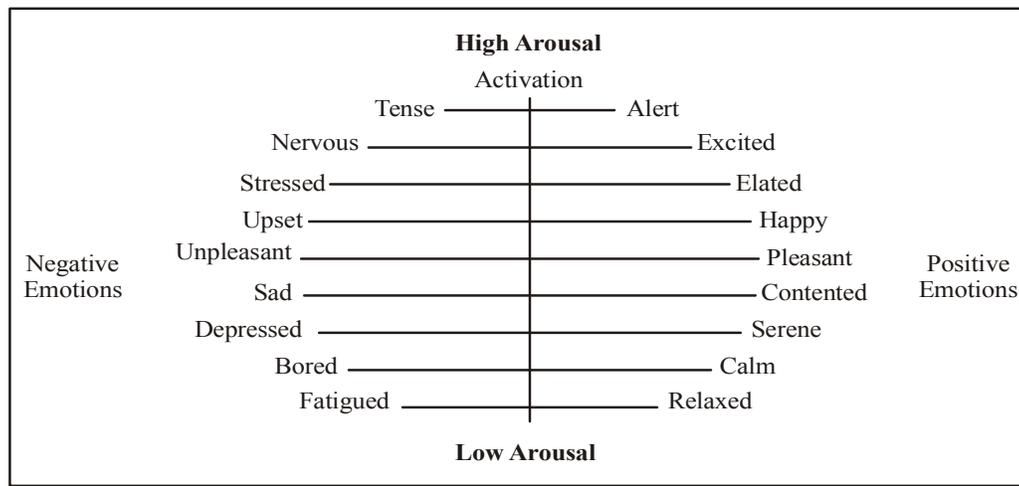
The two dimensional space in Exhibit 18.2 represents 2 dimensions, one representing the "Activation/Arousal" level and other one depicting the "Valence" of that emotion. For example, "tense" would be an emotion with a high level of activation and a negative valence, while calm would be a low-activation positive-valence emotion.

18.6.1 Emotions and Affective Feelings

According to Jan Pankeep, a neuroscientist, there are seven primal emotions and affective feelings associated with them. They are as follows :

Primal Emotions	Affective Feelings
Seeking	Enthusiastic
Rage	Angered
Fear	Anxious

Lust	Arousal
Care	Tender and Loving
Panic	Lonely and Sad
Play	Joyous

18.7 SUMMARY

We have learned a lot about emotions in this lesson. We know that emotions are part of the human experience. The source of emotion includes cognitive, physiological and evolutionary aspects. Thought processes and emotions should not be viewed as separate, opposing influences. Psychologists recognize that emotions include cognitive, physiological and other behavioural elements. The reasoning of a person is the result of a complex interaction of the mind and body and an understanding of the process must include all aspects of the being. Evolutionary theories of emotion suggest that emotions are responses resulting from evolutionary conditioning. Though these responses may be useful, do we choose them or are they simply thrust upon us in response to a situation ? Strictly speaking, we cannot choose our emotional response if an emotion is an innate response to a stimulus. Even if our emotions are not consciously chosen, we all have the ability to control the degree of an emotional response, at least to some extent. In the case of extreme emotional response, whether positive or negative, we are all better off if we take a step back and attempt to carefully consider the best response.

18.8 GLOSSARY

1. **Examples of common emotions :** are anger, contempt, disgust, fear, happiness, sadness, regret and surprise.

2. **Six observable features differentiate emotions from other mental states :** Conginitive antecedents, intentional objects, physiological arousal, physiological expressions, valence and action tendencies.

3. **Emotion :** They push us to make a decision when timing is critical.

4. **Emotions :** They help us to make better decisions because they allow us to better evaluate information.

18.9 SELF-ASSESSMENT QUESTIONS

Q1. Put yourself in the place of an equity mutual fund manager. Think of all the stocks you might select for inclusion in the portfolio. How would emotions enhance your decision making process ?

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Q2. Depict a two-dimensional coordinate map of emotion.

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18.10 EXAMINATION ORIENTED QUESTIONS

Q1. What is the role of emotions according to the evolutionary perspective ?

Q2. Describe the Plutchik's wheel of emotions.

Q3. Discuss the six observable features of emotions as suggested by John Elster.

18.11 SUGGESTED READINGS

➢ Chandra, P. (2017), Behavioural Finance, Tata McGraw Hill Education, Chennai (India).

➢ Ackert, Lucy, Richard Deaves (201), Behavioural Finance : Psychology, Decision making and Markets, Cengage Learning.

➢ Forbes, William (2009), Behavioural Finance, Wiley.

➢ Kahneman, D. and Tversky, A. (2000), Choices, values and frames. New York, Cambridge Univ. Press.

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EMOTIONAL STYLE

STRUCTURE

19.1 INTRODUCTION

We will become better financial decision-makers. If we understand where emotions come from and how they impact our behaviour, Though sometimes emotions are characterized as simply irrational responses to a situation, psychologists do not regard thought processes and emotions as separate, opposing influences. Psychologists recognize that emotions include cognitive, physiological and overt Behavioural elements. Cognitive psychologists focus on specific mental processes, including conscious mental processes like thinking, speaking, problem solving and learning. Early work on emotions explained emotions in terms of cognitive processes so that an emotion is simply what we think about a situation. Taking a different perspective, in 1884, William James developed a prominent theory of emotion that remains influential today. This theory suggested that an emotion is a feeling resulting from an autonomic response. The autonomic nervous system governs our bodies' involuntary actions, such as sweating, shaking and even fleeing. According to James, if you see a bear in the woods, you respond by freezing in your tracks and (initially) without emotion appraising the situation and then you have the conscious feeling of fear. Notice that this differs from the simple explanation that when you see a bear in the woods you feel fear and then you respond. According to James, "we feel sorry because we cry, angry because we strike, afraid because we tremble and not that we cry, strike or tremble, because we are sorry, angry or fearful, as the case may be." James's theory was dominant until another influential study by Walter Cannon. Cannon argued that physiological responses sometimes occur without emotion (e.g., sweaty palms). Although he agreed with James that emotions are different from other states of the mind because of how the body responds, Cannon did not agree that autonomic responses differentiated emotions because we can observe very similar responses with very different emotions (e.g., you might clench your fists in joy or anger). Cannon also argued that people's brains respond to a stimulus before their body takes action. According to his theory, when you see a bear in the woods, your brain and nervous system simultaneously receive signals. You then experience the conscious feeling of fear and autonomic arousal at the same time (you are probably sweating when faced with a large bear). Until the 1960s, emotions were used to describe how people behaved. Many psychologists were behaviourists and believed that their work

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should focus on observed behaviour, rather than mental processes. In other words, emotions were simply descriptions of observed behaviour and psychologists devoted little attention to understanding the source of emotion—that is, until Stanley Schachter and Jerome Singer again raised the question of where emotions come from. They concluded that emotions are our brain's interpretation of a situation. Like James, they believed that autonomic responses are important, but at the same time, they questioned, as Cannon did, whether emotions can be differentiated simply by autonomic responses. Their solution was a model that included a cognitive appraisal of the situation. When you see a bear in the woods, your body responds. Then your brain searches for an explanation to the arousal. Your brain recognizes that your body is responding to the bear and you feel fear. You may want to run, but your emotions exert control, allowing you to remain calm and leave the area as quickly as possible. If you run, the bear will chase, which does not lead to the best outcome.

19.2 OBJECTIVES

After going through this lesson, you will understand about :

(1)   Different emotional styles

(2)   The various games devised to understand emotional styles.

19.3 EMOTIONAL STYLE

According to neuroscientist Richard J. Davidson, each person has a unique emotional profile. As he puts it, "Just as each person has a unique fingerprint and a unique face, each of us has a unique emotional profile, one that is so much a part of who we are and those who know us well can often predict how we will respond to an emotional challenge."

19.3.1 Dimensions of Emotional Style

Based on his research, Davidson identified six dimensions of Emotional Style in his classic work *The Emotional Life* of Your Brain written with Sharon Begley. According to him, Each of the six dimensions has a specific, identifiable neural signature—a good indication that they are real and not merely a theoretical construct."

The six dimensions of Emotional Style are as follows :

1. **Resilience Style :** People at one end of this dimension recover quickly from adversity whereas people at the other end of this dimension recover very slowly.

2. **Outlook Style :** Does a person have a sunny disposition and look at the brighter side of things or does he tend to be cynical or pessimistic ? People at one end of the outlook spectrum may be characterised as Positive types; those at the other, as Negative types.

3. **Social Intuition Style :** Can a person read other people's body language and vocie tone and figure out whether they want to talk or be alone whether they are stressed or relaxed. Or is a person puzzled by the outward manifestations of other people's mental and emotional state ? Socially intuitive types are at one end of this spectrum; Socially Puzzled types are at the other end.

4. **Self-Awareness Style :** Is a person aware of his own thoughts and feelings and attuned to the messages of his body ? Or does he act and react without knowing why he does what he does because his inner self is opaque to his conscious mind ? Self-aware people lie at one end of his spectrum; Self-opaque people lie at the other end.

5. **Sensitivity to Context Style :** Does a person follow conventional rules of interaction so that he does not tell his boss the same dirty jokes he shares with his friends or engage in a date at a funeral service ? Or is he baffled when someone points out that his behaviour is inappropriate ? Tuned in people are at one end of the spectrum of the Sensitivity to Context Style; Tuned out people are at the other end.

6. **Attention Style :** Can a person filter out emotional or other distractions and stay focused ? Is he so absorbed in the TV show that he does not notice the whining of his dog ? Or do his thoughts flit from what he is doing to the quarrel he had with his colleague in the morning or the anxiety about an upcoming presentation ? Focused people are at one end of the Attention spectrum; Unfocused people are at the other end.

Emotionally a person is the product of different amounts of each of these six components. Since there are numerous ways to combine the six dimensions, there are countless Emotional Styles. Indeed, everyone is unique. As Davidson puts it, "...each of us is a color-wheel combination of the Resilience, Outlook, Social Intuition, Self-Awareness, Context and Attention dimensions of Emotional Style, a unique blend that describes how you perceive the world and react to it, how you engage with others and how you navigate the obstacle course of life." An illustrative emotional style is given below :

Resilience

1_____2_____10

Fast to recover   Slow to recover

Outlook

1_____8_____10

Negative   Positive

Social Intuition

1_____8_____10

Puzzled   Socially Intuitive

Self-Awareness

1_____6_____10

Self-Opaque   Self-Aware

Senstivity to Context

1_____6_____10

Tuned out   Tuned in

Attention

1_____8_____10

Unfocused   Focused

19.4 EMOTIONS AND INVESTING

Emotions have a bearing on risk tolerance and risk tolerance influences portfolio selection. Investors experience a variety of emotions as they consider alternatives, decide how much risk to take, watch their decisions play out, assess whether the initial strategy needs modification and finally learn how far they have succeeded in achieving their financial objectives.

The emotions experienced by a person with respect to investment may be expressed along an emotional time line as shown in Exhibit 19.1. Investment decisions lie at the left end of the time line and investment goals at the right end. According to psychologist Lola Lopes, investors experience a variety of emotions, positive and negative.

Exhibit 19.1 : Emotional Time Line		
Hope	Anticipation	Pride
Decisions ———————————————		Goals
Fear	Anxiety	Regret
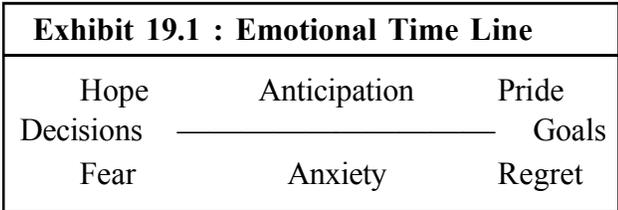
Positive emotions are shown above the time line and negative emotions below the time line. On the positive side, hope becomes anticipation which finally converts into pride. On the negative side, fear turns into anxiety which finally transforms into regret.

Hope and fear have a bearing on how investors evaluate alternatives. Fear induces investors to look at the downside of things, whereas hope causes them to look at the upside. The downside perspective emphasises security; the upside perspective focuses on potential gains. According to Lopes, these two perspectives reside in everyone, as polar opposites. However, they are often not equally matched, as one pole tends to dominate the other. The relative importance of these conflicting emotions determines the tolerance for risk.

The Five Year Rule Wall Street's conventional wisdom is that you should put money into stocks only when you are more than five years from your goal. What is the logic of this rule ? The "five year rule" is scarcely a mean-variance strategy. It is driven by emotional considerations. Think about a situation where an investor

has sufficient resources to achieve a major goal that is less than five years away by investing in safe fixed instruments. However, the investor allocates a substantial proportion of these resources to equities, only to discover that at the end of five years his equity investment has eroded in value and his goal has moved out of reach.

The dominant emotion in this case would be regret. Hence, the five-year rule seems to be essentially a regret-minimisation rule as historically very rarely have equities delivered a negative return over a five-year holding period.

Emotional Intelligence

Psychologist Daniel Goleman, author of the path-breaking book *Emotional Intelligence,* is an expert on the subject. He defines emotional intelligence as "the capacity for recognizing our own feelings and those of others, for motivating ourselves and for managing emotions well in ourselves and in our relationships."

19.5 FAIRNESS, RECIPROCITY AND TRUST

While most people accept that fairness is valued in our society, the notion of fairness has been largely overlooked in traditional finance which assumes that economic agents are driven by self-interest. In recent years, however, some researchers have recognised the importance of fairness, reciprocity and trust in the conduct of business transactions. Trust is a prerequisite for an efficiently functioning economy. The costs of business and personal transactions are significantly reduced if people trust each other and treat each other fairly. Empirical evidence suggests that a large number of people trust and treat others fairly, even when they are not likely to deal with them in future. Tipping servers in restaurants is a commonplace example of fairness and trust. People normally tip the servers, as long as the service is above a threshold level. Although tipping is not required, people often do it out of a sense of fairness.

To understand fairness, reciprocity and trust, pscyhologists have designed various games or experiments. The important ones are :

1) Ultimatum game

2) Dictator game

3) Trust game

1) Ultimatum Game

The participants in this game are divided equally into two groups put in two different Rooms, A and B. Each participant in Room A is randomly paired with someone in Room B. Neither of them know each other's identity. Each participant in Room A (proposer) is given ₹ 21000 and asked to send any portion of that amount to the randomly paired participant (responder) in Room B. Proposers can send any amount – ₹ 10, ₹ 100, ₹ 500, ₹ 900 or whatever. The respondent in Room B can choose to accept or reject the amount sent. If the respondent accepts the amount, the division proposed by the participant in Room A is final; if the respondent rejects the amount, neither the proposer nor the respondent receives anything.

This game is called the ultimatum game. According to the traditional economic theory, a self-interested respondent will accept any positive amount—something is better than nothing. Realising this, a prosposer would make the smallest possible offer.

When people play the ultimatum game in experimental settings, on average, proposers send more than the minimum possible offer. Perhaps they realise that respondents will reject offers they perceive to be unfair. Typically half the time respondents reject offers that are less than 20% of the proposer's endowment.

The results of the ultimatum game appear to be incongruent with pure self-interest in two ways. First, responders reject positive offers, which means that they do not maximise their self-interest. Second, proposers send more than the minimum offer, on average, suggesting that they want to be fair. However, you can argue that proposers behave strategically to retaliation of the respondents.

2) Dictator Game

To separate the effects of fairness and strategy, another game has been proposed. This game is similar to the ultimatum game except that the divison proposed by the participants in Room A is final. This game is called the dictator game because the participants in Room B have decision to make.

In the ultimatum game, all proposers are concerned with retaliation. In the dictator game roughly two-thirds of the proposers in the dictator game make

positive offers, even though there is no oppoutunity for retaliation or reputation building. This may be because people value fairness.

3) The Trust Game

While the dictator game seems to measure altruism, there is another game, called the trust game, that measures trust and reciprocity. It is described as below :

As in the previous games, one-half of the participants are in Room A and the other half in Room B. Each participant (now called investor) in Room A is randomly paired with someone Room B (now called trustee).

The rules of the game change from here on. Participants in both the rooms are given ₹ 21000 each. Investors in Room A can send any amount from their endowment (₹ 21000) to the trustees in Room B. Each rupee sent to Room B is multiplied three times. For example, if an investor in Room A sends ₹ 2500 to a randomly assigned trustee in Room B, the amount will be increased to ₹ 500. The trustee in Room B can decide how much of this to keep and how much of this to send back to Room A.

This game is called the trust game because it measures how much the investors in Room A trust their counterparts (trustees) in Room B. It is also called as the investment game because the participants in Room A are "investing" in participants in Room B.

In theory, the trustees in Room B, as purely self-interested persons, should not return anything. Anticipating such behaviour of trustees in Room B, the investors in Room A should not send anything to trustees.

With no trust, the investor in Room A would not send anything to his trustee in Room B and each participant ends up keeping the endowment amount of ₹ 21000. So, the total gain is ₹ 12000. With complete trust, the total gain is ₹ 24000 (3 × ₹ 21000 + ₹ 21000). So, if there is trust, all participants can benefit potentially.

In experiments, investors typically send about half of their endowment to trustees, though there is a wide variation across people. Trustees typically return less than one-half of what they receive, implying that the reciprocity ratio is less

than 500 per cent most of the time. In fact, many trustees send less than one-third of what they receive, implying that trust does not pay for inevstors.

19.5.1 Altruism

It represents the disinterested and selfless concern for the well being of other individuals. Adam Smith, father of economics, recognised the importance of markets and behaviour motivated by self-interest. However, he also realised that people aren't entirely guided by narrow self-interest. They are also concerned about others.

In his book *theory of Moral Sentiments,* Smith wrote : "How selfish so ever man may be supposed, there are evidently some principles in his nature, which interest him in the fortune of others and render their happiness necessary for him, though he derives nothing from him, except the pleasure of seeing it. It is this concern for others that contributes to making the economy more effective and efficient. If you show some concern for the well being of your employees, they'll be more productive and the size of the economic pie. When you engage in altruistic behaviour, you feel better. It increases your overall well being. It produces what American economist James Andreoni calls a *warm glow effect* that than compensates for the opportunity cost of altruistic behaviour.

19.5.2 Social Behaviour and Emotion

Emotions and social interactions are linked, as evidenced by research using FMRI (functional magnetic resonance imaging). Much of this research falls under a discipline called social neuroscience, which explores the "social brain," or the neural circuitry that is activated when people interact with one another. For example, FMRI technology was employed to examine the cognitive and emotional processes of participants during the ultimatum game. FMRI scans of participants showed that unfair offers triggered activity in the forebrain as well as the limbic system. The rational thought in the forebrain says "Let me accept this offer as it benefits me financially"; the emotion in the limbic system says, "By rejecting this offer, I can get even with the guy, even though it will mean some monetary loss." Heightened activity was observed in the limbic system of participants who rejected the offer, indicating which part of the brain won the argument.

Cornell economist Robert Frank's 1987 book *Passions within Reason* analysed some of the things that people do that are not consistent with economic models of pure self-interest. These include tipping in restaurants when far from home, seeking expensive retaliation and staying loyal to friends and spouses even when better opportunities arise. According to Frank, these behaviours reflect moral emotions (such as love, vengeance, guilt or shame) and these moral emotions appear to be the products of evolution. As moral spcyhologist Jonathan Haidt puts it, "Evolution seems to have made us 'strategically irrational' and at times for our own good, for example, a person who gets angry when cheated and who will pursue vengeance regardless of cost, earns a reputation that discourages would-be-cheaters."

19.5.3 Social Behaviour and Evolution

Why do human beings cooperate ? Why are many people fair, when they don't have to be ? It seems that evolution has favoured those who were cooperative and fair in exchanges. Groups that are pro-social seem to outperform groups that are not. This may be the reason why we are hardwired" to behave socially.

19.6 CONFORMITY

Conformity relates with the behaviour of people in accordance with socially accepted laws and conventions. Psychological studies of conformity suggest that people tend to conform to social pressure real or imaginary. In a classic experiment, researcher Solomon Asch asked students to consider lines in Exhibit 19.2 and decide which of the lines A, B or C is identical in length to the *first* line.

Exhibit 19.2 Asch Test
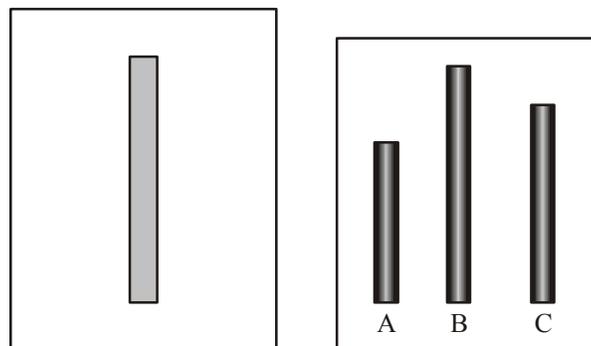
The obvious answer seems to be line C. Is it not ? However, if you are in a room with eight other university students who all said it was line A, you may not necessarily plump for C. Asch found that students who participated in the experiment conformed to the wrong majority roughly one-third of the time. Nearly 75 per cent of the students conformed at least once. Psychologists who have replicated Asch's experiments have found that, in general, conformity changes over time, reflecting social norms and culture.

19.6.1 Group thinking

Groupthinking, wherein the members of a group think alike, is an extreme form of conformity. Groupthinking may dominate a small group which is insulated from outside influence. Groupthinking occurs because a desire for conformity leads to collective confirmation bias and group members are reluctant to share information or challenge proposals made by others.

19.7 SUMMARY

Emotion may be differentiated from silimar constructs like feelings, moods and affect, within the field of affective neuroscience. *Feelings* are subjective representation of emotions. *Moods* are diffused affective states that last much longer and are usually less intense than emotions. *Affect* is a wider term that encompasses emotion, feelings and moods, even though it is commonly used interchangeably with emotion. According to the James–Langer theory, an external stimulus leads to a physiological response which in turn leads to an emotional reaction depending on how the person interprets the physiological response. Cognitive theories argue that thoughts and other mental activities have an important bearing on the formation of emotions. In his theory of evolution and natural selection, Charles Darwin argued that the traits that contribute to the surival of a species become the innate characteristics of the species in the long run. Darwin believed that this applied to physical traits as well as emotions. Based on Darwin's theory of evolution and natural selection, evolutionary theorists argue that our basic emotions have evolved to serve the needs of survival.

Each emotion has a polar opposite as shown below.

- Joy—Sadness

- Fear—Anger

- Anticipation—Surprise

- Disgust—Trust

Emotional experiences may be measured along two dimensions viz., valence (how negative or positive the experience feels) and arousal (how energising or enervating the experience feels). Emotions have a bearing on risk tolerance and risk tolerance influences portfolio selection. Neuroscientist Richard Davidson identified six dimensions of Emotional Style :

Resilience Style, Outlook Style, Social Intuition Style, Self-Awareness Style, Sensitivity to Context Style and Attention Style. Hope and fear have a bearing on how investors evaluate alternatives. Fear induces investors to look at the downside of things, whereas hope causes them to look at the upside. While most people accept that fairness is valued in our society, the notion of fairness has been largely overlooked in traditional finance which assumes that economic agents are driven by self-interest. Emotions and social interactions are linked, as evidenced by research using FMRI. Much of this research falls under a discipline called social neuroscience, which explores the "social brain", or the neural circuitry that is activated when people interact with one another. It seems that evolution has favoured those who were cooperative and fair in exchanges. Groups that are pro-social seem to outperform groups that are not. This may be the reason why we are "hardwired" to behave socially. **Pscyhological studies of conformity suggest that people tend to conform to social pressure, real or imaginary.**

19.8 GLOSSARY

- **Groupthink :** It is a process wherein the members of a group think alike.

- **Five year Rule :** It suggests that you should put money into stocks only when you are more than five years from your goal.

- **Altruism :** It refers to disinterested and selfless concern for the well being of others.

- **Psychological :** Psychological studies of conformity suggest that people tend to conform to social *pressure* real or imaginary.

19.9 SELF-ASSESSMENT QUESTIONS

Q1. Explain the Dictator game and Ultimatum game.

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Q2. Discuss the emotional timeline.

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19.10 EXAMINATION ORIENTED QUESTIONS

Q1. Explain the Trust Game.

Q2. Discuss the experiment of Solomon Asch.

Q3. What are the seven primal emotions and affective feelings associated with them?

19.11 SUGGESTED READINGS

1. Chandra, P. (2017). Behavioural Finance, Tata McGraw Hill Education, Chennai (India).

2. Ackert, Lucy, Richard Deaves (2010), Behavioural Finance Psychology, Decision making and Markets, Cengage Learning.

3. Forbes, William (2009), Behavioural Finance, Wiley.

4. Kahneman, D. and Tversky, A. (2000), Choices, value and frames, New York, Cambridge Univ. Press.

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SOCIAL INFLUENCE, SOCIAL INFLUENCE ON INVESTMENT AND CONSUMPTION

STRUCTURE

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20.1 INTRODUCTION

Social influence is the change in behaviour that one person causes in another, intentionally or unintentionally, as a result of the way the changed person perceives themselves in relationship to the influencer, other people and society in general.

20.1.1 Areas of Social Influence

Three areas of social influence are conformity, compliance and obedience.

(1)   ***Conformity :*** It is changing how you behave to be more like others. This plays to <u>belonging</u> and <u>esteem</u> needs as we seek the approval and friendship of others. Conformity can run very deep, as we will even change our <u>beliefs</u> and <u>values</u> to be like those of our peers and admired superiors.

(2)   ***Compliance :*** It refers to a person doing something that they are asked to do by another. They may choose to comply or not to comply, although the thoughts of social reward and punishment may lead them to compliance when they really do not want to comply.

(3)   ***Obedience :*** It is different from compliance in the sense that it is obeying an order from someone that you accept as an authority figure. In compliance, you have some choice. In obedience, you believe that you do not have a choice. Many military officers and commercial managers are interested only in obedience.

20.2 OBJECTIVES

After reading this lesson, you will be able to understand :

(1)   The meaning of social influence, and

(2)   Tts impact on investment and consumption.

20.3 SOCIAL INFLUENCE

In a fascinating book titled ***Social Influence,*** renowned sociologist Robert Cialdini discusses a variety of social and other factors that influence the behaviour of people. In particular, he looked at the following factors : reciprocation, social proof, liking, obedience to authority and scarcity.

(i) Reciprocation

The reciprocation principle says that a person tries to (or should try to) repay, in kind, what another person has given him. As Cialdini puts it, "We are human because our ancestors learned to share their food and their skills in an honored network of obligations." This is a unique adaptive mechanism of human beings facilitating the division of labour. Invoking this principle, free gifts and free samples are given to secure some reciprocal favour.

(ii) Social Proof

To decide what to do people look at what others are doing. Put differently, they look at social proof. That is why evangelical preachers seed their audience with "ringers," who are instructed to come forward to give witness and donation. Bevelin puts it differently, "We want to be socially accepted and not disliked or rejected. There is every reason to believe that imitation plays a prime part in markets as well." Pity and tradition are all the result of imitation. And since investing is inherently a social as they please, they usually imitate each other". In *True Believer, American* philosopher Eric Hoffer said, "When people are free to do each task how best to behave there."

(iii) Liking

As a rule, people prefer to say yes to the requests of someone they know and like. This simple rule is used in many ways by people to persuade others to comply with their requests. Here are some examples:

- The Tupperware Home Parties Corporation arranges for its customers to buy from a friend rather than from an unknown salesperson. To enable this, they incentivise the hostess of Tupperware parties with a percentage of the take.

- Actor McLean Stevenson once mentioned how his wife tricked him into marriage by saying that she liked him. As Cialdini puts it, "The information that someone fancies compliance."

- Joe Girard, the world's "greatest car salesman," sent a holiday greeting card each month to more than 13,000 former customers with a personal message. While the greeting card changed from month to month (Happy Christmas, Happy New Year and so on), the message was invariably "I like you."

(iv) Obedience to Authority

People tend to respect authority. Authority may stem from a position of power or an advanced clothing, qualification that takes years of work and achievement or even something like superior clothing.

(v) Scarcity

An opportunity appears more valuable when its availability is limited. The thought of losing something seems to motivate people more than the thought of gaining something of value. As G.K. Chesterton puts it, "The way to have anything was to realise that it might be lost. Compliance practitioners use scarcity as a weapon for influencing behaviour.

Psychologist Jack Brehm developed a theory called psychological reactance theory. The core idea of this theory is that people hate to lose the freedom they already have. As Cialdini explained, "So when increasing scarcity — or anything else — interferes with our prior access to some item, we will *react against* the interference by wanting and trying to possess the item more than before."

This theory explains impressive amounts of human behaviour. When something is restricted, censored, or banned, people crave more of it. As Cialdini puts it, "The feeling of being in competition for scarce resources has powerfully motivating properties. The ardor of an indifferent lover surges with the appearance of a rival." He added, "Shoppers at big close outbargain sales report being caught up emotionally in the event. Charged by the crush of competitors they swarm and struggle to claim merchandise they could otherwise disdain.

20.4 SOCIAL INFLUENCE ON INVESTMENT AND CONSUMPTION

Investing has become an integral part of social life. Not only do we invest, but we also like to talk about them. People discuss investments with their friends, co-workers, neighbours, family members, or even strangers through the web. This has created an interesting paradox. While you want to invest independently, you also want to go by the consensus view. Indeed the popular consensus acts like social pressure. In this regard it is more important to understand the herd insticts and overreaction.

20.4.1 Herd Instincts and Overreaction

There is a natural desire on the part of human beings to be part of a group. So people tend to herd together. Moving with the herd, however, magnifies the psychological biases. It induces one to decide on the "feel" of the herd rather than

on rigorous independent analysis. This tendency is accentuated in the case of decisions involving high uncertainty.

The heightened sensitivity to what others are doing squares well with a recent theory about ads, trends, and crowd behaviour. In a 1992 paper in the *Journal of Political Economy,* Sushil Bikhchandani, David Hirshleifer and Ivo Welsh referred to a phenomenon called information cascade. Essentially, their theory says that large trends or ads begin when individuals ignore their private information, but take cues from the actions of others. Imagine a traffic jam on a highway and you find that the driver ahead of you suddenly takes a little used exit. Even few others follow you and this, in turn, leads to more people imitating that behaviour.

What is interesting about this story is that a small bit of new information can cause a rapid and wholesale change in behaviour. As Bikchandani *et al.* wrote, "If even a little new information arrives, suggesting that a different course of action is optimal, or if people even suspect that underlying circumstances have changed (whether or not they really have), the social equilibrium may radically shift."

This observation appears very apt for financial markets which are constantly bombarded by new information cascades lead investors to overreact to both good and bad news. That show a stock market bubble—and in the opposite direction, a stockmarket crash—gets started. Eventually, however, the market corrects itself, but it also reminds us that the market is often wrong. The herd mentality means that financial assets are unlike other goods. The demand for them tends to increase when price rises. As an *Economist* article puts it, to the extent that investors worry about valuation, they tend to be extremely flexible, expectations of future profits are adjusted higher until the price can be justified. Or 'alternative valuation measures are dreaming up (during the internet era, there was 'price-to-click') that make the price look reasonable. Conversely, when confidence falters and prices decline, there are many sellers and buyers, pushing prices downwards.

20.5 CONSPICIOUS CONSUMPTION

There is another kind of irrationality induced by a desire to impress others. In his recent book *Luxury Fever,* Frank analysed the vigour with which people pursue goals that are incongruent with their happiness. Frank referred to the pursuit of

conspicuous consumption—consumption of things that are considered as markers of a person's relative success. Conspicuous consumption tends to be a zero-sum game.

Inconspicuous consumption, on the other hand, refers to goods and activities that are inherently valuable, that are not bought to show off or achieve status, and that are consumed more privately.

The message of Frank's book is that happiness depends on inconspicuous consumption, not conspicuous consumption. Endorsing this view moral psychologist Jonathan Haidt writes in his insightful book *Happiness Hypothesis*. "Stop trying to keep up with the Joneses. Stop wasting your money on conspicuous consumption. As a first step work less, earn less, accumulate less and 'consume' more family time, vacations and other enjoyable activities." A Chinese sage advised people to make their own choices rather than pursue the material objects everyone was pursuing. As he puts it, "Racing and hunting madden the mind. Precious things lead one astray. Therefore the sage is guided by what he feels and not what he sees. He lets go of that and chooses this."

Importance of Institutions

Nobel Laureate Herbert Simon, who developed the concepts of bounded rationality and satisficing, emphasised the importance of getting our assumptions right about social norms, culture and the law. In 1979. Simon wrote:

"The principle forerunner of a behavioural theory of the firm is the tradition usually called Institutionalism. It is not clear that all of the writings, European and American, usually lumped under this rubric have much in common, or that their authors would agree with each other's views. At best, they share a conviction that economic theory must be reformulated to take account of the social and legal structures amidst which market transactions are carried out. The social and legal environment provides the incentive structure within which decisions are made. In many instances, without an understanding of this environment, we can't truly understand why, how and what decisions are made, even if we get our psychological assumptions right."

20.6 SUMMARY

In a fascinating book titled *Social Influence,* renowned sociologist Robert Cialdini discusses a variety of social and other factors that influence the behavior of people. In particular, he looked at the following factors: reciprocation, social proof, liking, obedience to authority and scarcity. Investing has become an integral part of social life. Not only do we invest, but we also like to talk about them. People discuss investments with their friends, co-workers, neighbours, family members, or even strangers through the web. This has created an interesting paradox. While you want to invest independently, you also want to go by the consensus view. Indeed the popular consensus acts like social pressure. In his recent book *Luxury Fever,* Frank analysed the vigour with which people pursue goals that are incongruent with their happiness. Frank referred to the pursuit of conspicuous consumption—consumption of things that are considered as markers of a person's relative success. Conspicuous consumption tends to be a zero-sum game. Inconspicuous consumption, on the other hand, refers to goods and activities that are inherently valuable, that are not bought to show off or achieve status, and that are consumed more privately. The message of Frank's book is that happiness depends on inconspicuous constortion, not conspicuous consumption.

20.7 GLOSSARY

- **Institutionalism :** The principle forerunner of a behavioural theory of the firm is the tradition usually called Institutionalism.

- **Conformity :** Conformity is changing how you behave to be more like others.

- **Social Influence :** It is the intentional or unintentional change in the behaviour of one person caused by another.

- **Compliance :** Compliance is the adherence to some particular set of laws.

20.8 SELF-ASSESSMENT QUESTIONS

Q1.   What do you mean by conformity ?

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Q2.   Define Social Influence.

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20.9 EXAMINATION-ORIENTED QUESTIONS

Q1.   Discuss the impact of social influence on investment.

Q2.   Discuss the impact of social influence on consumption.

20.10 SUGGESTED READINGS

➢   Chandra, P. (2017). Behavioural Finance, Tata McGraw Hill Education, Chennai (India).

➢   Ackert, Lucy, Richard Deaves (2010), Behavioural Finance : Psychology, Decision making and Markets, Cengage Learning.

➢   Forbes, William (2009), Behavioural Finance, Wiley.

➢   Kahneman, D. and Tversky, A. (2000), Choices, value and frames, New York, Cambridge Univ. Press.

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