

# **CRITICAL FACTORS AFFECTING MARKET EFFICIENCY IN INDIAN MIDCAP AND SMALL CAP INDICES**

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**DOCTOR OF PHILOSOPHY**

**in**

**Management**

**By**

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**LOVELY PROFESSIONAL UNIVERSITY, PUNJAB  
2025**

## **Dedication**

**Dedicated to my parents Urmila Singh and Narendra Nath Singh**

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## **DECLARATION**

I, hereby declared that the presented work in the thesis entitled “**Critical Factors Affecting Market Efficiency in Indian Midcap and Small Cap Indices**” in fulfilment of degree of **Doctor of Philosophy (Ph. D.)** is outcome of research work carried out by me under the supervision of **Dr. Mahesh Sarva**, working as **Professor**, in the **Mittal School of Business** of Lovely Professional University, Punjab, India. In keeping with general practice of reporting scientific observations, due acknowledgements have been made whenever work described here has been based on findings of other investigator. This work has not been submitted in part or full to any other University or Institute for the award of any degree.



**(Signature of Scholar)**

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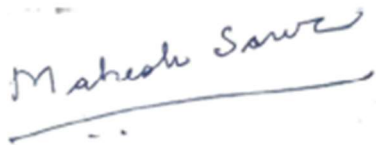
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## **CERTIFICATE**

This is to certify that the work reported in the Ph. D. thesis entitled “**Critical Factors Affecting Market Efficiency in Indian Midcap and Small Cap Indices**” submitted in fulfillment of the requirement for the award of degree of **Doctor of Philosophy (Ph.D.)** in the **Mittal School of Business**, is a research work carried out by **Shailendra Singh, 42000087**, is bonafide record of his/her original work carried out under my supervision and that no part of thesis has been submitted for any other degree, diploma or equivalent course.

A handwritten signature in blue ink that reads "Mahesh Sarva". The signature is written in a cursive style and is underlined with a single horizontal stroke.

**(Signature of Supervisor)**

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## **Abstract**

Worldwide, market efficiency has been an area of debate amongst scholars and practitioners alike. While market efficiency is not an absolute goal by itself, more efficient markets are associated with better resource allocation to productive sectors of the economy through the capital market route. It also fosters greater market integrity and investors trust, thus encouraging widespread participation from retail as well as institutional investors. In this context of Indian capital markets, there were two important starting points to this research. Firstly, there is a broad consensus amongst the scientific community about the existence of weak form of efficiency in Indian capital markets. Secondly, there has been a sudden expansion in the investor base of small cap and mid cap segment in the recent years. The present study was conceptualized against this background to assess the market efficiency of small and mid-cap indices particularly from stockbrokers' point of view. The subject of market efficiency has been thoroughly studied and debated and not new to the researchers. While the concept of market efficiency is well understood, the underlying triggers to inefficiency or predictors of efficiency have not been explored significantly. With widespread participation from retail pockets and application of new age technological innovations, capital markets in India are growing at an unprecedented rate. In this context, it is absolutely essential to understand the critical factors which impact market efficiency to reveal new insights for the investor community as well as the regulator.

Since market efficiency is a broad and dynamic concept, the researcher has defined the academic scope of the study by selecting small cap and mid cap indices to derive meaningful and concrete results. The present study is quite focused in nature and carefully takes a view on market efficiency of mid cap and small cap indices to explain its underlying challenges by including major aspects affecting price movement in markets. The study does not limit itself to exploring the generic set of factors of market efficiency but drills down to the latent factors which are critical and significant enough to impact market performance. Each of the critical factors shape up the overall strength, efficiency and performance of equity markets

and its constituent securities. Thus, a scientific understanding of the critical issues of market efficiency is a precondition to understand market behaviour in the long run.

The current study is both descriptive and exploratory, with data collected using a variety of methodologies. Thus, both primary and secondary sources have been used to gather data. The main tool for gathering data, a questionnaire, was created in a scientific manner following a careful analysis of the literature and consultation with professionals in the broking industry. The same was evaluated rigorously with domain experts as well as respondents to arrive to the factors most relevant to the study. Primary data has been collected from 366 SEBI registered stockbrokers. Keeping in view the technicality of the topic of market efficiency, experts' opinion was needed from market players who were knowledgeable and experienced. As a result, the purposive sample technique was utilized to choose respondents who consistently transact in Indian capital markets and have a thorough awareness of all aspects influencing market efficiency. Statistical techniques such as multiple regression, chi square test, and bivariate correlation were used to investigate the interrelationships between the variables under consideration. Exploratory techniques such as factor analysis and principal component analysis have been used to determine the interrelationships between market efficiency and its important components.

For secondary data, a total of 6 broad market indices of "National Stock Exchange (NSE)" were selected for the study from mid-cap and small cap segments. These six indices included for the empirical investigation were "Nifty Mid Cap 50", "Nifty Small Cap 250", "Nifty Mid Cap 150", "Nifty Full Small Cap 100", "Nifty Mid Small cap" and "Nifty 500". The data was collected on the daily open, high, low, and closing prices of the above-mentioned NSE broad market indices from January 1st, 2008, to December 31, 2023. Instead of depending exclusively on the closing price, the researcher chose to average all four of these prices

to reduce price fluctuation. These data points were used to evaluate the market efficiency of mid-cap and small-cap indexes via descriptive tests, ADF tests, autocorrelation, runs tests, and other methods.

The study concludes that there are five major latent issues that determine the market efficiency in the mid cap and small cap indices. These are “investor behaviour,” “market misconduct,” “historical price”, “market regulations” and “firm accountability and responsibility”. Besides, this there are some indirect factors such as macroeconomic fundamentals which also affect long term efficiency of markets. However, the study has focused on the five most critical factors as the major objective was to explore the key factors and investigate them further.

The researcher observed that that the identified latent factors have found sporadic mentions in capital market studies and no significant research has been conducted on the same. The study further concludes that “investor behaviour” and “market misconduct” emerge as the most critical factor affecting market efficiency in the said segments. For instance, herd mentality and investor biases severely affect investor rationality thereby pulling down the efficiency of markets. This goes against the basic tenet of market efficiency which assumes investor rationality. Similarly, market misconduct hampers fair trade and obstructs price discovery where traders make use of information asymmetry for personal gains. This also contradicts the basic assumption of market efficiency which advocates universal information availability with market participants. Statistical analysis confirmed that the three most important aspects which are significantly interlinked with market efficiency are “investor behaviour,” “market misconduct” and “firm accountability and responsibility.” The study establishes that while fundamental regulations take care of basic market performance, it is critical to address investor behaviour issues and understand the changing nature of market misconduct. The primary data analysis also finds that historical market metrics like market depth, volatility, bid ask spread, volume etc. also impact future price directions. This finding is in line with extant literature which establishes interlinkages between future and historic prices. Although market related metrics is important, the regulator does not have a direct control on these parameters in the short run. Another factor is firm accountability and responsibility which is a statistically significant parameter impacting market efficiency. This is largely addressed through corporate governance regulations. Overall, market misconduct and investor behaviour require the utmost policy attention to enhance market efficiency.



The findings of the secondary data are in tune with market efficiency findings of other researchers. It is concluded that the selected indices exhibit weak form of efficiency and are vulnerable to market misconduct and investor reactions leading to excessive volatility. Keeping in view the rising retail participation in these segments, a better understanding of market efficiency becomes even more critical to understand the challenges which inhibit market integrity.

Achieving market efficiency in India calls for a comprehensive approach encompassing regulatory reforms, technological innovation, investor education and liquidity improvements. By addressing these factors holistically, India can strengthen its capital markets, attract both domestic and foreign investments, and support long term economic growth.

No research work is free from limitations. The study centered around mid and small cap indices to investigate the significant variables of market efficiency. Though most of the issues identified above can be widely generalized based on supporting literature, the chance of overlooking some elements cannot be fully ruled out. The scope of the research was limited to market efficiency in general, therefore there was little room for investigating sector-specific variables influencing market performance in the short and long run. Market efficiency is a dynamic phenomenon. Different subgroups of the capital market may have different results across different time periods. Therefore, the findings should be evaluated considering the stated research objectives and academic scope.

In conclusion, this study provides valuable insights for both industry and academia, particularly in understanding the critical factors influencing market efficiency. By examining factors such as investor behavior, market misconduct, historical prices, market regulations, and firm accountability, this research underscores the multifaceted nature of market dynamics. For industry stakeholders, including regulators, the findings suggest areas of focus to enhance the efficiency of Indian capital markets. A proposed framework offers a structured approach for assessment and improvement.

Furthermore, this study opens avenues for future research. Scholars could delve deeper into individual factors identified here, such as investor biases or sector-specific market efficiencies. Exploring the impact of behavioral economics on market dynamics presents another promising area for investigation. Lastly, while this study provides insights from brokers' perspectives, future research could enrich understanding by exploring investors' viewpoints on market metrics.

**Date: 9<sup>th</sup> June 2025**

**Name: Shailendra Singh**

**Place: Pune**

## Acknowledgement

At the outset, I offer my gratitude to the Almighty, who blessed me with the necessary wisdom and motivation to complete this academic endeavors. I seek his blessings for all my future initiatives.

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**Date: 9<sup>th</sup> June 2025**

**Shailendra Singh**

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# **INTRODUCTION**

# CHAPTER 1

## INTRODUCTION

### Introduction

#### 1.1 Study Background

*“It’s crucial to understand that stocks often trade at truly foolish prices, both high and low. **“Efficient” markets** exist only in textbooks. In truth, marketable stocks and bonds are baffling, their behavior usually understandable only in retrospect.”* Warren Buffett

The assumption of efficiency in capital markets has been discussed and debated for a long. While a perfectly efficient capital market seems to be a far-fetched theory, a well-developed capital market ensures several benefits to investors as well as the economy. It plays an indispensable role in the economy by facilitating efficient allocation of resources through flow of funds between investors and businesses. They support capital formation by enabling enterprises to raise capital through the issuance of stocks, bonds, and other financial instruments, and they also facilitate investment by channeling savings. This leads to business expansion, innovation and subsequently economic growth. Well-functioning capital markets are vital for economic development. They provide access to funding for entrepreneurs and small businesses and create a virtuous cycle of innovation, entrepreneurship, job creation and wealth generation.

Like any other market, capital markets are also governed by the economic forces of demand and supply. These forces provide a mechanism for determining the prices of financial assets as they are traded in the market. Securities price changes reflect investors' assessment of their underlying value, as well as information regarding future expectations and risks. This price discovery mechanism forms the basic premise of efficient markets. In efficient markets, investors earn normal profits and are unable to consistently beat the market prices which are reflective of all types of information, public or private, and investors' risk perception. The debate around market efficiency is well known and both proponents and opponents of the same have demonstrated contradictory evidence through their empirical research work. Despite highly polarized views on the subject, there is a broad consensus on the dynamic and unpredictable nature of capital markets. Market efficiency is not a fixed

concept but a spectrum ranging from inefficiency to efficiency, within which investors conduct transactions driven by the motive for profit.

In a market that operates efficiently, investors can profit from accessing all pertinent information and trade financial instruments with minimal transaction costs. Consequently, it mitigates the opportunity for above-market returns in a large, liquid, and fiercely competitive environment, known as arbitrage. Market efficiency plays a pivotal role in allocating resources effectively from investors to businesses which fuels income generation, job creation and economic growth. However, market failure occurs when resource allocation efficiency is not achieved. In some cases, such market failure is triggered by macroeconomic fundamentals, geopolitical concerns or other understandable causes. However, in many cases the price behavior of stocks, particularly in some market segments, illudes and surprises the investor fraternity without any possible explanation for the price dips and ups. In such cases, the pricing mechanism fails to account for all the costs and benefits that buyers and users must consider when making a purchase, potentially leading to market collapse (**Pathak, 2022**).

Notwithstanding the debate around market efficiency itself, there is a broad consensus about the dynamic nature of markets' efficiency (**Kaura and Rajput, 2023; Kelikume *et al.*, 2020; Antonakakis *et al.*, 2019; Gârleanu and Pedersen, 2018**). Many researchers have emphasized on the need to understand and distinguish the relative levels of efficiency in markets across asset classes and time periods (**Procasky, 2023**).

An efficient market boosts investor confidence by ensuring that prices incorporate all available information. When investors perceive prices as fair and transparent, they are more likely to participate, resulting in increased trading activity and liquidity. They facilitate price discovery by reflecting all available information and incorporating the collective wisdom of market participants into prices. This allows businesses and investors to make more thoughtful decisions when purchasing, selling, or investing in financial assets. It further reduces the likelihood of market distortions and inefficiencies, such as bubbles, speculative manias, and price manipulation, promoting market stability and preventing systemic risks. It serves as the foundation for healthy financial markets and is vital to the economy's general health and stability.

## **1.2 Introduction - Market Efficiency**

Market efficiency is the extent to which prices accurately represent all pertinent and available information. It emphasizes that there is no way to beat the stock exchange if exchanges are efficient since every detail has been incorporated into the price movements of securities. It denies the availability of inexpensive or overpriced stocks and rules out any opportunity for arbitrage.

The concept of market efficiency emerged from the work of several economists and researchers over time, rather than being attributed to a single individual discovery. However, the “Efficient Market Hypothesis (EMH),” which is a vital concept in understanding market efficiency, was formally introduced by Eugene Fama in the 1960s. Fama, an American economist and Nobel laureate, published his seminal paper "Random Walks in Stock Market Prices" in 1965, where he presented the idea that stock prices reflect all available information and follow a random walk pattern. This laid the groundwork for the Efficient Market Theory. The theory indicates that continuously beating the market by leveraging publicly available knowledge is difficult, if not impossible, because prices already include all relevant information.

Efficient market hypothesis is crucial. The market is continuously receiving new data from media outlets, political news, economic studies, and maybe public studies. If the knowledge available to the market is efficient, fresh information will lead the price of shares to move quickly and precisely. Stock prices, in accordance with EMH, accurately represent all relevant market information. An investor in stocks cannot generate any further profit because the price already includes all the details **(Khanh and Dat, 2020)**.

Since Fama's initial work, Burton Malkiel, Robert Shiller, and other economists have developed and improved the concept of market efficiency. The Efficient Market Hypothesis (EMH) has been extensively tested empirically and has evolved into different forms—weak, semi-strong, and strong—based on how various types of information contribute to the complexity and variability of market prices.

Despite being an essential component of contemporary financial theory, the EMH is very controversial and frequently challenged. Supporters believe that fundamental or technical analysis is ineffective for identifying undervalued companies or predicting market moves.



According to them, neither method can consistently yield risk-adjusted excess returns (alpha), suggesting that only insider information could potentially generate above-average returns adjusted for risk. Despite a substantial body of research supporting the Efficient Market Hypothesis (EMH), there remains disagreement among scholars (**Downey, 2024**).

### **1.3 The Debate Around Market Efficiency**

The efficient markets hypothesis states that investors try to maximize their investment strategies by basing their judgments on the information at their disposal. However, empirical evidence shows investors frequently exhibit irrational and predictable biases, influenced by psychological factors (**Mittal, 2022; Dervishaj, 2021; Ye *et al.*, 2020**).

Behavioral finance complements traditional financial theory by recognizing the influence of human behavior on financial markets and providing tools to improve market efficiency in the face of psychological biases. It integrates the emotional aspect into conventional financial models to elucidate how the collective decisions of individual investors, who may depart from strict neoclassical rationality, impact financial markets (**Raut, 2020; Bisati *et al.*, 2021**). Therefore, behavioral economics emerges as one of the most critical influencers of market efficiency.

Testing the efficient market hypothesis presents numerous challenges, as evidenced by a substantial body of literature showcasing price fluctuations that contradict the hypothesis. Conversely, many investigations provide evidence supporting various forms of the efficient market hypothesis. Both camps do offer numerous empirical arguments and statistical test results. Philosophically, it raises questions about how contradictory statements can be supported by strong proofs on either side.

Another complex issue arises concerning the concept of acceptable risk. The efficient market hypothesis doesn't necessarily negate the existence of strategies yielding higher profits than the market portfolio, even if they entail greater risk. The market typically rewards investors who embrace risk, with the expectation that higher-risk strategies will generally yield higher average returns. A challenge to the efficient market hypothesis would arise if an investment strategy consistently generated returns surpassing the associated risk premium over an extended period. However, the lack of a universally accepted definition of "risk" complicates accurate measurement.

The majority of studies on stock market efficiency focus on testing or validating the efficient market hypothesis across its various forms: strong, semi-strong, and weak. Strong form of the efficient market hypothesis testing presents notable challenges due to the requirement for access to non-public information. Even when examining the investment behavior of corporate executives, who may have insider information, achieving exceptional results remains elusive. While examining the weak form of the efficient market hypothesis involves testing whether historical price data can predict future prices, commonly through techniques like technical or graphical analysis. Certain studies have shown no distinction in portfolio returns between those constructed using technical analysis and those chosen randomly. Thus, objections against the efficient market hypothesis in its weak forms are minimal. Research has also explored the semi-strong form of the hypothesis, yielding varied results concerning information efficiency and volatility tests across different timeframes.

The efficient market hypothesis is a cornerstone of modern finance theory (EMH). After being separately proposed by **(Samuelson, 1965; Fama, 1963 & 1965)**, it quickly became well-known among practitioners and academics. In essence, the efficient market hypothesis (EMH) states that stock prices in an efficient market promptly incorporate all pertinent information that is accessible to the public. This means that it is impossible for anyone to regularly beat the market without taking on more risk. Future price fluctuations of stocks are as predictable as a sequence of collected random numbers due to the random nature of information delivery. In other words, the efficient market hypothesis asserts that stock price swings are random events and hence difficult to anticipate future price movements based on past performance.

Therefore, EMH has been extensively studied and debated over the years, the notion that price changes are independent, uncorrelated, and unpredictable was originally introduced by Louis Bachelier. **(Blackledge and Lamphiere, 2021)** referred the Bachelier concept and elaborated that the sequence of security prices follows a stationary Gaussian random walk, implying that price changes do not exhibit autocorrelation. This concept was further elaborated upon by **(Stojkoski et al., 2021)** who likened the logarithm of price changes to particles undergoing Brownian motion.

Since its inception, a significant portion of the literature has been devoted to examining the validity of the EMH, particularly whether markets exhibit a random walk behavior. Through the analysis of various empirical datasets, conflicting evidence has emerged. It's important to recognize that EMH is not a binary concept, and several studies have highlighted the dynamic nature of market efficiency. These studies, conducted by researchers such as (**Ammy-Driss and Garcin, 2023; Wang *et al.*, 2021; Blackledge and Lamphiere, 2021**), have shed light on the evolving understanding of market efficiency.

#### **1.4 Relative Market Efficiency**

The continuous discussion over efficiency vs inefficiency in the context of emerging markets has only gotten more heated over time. Advocates of market efficiency in emerging markets highlight the significant improvements in market infrastructure, regulatory frameworks, transparency, and investor participation over the years. They argue that these developments have contributed to increased market efficiency, particularly in the more liquid and well-regulated segments of the market, such as large-cap stocks (**Bartels Asiamah, 2023**) which is not the case in small cap and mid cap segments (**Adrian et al., 2022**) However, critics point to several factors that suggest inefficiencies in emerging capital markets.

Additionally, concerns about information asymmetry, insider trading, market manipulation, and regulatory enforcement challenges raise questions about the overall efficiency of emerging markets. Furthermore, behavioral biases among investors, cultural factors, and structural issues within the Indian economy can also impact market efficiency. These factors contribute to the ongoing debate and lack of consensus regarding the efficiency of emerging capital markets.

(Alves et al., 2020) suggested that it is more practical to assess a market's relative efficiency, given the concept of a perfectly efficient market appears to be unreachable in reality. Therefore, it is more beneficial to differentiate between periods or markets that exhibit varying degrees of efficiency. Similarly, (**Chen and Haga, 2021**) concludes that markets are not always efficient. Investor sentiments, cognitive errors, market crashes, manipulative behaviour, regulatory compliances and trade volume all contribute to

inefficiencies in the stock exchange. Numerous studies have challenged the concept of Homo Economicus, highlighting cognitive flaws in investing decision-making. This suggests that human mistakes can make markets inherently inefficient. However, this does not imply that markets are not efficient most of the time. Markets are responding to high-frequency and AI trading, bringing asset prices closer to their true value. Although the EMH is generally accurate, there is evidence that markets include inefficiencies that may be exploited to generate higher profits.

Efficient sovereign bond and equities exchanges are crucial for a nation's economic growth. Effective pricing and allocations of funds lead to less distortions, higher risk pricing, and a balanced risk-adjusted profit for shareholders. **(Kohler and Stockhammer, 2020)** claimed that the financial markets are the markets that most closely resemble the ideal competitiveness within the economy and mirror economic growth of a nation over a period of time.

According to Fama, market efficiency exists in three different forms that is strong, semi strong and weak forms.

**Strong Form** – In its strong form, market efficiency suggests that stock prices incorporate all market, public, and private information. This implies that no investor possesses exclusive access to information that can be exploited for significant profits. Even insider knowledge would not benefit investors in a market with strong-form efficiency since it would already be reflected in asset values.

**Semi strong form** - In the semi-strong form, market efficiency suggests that stock prices change quickly to public information, including dividend and earnings announcements, as well as political or economic events. It is widely accepted that available information publicly is already factored into asset prices. This encompasses historical data, company-specific information, and other public sources such as economic indicators, news releases, and analyst forecasts.

Investors in a semi-strong efficient market think it is impossible to continuously get above-average profits by trading just on information that is readily available to the public. This

suggests that strategies relying solely on fundamental analysis, technical analysis, or any other approach based on public information will not consistently outperform the market.

**Weak form** – In the weak form, market efficiency, implies that asset prices fully reflect all past market prices and data. This basically suggests that historical data analysis cannot reliably produce excess returns since prior trade information, including as price and volume data, is already included into present asset values.

Besides, stock market other assets like cryptocurrencies provide a substitute for conventional financial products like shares and gold and the market for them is expanding quickly. Cryptocurrency values exhibit predictability, indicating a degree of weak market inefficiency. This suggests that buyers have opportunities to identify undervalued cryptocurrencies and potentially earn higher profits (**López-Martín *et al.*, 2021**). (**Hariyanto and Murhadi, 2021**) observed that dividend announcements result in favorable “Average Abnormal Return (AAR) and Cumulative Average Abnormal Return (CAAR)” numbers, regardless of whether the dividend is increased or decreased. Market reacts on dividend announcements as a reflection of investor sentiment. In such cases, the market efficiency hypothesis is supported in its semi-strong version. (**Himeur *et al.*, 2021**) It is recognized that establishing strong form efficiency, which involves private or confidential data, poses particular challenges in market informational efficiency. His findings indicate that stocks within the WIG 20 index, listed on the Warsaw Stock Exchange, demonstrate strong form efficiency. The above are just a few examples to show that efficiency differs across geographical markets, asset classes and time periods.

### **1.5 Capital Market Efficiency in the Indian Context**

Over the past two decades, Indian capital markets have experienced remarkable expansion, establishing themselves as a globally resilient force. Liberalization fueled economic growth augmented the pace of privatization manifolds which called for several avenues for investment and capital raising. Even amidst global financial crises and geopolitical uncertainties, the Indian capital markets have consistently showcased a notable ability to rebound, characterized by heightened stability and sustainability.

Globally, Indian capital markets are a premier destination for foreign institutional investors and international enterprises seeking expansion and investment. This is largely attributable to growth potential of the Indian economy driven by a large and young population, rising middle class, and ongoing economic reforms. India's young demographic profile presents a favorable investment landscape, with a growing workforce and increasing consumer spending driving economic growth. Besides demographic dividend, the country has reaped several benefits from advanced technological advancements and widespread digital transformation. Amidst global financial meltdown, Indian capital market have provided FIIs with diversification benefits, spreading their investment risk across different geographical regions and asset classes. India has established a robust regulatory framework, including “Securities and Exchange Board of India (SEBI)”, which enhances transparency, investor protection, and confidence in the market. Moreover, the market is characterized by ample liquidity, allowing foreign investors to easily buy and sell securities without significant market impact. India boasts a vibrant corporate sector with a diverse range of companies across various industries, offering attractive investment opportunities for retail and institutional investors alike. India maintains a relatively stable political environment, which fosters investor confidence and long-term investment outlook.

From an academic standpoint, Indian capital markets have occupied a prominent place amongst researchers. the complexity, diversity, and significance of Indian capital markets make them a fertile ground for research across various disciplines, ranging from finance and economics to policy and governance. Ample amount of research has been conducted on EMH around Indian capital markets, yielding mixed results about the nature of its market efficiency across periods, sectors and indices (**Woo *et al.*, 2020**). However, the extant literature on the subject leads us to believe that Indian capital markets are prone to several market inefficiencies. This means to say that they exhibit weak form of efficiency or at best the semi string form in certain cases, thereby providing opportunities to earn superior market returns through targeted strategies. In India, there's little support for the efficient market theory, even in its most basic form. Institutional investors rely on market research to predict prices and find undervalued stocks. To determine whether to buy and sell stocks, they utilize both fundamental research, which examines a company's financial

health, and technical analysis, which concentrates on price patterns and trends. While there are not many proponents of technical analysis in India, market research generally considers both fundamental and technical factors **(Garg, 2017)**. **(Mazumder, 2017)** shows that no matter how the market is doing, you can make money by buying stocks in March and selling them in July or November. This goes against the idea that market movements are random, which means there shouldn't be any predictable patterns. In an efficient market, studying past seasonal patterns should not help you earn more money. Also, the research suggests that insider trading might be happening, and Indian stock exchanges are not meeting the standards for semi-strong market efficiency.

It may not be wrong to say that most of the studies have only evaluated the EMH for different time periods and yielded results on the forms of market efficiency. Conforming to the postulates of EMH, many economists maintain that markets reach equilibrium due to the dominance of informed and rational agents. With advancements in technology, investors are expected to have speedy access to information, allowing them to accurately predict stock values based on information that is available. It is commonly acknowledged that stock prices rapidly assimilate information from many sources. However, there are instances where the EMH fails. While the EMH acknowledges exceptions such as calendar effects and some market anomalies, the stock market's performance continues to surprise regulators and investors alike. The array of market anomalies, sudden crashes and rebounds, prolonged investor sentiments, and acute volatility have consistently intrigued scholars, prompting them to continuously test the efficiency of markets across all forms of the EMH.

## **1.6 Indian Stock Market – An Overview**

The following sections look at the Indian stock market's structure and behavior, including its size, participants, and regulatory framework.

### **1.6.1 Indian Stock Market and its Participants**

Long-term investments, such as bonds, debt instruments, and stocks, are traded in two separate markets: the primary market, where new securities are issued. Conversely, the

secondary market is where securities that have already been issued are purchased and sold. Securities are initially traded on the main market in order to raise money. On the other hand, the secondary market gets involved when an investment is sold twice to raise long-term money. The stock exchange serves as a channel through which secondary market trades are conducted. A security must be registered on a particular stock exchange in order to be traded there **(Garg, 2014)**.

The “Bombay Stock Exchange (BSE)” and the “National Stock Exchange (NSE)” stand as the primary stock exchanges in India, facilitating the majority of trading activities. Established in 1875, the BSE was the first to emerge, while the NSE commenced trading in 1994, following its establishment in 1992. Both exchanges operate under identical trading methods, hours, and settlement procedures. As of December 31, 2023, the NSE boasts 2,266 listed companies, whereas the BSE hosts 5,315 listed firms as of January 30, 2024. Almost all of India's leading corporations are dual listed on both platforms. While the NSE commands higher trading volumes, the BSE holds a longstanding reputation as the more venerable exchange **(Singh, 2024)**. **(Manonmayi, 2022)** elucidated on the stock exchange's universal appeal, attracting individuals from diverse backgrounds as well as various organizations or institutions.

Investors in stock markets can be classified into the following groups.

- **Domestic Institutional Investors:** It covers investors who act as middlemen or make investments within the financial assets of the nation in which they are located.
- **Asset management firms:** Most mutual fund providers allocate their clients' money to assets that align with their stated financial goals. They are known as asset management firms.
- **Foreign Institutional Investors:** Hedge funds, international Asset Management Companies (AMCs), and other stock market participants fall under this category.
- **OCI and NRI:** Investors who are based abroad yet are of Indian origin fall under this category.



### **1.6.2 Stock Exchange - NSE**

This exchange holds the premier position in the country's stock market, ranking among the top four globally in terms of trading volume. Pioneering digital trading, it became India's first market to adopt screen-based technology. Since its inception in 1994, SEBI data indicates that it has consistently maintained its status as the largest equity trading platform in India, leading in both gross and daily volume every year since 1995. The NSE's fully integrated operations encompass exchange listings, trading activities, clearance and settlement processes, indexes, market data dissemination, technological advancements, and initiatives aimed at enhancing financial literacy. In adherence to its policies and procedures, the NSE oversees compliance by its trading and settling members (NSEIX, 2021). The establishment of the NSE was primarily aimed at introducing transparency to the stock exchanges. Initially utilizing a computerized screen-based system, the NSE later transitioned to floor trading, employing an open outcry method. Moreover, the NSE played a pivotal role in founding the National Securities Depository Limited (NSDL), enabling traders to digitally manage and monitor their securities and shares through a DEMAT account. Renowned for its digital security management, user-friendliness, transparency, cost-effectiveness, and enhanced trade performance, the NSE has significantly broadened the appeal of the Indian equity market to both domestic and foreign investors (Sumathi, 2018).

### **1.6.3 Stock Exchange - BSE**

Founded in 1875, the BSE stands as Asia's inaugural and swiftest stock market globally, boasting an impressive average response time of 6 microseconds. It has cemented its position as one of India's premier exchange organizations. Over its illustrious 143-year history, the BSE has played a pivotal role in fostering the growth of the Indian business landscape by providing a robust infrastructure for capital raising. Originally established as 'The Native Share & Stockbrokers Association', it made history in 2017 by becoming India's first listed stock market. Presently, the BSE facilitates trading in stocks, foreign currencies, bonds, derivatives, and mutual fund assets, offering a transparent and equitable marketplace. The BSE earned official recognition in May 1927 following the enactment of

the Bombay Securities Contract Control Act 1925. During the colonial era, India's financial ecosystem languished due to inadequate government investment in economic development, prompting many foreign companies to seek funding from the London capital market.

#### **1.6.4 Market Capitalization**

Market capitalization, commonly known as market cap, is a key financial metric used to determine the total market value of a publicly traded company. It is calculated by multiplying the company's current share price by its total number of outstanding shares. This figure helps categorize companies into large cap, mid cap, small cap, and micro-cap, indicating their size and market presence. While market cap provides a quick snapshot of a company's value and perceived stability, it should be used in conjunction with other financial indicators to make well-informed investment decisions.

The importance of market capitalization can be discussed as under:

- **Indicator of Size:** Market cap provides a quick assessment about the size of the company within the market. Higher market caps companies are generally perceived as bigger and more recognized, while with lower market caps often considered as smaller or emerging.
- **Investment Decision Making:** Investors often use market capitalization to categorize stocks into different investment categories. For example, large-cap stocks typically belong to well-established companies with stable earnings and lower risk, making them suitable for conservative investors. Conversely, because of their smaller size and sometimes unstable profitability, small-cap and mid-cap companies carry more risk even if they may have greater growth potential.
- **Benchmarking and Index Construction:** Market capitalization is instrumental in creating diverse stock market indices, including well-known benchmarks like the S&P 500, Dow Jones Industrial Average, and Russell Indexes. These indices serve as standards for evaluating the performance of various market segments and for comparing the performance of investment portfolios.

- **Liquidity Assessment:** Market capitalization can signal the liquidity of a stock, which is crucial for investors seeking to trade shares without causing substantial price movements. Stocks with bigger market capitalizations often have higher liquidity due to a wider pool of buyers and sellers in the market.
- **Valuation Comparisons:** A basis for evaluating the values of several businesses within the same sector or industry is provided by market capitalization. Investors can determine relative valuation indicators like price-to-book (P/B) or price-to-earnings (P/E) ratio by comparing the market capitalization of similar companies.
- **Risk Management:** Understanding the market capitalization of a company can help investors manage risk within their portfolios. Diversifying across businesses of various sizes helps lower the risk of the entire portfolio., as smaller companies may have different risk-return profiles compared to larger, more established ones.

Overall, market capitalization serves as a fundamental measure that investors, analysts, and financial professionals use to understand and evaluate companies within the stock market. Stocks have categories such as large, mid, and small caps on the exchange based on their market capitalization. The stocks with the largest market capitalization are known as large-cap stocks, and they are followed by mid and small-cap companies.

- **Large-Cap Companies:** Market capitalization is the basis for ranking firms listed on stock exchanges in accordance with regulations established (SEBI). The top 100 firms classified as large-cap have a market capitalization of at least Rs 20,000 crore or more large-cap companies in the Indian market typically have the highest market capitalizations. There is no strict threshold, but large-cap companies are often among the top 100 or 200 by market capitalization. These companies are often well regarded in their respective fields, have a large consumer base, and are well-established.

**Examples** of large-cap companies in the Indian market include HDFC Bank, Reliance Industries, Tata Consultancy Services (TCS), Infosys, and Hindustan Unilever Limited (HUL).

- **Mid-Cap Companies:** Mid-cap firms with market capitalizations ranging from around Rs 5,000 to Rs 20,000 crore, and they are ranked between 101 and 250. Mid-cap companies in India generally fall between large-cap and small-cap companies in terms of market capitalization. There is no precise cutoff, but mid-cap companies typically rank between 101st and 300th or 400th by market capitalization. These companies established themselves in their industries but might still be in a phase of growth and expansion. Though they come with a higher risk, mid-cap firms sometimes have more room for development than their large-cap counterparts.

**Examples** of mid-cap companies in India include Marico Limited, Ashok Leyland, Voltas Limited, and DLF Limited.

- **Small Cap Companies:** These firms have a market capitalization of less than Rs 5,000 crores and are ranked 251st and below. The relatively recent startups and enterprises in their growth stage make up the small-cap group.

In India, the market capitalization of small-cap firms is smaller than that of large-cap and mid-cap firms. Again, there is no fixed threshold, but small-cap companies are typically ranked beyond the top 300 or 400 by market capitalization. These businesses, which are frequently newer, could be involved in burgeoning industries or specialized markets. Small-cap stocks are known for their potential for rapid growth but also tend to be more volatile and riskier. Examples of small-cap companies in India include India Bulls Real Estate Limited, Adani Green Energy Limited, IDFC First Bank, and Indian Hotels Company Limited.

### 1.6.5 Market Regulations, Compliance and Surveillance

Regulations in the market are essential for maintaining the integrity, fairness, transparency, and stability of financial markets (**Buttigieg *et al.*, 2020**). Robust market regulations are a precondition to foster efficiency and trust in the capital markets. The Indian capital markets are regulated by various regulatory bodies and governed by a comprehensive framework of regulations and laws.

#### 1.6.5.1 SEBI and its Functions

SEBI is the main regulatory body in charge of the Indian capital markets. After being founded in 1988, SEBI was given formal authority in 1992 when the Securities and Exchange Board of India Act, 1992 was passed. The organization's principal responsibility is "to safeguard the interests of investors in securities and to encourage the growth of, and to regulate the securities market and for matters connected therewith or incidental thereto," as stated in the preamble (SEBI, 2023). The Board's duties also include promoting and regulating the securities exchange as well as safeguarding the rights of investors. Broadly it works with the following objectives.

- **Investor Protection:** Market regulations are designed to protect investors' interests by ensuring they receive timely and accurate information about securities, companies, and market activities. These regulations frequently include disclosure mandates, such as financial reporting standards, aimed at enabling investors to make well-informed investment choices.
- **Market Integrity and Fairness:** Regulations are in place to prevent fraudulent activities, market manipulation, insider trading, and other unethical practices that could undermine market integrity and fairness. Regulators enforce rules to maintain a level playing field for all market participants and promote trust in the financial system.
- **Market Stability:** Regulations help maintain market stability by establishing risk management measures, such as margin requirements, position limits, and circuit breakers, to mitigate excessive volatility and systemic risks. Regulators monitor market activity and intervene when necessary to prevent disorderly markets or financial crises.
- **Capital Formation and Efficiency:** Regulations facilitate capital formation by establishing rules for issuing and trading securities, such as initial public offering (IPO) requirements and listing standards. By promoting transparency and investor confidence, regulations contribute to efficient capital allocation and the functioning of primary and secondary markets.

- **Systemic Risk Management:** Regulators monitor and regulate financial institutions, including banks, investment firms, and clearinghouses, to prevent systemic risks that could threaten the stability of the broader financial system. The purpose of regulations like capital adequacy requirements, resolution procedures, and stress testing is to reduce systemic risks and improve the resilience of financial institutions.
- **Market Surveillance and Enforcement:** Regulators conduct market surveillance activities to detect and deter misconduct, market abuse, and violations of securities laws and regulations. Enforcement actions, including fines, penalties, and sanctions, are imposed on individuals and firms found to have violated regulatory requirements, serving as a deterrent to future wrongdoing.
- **Adaptation to Market Changes:** Regulatory frameworks evolve to address emerging risks, technological advancements, and market developments. Regulators regularly review and update regulations to ensure they remain effective, relevant, and adaptable to changing market conditions and innovation. In general, market regulations play a critical role in maintaining the efficiency, integrity, and stability of financial markets, preserving investor confidence, and protecting the interests of all parties involved.
- By establishing clear rules and standards, regulators help promote orderly and well-functioning markets that support long term market efficiency (Tarbert, 2020)

A brief snapshot of key market regulations concerning the market operations is given below

## 1.7 Aspects Impacting Market Efficiency

As discussed earlier, market efficiency is impacted by plethora of direct and indirect factors which make markets relatively efficient or inefficient. These factors primarily include aspects like market misconduct, informational asymmetry, investor behaviour, participation by international investors, market regulations, surveillance systems etc. Some of the key factors and their interconnectedness with market efficiency are discussed below.

### 1.7.1 Interlinkages between Informational Asymmetry and Market Efficiency

Fama, the recipient of the 2013 Nobel Prize in Economics, contends that market efficiency hinges on the accuracy of all available information. However, information accessibility

isn't uniform; some market players may possess information while others lack it. This gives rise to the principle of information asymmetry.

In a transaction, informational asymmetry happens when one party has access to more or better available information than the other. When insiders such as corporate executives or major investors—possess non-public knowledge that provides them an edge over other market players, it is commonly used in the context of the financial markets. In his 1970 article "The Market for Lemons," George Akerlof (who won the Nobel Prize in Economics in 2001) revolutionized economic theory by illustrating the detrimental effects of information asymmetries on market functionality.

Information asymmetry, a cornerstone of modern microeconomics, describes a scenario where two parties involved in an exchange possess unequal information. This concept challenges the notion of a perfectly competitive market, where buyers and sellers are presumed to be rational and base their decisions on identical information. Such information disparities are common in various settings (e.g., employer/applicant, seller/buyer, insurer/insured). It arises when one party in a transaction has access to different or superior information regarding the product's characteristics (e.g., price, quality, associated risks). In essence, parties rarely share identical information, which can significantly impact their decisions and behaviors in the transaction thus impeding market efficiency to a great extent. "Variance ratios, price informativeness, and post-earnings announcement drift (PEAD)" all indicate a decline in market efficiency following coverage reduction. High levels of trading aggression during post-announcement timeframes cause price overreaction because they reflect a crowding out of aggressive dealers following earnings announcements. The larger initial price response from more vigorously traded equities is offset by their prospective return reversals. It's interesting to see that price reaction is limited to positive news samples. On the other hand, strong sale orders reduce the PEAD drift by driving prices towards the fundamental value following negative news. Increased variability in the perceptions of naive investors following positive news might be the reason for the asymmetry in the outcomes. Investors who lack sophistication may find it more challenging to reach a consensus on how to interpret the {residual} news since a larger

proportion of previously accessible positive information has been priced in prior to the statement publication **(Klein, 2020)**.

Recognizing the detrimental effects of informational asymmetry on market efficiency, regulators often intervene to promote fair and transparent markets. Laws such as insider trading regulations aim to mitigate the advantage held by insiders, thus fostering market efficiency. In the presence of informational asymmetry, investors may adjust their behaviour. They may become more cautious, demanding higher returns to compensate for the risk of trading against better-informed participants. This behavior affects market dynamics and can influence efficiency. Over time, market participants develop strategies to cope with informational asymmetry. For instance, analysts conduct research to uncover valuable insights, and investors diversify their portfolios to mitigate risk. These efforts contribute to market efficiency by incorporating new information into prices more rapidly

Overall, informational asymmetry poses a challenge to market efficiency by allowing certain participants to gain an unfair advantage. However, through regulation, investor behaviour adjustments, and market dynamics, efforts are made to mitigate this imbalance and uphold the efficiency of financial markets.

### **1.7.2 Interlinkages between Market Misconduct and Market Efficiency**

Market manipulation activities are a major impediment to market efficiency. It refers to the illegal or unethical practices used to artificially effect the price or trading volume of financial instruments in order to deceive other market participants or to achieve unfair advantages in the market **(Riju, 2022)**. It may change the real dynamics of supply and demand for securities and jeopardize the stability and effectiveness of the financial system. The nature and scope of manipulative activities have changed over the years. Besides enhancing market operations and regulatory systems, new age technologies like machine learning and artificial intelligence have also changed the way trade manipulations are conducted in the markets **(Faysal, 2023)**. Though, market manipulation has a profound impact on efficiency levels in the market, the subject has not been explored much by researchers. The conceptual as well as practical understanding of market manipulation has



changed over the years. Market manipulation refers to deliberate actions intended to disrupt the free and fair functioning of financial markets, resulting in artificial, false, or misleading appearances concerning the price or market conditions of a security. Market manipulation may result in large financial losses and erode investor trust (Singh, *et al.*, 2024; Singh, 2021). There are several ways to manipulate the market, including:

- **Price Manipulation:** This entails manipulating the price of a securities by engaging in dishonest or fraudulent trading practices. Examples include:
- **Pump and Dump:** A plan wherein scammers disseminate inaccurate or misleading information to artificially boost the price of an asset (pump) and draw in investors. The scammers dump their holdings (dump) when the price hits a predetermined point, which causes the market to crash and leaves other investors losing money.
- **Painting the Tape:** Traders coordinate their buying or selling of a security to artificially increase trading volume and influence price movements. This tactic can entice other investors to join the trend, potentially exacerbating price manipulation.
- **Spoofing and Layering:** To create false market supply or demand, this method involves placing sizable orders with no plan to fulfill them. Traders might withdraw these orders after achieving their desired price effect. Spoofing entails placing and swiftly withdrawing orders on one side of the market to manipulate prices, while layering involves posting multiple orders at various price levels to mislead other traders.
- **Insider Trading:** This practice entails trading securities using material, non-public information that can impact the security's price. Insider trading is prohibited and unfair to other market participants who lack access to such information. It undermines market integrity and diminishes investor confidence.
- **Wash Trading:** This practice involves a single entity engaging in simultaneous buying and selling of the same security to generate artificial trading volume without changing ownership. Wash trading can create the appearance of liquidity and market activity, but it does not represent genuine trading interest.

- **Marking the Close:** This involves placing large orders at the closing price of a trading session to manipulate the closing price of a security. This can affect index prices and trigger automatic trading or investment decisions based on closing prices.

In recent years, its influence and depth have grown to the point where manipulation might have macroeconomic repercussions. The connections between market manipulation and financial health are becoming increasingly crucial to take into account as the practice of manipulating markets grows. Because manipulative methods impair intra-market networks, increase volatility, and misprice risk, they can both propagate and intensify systemic problems in the market (**Fletcher, 2020**). Stock manipulation is a significant problem for the effectiveness of markets. Pump-and-dump behaviour negatively impacts the accuracy of prices. Furthermore, it deteriorates market efficiency, particularly in the aftermath of manipulations.

When determining the effects of manipulating stocks on prices, firm fundamentals play a significant role. Manipulation of enterprises with bad fundamentals has an even more deleterious impact on market efficiency than manipulation of companies with strong fundamentals (**Huang and Cheng, 2015**). There exist theoretical contentions that suggest the presence of manipulation potential enhances informational efficiency by creating more motivation for market players to acquire knowledge. The combined ex-ante and ex-post consequences of manipulation have a net impact on economic efficiency through resource allocation, which makes pricing accuracy significant (**Putniņš, 2012**). Liquidity, return, and volatility of the shares increase during the manipulation phase and decrease afterwards. It is evident that operators really cause false information to appear around price, fluctuation, and volume in emerging markets. This can lower market efficiency by making arbitrage actions in the marketplace more effective. Furthermore, when manipulating stocks in developing markets, operators choose illiquid, struggling, and less volatile stocks (**Ergün et al., 2021**).

Insider trading remains a pervasive form of market manipulation and remains a significant issue in global financial markets. It involves individuals making stock trades based on significant nonpublic information, negatively affecting market efficiency, fairness, and

transparency. It also clarifies how shareholder confidence and trust are eroding, undermining capital market efficiency and impeding economic expansion. Insider trading impedes overall economic growth and maintains wealth disparity. Insider trading increases social inequality and hinders long-term economic growth by skewing resource distribution and maintaining unjust advantages.

Market manipulation in any form erodes investor confidence, integrity and efficiency of the market. Inefficient markets characterized by manipulation may deter participation from rational investors, leading to reduced liquidity and impaired price discovery mechanisms. Conversely, efficient markets built on transparency and fair practices tend to attract more participants, enhancing liquidity and improving market efficiency. In the long-term, persistent market manipulation can have long-term consequences for market efficiency. If investors perceive markets as being prone to manipulation, they may become hesitant to participate, leading to reduced liquidity and impaired price discovery. This can undermine the informational efficiency of markets over time, as prices may not accurately reflect underlying fundamentals.

Market manipulation is prohibited by securities laws and regulations in most jurisdictions, and regulatory authorities actively monitor and investigate suspicious trading activities. Penalties for market manipulation can include fines, sanctions, civil lawsuits, and criminal prosecution. Maintaining market integrity, protecting investor interests, and ensuring the smooth operation of financial markets all depend on the detection and prevention of market manipulation.

### **1.7.3 Interlinkages between Market Regulations and Market Efficiency**

The interplay between capital market laws and market efficiency is complex and multidimensional. Market regulations have a sustained impact on stock price efficiency as well. The changing nature of price efficiency demonstrates that laws and policies related to stock markets can support stock pricing efficiency in the short run as well as long run (He and Fang, 2019).

Strong market laws guarantee that all players have equal access to opportunities and information, which in turn promotes fairness and transparency. Rules can assist level the

playing field and encourage the efficiency of the market. Requirements for transparent disclosure guarantee that investors may get relevant information to make well-informed decisions, which in turn improves market efficiency. The role of market regulations is extremely critical in mitigating information asymmetry which is a key impediment to market efficiency (Singh, *et al.*, 2024; Singh, 2021). Capital market regulations often include provisions to protect investor rights and prevent fraud and misconduct. A well-regulated market is more attractive to investors, leading to increased participation and liquidity, which are essential for market efficiency.

While regulations are essential for promoting market efficiency, excessive or poorly designed regulations can stifle innovation and impede market functioning. Sustaining efficiency requires finding the ideal mix between permitting market innovation and regulating supervision. Market integrity and sufficient investor protection should be guaranteed by regulatory frameworks that are adaptable enough to change as the market does.

Capital market regulations are closely intertwined with market efficiency, as they aim to promote fairness, transparency, and stability while mitigating information asymmetry and protecting investor rights. Finding the right balance between regulatory oversight and market innovation is essential for fostering efficient and resilient capital markets. However, research around market regulations, compliance and market surveillance systems is extremely sporadic. Furthermore, studies related to market efficiency have barely investigated the impact of regulations on market performance and efficiency of price movements.

As discussed earlier, in the Indian context, SEBI has supreme regulatory powers to regulate all the activities of the capital market.

The Securities Laws (Amendment) Act, 2014 was enacted by the Indian Parliament, giving the Board further jurisdiction to request information from any outside authority, from banks or other individuals, and to conduct searches and seizures. It has the power to control any Ponzi or money-collecting scheme, get phone logs from anyone engaged in these illegal operations, and detain defaulters. Additionally, the Act permits the creation of special

courts to expedite the examination and prosecution of cases pertaining to the securities market.

To stop stock manipulation, exchanges and market regulators implement a number of policies. Graded Surveillance Measures (GSM) have been implemented by regulatory organizations in India. The GSM is distinct from other monitoring methods in the globe since it uses the company's financial standing as a shortlisting criterion to choose which businesses to include in the plan of action. Additional surveillance measures (ASMs) have been put in place by SEBI, which monitors equities daily for unusual price and volume movements along with the involvement of market-dominant players in trading activities. Stocks falling outside of the aforementioned criteria' predetermined bounds are assigned to the ASM category, where they are subject to both general extra margin requirements and selective extra margins for the dominant investor. The technique is intended to alert shareholders to suspicious behaviour in the stock that is not backed by fundamentals and, on the contrary, discourage manipulators. Following inclusion, the stock's price stabilizes and there is a general decrease in liquidity (**Inamdar and Chari, 2023**).

The “SEBI (Prohibition of Insider Trading) Regulations, 1992,” establish strict guidelines for insider trading and provide guidelines for reporting and compliance. Listed firms are also required by the Firms Act of 2013 and several agreements regarding listing to maintain openness in their corporate information and to deter insider trading (**Prakash, 2024**). The majority defend their opposition to insider trading on the grounds that it is unfair; perhaps the most significant effect is that insider trading reduces market efficiency. The new legislation from 2002 mandates that listed businesses and other organizations create internal policies and procedures to stop directors, staff, shareholders, and others from engaging in insider trading. It has been noted recently that laws against insider trading are ineffective, difficult to implement, and have negligible effect on the financial markets. As foreign regulators work to bolster the trust of local shareholders and draw in the global investing community, the need to monitor insider trading has also gained worldwide recognition (**Rewaria, 2021**).

Although once created as an administrative organization, SEBI has legislative, judicial and administrative authorities to regulate capital markets in India (**Hari, 2020**). From a

regulatory standpoint, it is crucial to manage the capital market's complexity by expanding it and safeguarding investors' interests simultaneously.

#### **1.7.4 Interlinkages between Corporate Governance Disclosures and Market Efficiency**

Corporate governance practices play a crucial role in shaping investor perceptions, managing risks, and fostering long-term value creation, all of which can influence stock price movements in the stock market. Companies that prioritize good governance are more likely to attract investors, support higher stock prices, and contribute to a more efficiency and stability of the market. Measures such as insider trading laws and disclosure requirements for corporate information help reduce the advantage held by insiders and ensure that material information is promptly disseminated to all market participants. This fosters a more efficient allocation of resources as prices reflect all available information more accurately.

Companies with strong corporate governance structures, such as independent boards of directors, transparent financial reporting, and well-defined shareholder rights, are perceived as less risky investments. As a result, investors are more likely to buy and hold shares of such companies, leading to increased demand and better price discoveries (**Gatto *et al.*, 2021**). With proper disclosures all key information is easily disseminated and publicly held by the market participants, leading to increased efficiency. Moreover, the goal of corporate governance practices like shareholder rights, board independence, and executive compensation plans is to match management's objectives with shareholders. When directors and executives are rewarded for acting in the interests of shareholders, they are more likely to make decisions that maximize shareholder value. This alignment of interests reduces agency costs and enhances market efficiency by ensuring that corporate resources are allocated efficiently (**Rashid *et al.*, 2020**).

In the Indian context, investors are being given constant, high-quality information thanks to the increased declarations that are now required by corporate governance laws. This data makes the process of price discovery easier and aids in the development of efficient stock markets. The 2003 introduction of Clause 49 in the Corporate Governance Act had a

notable effect on the volatility of the Indian stock market. The market's volatility has significantly decreased after the passage of the Governance Act. On the other hand, there was no proof that more news increased the markets' informational efficacy (**Prasanna, 2013**).

Corporate governance plays a decisive role in encouraging market efficiency by enhancing information transparency, aligning interests, managing risks, protecting stakeholders, and ensuring regulatory compliance. Companies with strong governance practices are more likely to attract investors, support efficient capital allocation, and support the market's overall integrity and stability.

#### **1.7.5 Interlinkages between Investor Behaviour and Market Efficiency**

A significant challenge to the Market Efficiency is the tendency for individuals to overreact or underreact to news, causing stock markets to respond according to investor behavior rather than purely rational decision-making processes. Investors' actions often deviate from theoretical predictions. For instance, individual investors typically hold a limited number of familiar stocks, resulting in poor diversification. Both individual and professional investors tend to engage in excessive trading, incurring high transaction costs without achieving proportionate returns. A notable market anomaly is the occurrence of bubbles, where asset prices remain elevated above their fundamental values for extended periods. Behavioral finance aims to elucidate this irrational exuberance.

The mechanism underpinning efficient markets relies on a sufficient number of analysts scrutinizing new information, evaluating its relevance, and trading based on that information. This process integrates the new information into asset prices. However, evidence suggests that learning and information assimilation take time, making adaptive markets a more accurate representation than efficient markets. Specifically, analysts have historically been slow to incorporate sustainability-related information into their valuations. It was only after the prominent Paris climate conference in 2015 that carbon emissions began to be factored into market prices to some extent. The extent to which other environmental factors, such as water scarcity and biodiversity loss, and social factors, like labor practices throughout the value chain, are reflected in stock prices remains unclear.

The Adaptive Markets Hypothesis posits that market efficiency is contingent upon an evolutionary model wherein individuals adapt to a changing environment. Consequently, as more analysts focus on a particular issue, the information will be integrated into market prices more thoroughly and rapidly.

Capital market efficiency is dynamic and evolving in nature. The share market's efficiency evolves with time and can be studied or investigated in its relative form. International, regional, and regional financial and non-monetary events impact its progress. Macroeconomic fundamentals, geopolitical concerns, international trade, foreign investment climate etc., may considerably shape up the performance of any capital market. Markets frequently offer abnormal returns, but these chances are time-dependent and complex. Financial liberalization has boosted efficiency in emerging stock exchanges, yet global shocks can have a negative impact. Asia's rising markets provide strategic insights for their counterparts. Global investors must avoid the homogeneity bias since there is potential for profits inside certain regions and markets. There are prospects for diversification and improved returns within the area, including similar markets (**Patra and Hiremath, 2022**). Today, the Indian market is highly integrated with its international counter parts, particularly the US financial system. Throughout the pre-crisis time frame, there was a cointegrating connection between the Indian and Hong Kong stock markets. Going ahead, international market events will continue to impact relative market efficiency. The stock exchange is also impacted in the near term by the liquidity controls, trade volumes, volatility and market sentiments. Developments of data science and machine learning enables high end data analysis so that huge chunks of market data can be converted into valuable insights. These market insights guide investors towards building their trade and investment strategies. Therefore, historical market data coupled with publicly available information is regarded as one of the most relevant pillars of market efficiency.



### 1.8 Challenges of Market Efficiency:

According to the theory of market efficiency, asset prices consider all available information, making it challenging for investors to regularly exceed the market. However, there are two main aspects to the EMH that have sparked considerable debate and research.

- **Unpredictability of Stock Gains:** One aspect of the EMH suggests that unpredictable gains in stocks indicate market inefficiency. If stock prices were fully efficient, investors wouldn't be able to earn excess returns by exploiting information asymmetries or mispricing's in the market.
- **No Guarantee of Extra Profits:** The other aspect highlights that even in efficient markets, investors cannot consistently earn excess profits. This means that while the EMH implies that stock prices reflect all available information, it doesn't guarantee that investors will always make profits from trading stocks.

In the 1980s, the EMH gained widespread attention and was initially viewed as an indisputable fact. However, subsequent research has challenged its assumptions. Studies have highlighted phenomena such as excess volatility, asset bubbles, seasonality effects, and investor overreactions, which are not fully explained by the EMH. Additionally, empirical evidence has shown that stock returns are not entirely unpredictable, and there are patterns that contradict the EMH's predictions.

Researchers have particularly focused on calendar anomalies, which are recurring patterns in stock returns that seem to defy the principles of the EMH. These anomalies include phenomena like the January effect (refers to the phenomenon where stocks often exhibit stronger performance in January compared to other months) and the weekend effect (where stock returns are typically lower on Mondays). The presence of these anomalies challenges the notion of market efficiency and suggests that there may be predictable patterns in stock returns that investors can exploit.

However, despite the mounting evidence challenging the EMH, there isn't a single, consensus viewpoint on how calendar anomalies interact with market efficiency (**Rossi, 2015**). The literature on calendar anomalies is fragmented, and researchers continue to debate the implications of these anomalies for the EMH and market efficiency as a whole.

In summary, while the EMH has been a widely studied and debated theory in finance, empirical evidence has shown that markets may not always be fully efficient. Calendar anomalies and other patterns in stock returns suggest that there may be opportunities for investors to earn excess returns, contradicting the predictions of the EMH. A significant challenge in an effective market is information asymmetry. A useful resource for maximizing the value of economic agents is information. When there exists an information gap between economic participants, information asymmetry happens. A lot of focus has been placed on information asymmetry in research on finance and accounting. Since information asymmetry is essentially not immediately observable, researchers must make use of proxy variables. Nevertheless, research that has categorized the proxies of information asymmetry according to its features has not yet been conducted. Issues related to information asymmetry continue to challenge the assumptions of universal availability of information to all investors.

Human psychology presents a significant challenge to market efficiency, primarily through phenomena like herd behavior and overconfidence. Here's a deeper look into these challenges:

- **Herd Behavior:** It describes the inclination of individuals to emulate the actions of the crowd, often without rational consideration of underlying fundamentals. In financial markets, this can result in heightened trading activity and the emergence of speculative bubbles or market crashes. When investors succumb to herd mentality, they may overlook crucial information or overly rely on others' actions, potentially leading to less-than-ideal investment choices.
- **Overconfidence:** Overconfidence is another psychological bias that can hinder market efficiency. Overconfident investors tend to overestimate their knowledge and abilities, leading them to take excessive risks or ignore warning signs in the market. This can result in poor investment outcomes and contribute to market inefficiencies. Overconfident investors may also underestimate the impact of random chance or external factors on their investment performance, leading to overtrading or misguided investment strategies.

- **Impact on Market Perception:** Herd behavior and overconfidence can distort perceptions of market efficiency. When investors follow the herd or exhibit overconfidence, they may contribute to market anomalies or inefficiencies that deviate from rational expectations. These deviations can erode confidence in the efficiency of the market and undermine trust in the pricing mechanism. Consequently, market participants may adopt a more cautious or skeptical approach, which can result in heightened volatility or decreased liquidity in the market.
- **Mitigating Challenges:** To overcome the challenges posed by human psychology, finance professionals and investors should focus on disciplined decision-making processes and sound investment principles. This includes conducting thorough analysis of investment opportunities, establishing clear investment goals and criteria, and avoiding emotional biases such as herd behavior and overconfidence. By adhering to a systematic approach to investment management and staying disciplined in the face of market fluctuations, investors can mitigate the impact of psychological biases and enhance their chances of long-term investment success.

In summary, human psychology presents a significant challenge to market efficiency through phenomena such as herd behavior and overconfidence. Investors may lessen the influence of these biases and make better investment decisions by being aware of them and implementing disciplined investing practices. This, in turn, can contribute to greater market efficiency and stability over time (**Ahmad and Wu, 2022**).

Several academics have raised questions about the validity of the Efficient Market Hypothesis (EMH) due to a multitude of anomalous phenomena and contradictory evidence, referred to as anomalies against the model. They have noted that the financial literature contains significant evidence of anomalies, leading to the development of numerous theories to account for some of these anomalies (**Woo et al., 2020**).

Market misconduct and manipulation of financial disclosure has severe impact on market efficiency. It is immoral and illegal since it results in less honest reporting and detrimental

economic decisions based on false information. The stock market becomes extremely fragile as a result of repeated scams and lack of openness **(Li and Hu, 2024)**.

The near-total dominance of market efficiency as a legislative objective has been observed in recent years. Regulators frequently declare that they are committed to maintaining effective stock markets. However, efficiency has not come without a price. People are losing sight of other, deeper values inside our economic framework, such as broader ideas of obligation, justice, and morality, by exclusively concentrating on concerns about economic efficiency, such as rivalry, contact, and transaction costs. Although regulators occasionally acknowledge these ideals, they frequently consider them as only a subset of efficiency; according to this perspective, the most effective approach to treat investors fairly, advance equality, and stop unethical, exploitative behaviour and raise market awareness is to simply establish an efficient market **(Schmidt, 2023)**.

Research on the impact of market concentration, regulatory limitations, and entry obstacles in various industries has produced conflicting results. Some data points to the possibility that strong regulatory frameworks might stifle competition and reduce market efficiency. On the other hand, legislative changes that support fintech innovation, provide consumer protection, and encourage the inclusion of money may increase competition, progress technology, and benefit consumers. Tight rules can unintentionally hinder competition and market efficiency, but legislative changes that support fintech innovation and inclusion in the economy can boost competition, progress technology, and enhance client outcomes. In order to promote innovation and preserve consumer interests and systemic stability, lawmakers and regulators should work to find a balance between regulatory flexibility and stability **(Karem and Azzahra, 2024)**. While market efficiency continues to be an idealistic objective, regulatory changes should encourage broad based investor participation and foster confidence and trust in the investment community. A well-diversified and well informed investor participation significantly lowers the risk of market misconduct and creates long term goodwill.

While market efficiency and its various forms have been deeply understood and there is no dearth of research on the subject, the challenges towards attaining it have been barely explored. As explained earlier, efficiency is not an absolute goal. As its understanding has

significantly matured, it is apt to investigate the factors that hinder or drive relative efficiencies and inefficiencies in capital markets. Keeping this in view the present study is positioned in the larger context of market efficiency to explore and critically examine the various drivers of market efficiency and their impact thereof.

### **1.9 Research Problem**

The research literature around market efficiency of Indian Capital Markets suggests that they exhibit weak or at best semi strong form of efficiency (**Sharma *et al.*, 2021**). Findings suggest that a multitude of factors impact the efficiency levels of markets, which is typically weak in mid cap and small cap segments. A market with weak or semi strong efficiency levels is highly vulnerable to information asymmetries, market manipulation, acute volatilities and irrational investor behaviour (**Klein, 2020**). This subsequently erodes investors confidence and dents regulatory goodwill. The advent of technology has connected a large number of investors with capital markets in a significant way (**Gatto *et al.*, 2021; Faysal, 2023**) and aided regulatory authorities through technologies like regtech. On the other side, technological advancements have changed the ways and means by which capital market crimes and price manipulations are performed (**Baldauf and Mollner, 2020; Aharon, 2023**). As a result of market inefficiency, events of market misconduct and herd behaviour are rampant in the mid cap and small cap segment as compared to large cap (**Riju, 2022**). Furthermore, the increased penetration of mutual funds, exchange traded funds and index funds have made small cap and mid cap segments lucrative to retail investors as well.

Despite the growing importance of these segments within the investment community, there is limited research on the factors affecting market efficiency in small and mid-cap segments in India. While many scholars have done commendable work around the measurement of market efficiency of Indian capital markets and have discussed the nature and the level of efficiency in the markets (**Bharadiya, 2023; Diwan and Sreeraman, 2023; Rahmani *et al.*, 2023**), they do not answer the question “Why Indian mid cap and small cap segments are efficient or inefficient?” This study is a concerted scientific attempt to understand what inhibits market efficiency and what leads to it. The ever rising investment share of retail

investors in the mid cap and small cap space necessitates the need for understanding the critical factors that are drivers or barriers of market efficiency so that more informed choices can be made. Therefore, this study aims to address this gap by examining the factors influencing market efficiency in small and mid-cap segments of the stock market in India. It is also imperative to understand the barriers and triggers to market efficiency in mid cap and small cap segments from a regulatory as well as investment standpoint. This will enable the investment fraternity to assess these segments in a more holistic way before making their investments. It will also inform regulatory authorities to assess the critical factors affecting market efficiency and undertake needful action to protect market integrity in mid cap and small cap segments.

Although the core objective of this study is to identify and explore the critical factors impeding market efficiency, the study also intends to propose an approach to the regulator for improving and enhancing overall market efficiency, with a specific focus on the mid-cap and small-cap segments. Besides exploring the generic factors impacting market efficiency, the study drills down further to examine the interlinkages of market misconduct and investor behaviour with market efficiency.

#### **1.10 Aims and Objectives of the Study**

This study aims to investigate the factors that affect market efficiency in the context of Indian Midcap and Smallcap indices. Considering this aim, the study has the following specific objectives.

- To determine the set of generic factors as well as latent factors hindering market efficiency in Indian Capital markets
- To analyze the perception of market participants with respect to critical factors of market efficiency
- To examine the level of efficiency of Indian Capital Markets with respect to Mid Cap and Small Cap segments
- To propose an approach to the regulator for improving and enhancing overall market efficiency, specially focusing on the mid-cap and small-cap segments.

### **1.11 Research Questions**

- What are the generic factors as well as latent factors hindering market efficiency in Indian Capital markets?
- What is the perception of market participants with respect to critical factors in the efficiency of the market?
- What is the level of efficiency of Indian Capital Markets with respect to mid-cap and small-cap segments?
- What framework will be useful to the regulator for enhancing the overall market efficiency of the small and mid-cap segments?

### **1.12 Significance of the Study**

This study will help to further the theoretical understanding of market efficiency by investigating the factors that influence in market efficiency in India's small and mid-cap stock markets. While EMH provides a theoretical framework for evaluating financial market efficiency, its relevance to small and mid-cap segments in emerging market nations has yet to be fully explored. This study adds to our knowledge of the intricacies of market dynamics in emerging nations by examining the variables influencing market efficiency in these segments. Ultimately, by offering insightful information on how small- and mid-cap markets operate in developing nations, this study contributes to the body of knowledge already available on market efficiency.

In terms of practical implications, this study has significance for investors, regulators, and market participants in India in particular, and emerging nations in general. This study provides significant insights for investors wishing to make well-informed investment decisions in small- and mid-cap markets by analyzing the elements influencing market efficiency in these categories. The results of this study can also be used by regulators to create and conduct measures that support investor protection, market efficiency, and transparency in small- and mid-cap stock market categories. Furthermore, by having a deeper comprehension of the factors that influence market efficiency, market players may create trading plans and risk management techniques that are more successful. Given the

circumstances, this research helps emerging nations create stronger, more robust financial systems, which in turn promotes economic expansion.

### **1.13 Present Study & Chaptalization Scheme**

Since stock prices accurately represent available information, it is expected that investors have the capacity to quickly obtain and understand important data in order to make intelligent stock price predictions. However, just saying that there are drifts from the EMH due to market distortions may not be enough. There is a greater need to explore the underlying causes for market inefficiency. This study is motivated by the evolving landscape of the financial market, shifts in investor behavior, technological advancements, regulatory regimes, besides historic price movements.

The present study is exploratory and descriptive in nature. From an exploratory point of view, it seeks to explore the range of factors impacting market efficiency in the mid cap and small cap segment of the Indian capital market and identify the critical ones for further analysis. From a descriptive point of view, the research studies the interlinkages of key factors with market efficiency and also examines the level of market efficiency of 6 mid cap and small cap indices from the period of **1<sup>st</sup> Jan 2008 to 31<sup>st</sup> Dec 2023**. It uses a combination of primary and secondary data to achieve the specified objectives.

Keeping in view the technicality of the subject, data has been collected from market experts and big stock traders who have intricate understanding of market activities. The study tries to bring out the inherent challenges and constraints to market efficiency in mid cap and small cap segments. The research has focused more on exploring the critical barriers of market efficiency and then examining their relationship with overall efficiency. The study is comprehensive and exhaustive in the sense that it not only explores the latent factors but brings out the key hindrances towards market efficiency through rigorous statistical analysis. While the research undertakes a wholistic analysis of all the factors like "*Investor Behaviour*", "*Market Misconduct*", "*Historical Price Movement*", "*Market Regulation*," and "*Firm Accountability and Responsibility*", it particularly draws attention to market misconduct and investor behaviour which surface the biggest impediment to market efficiency.



Secondary data analysis has been conducted to gauge the market efficiency of Indian mid cap and small cap indices. For this purpose, historical market data on **Nifty Mid Cap 50, Nifty Small Cap 250, Nifty Mid Cap 150, Nifty Small Cap 100, Nifty MidSmallcap and Nifty 500** indices for the period of **1<sup>st</sup> Jan 2008 to 31<sup>st</sup> Dec 2023** has been collected from exchange archives and the same has been analyzed to draw out the results.

Finally, a framework has been suggested to the regulators to assess the market efficiency in mid cap and small cap indices which can greatly enable them to monitor key aspects of these segments from an efficiency perspective. This has been developed using well established parameters that are key to market monitoring and are easily quantifiable at any point in time.

The thesis has been split into six chapters. Each chapter has an "Introduction" section that summarizes the primary topics covered and the chapter's structure. References wherever necessary have been added at the end of each chapter. The entire text has been supported with the help of extensive footnotes for proper understanding and referencing. The chapterization scheme is as follows.

- **Chapter 1 – Introduction** - This chapter will provide an overview of the research topic, problem statement, and its significance, along with the research aim and objectives.
- **Chapter 2 – Review of Literature** - This chapter will survey the literature related to this topic, identify the research gap, and establish the study's theoretical framework.
- **Chapter 3 – Research Methodology** - This section will describe the research design, approach, data collection, and analysis methods, along with the sample and population for the study.
- **Chapter 4 – Primary Data Analysis and Interpretation**
- **Chapter 5 – Secondary Data Analysis and Interpretation**
- **Chapter 6 – Findings, Suggestions and Conclusion** - This chapter will present the findings, suggestion on the future avenue and the conclusion of the study according to the research questions and objectives.

## **Review of Literature**

## **Chapter 2**

### **Review of Literature**

#### **Introduction**

A comprehensive literature review serves as a crucial foundation that elucidates the rationale behind a research inquiry. It necessitates researchers to extensively examine existing literature within their field of study to establish a theoretical and conceptual framework, as well as to define key terms and constructs. Through a critical evaluation of prior works, researchers gain insight into the methodologies and approaches employed by various scholars, aiding in the formulation of a robust research design. Conducting a literature review involves meticulously analyzing the published body of knowledge through processes such as summarization, classification, comparison of previous studies, and synthesis of findings. This supplementary step in the research process facilitates the transition from the unknown to the known, enriching and complementing research arguments. Furthermore, it enables researchers to pinpoint research gaps and formulate a problem statement by gaining a nuanced understanding of the researchable areas within their chosen field.

A literature review typically encompasses literature published within a defined timeframe, allowing researchers to establish a broad research paradigm and subsequently refine it in terms of constructs, concepts, and methodologies. It serves as both a summary and synthesis of existing literature, often referred to as a catalyst for crafting a well-founded thesis.

This literature review delves into various aspects related to capital market efficiency, encompassing a broad overview as well as a targeted examination of specific issues such as market misconduct, investor behavior, market regulation, historical pricing trends, and firm disclosure practices. Ultimately, the review aims to establish research gaps, providing the rationale behind the study's focus and objectives.

The review has been conducted with the following objective:

1. To determine the set of generic factors as well as latent factors hindering market efficiency in Indian Capital markets.
2. To analyze the perception of market participants with respect to critical factors of market efficiency
3. To examine the level of efficiency of Indian Capital Markets with respect to Mid Cap and Small Cap segments
4. To propose an approach to the regulator for assessing and enhancing overall market efficiency, with a specific focus on the Mid Cap and Small Cap segments.

## **2.1 Market Efficiency**

As per (Woo, *et al.*, 2020), in the financial markets, market efficiency measures how efficiently asset prices represent all available information. Investors find it challenging to consistently outperform the market by taking advantage of undervalued or overvalued stocks because in an efficient market, markets react swiftly to any new information.

There are three types of stock market efficiency according to the Efficient Market Hypothesis:

- Weak Form Efficiency: Asset prices in a weak form efficient market take into account all historical market data, such as prices and trading volumes. Because future prices cannot be predicted from historical data alone, investors cannot profit abnormally by studying past price fluctuations.
- Semi-Strong Form Efficiency: Asset prices in a semi-strong form efficient market take into account all publicly available information, including news, earnings reports, and economic indicators, in addition to historical market data. Trading using publicly available information does not consistently yield remarkable profits for investors because prices shift quickly to take new facts into account.
- Strong Form Efficiency: All available information, both public and private, is reflected in asset prices in a strong form efficient market, rendering insider

knowledge useless for consistently producing anomalous returns. This implies that all accessible information, including insider knowledge, is already reflected in prices.

Market efficiency is a cornerstone of modern financial theory and bears significant implications for investors, market participants, and policymakers (**Sivaramakrishnan, *et al.*, 2017**). A high level of market efficiency (**Wermers, 2020**), suggests that it is challenging for investors to consistently outperform the market through active trading strategies, prompting many to adopt passive investment strategies like index investing.

## **2.2 Market Efficiency Definition**

As per (**Gibson, 1889**) first presented the idea of market efficiency in his book "The Stock Markets of London, Paris, and New York." Gibson explained in this work that the value of shares, after they are exchanged openly in an open market, can be thought of as representing the combined knowledge of the most knowledgeable people about those shares.

In the year 1900, Louis Bachelier, a French mathematician, presented his doctoral thesis titled "Théorie de la Spéculation" (Theory of Speculation) (**Bachelier, 1900**). He observed that market prices incorporate information from past, present, and even anticipated future events, yet these factors often do not exhibit a discernible relationship with price changes. Bachelier concluded that the market does not predict fluctuations in asset prices and stated that "The mathematical expectation of the speculator is zero," aligning with Samuelson's concept of efficient markets described as a martingale. This implies that asset prices follow a random walk pattern, rendering their movements unpredictable. When Bachelier's work was translated into English by (**Cootner, 1964**) and then addressed in (**Fama's 1965, 1970**), it became apparent how insightful his observations were on market efficiency.

## **2.3 Early Development in EMH**

(**Pearson, 1905**) coined the word "random walk" to define the erratic movement resembling that of a drunk person staggering unpredictably. (**Kendall and Hill, 1953**) analyzed weekly stock price data and observed that they exhibit a random-walk pattern,

showing minimal autocorrelation of price changes. Similarly, **(Working, 1934; Roberts, 1959)** noted that stock returns appear to follow a random walk pattern. **(Osborne, 1959)** found evidence in favor of the square root of time rule and proved that the logarithm of common stock values follows Brownian motion.

The concept of a random walk implies that predicting future asset price movements is challenging. **(Blackledge and Lamphiere, 2021; Cowles, 1933, 1944; Cowles and Jones, 1937; Working 1949)** discovered that professional forecasters struggle to accurately predict market movements, and professional investors often fail to outperform the market. **(Memon, 2022)** utilized spectral analysis to confirm that short-term price movements adhere to the random-walk hypothesis, although long-term movements do not consistently follow this pattern.

Despite certain reports of a periodic correlation in the price of stocks by **(Cowles and Jones, 1937; Working, 1960; Alexander, 1961)** argued that such correlation could be artificially induced by averaging. Cowles (1960) reevaluated the findings of **(Cowles and Jones, 1937)** and discovered mixed evidence of sequential correlation, even after rectifying errors resulting from averaging.

#### **2.4 Recent development in Market Efficiency**

Recent developments in market efficiency have been influenced by various factors, including technological advancements, regulatory reforms, and shifts in investor behavior **(Ho *et al.*, 2017)**. The rise of algo trading, high-frequency trading, and artificial intelligence has transformed market dynamics, enabling faster information processing and more efficient price discovery **(Rahmani *et al.*, 2023)**. However, concerns regarding technological disruptions and market manipulation have emerged alongside these developments. Additionally, the proliferation of big data and machine learning algorithms has provided new tools for analyzing market behavior and identifying patterns, contributing to a deeper understanding of market inefficiencies **(Bharadiya, 2023)**. Integrating insights from behavioral finance into traditional finance models has also played a significant role, shedding light on the cognitive biases and emotional factors that influence investor decision-making. Regulatory changes, such as MiFID II in Europe and the Dodd-Frank Act in the United States, have aimed to improve market transparency,

fairness, and stability by introducing new reporting requirements and trading protocols **(Priem, 2024)**. Moreover, advancements in market microstructure research have provided insights into the underlying mechanisms driving market liquidity, price formation, and trading dynamics **(Lokesh, 2022)**. Studies on sustainable finance and ESG integration have gained traction, with researchers examining the relationship between ESG performance and financial performance **(Diwan and Sreeraman, 2023)**. The COVID-19 epidemic foster the importance of market resilience and crisis management, prompting research on market reactions to crises and the effectiveness of policy interventions **(Nguyen et al., 2023)**. Overall, recent developments in market efficiency reflect a dynamic and evolving landscape shaped by technological innovation, regulatory reforms, and changing investor preferences. Ongoing research and collaboration across disciplines will be essential for addressing emerging challenges and enhancing market efficiency in the future.

## **2.5 Market Efficiency in Emerging Market Economies**

Following the formal introduction of the Efficient Market Hypothesis (EMH) in the 1970s, the market efficiency paradox was first presented by **(Grossman, 1976)** as a result of conflicting research.

The paradox posits that the more investors believe in market efficiency, the less efficient the market becomes. The rationale behind this paradox lies in the idea that if investors perceive the market as efficient, they may become complacent in gathering information, thereby leading to market inefficiency. Understanding the efficiency of capital markets in emerging economies like India has become increasingly important due to the growing movement of investments into these markets, driven by their integration with more developed ones. Capital market theory employs the concept of market efficiency to describe the extent to which stock prices accurately reflect all available, pertinent information. This theory originates from **(Samuelson's 1965)** that the anticipated prices of assets change randomly. **(Fama, 1970)**, provided formal theory and evidence supporting market efficiency, later refining his ideas in 1991 based on further research developments. Although the Efficient Market Hypothesis (EMH) continues to spark debate in finance and economics, some scholars, like **(Shiller, 2003)**, suggest the theory is only partially valid.

They argue that today's stock prices may not reliably predict future prices due to factors such as volatility and information disparities. Consequently, current research emphasizes the analysis of stock prices in light of information events, such as mergers, acquisitions, and stock splits (**Chatterjee et al., 2024; Sehgal and Bijoy, 2015**).

In a seminal study, (**Fama and French, 1988**) debated that investor risk tolerance is influenced less by firm size and market returns. Recent research has also underscored the "value effect," indicating that returns may not always correlate with the level of risk assumed. Amid ongoing debates surrounding the Efficient Market Hypothesis (EMH), this study seeks to evaluate its applicability in the perspective of the Indian stock market.

As previously mentioned, market efficiency is categorized into three forms: weak, semi-strong, and strong.

- The weak hypothesis suggests that prices take into account all past data that is accessible to the general public.
- According to the semi-strong hypothesis, prices take into account all information that is readily available to the public and immediately adapt to new information.
- According to the strong hypothesis, prices immediately take into account privileged or secret information.

The efficiency of the market significantly influences investors' investment policies. In an efficient market, researching to identify winners or losers is deemed futile, as asset prices accurately represent the market's best estimate of risk and expected return, considering all available information at the time (**Leins, 2022**). Consequently, undervalued assets offering higher-than-expected returns or overvalued assets offering lower-than-expected returns are scarce. Thus, an optimal investment strategy in an efficient market involves focusing on the risk and return characteristics of assets or portfolios (**Alim and Ali, 2021**). Conversely, in inefficient markets, investors may benefit from identifying mispriced assets, as successfully identifying them can enhance portfolio performance overall.

Research on market efficiency has investigated how quickly information is incorporated into prices. Inefficient resource allocation would occur if prices could not adjust to stock market conditions. Information dissemination is rapid because complete data on the price



and volume of previous transactions is readily accessible, and any price-sensitive information is highly accurate and immediate. This gradually enhances market liquidity by enabling investors to buy or sell quickly at prices close to the last traded price. Security prices remain stable from one transaction to the next unless significant new information enters the market. Prices can deviate from the intrinsic value of a security when substantial information is present in the market, but these deviations are typically random and uncorrelated. In such markets, security prices reflect their fundamental value.

Numerous studies have been conducted in the Indian context, though only a select few are mentioned here for reference. For instance, **(Jain *et al.*, 2020)** examined the efficiency of the Indian stock market from April 2010 to March 2019 and concluded that it is weak-form inefficient, thus presenting opportunities for outperformance. Similarly, **(Vidya, 2018)** found that stock market price changes exhibit randomness, suggesting weak-form efficiency.

A brief survey of the literature can greatly aid the researcher in understanding the chosen problem. Reviewing specific studies allows the researcher to gain a comprehensive understanding of the situation. In shaping the current chapter, references to past studies will be beneficial. A significant body of empirical research has challenged the semi-strong form of market efficiency, with these findings often referred to as 'anomalies' in the literature on the efficient market hypothesis.

## **2.6 Major Research Work Around Market Efficiency**

Here we present a brief synopsis of the literature that has already been written in this field. Runs tests and autocorrelation are two common empirical techniques used to study stock market activity in a large number of research. **(Fama, 1965)** applied these techniques to analyze daily returns of the Dow Jones and concluded the market was efficient. However, **(Lo and Mackinlay, 1988)** demonstrated the limitations of these tests and introduced a more robust approach known as the variance ratio test, or Lo and Mackinlay variance ratio test **(Lo and Mackinlay, 1988)**. Applying this test to US stock indices, they found evidence of market inefficiency due to mean reversion in returns. Multiple studies have explored the effectiveness of BRICS stock markets using both parametric and nonparametric tests. For

example, **(Urrutia, 1995)** used variance ratio tests on Latin American equity markets and suggested they do not follow a random walk, while the runs test indicated market efficiency. Additionally, **(Grieb and Reyes, 1999)** applied variance ratio tests to the Brazilian and Mexican markets, concluding that the Brazilian markets are efficient.

Focusing on the stock market of Russia, **(Abrosimova et al., 2002)** investigated weak-form efficiency using autocorrelation and variance ratio tests. **(McGowan, 2011)**, employing a serial correlation test, also found evidence supporting weak-form efficiency. In contrast, **(Said and Harper, 2015)** utilized autocorrelation and variance ratio tests and determined that the stock market of Russia is not efficient. Several studies have investigated the efficiency of Indian stock markets. **(Sharma and Kennedy, 1977)** Proven that the Indian market follows a random walk, a finding echoed by **(Barua, 1981; Barua et al., 1991; Amanulla and Kamaiah, 1998; Mitra, 2000; Chawla, et al. 2006; Gupta, 2014)**. However, other studies, including those by **(Poshakwale, 2002; Chaudhuri and Wu, 2003; Ahmed, et al. 2006; Rakesh Gupta and Parikshit, 2007; Anil K. Sharma and Neha, 2011; Hiremath and Kamaiah 2012; Hiremath and Jyoti, 2014; Gupta and Sankalp, 2017)** concluded that the stock markets are not efficient.

Regarding stock market efficiency in China, several studies support the weak form efficiency of Chinese markets, including those by **(Liu, et al. 1997; Fifield and Jetty, 2008; Darrat and Zhong, 2000; Lock, 2007; Charles and Darné, 2008; Kian-Ping Lim et al. 2009; Lim and Brooks, 2009; Lee, et al. 2001)**. Conversely, **(Lima and Tabak, 2004; Seddighi and Nian, 2004; Andrea and Marianna, 2016)** found evidence of dependence in the return series of Chinese markets, suggesting inefficiency. In the case of South Africa, **(McMillan and Thupayagale, 2008)** concluded that African markets do not follow a random walk, whereas **(Smith, et al. 2002; Lumengo, 2012)** indicated that the markets of South Africa are efficient.

There is limited research on market efficiency in BRICS markets. **(Camelia, 2012)** investigated weak-form market efficiency across BRIC emerging markets, concluding that none of the markets were efficient during the study period. **(Karamchandani et al., 2014)** employed the Hurst exponent to assess the efficiency of BRIC stock markets and found higher predictability, indicating inefficiency in all four markets. **(Tiwari and**

**Kyophilavong, 2014)** utilized wavelet-based unit root tests to examine whether BRICS stock markets adhere to the random walk hypothesis and noted that, except for the Russian market, the others did not follow a random walk during the study period. In contrast, **(Mobarek and Angelo, 2014)**, using individual and multiple variance ratio tests, determined that BRIC stock markets are efficient. **(Robert's, 2016)** study also supported the finding that BRIC stock markets exhibit weak-form market efficiency.

This clearly indicates that market efficiency is time dependent. Additionally, the outcomes of efficiency studies significantly depend on the specific tests employed. Therefore, it is essential to evaluate market efficiency over various periods using appropriate testing methods.

## **2.7 Divergent Views on Market Efficiency**

The market efficiency continues to be a highly debated topic within finance and economics. Some researchers, like **(Shiller, 2003; Elangovan, et al., 2022)**, have suggested that the theory might be considered "half-true." This skepticism stems from the argument that today's stock prices cannot reliably predict tomorrow's prices due to market volatility and information asymmetry **(Bhowmik and Wang, 2020)**. As a result, current research has pivoted towards examining stock prices within the framework of information availability, with particular emphasis on the effects of corporate events such as mergers, consolidations, and stock splits (Jain et al., 2020; Parthasarathy, 2016).

In their study, **(Fama and French, 1988)** argued that the risk assumed by investors is not heavily dependent on the company's size or the overall market return. More recent research has concentrated on the "value effect," demonstrating that returns are not necessarily correlated with the level of risk undertaken **(Cakici and Zaremba, 2021)**. This body of work suggests that factors other than risk, such as company fundamentals or market conditions, might play a more significant role in determining stock returns **(Phan, et al., 2023)**.

Extensive academic research on the Efficient Market Hypothesis (EMH) has generally reached a consensus that inefficient markets, It is impossible to earn persistent excess profits from trading securities **(Khoa and Huynh, 2021)**. However, the EMH is based on

the assumption that capital markets reach equilibrium primarily because they are dominated by informed and rational agents **(Delcey, 2023)**. This assumption may not hold true in all circumstances, leading to instances where the EMH does not accurately describe market behavior **(Elangovan, et al., 2022)**. Consequently, numerous scholars have repeatedly tested the EMH to determine if markets exhibit weak, semi-strong, or strong form efficiency.

By the early twenty-first century, the once-prevailing dominance of the Efficient Market Hypothesis (EMH) had significantly waned. Increasingly, financial economists and statisticians began to acknowledge that stock prices might be at least partially predictable **(Martin and Nagel, 2022)**. This shift in perspective gave rise to a new group of economists who emphasized the psychological and behavioral factors influencing stock-price determination **(Cheng, 2022)**. These factors posited that future stock prices could be somewhat anticipated based on historical price patterns and certain fundamental valuation metrics **(Da, et al., 2021)**. Furthermore, some of these economists advanced the even more contentious argument that these predictable patterns could enable investors to achieve excess risk-adjusted returns.

## **2.8 Factors Impacting Market Efficiency**

A cornerstone of financial economics is the principle of market efficiency, which holds that asset prices adequately represent all available information **(Economics, 2021)**. However, the reality of achieving market efficiency is complex and influenced by various factors that can both enhance and impede it. The dissemination and quality of information are paramount. As per **(Bergemann and Ottaviani, 2021)** in an efficient market, information is rapidly and uniformly distributed among participants, enabling people to make informed decisions. This transparency guarantees that asset prices accurately represent their genuine value. However, market efficiency is compromised by information asymmetry, which occurs when specific people or groups have access to knowledge that is not generally known **(Komalasari, et al., 2022)**. The two best instances of how asymmetry can skew market prices are insider trading and selective information disclosure **(Hu et al., 2022; Houston, 2020)**.

Market efficiency is greatly impacted by investor behavior (**Woo, et al., 2020**). Behavioral finance highlights how cognitive biases and psychological factors influence trading decisions (**Vasileiou, 2022**). Overconfidence, for instance, can lead to excessive risk-taking, while herd behavior can cause price bubbles and crashes. These non-rational behaviors lead to price deviations from fundamental values, questioning the assumption of perpetual market rationality and efficiency (**Andraszewicz, 2020**). Understanding these psychological factors is essential for enhancing market predictions and devising strategies to reduce their influence.

The structural components of the market are pivotal in influencing efficiency. Market liquidity, defined as the ease with which assets can be traded without impacting their prices, is fundamental to market efficiency (**Choi and Munro, 2022**). High liquidity facilitates smoother transactions and more accurate price discovery. Conversely, illiquid markets can experience price distortions and increased volatility (**Schwartz, et al., 2020**). As per (**Fernandez, et al., 2020**), transaction costs are another structural element; lower costs enable more frequent trading and better alignment of prices with true asset values. The structure of trading platforms, the presence of market makers, and the overall market design contribute to the efficiency of the trading environment.

Regulatory frameworks and interventions are pivotal in shaping market efficiency (**Awrey and Judge, 2020**). Effective regulations ensure transparency, fairness, and accountability, which are essential for maintaining investor confidence and market integrity. Regulations that mandate timely disclosure of financial information, prevent fraudulent activities, and manage systemic risks contribute to market efficiency (**Singh et al., 2023**). However, excessive regulation or poorly designed regulatory interventions can stifle market activity and introduce inefficiencies (**Lev-Aretz and Strandburg, 2020**). Balancing regulatory oversight with market freedom is crucial for fostering an environment conducive to efficient trading.

Technological advancements have significantly transformed financial markets, enhancing efficiency in multiple ways (**Palmié et al., 2020**). Information technology has revolutionized the speed and accuracy of information dissemination. The rise of electronic trading platforms, high-frequency trading, and algorithmic trading has enabled faster

transactions and improved market liquidity (**Baldauf and Mollner, 2020**). Despite these advancements, perfect market efficiency remains an ideal rather than a reality. According to (**Woo, et al., 2020**), financial anomalies and market crises reveal persistent inefficiencies and deviations from the Efficient Market Hypothesis (EMH). For instance, the Dot-Com Bubble and the 2008 Financial Crisis highlighted how psychological factors, information asymmetry, and regulatory failures can lead to significant market distortions (**Aharon, 2023; Woo, et al., 2020**). These events underscore the importance of continuously testing and refining the assumptions of market efficiency.

The EMH assumes that markets are dominated by rational and informed agents who act in their best interests, leading to price equilibrium (**Wong et al., 2022**). Although, this presumption frequently proves incorrect. Behavioral biases, unequal information access, and varying levels of investor sophistication create conditions where markets can be predictably inefficient (**Weixiang et al., 2022**).

(**Mwenye, 2020**) empirical studies have shown that market efficiency is not static but time-dependent and context-specific. Factors such as economic cycles, technological advancements, and changes in regulatory landscapes can influence market behavior and efficiency. For instance, during periods of economic instability, markets may become less efficient due to heightened uncertainty and irrational behavior among investors.

## **2.9 Macroeconomic events and Stock Prices**

This section provides an explanation of calendar irregularities in markets with various micro-structures. A calendar anomaly is an irregular earnings series that is cyclical and is based on the calendar. The market behaves differently throughout the day and on different days of the week.

and throughout the month and year, according to the calendar time hypothesis (**Rossi, 2015**). Scholars have often studied two types of calendar effects:

- (i) the month impact (especially in January) and
- (ii) the weekday effect.

### 2.9.1 The January Effect

In the equities market, the adage "As January goes, so goes the year" has become widely accepted and is also known as the "January Effect." (Cheema, *et al.*, 2023) gave the earliest evidence of this cyclical phenomena. Eventually, a thorough investigation into this anomaly in the US stock market was conducted by (Woo, *et al.*, 2020; Chesoli, 2021). According to (Zhang, *et al.*, 2017), There are statistically significant variances in mean returns between months, with the exception of the 1990–2016 period. These disparities are mostly caused by large returns in January.

Their research exposed anomalies in the monthly returns of the DOW & SENSEX from 1990 to 2016. Along with this the research also highlights the empirical evidence of the calendar effect of the indices for 13 emerging market indices and 12 developed market indices. around

Subsequent studies by (Ali and Ulku, 2020; Gultekin and Gultekin, 1983; Peillex and Ouadghiri, 2021) reported similar findings. In other significant industrialized nations, they showed exceptionally high returns. Evidence is specifically presented indicating that the stock market return distributions show notable seasonality's.

In most countries of the world, the excessively large returns in January appear to be the cause of seasonality when it does occur (Thaler, 1987; Woo, *et al.*, 2020) and identified a January anomaly in nineteen nations outside the United States. (Kanama, 2022) analyzed the Italian Stock Exchange (MIB) from January 1<sup>st</sup>, 2013, to December 31<sup>st</sup>, 2021: The Italian stock market has a strong seasonal trend, as seen by the results derived from the MIB index for the whole time under consideration.

Researcher (Vidal-García *et al.*, 2024; Hollstein, 2022) conducted additional research to examine the relationship between size effects in the stock market and the month of the year. According to (Chiah and Zhong, 2021), January has the strongest correlation of anomalous returns with size, which is consistently negative. Not only that, but January's anomalous return distributions have substantially larger means than the other eleven months. Furthermore, (Parnes, 2020) examined the S&P 500's performance from 1957 to 2019. He discovered that the lowest percentile of CRSP stocks in a value-weighted portfolio had an average monthly return of 8.06% in January, which was significantly

greater than the S&P 500's return of 2.34%. Another research on this seasonal trend was conducted in Australia by **(Wats, 2019)**. They discovered cyclical irregularities in July–August and December–January.

From 1985 to 2001, **(Mylonakis and Tserkezos, 2008)** studied the stock market of Athens (ASE). According to their analysis, January's mean returns were higher than those of the previous months.

In 2015, **(Norvaisiene and Stankeviciene, 2022)** explored the Baltic Stock Market's seasonal trends. Their study concentrated on the Nasdaq OMX Tallinn, Nasdaq OMX Riga, and Nasdaq OMX Vilnius daily log return indexes for the Baltic stock exchange between 2004 and 2019. According to their findings, January and October effects were how the month effect in Baltic stock markets showed up in Estonia. They added that, in comparison to other months, January, August, and November were exceptionally good months for investors in the Lithuanian market because of the greater stock returns. Additionally, they saw the October effect in Lithuania, which is defined by seasonal patterns of October stock price declines.

### **2.9.2 The Weekend Effect**

A weekend effect identified by **(Kra, et al., 2019; Gumanti & Utami, 2002)** who recognized this as one of the seasonal market anomalies. This phenomenon is characterized by negative share returns on Mondays in contrast to positive returns on other days of the week **(Chiah and Zhong, 2021)**. This observation is further supported by **(Charifzadeh and Herberger, 2020; Wang, et al., 2019)**, who observe that Fridays typically see the biggest positive returns on the market, whereas Mondays typically experience negative returns.

In research focused on the Indian stock market, numerous studies have identified distinct patterns in weekday returns. **(Choudhry, 2000)** detected a favorable Friday effect on the BSE 100 returns. **(Bhattacharya et al., 2003)** detected a significant favorable Monday effect for BSE 100. **(Gupta, 2006)** shown that for the BSEI 00 and S&P CNX 500, returns are greater on Fridays than they are on other trading days.



(Chia and Liew, 2010) discovered that there was a notable Friday negative effect and Monday positive effect for BSE. (Kutchu, 2012) observed that returns are high on Fridays for S&P CNX Nifty 50, Nifty Junior, and CNX Nifty 500. (Srinivasan and Kalaivani, 2013) found that for the Nifty 50 and BSE Sensex, average returns are much greater on Mondays than on Wednesdays. They also noticed that return volatility is negatively impacted on Tuesdays.

(Aziz and Ansari, 2015) discovered that the results for the BSE Sensex and Nifty 50 were positively impacted on Mondays and Wednesdays, respectively. They also noticed that Tuesday had a negative impact on return volatility, particularly for the BSE Sensex.

Research on the Nifty 50 and Nifty 500 by (Nageswari *et al.*, 2011), the BSE by (Patel and Patel, 2011) and the NSE Sensex and NSE Nifty by (Mitra, 2016) have reported findings that contrast with these, finding that there is insufficient evidence that the Indian stock market is affected by day and weekend fluctuations. Tuesdays saw statistically substantial volatility for both the NSE Nifty and the BSE Sensex, according to (Mitra, 2016).

(Plastun *et al.*, 2019)) conducted an analysis on weekday anomalies using the S&P 500 index data from 1999 to 2018. It was observed that the most volatile days are Mondays in Germany and Japan, Fridays in Canada and the US, and Thursdays in the UK.

Potential causes for these anomalies have been proposed by a number of research. There is a theory that businesses and governments frequently announce bad news over the weekend, which increases volatility on Mondays. On the other hand, because of information symmetry on Fridays, trading volumes typically rise, and because of information asymmetry on Mondays, they typically fall.

When the returns from the last trading day of the prior week are positive, the Monday anomaly vanishes, according to (Stosic, *et al.*, 2022; Rossi, 2015). However, not all markets exhibit the same weekday effect deviations. (Couto, *et al.*, 2021) examined daily returns in four equity markets and found that the lowest mean returns for the Japanese and Australian stock markets occurred on Tuesdays.

To conclude, calendar anomalies have been the subject of numerous research, mostly focusing on worldwide stock markets. Even though there is growing evidence of these

consequences on a global scale, investigations have produced contradicting findings. The development of a broad theory on this problem has been hampered by the fragmentation of the calendar anomalies literature. There isn't a single, accepted viewpoint of how the EMH and calendar influences interact (**Rossi, 2015**).

## **2.10 Insider Trading, Market Manipulation and Market Efficiency**

Financial markets play a pivotal role in fostering growth in economies across countries. The presence, diversity, and volume of financial market activities are critical indicators of a nation's development and economic status (**Sun, 2021**). Therefore, robust and evolving financial markets are fundamental to the sustainability of any advanced economy (**Chan & Ka, 2014; Chau et al., 2021**).

However, when financial markets operate without the requisite efficiency, the overall economic stability is compromised. This inefficiency can have far-reaching repercussions, affecting both national and international economic ecosystem (**Apolaagoa et al., 2020**). One of the significant threats to market efficiency is the issue of market manipulation. As financial markets grow and evolve, manipulation tactics become increasingly sophisticated, posing substantial challenges to maintaining market integrity (**Maurer, 2017**). Manipulation, a form of market abuse, has been a persistent issue since the inception of organized financial markets, such as the first economic market established in Amsterdam, the Netherlands (**Putniņš, 2020**).

In this context, the importance of implementing stringent regulatory frameworks and adopting advanced technological solutions cannot be overstated. These measures are essential to detect and prevent market manipulation, thereby ensuring the smooth functioning of financial markets (**Khodabandehlou and Golpayegani, 2022**). According to (**Admati, 2017**), maintaining market efficiency is crucial not only for the health of the national economy but also for safeguarding the global financial system against the adverse effects of market abuses and inefficiencies.

Given the diversity of financial markets and the corresponding variety of manipulation techniques, market manipulation is defined in several ways (**Barak et al., 2017; Putniņš, 2020**). The Federal Bureau of Investigation (FBI) defines market manipulation as schemes

orchestrated by individuals or groups to disrupt fair and orderly markets for personal gain. Similarly, the U.S. Securities and Exchange Commission (SEC) characterizes market manipulation as deliberate actions that interfere with the free forces of supply and demand in the stock market (**Cataldo II et al., 2015**). The interference is usually intended to deceive investors by controlling or influencing stock prices or market activity (IOSCO, 2000). Therefore, market manipulation comprises any activities where individuals or organizations influence prices artificially in several ways, generating a misleading appearance of market activity to deceive or defraud other investors and traders (**Alexander & Cumming, 2020**).

Market manipulation can be classified in several ways, with one of the most renowned and comprehensive classifications developed by (**Allen and Gale, 1992**). They identified three primary types of manipulation: "information-based," "action-based," and "trade-based."

- **Information-based manipulation** involves spreading false or misleading information to influence the price of an asset in a specific direction. Manipulators aim to create misinformation that can sway investor decisions and market outcomes.
- **Action-based manipulation** refers to actions taken beyond mere trading activities. This might involve making operational changes to a corporation, such as selling a branch or changing its structure, without notifying shareholders. These actions aim to change the real or perceived worth of an asset, hence affecting its price.
- **Trade-based manipulation** entails attempt to manipulate the market through specific buying or selling strategies. This can involve placing trades in a manner designed to create artificial price movements or trading volumes, misleading other market participants about the true value or demand for an asset.

These classifications underscore the diverse methods manipulators use to distort market dynamics and deceive investors (**Allen and Gale, 1992**).

Regulatory measures have somewhat addressed the first two types of market manipulation outlined above. As per (**Li et al., 2017; Putniņš, 2012; Aggarwal and Wu, 2003**), to combat information-based manipulation, companies are required to regularly disclose their

financial information and activities to the public, making the deliberate dissemination of false statements a criminal offense. This ensures transparency and accountability, deterring individuals from spreading misleading information to influence asset prices **(Lin, 2016; Söderström, 2011)**. Similarly, **(Abbas *et al.*, 2019)** address action-based manipulation, laws prohibit company managers and administrators from selling assets or making significant operational changes, such as merging corporations or selling strategic assets, without prior public disclosure of such activities. This legal framework aims to prevent insiders from manipulating the perceived value of an asset for personal gain **(Al-Hashedi and Magalingam, 2021; Li *et al.*, 2017)**.

As per **(Neupane *et al.*, 2017)**, confronting trade-based manipulation proves more challenging. This type of manipulation often appears legal on the surface, with no obvious violations, making detection and prosecution difficult **(Singh *et al.*, 2024)**. Trades executed with the intent to deceive, such as spoofing or collusive actions, fall into this category. These manipulative practices involve placing and then canceling large orders to create a false impression of market activity or engaging in coordinated trading to manipulate prices, both of which are subtle and hard to identify **(Alexander and Cumming, 2020; Allen and Gale, 1992)**. Consequently **(Putniņš, 2020)** defines that trade-based manipulation remains a significant regulatory challenge, requiring sophisticated surveillance and enforcement mechanisms to detect and mitigate these deceptive practices effectively.

The issue of trade-based manipulation holds significant importance due to its extensive reach and profound economic impact **(Neupane *et al.*, 2017)**. This form of manipulation is particularly challenging to identify because, on the surface, the trades appear legitimate; stocks are genuinely bought and sold, making it difficult for market regulators to question these transactions without concrete evidence of wrongdoing **(Basu, K. 2018)**. However, these trades are often conducted by a specific group with aligned interests, essentially constituting formal trades intended to deceive other investors **(Cartea *et al.*, 2020)**.

The significance of trade-based manipulation gained heightened attention following the 2010 flash crash, drawing increased scrutiny from researchers and market regulators **(Dalko and Wang, 2020; Wang *et al.*, 2020)**. The diversity and seemingly limitless methods of trade-based manipulation present considerable challenges for supervisors

tasked with detecting and preventing these practices. Despite numerous efforts, identifying and addressing trade-based manipulation remains a complex and unresolved issue **(Putniņš, 2020)**.

Manipulative activities in financial markets have a profound impact that goes well beyond direct financial losses, primarily because they erode the trust of market participants **(Golmohammadi & Zaiane, 2015)**. This decline in trust can push investors toward alternative markets, leading to reduced market liquidity and higher trading costs. These conditions ultimately result in lower employment rates and slower economic growth **(Zhang et al., 2017)**.

Hence, to protect the interests of honest investors and mitigate the negative consequences of manipulation, it is essential to identify and deal with these activities **(Imisiker and Tas, 2018)**.

Despite the swift and severe responses from legislators and market regulators against perpetrators of such acts, manipulation remains a pressing issue. It poses a significant concern for both market participants and supervisors, highlighting the need for continuous vigilance and effective regulatory measures **(Golmohammadi and Zaiane, 2015)**. Addressing these challenges is vital for maintaining market integrity and ensuring the smooth functioning of financial markets.

### **2.11 Investor Behaviour, Baises, and Heuristics**

Investor behavior plays a pivotal role in shaping the efficiency of stock markets, particularly in interpreting and reacting to available information **(SABIR et al., 2021)**. Understanding how investors make decisions and the biases they may exhibit is crucial for assessing market efficiency. Behavioral factors such as herd behavior, overconfidence, and loss aversion can influence trading patterns and market outcomes **(Gupta and Ahmed, 2017)**. Market efficiency relies on the rationality and efficiency of investors in processing and incorporating new information into asset prices. Deviations from rational behavior can lead to market inefficiencies, such as mispricing of assets and increased volatility **(Nurdina et al., 2021)**. Studying investor behavior provides insights into the underlying mechanisms driving market dynamics and price movements. Behavioral finance theories offer alternative perspectives to traditional finance models, highlighting the importance of

psychological factors in market efficiency (**Weixiang et al., 2022**). Behavioral biases may cause investors to underreact or overreact to information, resulting in deviations from fundamental values and potential arbitrage opportunities (**Zahera and Bansal, 2018**). Research in this area aims to bridge the gap between theory and practice, offering practical implications for market regulators, investors, and policymaker. Overall, keeping robust and well-functioning financial markets requires an awareness of the interactions between investor behavior and stock market efficiency. Here, we examine how four well-established behavioral biases influence the decision-making of market investors.

- The **disposition effect** is one of the most prominent behavioral patterns in investing is the tendency to sell "winners" (stocks that have appreciated in value) and hold on to "losers" (stocks that have depreciated in value). (**Graham, 2016**) refers to investors' tendency to sell assets that have appreciated in value while holding onto those that have depreciated, driven by the psychological discomfort of realizing losses and the premature celebration of gains. This effect using three types of data: aggregate, individual, and experimental. (**Baltagi et al., 2006**) pioneered the use of aggregate data, discovering that stocks with rising prices have higher trading volumes, a finding supported by (**Ah Mand et al., 2023; Raimundo et al., 2022; Komalasari et al., 2022**). (**Bharandev and Rao, 2020; Huang, 2017**) examined Indian and Taiwan initial public offerings (IPOs) and found suppressed trading below the offer price and increased volume at new highs. (**Ainia et al., 2019; Zahera and Bansal, 2018**) found that investors tend to realize gains more than losses using average purchase prices as reference points, a tendency highlighted by (**Richards et al., 2017**), especially among low-income and non-professional investors. (**Sadhwani and Bhayo, 2021**) linked the disposition effect to stock momentum. (**Rocchi and Thunder, 2019**) noted longer holding periods for losing trades, particularly among less successful traders. (**Li et al., 2017**) found the effect is less pronounced in managed accounts. (**Barinov et al., 2024**) showed investors adjust reference points based on quarterly earnings announcements.
- **Herd behavior** occurs when investors imitate the actions of others or follow general market trends instead of relying on their own analysis and information, leading to market inefficiencies and bubbles as collective behavior drives asset prices away from

their intrinsic values (**Choi et al., 2022**). As per the empirical research suggested that herding can lead to lower volatility and contradicts rational asset pricing theories (**Trehan and Sinha, 2019; Kallinterakis and Gregoriou, 2017**). Furthermore, studies indicate higher levels of herding in emerging markets compared to developed ones, with significant movements and persistence regardless of market conditions (**Economou et al., 2018**).

- The **availability heuristic** describes how individuals assess the probability of an event based on the ease with which they can recall similar occurrences, causing investors to overestimate the likelihood of easily remembered events and make decisions based on recent or vivid information rather than objective analysis (**Shah et al., 2019**). (**Zhou, 2018**) find that investors tend to focus on stocks that have recently garnered attention, such as those in the news or experiencing abnormal trading volume. (**Baier et al., 2022**) suggest that investors and analysts may be overly credulous, failing to adequately discount for the incentives of others to manipulate signals. (**Huang et al., 2018**) links stock traders' behavior to the availability heuristic, suggesting that the salience of earnings surprises affects trading decisions. (**Griffith et al., 2020**) proposes a model in which analysts base risk and return judgments on global attitudes towards stocks. (**Lockwood et al., 2023**) discuss the "recency bias," indicating that analysts' forecasts are influenced by recent economic conditions. (**Kliger and Kudryavtsev, 2010**) document the "outcome availability effect" and the "risk availability effect," showing how market index returns influence reactions to analyst recommendations.
- The **gambler's fallacy** (Laplace, 1796) is the mistaken belief that a series of independent random events will display negative autocorrelation, leading investors to incorrectly expect that after a series of gains, losses are due to follow, or vice versa, even though the probability of these outcomes remains constant. However, the impact of the gambler's fallacy on financial decision-making, such as in stock market behavior, remains less clear. While there is some evidence of its influence in other domains, such as lottery betting, its role in financial markets, as noted by (**Ziembra, 2023**), is still debated and requires further investigation.

- Understanding these biases is crucial for developing strategies to mitigate their effects and for designing interventions that promote more rational and informed decision-making in financial markets. By recognizing the influence of psychological factors, investors and policymakers can work towards creating more efficient and stable market environments.

## **2.12 Corporate Governance and Earnings Announcements**

### **2.12.1 Corporate Governance**

Corporate governance has been fundamental to the Indian corporate sector since its establishment (**Mishra *et al.*, 2023**). However, the failure of significant businesses and instances of dishonest behavior, such as the accounting fraud at Satyam Computers and the Harshad Mehta scam, have underscored the seriousness of corporate governance issues. In the past two decades, corporate governance frauds have become more frequent, prompting the establishment of various committees tasked with framing laws and regulations aligned with international standards (**Van Driel, 2018**). Research on corporate governance and firm performance has predominantly focused on advanced economies (**Fan *et al.*, 2011; Singh and Delios, 2017**). However, the research on the influence of corporate governance on firm performance in emerging countries, notably India, is inconclusive (**Bhatt & Bhattacharya, 2015; Din *et al.*, 2022**). Effective corporate governance is crucial for increasing business profitability, which is required to meet overall corporate objectives (**Sofat and Singh, 2017**).

Robust corporate governance principles are essential for every business organization since they play a crucial part in the management of organizations in both developed and emerging markets worldwide. Advanced economies and developing nations differ greatly in a variety of respects. (**Achchuthan, 2013**). For rising economies like India, good corporate governance is crucial for company success, especially when it comes to catering to global markets and competing internationally. Good corporate governance includes values such as transparency, fairness, responsibility, independence, and accountability, all of which have a direct impact on organizational performance (**Nur'ainy *et al.*, 2013**). It ensures a balance of power, ultimately enhancing a firm's value and improving its overall



financial performance. The need for corporate governance arose due to the lack of conformity with laws and regulations related to financial reporting and accountability of management and board members, leading to significant losses for investors. In India, the formation of many committees generated thorough discussions on corporate governance, including the Kumar Mangalam Birla committee in 1999, the Naresh Chandra committee in 2002, the Narayan Murthy committee in 2003, and the Dr. J. J. Irani committee in 2005. Prior to this, the Companies Act of 1956 was the basic regulatory framework for companies, followed by Clause 49 of the Equity Listing Agreement, which comprised both mandatory and non-mandatory measures. The Companies Act of 2013, which replaced the Companies Act of 1956, considerably brought India's corporate governance norms in line with those of developed nations.

Several studies have extensively analyzed the effect of corporate governance on firm performance **(Bhagat and Bolton, 2019)**. To understand corporate governance in the Indian context, a thorough review of relevant literature is required, with an emphasis on corporate governance practices and their influence on firm performance. CEO duality, where the roles of CEO and chairperson are combined, is a significant issue in corporate governance, as it can affect firm performance. Proponents of CEO duality argue that it positively impacts firm performance, consistent with the stewardship theory. Conversely, opponents argue that it negatively impacts performance, aligning with agency theory **(Yu, 2023; Almashhadani and Almashhadani, 2022)**.

The size and composition of the board determine its monitoring function and effectiveness on behalf of shareholders **(Mishra *et al.*, 2023)**. Board attributes such as size, independence, and meeting frequency have an impact on firm performance, however the association between these factors and firm performance in Indian firm is typically weak **(Arora and Sharma, 2015)**. **(Bi, 2022)** highlight the intensity of board activity, using the number of "director-days" as a proxy for board monitoring activity. Several studies have looked at board composition and size as indicators of the board's monitoring capabilities. Outside directors are often considered more effective monitors than internal directors, with the appointment of independent directors contributing to more effective oversight. **(Chen *et al.*, 2020; Bebchuk and Hamdani, 2017)**.

Examining a sample of leading Bombay Stock Exchange (BSE)-listed companies, **(Alabdullah *et al.*, 2018)** discovered a notable positive relationship between firm size and board size. There was a significant difference in the average board size between small and large firms, as demonstrated by **(Jenter *et al.*, 2023)**. However, **(Lange and Sahu, 2008)** found an insignificant but negative association between firm size and board size in their study of Nifty-listed Indian companies. **(Chen, 2019)** also observed that smaller firms tend to have smaller boards with a higher proportion of insiders. Board meeting attendance serves as an indicator of board oversight quality, as discussed by **(Joecks *et al.*, 2024)**. Metrics such as board attendance, which reflect directors' participation in meetings, have been examined alongside governance metrics **(Min *et al.*, 2018)**.

Regarding the relationship between board characteristics and firm-specific attributes, existing literature has demonstrated that larger firms require a greater number of directors due to the increased complexity of their operations **(Khan *et al.*, 2021; Monem, 2013; Chen and Al-Najjar, 2012)**. However, these studies have found that the percentage of non-executive directors (NEDs) on the board does not have a statistically significant impact on firm performance. However, in Sri Lankan businesses, a favorable correlation has been shown between firm performance and corporate governance characteristics **(Danoshana and Ravivathani, 2019)**. Research conducted in several countries has indicated a noteworthy positive correlation between corporate governance practices and firm performance (Arora and Bodhanwala, 2018; Hermuningsih *et al.*, 2020; Buallay *et al.*, 2017).

### **2.12.2 Earnings Announcements**

Financial information plays a pivotal role in evaluating stock prices. Investors depend on publicly available financial data to assess a company's potential. Earnings show the gains or losses a company has incurred from its operations over a given period. Among the crucial financial disclosures, dividend, and earnings announcements guide investors in their decisions to buy or sell company shares **(Bustani *et al.*, 2021)**. A company's return calculates how well it performed over a defined time period in the capital market. Earnings announcements provide a benchmark for evaluating a firm's profitability and financial

strength in the eyes of the market (**Driskill *et al.*, 2020**). New financial data is usually unpredictable since, if it weren't, the stock price would have already taken it into account before the release.

Earnings for a given period convey two types of information: they reveal the wealth generated for equity shareholders during that period and hint at potential future earnings that could be distributed to shareholders. Three connections between share prices and earnings releases were noted by (**Beaver, 1968**):

- Earnings for the current period provide information useful for predicting future period earnings.
- Earnings for the current period offer insights into expected dividends for future periods.
- Earnings for the current period help determine the present value of expected future dividends.

(**Driskill *et al.*, 2020**) contended that “85 to 90 percent of the net effect of yearly income information is already represented in securities prices via more prompt media, including interim reports.” This shows that the capital market is unaware of just 10-15 percent of the stated information prior to the earnings announcement. Price fluctuations demonstrate that earnings releases have informational content (**Beaver, 1968**), with share price changes in the weeks following quarterly earnings announcements outperforming typical share price changes (**Lyle *et al.*, 2018**).

Market capitalization is another factor that influences the amount of pre-disclosure information (**Verrecchia, 2022**). Smaller firms achieve higher abnormal returns on earnings announcements compared to firms with larger market capitalizations (**Barinov *et al.*, 2024**). After adjusting for risk, abnormal returns tend to rise around earnings releases. In Europe, however, reported earnings announcements may not give robust measures of earnings events since this information is already absorbed into share prices during the reporting period, capturing only a small fraction of the information in share prices (**Rossi and Gunardi, 2018**).

### 2.13 Analyzing Market Efficiency through Historical Market Data

Efficiency is a key notion in finance, often referring to a market where relevant information is represented in the pricing of financial assets (**Goldstein and Yang, 2017**). This review focuses primarily on this form of informational efficiency. Sometimes, economists also discuss operational efficiency, which concerns how resources are used to facilitate market operations.

In competitive capital markets, basic microeconomic principles suggest that investors cannot consistently achieve above-average profits from their investment strategies (**Greenwald et al., 2020**). Although this idea seems evident today, it wasn't widely recognized for much of the 20th century. Prior to the late 1950s, there were few theoretical or empirical investigations of securities markets (**Polillo 2018**). The literature was fragmented across various academic journals until (**Cootner, 1964**) compiled a collection of relevant papers, bringing together research from operations research, statistics, mathematics, and economics.

### 2.14 Market Regularities in Value, Size, and Other Factors

There were studies presenting contradictory findings, yet these were not widely acknowledged until the 1980s. (**Weant III, 2020; Basu, 1977**) research focused on the predictive power of price-to-earnings (P/E) ratios in stock returns. They discovered that equities with lower P/E ratios regularly outperformed their counterparts with higher P/E ratios by more than 7% every year. While Basu's findings may be interpreted as a challenge to the standard CAPM benchmark he employs, he views them as indicating a market inefficiency: *“Securities trading at different multiples of earnings, on average, seem to have been inappropriately priced vis-a-vis one another, and opportunities for earning “abnormal” returns were afforded to investors.”* A seminal contribution that consolidated the literature on earnings-related anomalies (**Fielding, 2019**).

Following Basu's study on low P/E stocks, (**Banz, 1981**) examined the long-term returns associated with investing in smaller companies. Banz conducted an analysis of monthly returns spanning from 1931 to 1975 on stocks listed on the New York Stock Exchange. After correcting for risk, his research found that over this period, the fifty smallest stocks

regularly beat the fifty largest stocks by an average of one percentage point per month. This observation of a small firm effect prompted extensive scholarly inquiry into this phenomenon (Siegel, 2021), and subsequent research has confirmed its presence across various countries (Hu, *et al.*, 2019).

Apart from anomalies related to earnings and firm size in returns, there exist several other perplexing phenomena that challenge the efficient markets hypothesis. One prominent anomaly that has yet to be completely addressed is the negative long-term performance observed in new stock issue, as recorded by (Siegel, 2021) and (Flammer and Bansal, 2017). (Santos, 2017) found that investing in these shares at the end of their first trading day resulted in significant underperformance over the subsequent three years. This underperformance persisted relative to various benchmarks, including a meticulous matching approach that accounted for each security's market capitalization and industry. The joint hypothesis problem is a major hurdle when interpreting these kinds of studies. The extent of over or underperformance hinges crucially on the selection of benchmarks (Burger, 2018), complicating the interpretation of results. On one hand, anomalous behavior may suggest market inefficiencies (Al-Khazali and Mirzaei, 2017). Consistent patterns in returns, on the other hand, may suggest inadequacies in the underlying asset pricing models even when no bias or mistake is present in abnormal returns.

(Fama and French, 1992) found that two factors, closely related to Basu's earnings and Banz's size metrics, account for a considerable amount of the cross-sectional variation in stock returns from 1963 to 1990. These findings have been corroborated across various international markets, as evidenced by studies such as (Linnainmaa and Roberts, 2018). Their main finding was that market capitalization and book-to-market equity not only account for these two factors, but also for the impact of price/earnings ratios and leverage. This observation aligns with asset pricing theory, suggesting that their model serves as an empirical framework akin to arbitrage pricing theory (Barillas and Shanken, 2018).

Alternatively, the significant predictive value of book-to-market equity might suggest market overreaction (Reddy *et al.*, 2021), although initial tests conducted by the authors do not confirm that size and book-to-market effects arise solely from the specific type of market overreaction theorized (Bordalo *et al.*, 2024). In addition to these observed

regularities, there exists a substantial body of literature on stock market seasonality. This includes research into month-of-the-year, week-of-the-month, day-of-the-week, and hour-of-the-day effects, as documented by scholars such as **(Rossi and Gunardi, 2018)** and **(Latif et al., 2011)**. Some of these patterns, like the January effect in small stock returns, may reflect either market inefficiencies or seasonal trends in asset pricing. Other short-term patterns, particularly those observed over very brief periods, may find better explanations within market microstructure theories.

#### **2.14.1 Fundamental Valuation Test**

The empirical investigation, including event studies and strong-form tests, reveal that security prices rapidly respond to new information **(Goldstein and Yang, 2017)**. While it is possible that assets may be chronically overpriced or undervalued for prolonged periods, determining whether prices accurately reflect fundamental values presents greater challenges than assessing their reaction to information **(Gabriel, 2020)**.

As per Sikalidis -2017 investigation on stock market price variations and he finds that these fluctuations exceeds what could be justified by subsequent changes in dividend payments **(Sikalidis and Leventis, 2017)**. According to **(Shiller, 1981)** *"measures of stock price volatility over the past century appear to be far too high - five to thirteen times too high - to be attributed to new information about future real dividends.... The failure of the efficient markets model is thus so dramatic that it would seem impossible to attribute the failure to such things as data errors, price index problems, or changes in tax laws."* This extension of Shiller's earlier work on the bond market **(Shiller, 1979)** encounters similar challenges to the anomalies outlined previously, as his methodology serves as a joint test of market efficiency and the validity of his dividend process model. This literature has caused significant debate **(Durusu-Ciftci et al., 2019)**, resulting in "second generation" variance limits tests, as summarized in **(De Villiers et al., 2020)**.

Due to its presumption that high price volatility signifies market inefficiency, the variance boundaries literature is difficult to interpret **(Woo et al., 2020)**. This assertion is closely tied to considerations of market survival. For instance, while the US market survived the crash of 1929 and the UK market survived the financial turbulence of 1974, these episodes

of excessive price volatility may seem justified ex post over the sample period. However, as mentioned by **(Dettoni et al., 2024)**, a large number of stock markets fail, which can result in situations where dividend volatility could have been infinite, making the observed variance of stock prices in relation to subsequent dividend behavior excessively low.

Similar complexities apply to the equity premium puzzle introduced by **(Bai and Zhang, 2022)**. Their model, based on consumer preferences and economic consumption processes, fails to reproduce the observed long-run equity premiums given prevailing interest rates. They further show that, given their model assumptions and average risk-free interest rates ranging from 0% to 4%, the mean premium would not be higher. This contrasts starkly with the observed US equity risk premium percentage per annum.

#### **2.14.2 Overreaction and Underreaction Test**

Finally, attention shifts to additional tests focusing on return predictability **(Martin and Nagel, 2022)**, which can be categorized into two groups. Firstly, contrary to early random walk literature, research have found positive autocorrelation in security returns at weekly and monthly periods **(Bajzik, 2021)**. Secondly, evidence suggests negative serial correlation in returns over longer horizons spanning several years **(Golez and Koudijs, 2018)**. Despite claims by some researchers about potential arbitrage opportunities from exploiting short-term return autocorrelation, there are still doubts regarding whether trading spreads, commissions, and other expenses related to using these strategies account for any abnormal returns **(Siegel, 2021)**.

On the other hand, longer-term mispricing can pose a bigger threat to market efficiency **(Chordia et al., 2017)**. One study in this regard is by **(Petajisto, 2023)**, who examines time series dependencies in returns. They find that stocks underperforming the most over a three- to five-year period tend to exhibit higher market-adjusted returns in subsequent periods **(Petajisto, 2023)**, and vice versa. Return reversal is a phenomenon that is described by market overreaction, in which stock prices deviate from their fundamental value. **(Han et al., 2020)** also document a similar pattern, suggesting that such price behavior aligns with theories of positive feedback trading.

### **2.15 Role of Market Regulations**

Following the 2008–2009 financial crisis, the US has gone through one of its busiest periods of regulatory action **(Trebbi and Xiao, 2019)**. The Dodd–Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank), passed into law in July 2010, is a cornerstone of this comprehensive reaction to the near-collapse of the financial system. Dodd-Frank has led to the implementation of hundreds of regulatory rulemaking requirements, affecting nearly every aspect of modern financial activity, including derivatives trading, housing finance, and capital requirements for depository institutions. India's regulatory framework, overseen by the Securities and Exchange Board of India (SEBI), plays a pivotal role in maintaining market integrity and investor protection **(Banerjee, 2023)**. Established as an administrative body in 1988 and gaining statutory status in 1992, SEBI regulates and promotes the securities market in India (Ministry of Finance, 1992). SEBI enforces key legislations such as the Securities Contract Regulation Act, 1956, and the Securities Contract Regulation Rules, 1957, to ensure fair trading practices (SEBI, 2021). It also implements various regulations to safeguard investors, including the Prohibition of Insider Trading Regulations and the Takeover Regulations (SEBI, 2020). The listing agreement between stock exchanges and issuers, although not statutory, serves as an essential tool for investor protection **(Johnson, 2019)**. SEBI's regulatory initiatives, such as the introduction of the SEBI (Listing Obligations and Disclosure Requirements) Regulations, 2015, have significantly enhanced corporate governance standards **(Saha and Kabra, 2019)**. The regulator's proactive measures have been crucial in mitigating market risks and fostering a transparent financial environment in India **(Banerjee, 2023)**. Overall, SEBI's regulatory framework ensures the orderly functioning of the Indian securities market, thereby enhancing investor confidence and market efficiency **(Das et al., 2020)**.

Regulation can be analyzed from multiple perspectives, particularly considering the expectations of market participants. Issuers, for instance, seek the securities market to achieve two main goals:

- (i) obtaining a fair price for the securities they issue and
- (ii) (ii) minimizing both direct and indirect issuance costs.



Persistent mispricing can lead issuers to seek alternative financing methods or migrate to more efficient markets elsewhere **(Stambaugh and Yuan, 2017)**. Direct issuance costs include managing and distributing the issue, while indirect costs encompass the "discounts" issuers might offer to ensure successful subscription, a topic extensively discussed on IPO underpricing. Post-issuance, direct costs are associated with listing, complying with regulations imposed by stock exchanges and securities regulators, and maintaining the required information flow. Indirect costs in this phase might involve the impact of mandatory disclosures on the competitive interests of the business. These considerations highlight the complex cost-benefit dynamics that issuers must navigate within regulated securities markets.

Investors want the securities market to protect their interests from unfair actions by company managers, provide an easy and low-cost way to trade stocks, and offer products to manage investment risks **(Das et al., 2020)**. Financial intermediaries, like brokers and advisors, look for opportunities to create and offer various services, such as helping companies raise money and providing investment advice **(Boot et al., 2020)**. They want the freedom to innovate and find ways to cut costs or profit from market inefficiencies **(Gomber et al., 2018)**. Stock exchanges need a stable and transparent set of rules to help them provide liquidity, meaning they can quickly and efficiently facilitate buying and selling of securities **(Boot et al., 2020)**. The government and society expect the securities market to be a stable and secure part of the financial system, working well with other financial sectors. If the securities market fails, it can negatively affect the entire financial system **(Battiston et al., 2017)**.

Sometimes, these goals conflict. For example, intermediaries might benefit from market inefficiencies that increase costs for issuers and investors. Regulation helps manage these conflicts by ensuring fair play. According to **(Corradi and Helleringer, 2021)**, effective regulation requires certain conditions to ensure investors get reliable information and are protected from self-dealing, which is when company insiders engage in transactions that benefit themselves at the expense of the company. While these conditions are necessary, they are not enough by themselves to create a thriving securities market.

### **2.16 Prominent work around mid-cap and small cap indices**

The efficiency of the Indian capital market in the weak form has been the subject of numerous studies over different periods, yet the results remain inconclusive (**Vidya, 2018; Ahmed, et al. 2006**). While some studies suggest that the Indian market exhibits weak-form efficiency, others argue that it does not. The following provides a detailed summary of some key research findings, with a specific focus on mid-cap and small-cap indices.

(**Marisetty and Madasu, 2021**) highlight that determining the timeline for an event study is a critical decision for researchers. The researcher's expertise is demonstrated in selecting the appropriate event window for the study. Many studies utilizing the event study approach to examine market efficiency use event windows that range from 21 to 121 days for daily analyses and 25 to 121 months for monthly analyses. (**Krishnan and Periasamy, 2022**) discovered that small businesses react strongly to the information content of dividend announcements, particularly those promising indicating dividend growth. However, they noticed a different reaction when companies reported lower dividend increases. (**Marisetty and Babu, 2020**) provided robust evidence supporting the semi-strong form efficiency of the Indian stock market, particularly in relation to bonus issue corporate actions. (**Theckanathukaduppil, 2021**) looked at stock splits and bonus issue return on the event day and discovered large positive abnormal returns, indicating that the Indian stock markets are semi-strong efficient markets. (**Shekhar and Rai, 2021**) It has been suggested that the Indian stock market is not semi-strong form of efficient since securities prices do not rapidly and unbiasedly reflect the information that is available. (**Hansda et al., 2020**) discovered that the signaling hypothesis is supported by the positive response of share prices to announcements of dividend increases. Their research led them to the conclusion that semi-strong form efficiency is not present in the Indian stock market.

### **2.17 Research on market efficiency in the Indian Context**

Research on market efficiency within the Indian context has yielded mixed results, reflecting the complexity and evolving nature of the Indian financial markets (**Malafeyev et al., 2017**). In its simplest form, market efficiency means that asset prices completely represent all available information. (**Gupta, et al., 2018**). Studies on the Indian stock market have explored various dimensions of this concept, including informational

efficiency, return predictability, and anomalies (**Kumar and Jawa, 2017**). One significant aspect of market efficiency research in India involves the examination of stock price responses to corporate announcements (**Chakraborty and Chetan, 2018; Singh and Singh, 2017**). Studies such as those by Gupta and Agarwal (2005) have shown that Indian markets react swiftly to new information, suggesting a certain level of informational efficiency (**Yadav, 2017**). However, the extent of this efficiency is often debated, with some researchers highlighting instances of delayed reactions and information asymmetry. Return predictability in Indian markets has also been a focal point of research. For instance, (**Chui et al., 2023**) documented patterns of positive autocorrelation in short-term returns, indicating potential for momentum trading strategies. Conversely, studies have also identified mean reversion in longer-term returns, similar to findings in other emerging markets, which points to the possibility of overreaction and subsequent correction (**Steffen, 2023**). Market anomalies, such as the size effect and the value effect, have been explored extensively in the Indian context (**Woo et al., 2020**). Studies showing that smaller firms and those with lower price-to-earnings ratios tend to outperform their larger and higher P/E counterparts (**Gupta, 2018**). This suggests that Indian markets may not be fully efficient, as these anomalies would provide opportunities for abnormal returns.

Another important strand of research pertains to the market efficiency of derivative markets in India. Studies by (**Parizad et al., 2022**) have analyzed the impact of derivative trading on spot market volatility and efficiency. The findings indicate that derivatives markets contribute to greater informational efficiency in the underlying securities markets.

Despite these insights, challenges to market efficiency in India remain. Factors such as regulatory changes, market microstructure, and the presence of informed traders versus noise traders play significant roles. The regulatory environment, overseen by the Securities and Exchange Board of India (SEBI), has been crucial in shaping market practices and ensuring a level playing field.

In conclusion, while there is evidence supporting various degrees of market efficiency in India, some researchers also indicate an evolving landscape influenced by regulatory frameworks, market structure, and investor behavior. The continuous development of the Indian financial markets and the increasing sophistication of market participants suggest

that studies on market efficiency will remain a dynamic and important area of research. These are some relevant researches on market efficiency in the Indian context:

Table 2.1: Media Research on Market Efficiency

Year	Research Work	Theme	Major Findings
2017	Malafeyev, O., Awasthi, A., & Kambekar, K. S. (2017). Random walks and Market Efficiency in Chinese and Indian equity markets. <i>arXiv preprint arXiv:1709.04059</i> .	Random walks and Market Efficiency in Chinese and Indian equity markets	The research finds both the Indian and Chinese stock markets exhibit inefficiencies, suggesting opportunities for abnormal returns due to predictability from past information.
2017	Kumar, H., & Jawa, R. (2017). Efficient market hypothesis and calendar effects: Empirical evidence from the Indian stock markets. <i>Business Analyst</i> , 37(2), 145-160.	Efficient market hypothesis and calendar effects: Empirical evidence from the Indian stock markets	Empirical evidence suggests that market inefficiencies, such as calendar anomalies, challenge the weak form efficiency hypothesis in India, providing opportunities for active investment strategies.
2017	Yadav, S. (2017). Stock Market Volatility-A Study of Indian Stock market. <i>Global Journal for Research Analysis</i> , 6(4), 629-632.	Stock Market Volatility-A Study of Indian Stock market	Recent analysis indicates that post-liberalization, Indian stock market cycles have shown reduced volatility and more stable bull phases compared to pre-liberalization periods.
2017	Singh, S. K., & Singh, K. B. (2017). Market reaction around mergers and acquisitions announcements in India: a test of Efficient Market Hypothesis. <i>Gurukul Business Review-Gbr</i> , 13, 37-41.	Market reaction around mergers and acquisitions announcements in India: a test of Efficient Market Hypothesis	The study finds that the Indian stock market shows abnormal returns around M&A announcements, suggesting inefficiencies and challenging the strong form of the Efficient Market Hypothesis (EMH).

2018	Gupta, S., Choudhary, H., & Agarwal, D. R. (2018). An empirical analysis of market efficiency and price discovery in the Indian commodity market. <i>Global Business Review</i> , 19(3), 771-789.	An empirical analysis of market efficiency and price discovery in Indian commodity market	The study concludes that the Indian commodity market is inefficient, with prices not fully reflecting available information promptly, challenging the Efficient Market Hypothesis (EMH).
2018	Chakraborty, S., & Chetan, G. K. (2018). A study of quarterly earnings announcement and stock price reactions—With reference to NIFTY Midcap 150. <i>Journal of Commerce and Accounting Research</i> , 7(4), 1-12.	A study of quarterly earnings announcement and stock price reactions—With reference to NIFTY Midcap 150	The study concludes that quarterly earnings announcements significantly impact stock prices of the NIFTY Midcap 150, indicating market sensitivity to new financial information.
2018	Gupta, V. (2018). Predicting accuracy of valuation multiples using value drivers: evidence from Indian listed firms. <i>Theoretical Economics Letters</i> , 8(5), 755-772.	Predicting accuracy of valuation multiples using value drivers: evidence from Indian listed firms	The study concludes that valuation multiples of Indian listed firms can be accurately predicted using key value drivers.
2020	Woo, K. Y., Mai, C., McAleer, M., & Wong, W. K. (2020). Review on efficiency and anomalies in stock markets. <i>Economies</i> , 8(1), 20	Review on efficiency and anomalies in stock markets	The review concludes that while stock markets show some efficiency, various anomalies persist, challenging the Efficient Market Hypothesis (EMH).
2022	Parizad, P. D., Singh, K., & Pai, R. (2022). An analytical study of	An analytical study of equity derivatives	The study concludes that equity derivatives traded on the NSE of India play a

	equity derivatives traded on the NSE of India. <i>Cogent Business &amp; Management</i> , 9(1).	traded on the NSE of India	significant role in price discovery and market efficiency, but also exhibit some inefficiencies and risks.
2023	Chui, A., Ranganathan, K., Rohit, A., & Veeraraghavan, M. (2023). Momentum, reversals and liquidity: Indian evidence. <i>Pacific-Basin Finance Journal</i> , 82, 102193.	Momentum, reversals and liquidity	The study finds liquidity significantly influences momentum and reversals in financial markets. Higher liquidity supports momentum, while lower liquidity can amplify reversals due to trading challenges and price volatility.

## 2.18 Research Gap

As evident from the review of literature, there is enough academic work on market efficiency in the context of emerging markets which discuss the forms and levels of efficiency of financial markets. Particularly, in the Indian context, the majority of the studies revolve around the nature of market efficiency (strong, semi, weak) relying largely on analysis of historical market data from secondary sources (**Woo, et al., 2020; Rahmani et al., 2023; Andrea and Marianna, 2016**). While these studies address the “what” of market efficiency, there are negligible findings on the “why” part. This means to say that the extant literature strongly establishes the presence of weak and semi strong form of efficiency levels in the Indian capital market but doesn’t address why it is so.

Although some sporadic mentions about market efficiency factors (**Economics, 2021; Hu et al., 2022; Komalasari, et al., 2022**) can be traced in the literature, an exploration of these factors and their interlinkages with market efficiency has not been studied in detail. Finally, limited studies have been conducted on primary data. For instance, it is of academic interest to collect primary data to analyze the viewpoint of market participants, who are the true drivers of market activity and whose behaviours and perspectives have

significant impacts on market transactions. Most of the studies around market efficiency in the Indian capital market context are based only on secondary data and deal only with forms of market efficiency (**Awrey and Judge, 2020; Economics, 2021; Mwenye, 2020**). The secondary data heavily relies only on historical market data, leaving no scope for incorporating other critical factors into the study from the market participants' (brokers, investors, traders) point of view. Therefore, the tools and methodology used are quite similar in nature, yielding repetitive results without leading to novel research aspects on the subject. To address this gap, studies using primary data are also essential to derive holistic results that can bring out future research directions.

The present study undertakes a mixed approach by employing a blend of primary and secondary data and exploring the important factors of market efficiency besides its forms. Therefore, it tries to address the research gap with respect to the various underlying factors of market efficiency that lead Indian stock markets to being semi and weak form efficient.

# **RESEARCH METHODOLOGY**



## CHAPTER – 3

### RESEARCH METHODOLOGY

#### Introduction

Research methodology encompasses a structured and scientific approach aimed at addressing questions, formulating theories, and acquiring knowledge. It serves as the journey towards uncovering findings, answering key questions such as:

- i. What is the study's objective?
- ii. What is the extent of the study's relevance and applicability?
- iii. What specific issues does the study aim to tackle and what questions does it seek to resolve?
- iv. How will the study be executed?
- v. How will the study's tasks and subtasks be organized?
- vi. What are the crucial elements, dimensions, and factors involved in the study?
- vii. What are the resource requirements in terms of time and finances?
- viii. What type of information needs to be gathered and from which sources?
- ix. Which tools and methodologies will be utilized for the investigation?
- x. What analytical methods will be employed, and how will conclusions be drawn and presented?
- xi. What limitations and obstacles might be encountered?
- xii. In essence, research methodology serves as the foundation for the entire research process, guiding researchers through the systematic exploration and discovery of knowledge.

Research methodology is conceived as a systematic, sequential, and scientific approach to investigating a problem. As **(Greenfield, 1996)** suggests, research involves a blend of investigative skills, experimental methods, data collection, measurement, inference, interpretation, and reporting. **(Kothari, 2004)** defines research as a process aimed at discovering answers to questions through scientific procedures. **(Somekh and Lewin, 2005)** elaborate on methodology, describing it as the collection of methods guiding a

specific research endeavor, as well as the underlying principles, theories, and values informing the chosen approach.

In essence, research methodology encompasses the processes, methods, tools, and analytical techniques employed by researchers to systematically collect and analyze information, with the aim of addressing particular questions. Therefore, this chapter is dedicated to outlining the procedures, techniques, and analytical tools utilized in the study to derive its findings. The chapter's structure is outlined as follows:

- i. **Research Paradigm and Background** - An introductory section has been included to offer insights into the overall research paradigm or the background settings within which the study titled “**Critical Factors Affecting Market Efficiency in Mid cap and Small Cap Indices**” has been conducted.
- ii. **Scope and Relevance** – This section brings out the importance of the study and outlines the academic scope of the study.
- iii. **Problem Statement and Research Questions** – The section put forth the statement of the problem that has been conceptualized by the researcher after a meticulous and thorough study of concepts and literature. This is in the form of questions that the study intends to answer through systematic investigation.
- iv. **Research Objectives** – In the context of the research problem, research objectives have been determined to arrive at the actual purpose of the study.
- v. **Research Design** – The “research design” section presents the complete approach of research, type of investigation, data collection plan, primary and secondary data sources, class of respondents, tools used, and assumptions of the study.
- vi. **Primary Data collection** - The present study uses a mixed approach to data collection as data has been gathered from primary and secondary sources to achieve the specified objectives. In this section primary data collection has been discussed in detail.
- vii. **Sampling Design** – The sampling design along with detailed data collection plan and sampling methods has been discussed in detail in this section along with justifications for sample selection. The population and sample selection plan have

been discussed in detail dovetailing critical aspects of sampling technique, sample size and justifications thereof.

- viii. **Development of Data Collection Instrument** – This section presents the methods and methodology used for development of interview schedule like pilot survey and expert's opinion to arrive at important underlying constructs and working variables related to the study.
- ix. **Secondary Data Collection** – As per the laid down objectives, secondary data has also been collected. This section briefly describes the type of secondary data obtained from different sources to be analyzed further in the light of given objectives.
- x. **Conceptual Framework for Testing the Hypotheses** – Based on the literature review and research objective a conceptual model has been developed and presented in this section. It highlights the key constructs relevant for testing the research hypotheses. The constituent indicators of each construct have also been included.
- xi. **Constructs and Variables** – The broader constructs of the study and the working variables have been clearly explained, justified, and presented in this section.
- xii. **Use of Analytical Tools** – Description of data analysis techniques has been given in this section and various statistical tests chosen for hypotheses testing have also been discussed.
- xiii. **Expected Research Outcomes** – The expected research outcomes derived from the given research objectives have been presented herein.
- xiv. **Organization of Thesis** – The organization of thesis along with chapter scheme and important sections have been presented herein.
- xv. **Research Limitations** – The researcher has duly highlighted the research limitations faced during the study period.

### **3.1 Research Paradigm and Background**

The concept of "paradigm" can be regarded as a flexible variety of logically interrelated assumptions, concepts, or propositions that govern thought and research, as described by

(Bogdan and Biklen, 1998), or as the philosophical justification or motive for undertaking a study, as described by (Cohen and Manion, 1994). Exploring paradigms or the contextual background aids in better understanding the overall research methodology and the significance of the findings.

The present study was conducted at a time when Indian capital markets were witnessing phenomenal growth and significant participation from retail pockets despite the aftereffects of Covid – 19. India's market capitalization has risen sharply, now standing as the world's fifth largest at around \$5 trillion<sup>1</sup> after United States, China, Japan and Hongkong. The expansion of India's market value has bolstered its global influence and drawn increased investments from foreign investors, particularly those utilizing exchange traded funds (ETFs). India is presently the second-largest market, behind China, in the MSCI Emerging Markets Index, with a weightage of around 19 %, a significant rise from its 2018 figure of just 8.2 percent.

The surge in highly valued stocks, especially in the small and midcap sectors, during the post-pandemic bull run has been primarily fueled by the notable involvement of retail investors in the market rally. Since 2022, the National Stock Exchange Nifty Midcap 100 has surged approximately 60 percent, while the Nifty Smallcap 100 has seen a rally of over 70 percent. Market observers attribute the surge in high P/E (price-to-earnings ratio) companies to the influx of new investors joining the market during the post-pandemic bull run. Many of these stocks in the small and midcap categories and are being snapped up by recent entrants who have only experienced a rising market. Such investors often overlook valuations, with little concern for fundamentals. According to high valuation that these segments are commanding lacks fundamental justification. The realm of high P/E stocks isn't limited to new-age companies. Even in traditional sectors, where growth rates are steady or below 10 percent, stocks were commanding high multiples following the post

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<sup>1</sup> “Retrieved from “The milestone march: India's market capitalization hits \$5 trillion” – Business Standard ([https://www.business-standard.com/markets/stock-market-news/market-cap-of-bse-listed-companies-hits-5-trillion-first-time-ever-124052101387\\_1.html](https://www.business-standard.com/markets/stock-market-news/market-cap-of-bse-listed-companies-hits-5-trillion-first-time-ever-124052101387_1.html))”

pandemic bull run. Besides, unexplained valuations, the rise of digital infrastructure in the post pandemic world augmented the speed of information dissemination from several sources. This led to rise of fin influencers and increased participation from retail players based on their advice.

The above phenomenon points out the deviations from market efficiency where investors presumably behave in a rational way and have access to all types of information. Further the excessive returns posted by mid cap and small cap indices are contradictory to the beliefs of market efficiency where returns are predictable and random. Keeping in view this contextual setting, there was a felt need to explore the factors affecting market returns and price movements in the mid cap and small cap segment. While the impact of historical price movements and important macroeconomic events can be explicitly felt in the markets, many underlying factors may inhibit the market efficiency as well as market integrity, making way for market misconduct activities. The objective of the current study is to investigate all direct and latent factors that contribute to market inefficiencies in the mid-cap and small-cap segments. The entire research has been conducted with the firm belief of the researcher that there are critical latent factors impacting market efficiency which require greater regulatory attention to foster investor trust and maintain market integrity.

### **3.2 Scope and Relevance**

The academic scope as well as the relevance of the study has been highlighted below.

#### **3.2.1 Academic Scope of the Study**

As discussed in the earlier sections, The study focuses on the mid-cap and small-cap indexes of Indian capital markets. The mid cap and small cap indices used for the study were later dovetailed in section 3.9 of this chapter. Keeping in view the technicality of the subject, the present study has been conducted from market makers' perspective as they have a nuanced understanding of market operations and related activities. The study has focused on the direct as well as indirect latent factors that inhibit market efficiency in the said segments.

A rigorous review of academic literature on the subject strongly establishes the presence of weak and semi strong form of efficiency levels in the Indian capital market. Therefore,

the present research is pinned on the assumption that Indian mid cap and small cap segments exhibit weak or at best semi strong form of efficiency. In line with most of the studies relevant to this research, the present investigation also assesses the market efficiency of the identified indices and the same has been evaluated by analyzing historical market data. Additionally, the research explores deeper into the underlying causes of market efficiency or in efficiency which forms its core objective.

Therefore, the academic scope of the study extends to the most critical factors or predictors of market efficiency besides the well-established theories of historical market data. The findings thus arrived at render greater insights for Indian mid cap and small cap segments and a suggestive framework has been developed to enhance the overall market efficiency of these segments.

### **3.2.2 Relevance of the Study**

At a broader level, Indian capital markets are poised for a huge expansion on account of international geopolitical concerns, rise of technological advancements and increased investment surplus with investors. Institutional and individual investors have shown a great amount of interest in the Indian mid-cap and small-cap sectors in recent years. This could be attributable to several factors including strong government initiatives for SME sector, potential growth opportunities, significantly higher levels of historic returns, increased liquidity and market depth, greater scope for portfolio diversification and increased allocations of domestic institutional investors like mutual funds and insurance companies. However, against this background, studies have largely analyzed the historical market data from secondary sources to comment on the market efficiency of various segments. Limited number of studies has been conducted from the viewpoint of market participants, who are the true drivers of market activity and whose behavior's and perspectives have significant impacts on trade transactions.

As such, the present study bears considerable relevance within the framework of market efficiency.

- i. The study unearths micro level factors that make Indian capital markets relatively efficient or inefficient in the mid cap and small cap segment.

- ii. This study explores important latent factors like investor behaviour and biases, market misconduct, insider trading, market regulations etc. which have the potential to disrupt market movements and hamper efficiency in the long run. The understanding of these parameters is extremely critical in ensuring efficient market transactions and fostering investors' confidence in mid cap and small cap segments.
- iii. The results of the survey give important insights into the perceptions of market makers including traders, clearing members and market researchers. Their experience and collective wisdom offer several explanations for supernormal returns witnessed by mid cap and small cap stocks in recent years particularly during the post pandemic period.
- iv. From a regulatory standpoint, the research is very relevant to understand the indirect factors that can disrupt the normal functioning of markets. There has been a significant infusion of funds into the mid and small company divisions from both retail and institutional investor. Often, huge quantum of funds diverted to a particular segment cause market disruptions like speculation, insider trading, overbuying, overselling, herd reactions and rumors. It is critical to keep such activities under check and this calls for greater transparency and efficiency in market transactions in the interest of investors, big or small.
- v. The study is truly relevant for categories like mid cap and small cap which are poised for greater economic growth in the times to come. Strong government focus on SME sector, better opportunity for portfolio diversification and potential for high returns, will further drive the growth story of this segment. The study's findings will be useful for professionals or academics interested in exploring deeper into these areas.
- vi. Taking cues from existing literature, the study corroborates the findings on market efficiency of Indian capital markets and strengthens the argument of weak and semi strong form of efficiency. By doing so, researchers. It emphasizes on the need for greater research in the mid cap and small cap segments, highlighting areas of relevance for the future.

- vii. The study clearly brings out the strongest predictors of market efficiency, pointing out to the most pressing issues which require policy attention.
- viii. The present investigation relies on mixed methods of data collection. Therefore, while secondary data have been analyzed to assess the efficiency levels, primary data analysis has revealed the underlying reasons for relative efficiencies or inefficiencies in mid cap and small cap indices. The combined interpretation of the results is useful in developing a model framework for assessing and enhancing the market efficiency of the said segments.

### **3.3 Problem Statement**

In any research endeavor, a problem statement serves as the focal point, clearly delineating the issue at hand for investigation. It should be succinct and devoid of vague notions, aiming to captivate the reader's interest and contribute to the existing literature in the field. **(Hernon and Metoyer-Duran, 1993)** outlined nine attributes that a problem statement should embody:

- I. It must be clear and precise, avoiding broad generalizations.
- II. It should pinpoint the specific issue under scrutiny.
- III. It may pose targeted questions and highlight key factors, themes, or variables.
- IV. Key concepts and terms should be identified.
- V. The study's scope and academic boundaries need to be defined.
- VI. While offering generalizability, excessive generalization should be avoided.
- VII. It should emphasize the significance of the study and justify the need for investigation.
- VIII. Jargon and value-loaded language should be eschewed solely for attention-seeking purposes.
- IX. The problem statement should go beyond mere data description.

The problem statement for the current research, titled "Problem Statement", is provided in **Box No. 1.**



**Box No. 1****Problem Statement**

The existing body of research on the market efficiency of Indian Capital Markets indicates a tendency towards weak or semi-strong efficiency levels. These findings underscore the influence of numerous factors on market efficiency, particularly highlighting its weakness in the mid-cap and small-cap segments. Markets exhibiting weak or semi-strong efficiency are susceptible to information asymmetries, market manipulation, heightened volatility, and irrational investor behavior. Consequently, such inefficiencies erode investor confidence and undermine regulatory credibility. The advent of technology has significantly connected a vast number of investors with capital markets, facilitating regulatory oversight through advancements like regtech. However, technological progress has also altered the landscape of capital market crimes and price manipulations. Consequently, instances of market misconduct and herd behavior are more prevalent in mid-cap and small-cap segments compared to larger counterparts. Moreover, the growing penetration of exchange-traded funds, mutual funds, and index funds has made mid-cap and small-cap segments attractive to retail investors. Despite their increasing significance, there is a dearth of research on the factors influencing market efficiency within these segments in India. Therefore, this study aims to bridge this gap by investigating the factors affecting market efficiency in the small and mid-cap segments of the Indian stock market.

Understanding the barriers and triggers to market efficiency in these segments from both regulatory and investment perspectives is crucial. Such insights will enable investors to evaluate these segments comprehensively before making investment decisions and inform regulatory authorities to take necessary actions to safeguard market integrity. While the fundamental purpose of this study is to identify and explore important factors that hinder market efficiency, it also seeks to propose approaches to regulators for enhancing overall market efficiency, with specific attention to the mid-cap and small-cap segments. Additionally, the study delves deeper into the interplay between market misconduct, investor behavior, and market efficiency.

### **3.4 Research Questions**

The initial stage in the exploration phase is to select one or more research questions related to a certain behavior, event, or phenomenon of interest. The current research was undertaken to answer the following research questions.

- I. What are the generic factors affecting market efficiency of mid cap and small cap segment?
- II. What are the latent factors affecting market efficiency of mid cap and small cap segment?
- III. Is there a difference between market efficiency level of mid cap and that of small cap segment?
- IV. What are the possible solutions to assess and enhance the market efficiency of mid cap and small cap segments?

### **3.5 Research Objectives**

In the background of the above research questions, the following study objectives have been set to lead the investigation.

- I. To determine the set of generic factors as well as latent factors hindering market efficiency in Indian Capital markets.
- II. To analyze the perception of market participants with respect to critical factors of market efficiency
- III. To examine the level of efficiency of Indian capital markets with respect to mid-cap and small cap segments
- IV. To propose an approach to the regulator for assessing and enhancing overall market efficiency, with a specific focus on the mid cap and small cap segments.

### **3.6 Research Design**

A research inquiry demands scientific rigor and systematic methodology, thus emphasizing the significance of an appropriate research design. A well-constructed research design ensures the effective organization of data collection and analysis in alignment with the research objectives, while also optimizing resource utilization. Simply put, as **(Kerlinger, 1986)** asserts, research design serves as a structured plan or strategy for investigation,

tailored to elicit answers to research questions and manage variance. The selection of a suitable research design is typically contingent upon the nature of the research problem. It amalgamates various facets of the study, including data collection, measurement, and analysis, within a coherent framework **(Trochim, 2007; De Vaus, 2001)**.

In this study, both exploratory and descriptive research designs are employed. Given the multifaceted objectives of the study, a mixed approach was deemed most appropriate. While a descriptive research design aims to depict the current scenario and observed phenomena within the population, exploratory research entails a thorough investigation that delves into extensive inquiry and in-depth analysis of the pertinent issue. Numerous scholars have advocated for the efficacy of mixed methods, positing that they offer enhanced insights in research endeavors and afford opportunities to validate qualitative findings with quantitative data **(Greene *et al.*, 1989; Creswell and Plano, 2007; Molina-Azorin, 2011)**.

The primary survey conducted is based on the respondents' opinion on market efficiency related factors in mid cap and small cap segments. Since market efficiency is a complex phenomenon and requires technical understanding, It was decided to gather responses from market professionals who have knowledge and experience on the subject at hand.

The concept of efficiency itself is not static but dynamic as it keeps changing based on market events and information dissemination. Therefore, there is not a concept such as absolute market efficiency and it should be viewed in terms of relative efficiency of inefficiency of a particular segment of stocks. There are various direct and indirect drivers of efficiency levels in the market. While some of them can be easily understood such as the impact of historical price movements or volatility on future returns can be empirically investigated. But markets are also impacted by many other aspects like corporate governance, firm disclosures, insider trading etc. Furthermore, a set of many indirect factors like market regulations, information asymmetries, investor biases, heuristics etc. also affect price movements and trades. Thus, it was imperative to establish a well-organized data collection instrument to elicit the necessary responses regarding the critical factors mentioned above. However, there is a lack of standardized tools for measuring

market efficiency from the perspectives of traders or investors. Consequently, a structured questionnaire had to be developed based on expert opinions and a review of existing literature. Through an in-depth analysis, the researcher assessed the relevance of various factors and their impact on mid-cap and small-cap indices, informing the creation of the questionnaire for primary data collection. The aim was to investigate the factors contributing to or hindering market inefficiency within these segments.

Recognizing that a mere enumeration of factors was insufficient, exploratory techniques were employed to yield comprehensive results and understand the intricate connections between these factors and market efficiency. While the descriptive research design facilitated the delineation of factors, the exploratory design was utilized to uncover the most crucial ones warranting immediate attention to enhance the overall efficiency levels of the small-cap and mid-cap segments of the Indian capital markets.

### **3.6.1 Primary Data Collection**

Data collection for studies typically involves two main sources: primary and secondary. Primary data collection involves gathering firsthand information, while secondary data refers to information already recorded at an earlier time, utilized in research to either directly or indirectly support findings derived from primary data.

In this study, a combination of both primary and secondary data collection tools was utilized. The primary data was collected through a well-designed structured questionnaire which was sent via email as google forms to gather responses in a swift and coherent manner. Keeping in view the technicality of the subject and the research objectives, the sampling plan was designed carefully and respondents were selected for the survey as per the sampling plan. The detailed sampling plan and data collection instrument have been discussed subsequently.

### **3.6.2 Sampling Design**

Sampling design refers to the systematic process used to pick a group of persons, items, or entities from a broader population for research or data collection purposes. It involves determining the sampling frame, which is the list or collection of components from which

the sample will be selected, as well as identifying the sampling method or methodology to be utilized. Sampling design also involves considerations such as sample size, sampling strategy, and the criteria for inclusion or exclusion of elements in the sample. The goal of sampling design is to ensure that the sample is representative of the population of interest and that valid inferences can be made from the sample to the larger population.

The details on population, sampling technique and sample size are discussed subsequently.

### **3.6.3 Population**

In research design and statistical analysis, a "population" represents the entire assembly of entities that one aims to comprehend or, more formally, about which one intends to make inferences. Hence, accurately defining the population of interest stands as a fundamental aspect of research design because how the population is delineated shapes the breadth of the inferences derived from the research endeavor (Salkind, N. J. 2010). Put simply, in research, "population" pertains to a specific target group of objects, entities, or individuals from which inferences are to be drawn. This target population encompasses all elements slated for study, with a representative subset of elements referred to as the "sample" forming the basis for analysis.

In the present study, the target population comprises of the total number of stockbrokers registered with SEBI, Mumbai. According to SEBI, there are 4929<sup>2</sup> registered stockbrokers on the equity segment. They are authorized to trade and transact in the equity segment of Indian capital market through the exchanges that is National Stock Exchange (NSE) and Bombay Stock Exchange (BSE). Thus, these SEBI registered stockbrokers constitute the population of the study.

### **3.6.4 Sampling Technique**

The sample of respondents have been drawn using Purposive sampling from the list of SEBI registered brokers which served as the sampling frame for selection of participants for the survey.

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<sup>2</sup> [SEBI | Registered Stockbrokers in equity segment](#)

Purposive or judgmental sampling is a method in which certain people or events are intentionally chosen to provide essential information that cannot be gathered through other means (Maxwell, 1996). The researcher includes cases or participants in the sample because they feel they deserve to be included. According to the research objectives as well as the academic scope of the study, non-probability sampling approach in the form of Purposive Sampling technique has been used for collection of primary data.

The study has been conducted from the exchange members' or traders' perspective so the sampling unit (respondent) was a single firm which was a SEBI registered stock trader. Keeping in view the technicality of the topic of market efficiency, experts' opinion was needed from market players who were knowledgeable and experienced. Therefore, purposive sampling technique was used to select respondents who continuously transact in Indian capital markets and have deep understanding of all the factors affecting market efficiency. Further, more than ninety percent of stockbrokers are concentrated in Mumbai, so geography or area-based sampling methods could not be employed. To ensure authenticity and credibility of responses, only SEBI registered stock broking firms had to be approached who are well versed with stock market modalities and regulations. Hence, it was deemed useful to undertake purposive sampling of stock broking firms based on certain characteristics, knowledge, experiences and select only those participants who could render meaningful insights to achieve the laid down objectives of the present study.

### **3.6.5 Sample Size and its Determination**

Samples consist of elements drawn from the statistical population as defined by the researcher. In cases where the population size is extensive, representative samples are studied and subjected to statistical testing to draw inferences about the population. These findings can then be generalized or extrapolated to a broader range of similar elements, typically representing the target population of the study.

The sample size for the present study is 366. To select an adequate sample size, Morgan's table for sample size determination was used. According to the Morgan's table the suggested sample size for a population of more than 4,500 but less than 5,000 was 354. To ensure adequacy of responses, the researcher emailed 422 forms and captured data of 403

forms. However, only 366 firms completed the survey correctly and were selected for further investigation. The study's ultimate sample size was 366. Since each respondent was a broking firm, physical meetings were not possible. Google forms was the most suitable method of reaching out to the concerned offices. So, data was gathered from the selected broking firms via email by the use of google forms.

### **3.6.6 Development of Data Collection Instrument**

The primary data was collected through a structured questionnaire which was prepared in English language and later converted into google form to gather the required responses in a coherent manner. The items of the questions were developed through researcher's in-depth understanding of the subject and extensive review of literature. In the second stage, the developed questionnaire was discussed with market experts and their opinion on the subject was taken to improvise the questionnaire further. The researcher personally met and interviewed 5 market experts who had rich experience in the stock market industry and were associated with reputed investment banks and capital market firms. The detailed discussions with them helped in revising the questionnaire by deleting some items and including few new ones. The list of personal interviews taken are as follows.

- Vitthal Kulkarni (Head of Treasury Analytics, HDFC Bank)
- Paul Cottee (Director SME - Compliance, NICE Actimize)
- Riyaz Ladiwala (EVP – Digital Transformation, Edelweiss)
- Alpesh Porwal (VP - Paisa-Bazar)
- Nirmal Pareek (SVP – Prabhudas Liladher)

While the researcher could derive all the critical factors of market efficiency from the review of extant literature, the personal interviews were immensely helpful in drawing out the items and the indicators for each of the identified critical factors. This helped in shaping the questionnaire properly to capture the requisite responses. Besides development of the questionnaire, all the personal interviews were an opportunity for the researcher to discuss market related factors and capture expert views on mid cap and small cap segments in the context of market efficiency.

The survey captured the responses through close ended ordinal Likert scale statements. The questions were centered around the underlying factors impacting market efficiency. This included six major aspects

- i. Investor Behaviour
- ii. Market Misconduct
- iii. Historical Price Movement
- iv. Market Regulations
- v. Firm Accountability and Responsibility

The data collection instrument focused mainly on two aspects. One was the factors of market efficiency in mid cap and small cap indices and the other was to understand the perception of broking firms about mid cap and small cap indices. The questionnaire was divided into two parts, Part A and Part B. Part A comprised demographic questions like name of the broking firm, location, years of experience, registration number etc. Part B of the questionnaire comprised questions related to market efficiency factors in line with the specified research objectives constructed on an ordinal scale with Likert scale statements. A total of 53 Likert scale statements representative of market efficiency factors were included in the questionnaire.

These statements were arrived at in a systematic manner after extracting relevant items from the literature and conducting in depth interviews with domain experts. While the literature review helped in identification of the major five market efficiency related factors, extensive discussions with experts helped in drawing out a comprehensive list of items to be included or excluded within each of the five critical factors. It also helped in establishing the content validity of the said items. The face validity and refinement of statements was further carried out through the pilot survey conducted with 25 random respondents. The reliability of the scale was checked using Cronbach alpha. Finally, 53 items were included in the final questionnaire as statements that were to be administered to the respondents. The items were operationalized into Likert scale statements to capture ordinal data from respondents which has been explained in Table



3.1. A visual representation of the process is depicted in Figure 3.1 titled as “Development of Scale and Data Collection Instrument.”

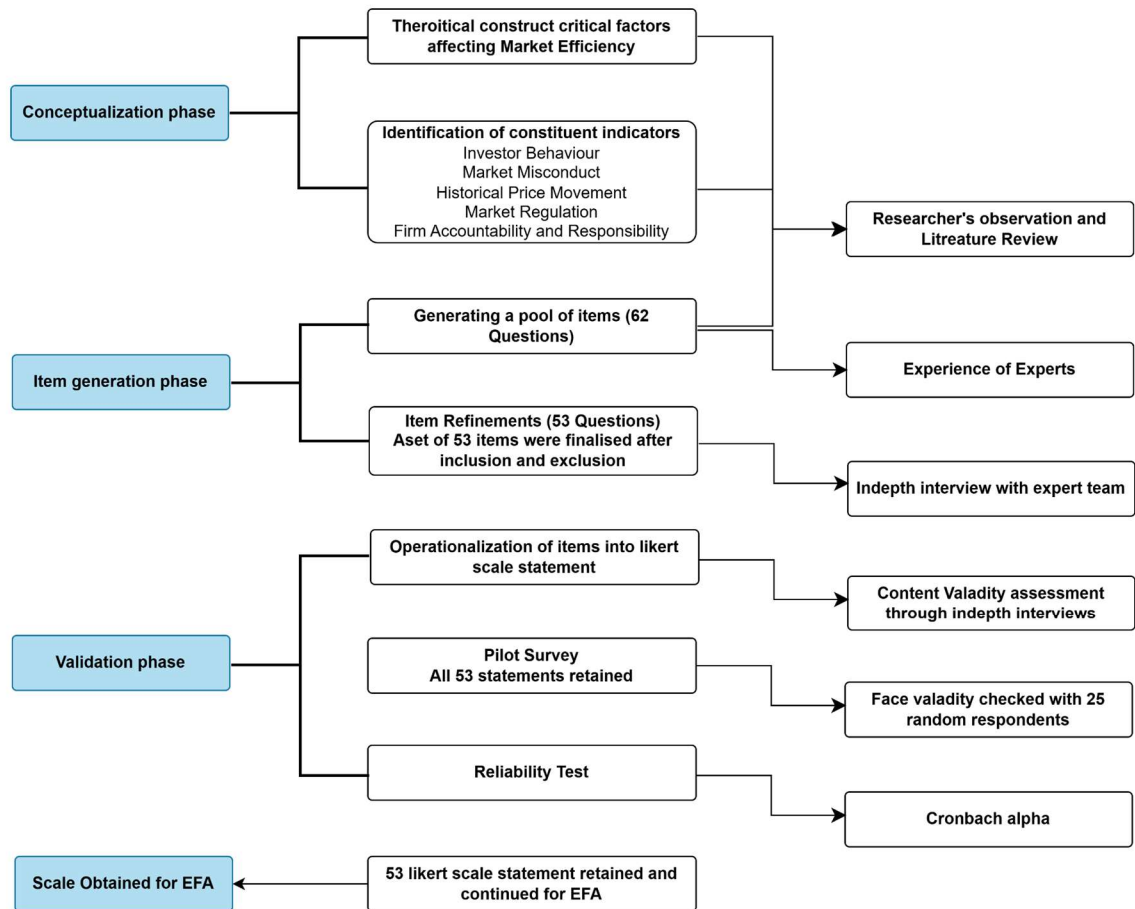


Figure 3.1: Development of Scale and Data Collection Instrument

### 3.7 Constructs, Variables, and Indicators

#### 3.7.1 Construct

The objective of this study is to investigate the key factors influencing market efficiency within the mid-cap and small-cap segments of the Indian capital market, focusing on the perspective of stock broking firms. As outlined in the study's scope, various critical factors related to market efficiency in a general context have been examined. Additionally, the study delves into the overall perceptions of broking firms regarding mid-cap and small-cap indices. At a broader level, the study encompasses factors such as *"Investor Behaviour"*,

*"Market Misconduct", "Historical Price Movement", "Market Regulation," and "Firm Accountability and Responsibility".*

Hence, the theoretical construct or concept under investigation is the "Critical Factors of Market Efficiency." A construct is a conceptual framework comprising abstract, loosely bound ideas, phenomena, activities, underlying themes, or subject matter proposed for assessment (Cronbach, 1955; Lavrakas, 2008). However, due to its expansive dimensions and inherent subjectivity, it is often not directly measurable. Consequently, constructs must be operationalized through indicators and variables that can be measured in a structured and cohesive manner.

### **3.7.2 Operationalization of Variables and Indicators**

Considering the study's objectives and scope, The researcher did a thorough literature analysis to determine the most important characteristics and indicators of market efficiency in the mid-cap and small-cap segments. Through this systematic review approach and following multiple discussions with experts in the capital market field, the researcher developed the following set of independent variables pertaining to critical factors of market efficiency.

- Investor Behaviour
- Market Misconduct
- Historical Price Movement
- Market Regulations
- Firm Accountability and Responsibility

The dependent variables utilized to understand the general perception of the respondents were classified as

- i. Overall Market Efficiency of Mid cap segment
- ii. Overall Market Efficiency of Small cap segment

None of these variables can be directly measured like simple variables such as "name" or "location," or straightforward categorical metrics like "years of experience." Instead, they represent complex constructs that are influenced by multiple indicators. Thus, it was crucial

to operationalize these variables by employing multiple indicators to facilitate quantification.

The meaning and description of each indicator has been explained in detail in Section no. 3.7.3. The dependent variable that is “Overall Market Efficiency of Mid cap segment” and “Overall Market Efficiency of Small cap segment” was captured from the primary data based on the perception of the respondents about the overall market efficiency in the two segments.

Thus, the measurement of variables was done broadly in the following way:

- i. **Development of Likert Scale** - To assess a broad range of factors influencing capital market efficiency, a Likert scale was created containing multiple indicators (items) presented as statements. These items were drawn from literature reviews, the researcher's expertise, and consultations with domain experts. Consequently, data pertaining to all the pivotal factors concerning market efficiency in the study were quantified in ordinal terms. Likewise, the clients' experiences and perceptions regarding the overall market efficiency of mid-cap and small-cap indices were also measured in ordinal terms using a Likert scale.

### 3.7.3 Description and Measurement of Variables

The variables analyzed in the study, along with their indicators and descriptions are summarized in the following table. The independent and dependent variables used in statistical analysis are explained in Table 3.1.

Table 3.1: Critical Factors of Market Efficiency: Description and Measurement of Variables

Indicators	Description	Measurement
Adequate disclosures by firms on business segment information	This indicator describes to what extent adequate disclosures by the firms about business operations is relevant to corporate governance?	
Presence of women directors on the board	This indicator describes the perceived relevance of having women directors on the firm's board without having promoter's background.	

Distinctive and separated roles of the Chairperson and the CEO	This indicator describes to what extent role distinction between CEO and promoter is perceived to be necessary for better corporate governance	Likert Rating Scale (Ordinal Data)
Attendance in board meetings by all board members	It refers to relevance of board members' attendance in meetings as perceived by the respondent	
Encouraging shareholder participation via video or tele-conferencing or via advance question submissions	It refers to the ease of participation in board meetings via technology enabled tools.	
Total number of members in Audit Committee	This indicator describes to what extent the number of members in audit committee is relevant for better corporate governance	
Adequate disclosures about potential conflicts of interest among board members and key executives	This indicator describes the importance of disclosing potential conflicts of interest among board members and key executives	
Consistency of Dividend Payment	This refers to the importance of consistent dividend payments in terms of corporate governance as perceived by the respondents	
Transparent and Regular Corporate Communication with investors	This indicator describes to what extent regular and transparent communication with investors is important for better corporate governance	Likert Rating Scale (Ordinal Data)
Presence of Information asymmetries	This indicator describes the presence of information asymmetries in capital markets as perceived by respondents.	
Information asymmetries causing market inefficiencies	This indicator describes the role of information asymmetry in causing market inefficiencies as perceived by the respondent.	
Difficulty in detection of illegal insider trades due to complex nature of the stock market	This indicator refers to the perceived difficulty in detecting illegal insider trading activities due to the complex and dynamic nature of the stock market.	
Likelihood of market participants with superior information to make profitable investments	This indicator refers to the perceived advantage that market participants can have by holding superior information which helps in profitable investment decisions.	

Importance of timely and accurate information in maintaining a level playing field	This indicator refers to the perceived importance of timely and accurate information to maintaining a level playing field in capital markets.	
Role of technological advancements in reducing information asymmetries.	This indicator describes to what extent technological advancements have reduced information asymmetry by enhancing availability and accessibility of market information.	
Increased information asymmetries due to use of high-frequency algorithmic trading	The indicator describes the perceived role of high frequency algorithmic trading in exacerbating information asymmetries in capital markets.	
Adequate powers with regulatory bodies to enforce compliance standards against market manipulation	This indicator refers to the perceived importance of adequate regulatory powers in enforcing strict compliance standards against market manipulation activities.	Likert Rating Scale (Ordinal Data)
Quantum of penalties and sanctions imposed on non-compliant firms.	This indicator refers to the perceived importance of penalties and sanctions on companies that fail to comply with regulatory standards.	
Dissemination of international best practices of corporate governance to curb market manipulation	This indicator describes to what extent dissemination of international best practices of corporate governance can curb market manipulation.	
Regulatory measures aimed to reduce information asymmetries	This indicator refers to the perceived importance of regulatory measures in reduction of information asymmetries.	
Regulatory powers to restrict misuse of social media for market manipulation or misconduct	This indicator describes the perceived significance of regulatory powers in restricting the misuse of social media for prevention of market misconduct.	
Use of advanced technology and AI driven tools to enhance regtech for market surveillance	This indicator describes the perceived importance of AI driven tools in enhancing regtech for market surveillance.	
Regulations adopting prevention approach to market manipulation and insider trading	This indicator refers to the importance of adopting prevention approach to market manipulation by regulators.	
Herd mentality as an impediment to efficient trades	This indicator refers to what extent herd mentality can affect efficient trades in the stock market.	

Inefficient trades due to personal biases and perception about specific sectors	This indicator refers to what extent personal biases and perception can lead to inefficient trades.	Likert Rating Scale (Ordinal Data)
Importance of investors' financial analysis skills in making sound investment decisions.	This indicator refers to the perceived importance of Importance of investors' financial analysis skills in making sound investment decisions.	
Suboptimal investments in stock markets due to Influence of peers and family members	This indicator refers to what extent influence of peers and family members may lead to suboptimal investments as perceived by the respondents.	
Impact of educational qualification and professional experience on market related decisions	This indicator describes the perceived role of educational qualification and professional experience on decision making in stock markets.	
The general investor sentiment in the market determines the level of market efficiency	This indicator refers to the role of investor sentiment in driving market efficiency as perceived by the respondents.	
Excessive bad trades due to investors' overconfidence and perceived superiority of their knowledge	This indicator refers to the extent to which investors' overconfidence can lead to bad trades in the stock market	
Excessive reliance on fin influencers as an impediment to rational investment decisions	This indicator refers to the extent to which reliance on fin influencers may be an impediment to rational investment decisions in stock markets.	
Impact of investor sentiments towards accumulated savings on nature and quantum of investments	This indicator refers to the extent to which investor sentiments towards accumulated savings can impact nature and quantum of investments.	
Irrational trade transactions due to investors attitude towards booking losses and profits	This indicator describes the perceived impact of investors attitude on trades with respect to booking losses or profits.	
Impact of trading volume on stock market efficiency	This indicator refers to the perceived impact of trading volume on stock market efficiency.	Likert Rating Scale (Ordinal Data)
Impact of trading volume during market open and close affects stock market efficiency	This indicator refers to the perceived impact of trading volume during market open and close affects stock market efficiency.	
Impact of Bid-Ask spread on stock market efficiency	This indicator refers to the perceived impact of Bid-Ask spread on stock market efficiency.	

Influence of market depth on stock market efficiency	This indicator refers to the perceived influence of market depth on stock market efficiency.	
Impact of price manipulation on stock market efficiency	This indicator refers to the perceived impact of price manipulation on stock market efficiency.	
Historic price movements as predictors of future returns	This indicator refers to perceived significance of historic price movements in predicting future returns.	
Influence of price volatility on stock market efficiency	This indicator refers to the perceived influence of price volatility on stock market efficiency.	
Annual GDP growth rate	This indicator refers to the perceived significance of annual GDP growth rate in driving market efficiency.	Likert Rating Scale (Ordinal Data)
Banking Liquidity and Availability of funds	This indicator refers to the perceived significance of banking liquidity in driving market efficiency.	
Industry specific policies and regulations	This indicator refers to the perceived significance of industry specific policies and regulations in driving market efficiency.	
Government Fiscal Policy	This indicator refers to the perceived significance of government fiscal policy in driving market efficiency.	
RBI Monetary Policy	This indicator refers to the perceived significance of monetary policy in driving market efficiency.	
International Geopolitical conditions	This indicator refers to the perceived significance of international geopolitical conditions in driving market efficiency.	
Overall stability of the financial system	This indicator refers to the perceived significance of financial stability in driving market efficiency.	
Levels of Foreign Institutional Investment	This indicator refers to the perceived significance of foreign institutional investment in driving market efficiency.	
Valuation of mid cap indices	This indicator describes the perceived valuation of mid cap indices	Likert Rating Scale
Adequate disclosures about mid-cap companies	This indicator describes the perceived adequacy of disclosures about mid-cap companies.	

Vulnerability of mid cap indices to market manipulation and insider trading	This indicator describes the perceived vulnerability of Mid cap indices to market manipulation and insider trading	(Ordinal Data)
Accessibility to real-time market data for mid-cap investments	This indicator describes the perceived accessibility to real-time market data for mid-cap investments.	
Opportunity for abnormal returns in mid cap indices	This indicator describes the perceived opportunity for earning abnormal returns in mid-cap investments.	
Volatility in mid cap indices commensurate with risk return expectations	This indicator describes the perceived level of volatility acceptable for potential returns in mid cap indices.	
Valuation of small cap indices	This indicator describes the perceived valuation of small cap indices	Likert Rating Scale (Ordinal Data)
Adequate disclosures about small-cap companies	This indicator describes the perceived adequacy of disclosures about small-cap companies.	
Vulnerability of small cap indices to market manipulation and insider trading	This indicator describes the perceived vulnerability of small cap indices to market manipulation and insider trading	
Accessibility to real-time market data for small-cap investments	This indicator describes the perceived accessibility to real-time market data for small-cap investments.	
Opportunity for abnormal returns in small cap indices	This indicator describes the perceived opportunity for earning abnormal returns in small-cap investments.	
Volatility in small cap indices commensurate with risk return expectations	This indicator describes the perceived level of volatility acceptable for potential returns	

Source: Questionnaire

### 3.8 Secondary Data Collection

As discussed earlier, the present study has employed a mixed research design and has also used secondary data to assess the overall market efficiency of mid and small cap indices. A total of 6 broad market indices of National Stock Exchange (NSE) were selected for study from mid-cap and small cap segments. These six indices included for the empirical investigation were Nifty Mid Cap 50, Nifty Small Cap 250, Nifty Mid Cap 150, Nifty Full Small Cap 100, Nifty Mid Small cap and Nifty 500.



### 3.9 Data Sources and Data Description

Data on the daily opening, closing, high, and low values of the above-mentioned broad market indexes of the NSE were gathered by the researcher between January 1, 2008, and December 31, 2023. The researcher decided to use the average of these four prices rather than only the closing price to mitigate price fluctuation volatility. While previous studies typically focused on closing prices under the assumption that trading occurs at that time, (Lodha and Sora, 2015) suggest using the average of the four prices to dampen fluctuations and partially control volatility. All historic market data were sourced from the official website of the NSE.

A brief description of the six indices selected for the study is presented in Table 3.2.

Table 3.2: Broad Market Indices of NSE

Sr No.	Index Name	Index Description as per NSE
1	<b>Nifty Mid Cap 50</b>	The Nifty Midcap 50 Index, comprising the top 50 midcap companies, makes up 7% of the NSE's free float market cap and accounted for 9.6% of the NSE's total traded value over six months ending September 2023.
2	<b>Nifty Small Cap 250</b>	The Nifty Smallcap 250 Index covers companies ranked 251-500 by market cap in the Nifty 500. As of September 2023, it represents 8% of NSE's market cap and contributed 15.5% to NSE's trading volume in the last six months.
3	<b>Nifty Mid Cap 150</b>	The Nifty Midcap 150 Index comprises companies ranked 101-250 by market capitalization in the Nifty 500. As of September 2023, it represents 15% of NSE's free float market cap and contributed 21.1% to NSE's trading volume over the last six months.
4	<b>Nifty Full Small Cap 100</b>	The Nifty Smallcap 100 Index tracks the small-cap segment's performance. As of September 2023, it represents around 5% of NSE's free float market capitalization and contributed approximately 9.5% to NSE's total traded value over the six months ending September 2023.
5	<b>Nifty Mid Small cap</b>	The Nifty Mid Smallcap 400 Index represents about 24% of NSE's market capitalization and contributed around 36.6% to its total traded value over six months ending September 2023, focusing on mid and small-cap companies.

6	<b>Nifty 500</b>	The Nifty 500 Index represents 93% of NSE's free float market cap as of September 29, 2023, and its constituents contributed 82.6% of the total traded value on the NSE over the preceding six months..
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**Source:** - NSE India

Besides market data on the identified indices, secondary data was also collected from the internet and online academic databases. This data primarily served to bolster and corroborate the findings obtained from the primary survey and aided in reviewing the extant literature on the subject. It was gathered from the from the following sources.

- i. Important publications on Indian Capital Market and Market Regulations
- ii. SEBI circulars, reports, and publications
- iii. Annual reports and Publications of BSE and NSE
- iv. Research Papers from Academic Journals
- v. Newspaper Articles
- vi. Research Reports
- vii. Doctorate Theses

### **3.10 Hypotheses**

To accomplish the objectives of the study, the hypotheses were designed and tested to make suitable inferences in the context of the larger issue addressed in the study. A total of 12 hypotheses were framed. The details are mentioned in Chapter 4, under section “C” and Table 4.14.

### **3.11 Statistical Tools for Analysis**

The primary and secondary data acquired for the study were statistically analyzed to determine the findings. The tools and tests used for analysis have been mentioned in the subsequently.

#### **3.11.1 Primary Data Analysis**

The data gathered through a primary survey was subject to statistical analysis to conduct hypotheses testing and derive relevant insights aligned with the research objectives. Given

that the research design encompasses both exploratory and descriptive elements, statistical exploratory analysis as well as hypotheses testing was employed to achieve the research objectives. The updated version of IBM SPSS for Statistical package for social science was used for conducting the statistical data analysis. Data was entered using Microsoft Office Excel.

The following statistical techniques were used for exploration of factors, analysis of survey data and testing the research hypotheses.

- i. Descriptive Statistics – Mean and Standard Deviation
- ii. Reliability Analysis: Cronbach's Alpha
- iii. Exploratory Factor Analysis
- iv. Chi Square Test of Association
- v. Bi-variate Correlation
- vi. Multiple Regression Analysis
- vii. Mann Whitney Test

### **3.11.2 Secondary Data Analysis**

The historical price data collected on six mid cap and small cap indices were also analyzed statistically to check the market efficiency of these segments. To accomplish the goals of secondary data analysis the following tools were employed

- i. The Augmented Dickey–Fuller (ADF) test
- ii. Descriptive statistics including average monthly returns, maximum, minimum, standard deviation, skewness, kurtosis, and the Jarque–Bera Test
- iii. Autocorrelation analysis
- iv. The Runs test

The daily returns were calculated using the formula  $[(LN (Today's closing price/yesterday's closing price) \times 100)]$ . It is important to note here that the analytical tools and tests used here have been utilized by previous researchers, thus demonstrating consistency with established methodologies in the literature. The tools have been selected from the extant

literature concerning market efficiency studies. The use of these techniques has also been discussed in chapter number 2 in the literature review section. Some of the notable works in this regard are **(Degutis and Novickyte, 2014; Harshita *et al.*, 2018)**.

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# **Primary Data Analysis and Interpretation**

## **Chapter 4**

### **Primary Data Analysis and Interpretation**

#### **Introduction**

Data analysis is examining, refining, transforming, and modelling data in order to get important insights, make conclusions, and improve decision-making. It encompasses a range of techniques across various fields such as business, science, and social sciences. The present study uses a mix of primary and secondary data analysis to fulfil the research objectives. This chapter pertains to primary data analysis while secondary data analysis has been presented in detail in the next chapter that is “Chapter 5”. In this chapter, the researcher has meticulously analyzed the primary data collected from SEBI registered stockbrokers via a structured questionnaire and presented the interpretations.

The primary data collected through questionnaire was analyzed using IBM SPSS, employing several statistical tests to derive meaningful results. The research used many statistical methods, including descriptive statistics, exploratory factor analysis, multiple regression analysis, independent sample t-test, Chi square test of independence, and bivariate correlation.

Descriptive and statistical tests have been conducted on the information gathered from SEBI-registered stockbrokers. It consists of frequency distribution tables and pictorial representations in the form of charts and tables wherever necessary. Exploratory factor analysis has been used to uncover the most critical latent factors that explain the barriers to market efficiency. Finally statistical tests such as independent sample t-test, Chi square test of independence, Bi- variate correlation and Multiple Regression analysis have been used to test the hypotheses.

The entire chapter has been divided into three broad sections:

**Section A** – This section presents the analysis of the questionnaire in the form of descriptive statistics and visual representations using tables and charts.

**Section B** – This section presents the results of exploratory factor analysis to extract latent factors inhibiting market efficiency.

**Section C** – The results of statistical hypotheses testing have been presented in this section.

## Section A (Descriptive Analysis)

### 4.1 Investor Behaviour

This section gives a bird’s eye view on the “Investor Behaviour” by providing all the investor behavioral and emotional challenges in a consolidated manner. The overall mean has been calculated for all the parameters in order to give clearer picture of the most significant challenges. This has been done by calculating the mean rank for each of the 11 parameters within the “Investor Behaviour”.

The present section gives overview of the “Investor behaviour” and where 11 major components are covered:

Table 4.1: Investor Behaviour Components

Descriptive Statistics								
Investor Behaviour	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Median	S. D
<b>Herd Mentality</b>	22 6%	17 5%	35 10%	156 43%	136 37%	<b>4.0027</b>	<b>4</b>	<b>1.0927</b>
<b>Investor Biases</b>	11 3%	16 4%	29 8%	132 36%	178 49%	<b>4.2295</b>	<b>4</b>	<b>0.9789</b>
<b>Financial Analysis Skills</b>	72 20%	57 16%	16 4%	112 31%	109 30%	<b>3.3524</b>	<b>4</b>	<b>1.5217</b>
<b>Peer and Family Influence</b>	45 12%	46 13%	59 16%	125 34%	91 25%	<b>3.4672</b>	<b>4</b>	<b>1.3173</b>
<b>Education Qualification and Professional Experience</b>	42 11%	21 6%	13 4%	159 43%	131 36%	<b>3.8633</b>	<b>4</b>	<b>1.2795</b>
<b>General Investor Sentiment</b>	48 13%	69 19%	14 4%	132 36%	103 28%	<b>3.4726</b>	<b>4</b>	<b>1.4057</b>
<b>Overconfidence</b>	32 9%	67 18%	19 5%	112 31%	136 37%	<b>3.6912</b>	<b>4</b>	<b>1.3592</b>
<b>Reliance on Fin Influencers</b>	65 18%	56 15%	33 9%	107 29%	105 29%	<b>3.3579</b>	<b>4</b>	<b>1.4748</b>
<b>Sentiments towards accumulated Savings</b>	17 5%	27 7%	31 8%	136 37%	155 42%	<b>4.0519</b>	<b>4</b>	<b>1.1039</b>
<b>Attitude towards booking Losses and Profits</b>	31 8%	56 15%	51 14%	119 33%	109 30%	<b>3.5983</b>	<b>4</b>	<b>1.2846</b>
<b>Greed and Fear</b>	29 8%	45 12%	58 16%	123 34%	111 30%	<b>3.6612</b>	<b>4</b>	<b>1.2457</b>



Figure 4.1: Historical Price Movement Components

#### 4.1.1 Interpretation

The data provides a detailed insight into various aspects of investor behaviour, highlighting both consensus and divergence among respondents. At the top end, *investor biases* (mean 4.2295) and *sentiments towards accumulated savings* (mean 4.0519) stand out prominently. A substantial 85% and 79% of respondents, respectively, strongly agree or agree with the impact of biases on trading decisions and the influence of emotional factors on savings behaviour. Additionally, *herd mentality* (mean 4.0027) has a negative impact on market efficiency.

In contrast, *financial analysis skills* (mean 3.3524) and *reliance on fin influencers* (mean 3.3579) exhibit lower mean scores. While 61% and 58% of respondents agree with the importance of analytical skills and the impact of fin influencers, respectively, there is a notable segment (36% and 33%) who either disagree or express reservations.

Moreover, *attitudes towards booking losses and profits* (mean 3.5983) and sentiments regarding *greed and fear* (mean 3.6612) reflect moderate agreement levels. Approximately 63% and 64% of respondents acknowledge the impact of emotional biases on trading decisions and investment behaviour, with 23% and 20% expressing disagreement, respectively.



Additionally, A majority (59%) of respondents believe that *peer and family* influences significantly impact investment decisions, with 25% holding a contrary view, reflecting divided opinions on social influences in investments. Additionally, 79% emphasize the importance of *education and professional experience* in decision-making, while only 17% disagree, indicating strong consensus on their positive influence. In terms of market efficiency, 64% agree that *investor sentiment* plays a crucial role, contrasting with 32% who disagree, revealing varied perspectives on sentiment's impact. Moreover, 68% agree that *overconfidence* leads to poor trading decisions, while 17% disagree, highlighting differing perceptions on the consequences of overconfidence in investments.

## 4.2 Market Misconduct

This section gives a bird's eye view on the "Market Misconduct" by providing all the market misconduct related challenges in a consolidated manner. The overall mean has been calculated for all the parameters in order to give clearer picture of the most significant challenges. This has been done by calculating the mean rank for each of the 11 parameters within the "Market Misconduct".

The present section gives overview of the "Market Misconduct" and where 10 major components are covered:

Table 4.2: Market Misconduct Components

Descriptive Statistics								
Market Misconduct	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Median	S. D
Presence of Information Asymmetries	16 4%	12 3%	11 3%	178 49%	149 41%	4.1803	4	0.964
Unfair Advantage to Certain Market Participants	36 10%	32 9%	49 13%	132 36%	117 32%	3.7158	4	1.268
Detection of Insider Trading	19 5%	18 5%	24 7%	166 45%	139 38%	4.0601	4	1.0515
Access to timely and accurate information	19 5%	24 7%	56 15%	126 34%	141 39%	3.9453	4	1.1246
Reduction of Information Asymmetries through Technology	31 8%	54 15%	11 3%	131 36%	139 38%	3.8005	4	1.3124
Increase in Information	34 9%	32 9%	115 31%	87 24%	98 27%	3.5	4	1.232

<b>Asymmetries through algorithmic trading</b>								
<b>False Market Sentiments from Traders</b>	8	27	21	164	146	<b>4.1284</b>	<b>4</b>	<b>0.9652</b>
	2%	7%	6%	45%	40%			
<b>Social Media Aids Information Dissemination</b>	31	27	11	143	154	<b>3.989</b>	<b>4</b>	<b>1.228</b>
	8%	7%	3%	39%	42%			
<b>Price Inflation through Misinformation</b>	148	124	53	27	14	<b>2.0027</b>	<b>2</b>	<b>1.0902</b>
	40%	34%	14%	7%	4%			
<b>Market Illusion from Counteractive Orders</b>	31	25	56	122	132	<b>3.8169</b>	<b>2</b>	<b>1.2311</b>
	8%	7%	15%	33%	36%			

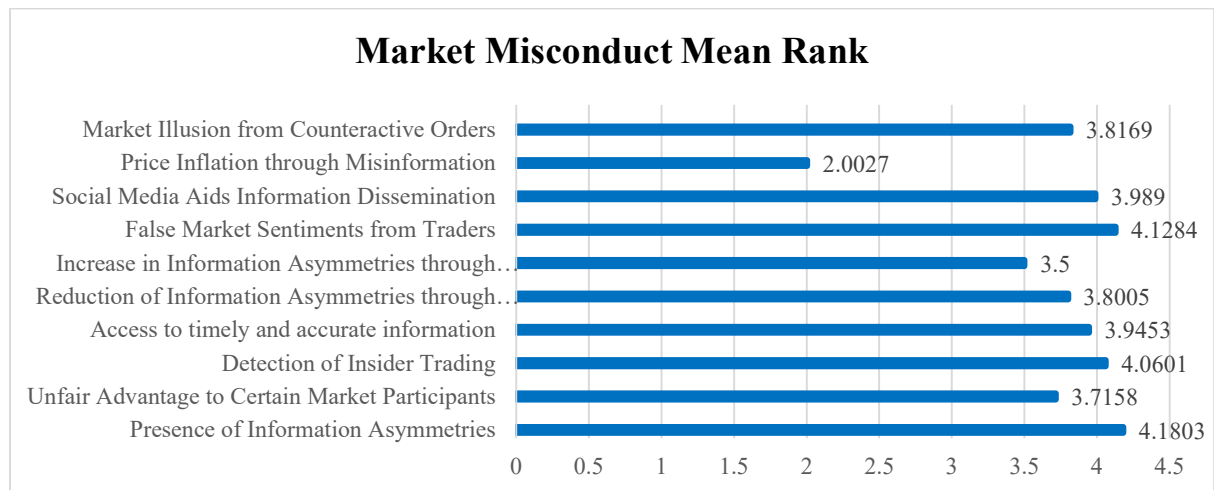


Figure 4.2: Market Misconduct Mean Rank

#### 4.2.1 Interpretation

The survey highlights significant concerns and mixed opinions among respondents regarding various aspects of market misconduct. The top two highest mean scores reveal that a substantial majority recognize the presence of *information asymmetries* (Mean: 4.1803) and the *impact of false market sentiments* from traders (Mean: 4.1284), indicating widespread acknowledgment of these issues. Specifically, 90% agree or strongly agree about *information asymmetries*, and 85% recognize the problem of *false market sentiments*. Conversely, the bottom two lowest mean scores show skepticism about the extent of *price inflation through misinformation* (Mean: 2.0027) and mixed feelings regarding the increase

in information asymmetries through algorithmic trading (Mean: 3.5). For *price inflation through misinformation*, a significant portion of respondents (74%) disagree or strongly disagree, suggesting doubt about its impact. On the other hand, opinions on algorithmic trading are more varied, with 51% agreeing it *increases information asymmetries*, while the rest are either neutral or disagree.

Each aspect of market misconduct reflects distinct levels of agreement among respondents. The belief in *unfair advantages to certain market participants* has a mean of 3.7158, with 68% in agreement. *Detection of insider trading*, scoring a mean of 4.0601, is seen positively by 83% of respondents. *Access to timely and accurate information* is important to 73%, with a mean of 3.9453. Technology's role in reducing information asymmetries is acknowledged by 74%, with a mean score of 3.8005. *Social media's role in disseminating information* is noted positively by 81%, with a mean of 3.989. Lastly, market illusion from counteractive orders is recognized by 69%, with a mean score of 3.8169.

### 4.3 Historical Price Movement

This section gives a bird's eye view on the "Historical Price Movement" by providing all the historical price movement related challenges in a consolidated manner. The overall mean has been calculated for all the parameters in order to give clearer picture of the most significant challenges. This has been done by calculating the mean rank for each of the 6 parameters within the "Historical Price Movement".

The present section gives overview of the "Historical Price Movement" and where 6 major components are covered:

Table 4.3: Historical Price Movement Components

Descriptive Statistics								
Historical Price Movement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Median	S. D
Trading Volume	13 4%	29 8%	37 10%	128 35%	159 43%	3.0683	4	1.0805
Volume at Market Open and Close	63 17%	52 14%	49 13%	104 28%	98 27%	3.3333	4	1.4404
Bid-Ask Spread	32 9%	51 14%	37 10%	130 36%	116 32%	3.6748	4	1.2871
Market Depth	33 9%	29 8%	36 10%	139 38%	129 35%	3.8251	4	1.2445
Historic Prices	159	133	23	34	17	1.9535	2	1.1335

	43%	36%	6%	9%	5%			
	78	88	27	79	94	3.0628	3	1.5271
<b>Volatility</b>	21%	24%	7%	22%	26%			

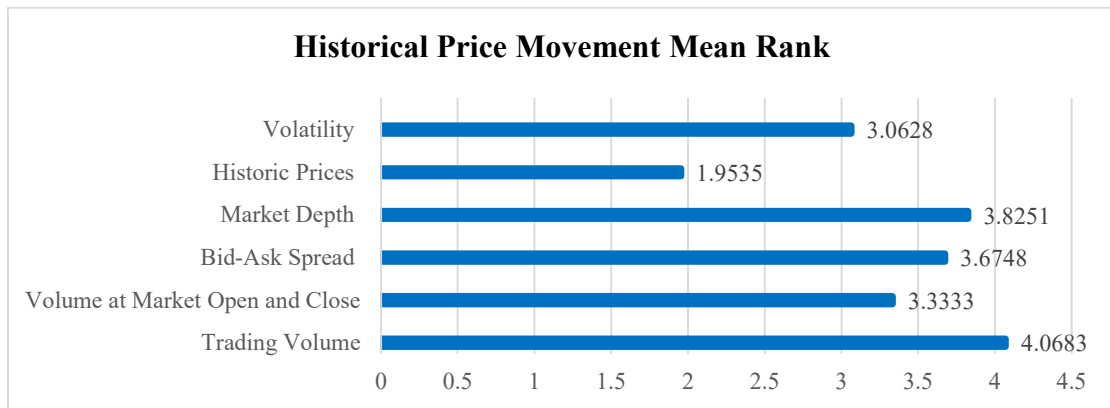


Figure 4.3: Historical Price Movement Mean Rank

#### 4.3.1 Interpretation

The table presents respondents' perceptions of various market indicators and their impacts. The top two highest mean scores reveal significant attention to *Trading Volume* (Mean: 4.0683) and *Market Depth* (Mean: 3.8251). For trading volume, 78% of respondents agree or strongly agree with its importance, suggesting it is widely recognized as a crucial factor in market analysis. Similarly, 73% agree or strongly agree about the significance of market depth, indicating broad acknowledgment of its role in market stability.

Conversely, the bottom two lowest mean scores highlight skepticism about the relevance of *Historic Prices* (Mean: 1.9535) and *Volatility* (Mean: 3.0628). Historic prices are particularly questioned, with 79% disagreeing about their importance, reflecting a general disbelief in their predictive value. Opinions on volatility are mixed, with only 48% agreeing, indicating varied views on its impact on market movements.

Other indicators also reflect varied levels of agreement. The *Bid-Ask Spread* has a mean of 3.6748, with 68% of respondents recognizing its significance. *Volume at Market Open and Close* scores a mean of 3.3333, with more diverse opinions; 55% agree, while 31% disagree, indicating a more split perception.

#### 4.4 Market Regulation

This section gives a bird's eye view on the "Market Regulation" by providing all the market regulation related challenges in a consolidated manner. The overall mean has been calculated for all the parameters in order to give clearer picture of the most significant challenges. This has been done by calculating the mean rank for each of the 5 parameters within the "Market Regulation".

The present section gives overview of the "Market Regulation" and where 5 major components are covered:

Table 4.4: Market Regulation Components

Descriptive Statistics								
Market Regulation	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Median	S. D
Insider Trading Compliance	3 1%	17 5%	46 13%	159 43%	141 39%	4.142	4	0.866 2
Penalties and Sanctions	39 11%	44 12%	57 16%	103 28%	123 34%	3.620 2	4	1.337
Enforcing Measures to Reduce Asymmetries	27 7%	39 11%	39 11%	136 37%	125 34%	3.8	4	1.224 1
Restricting Social Media Misuse	102 28%	89 24%	78 21%	28 8%	69 19%	2.653	2	1.438 1
Using Regtech for Market Surveillance	28 8%	27 7%	43 12%	143 39%	125 34%	3.846 9	4	1.191 3

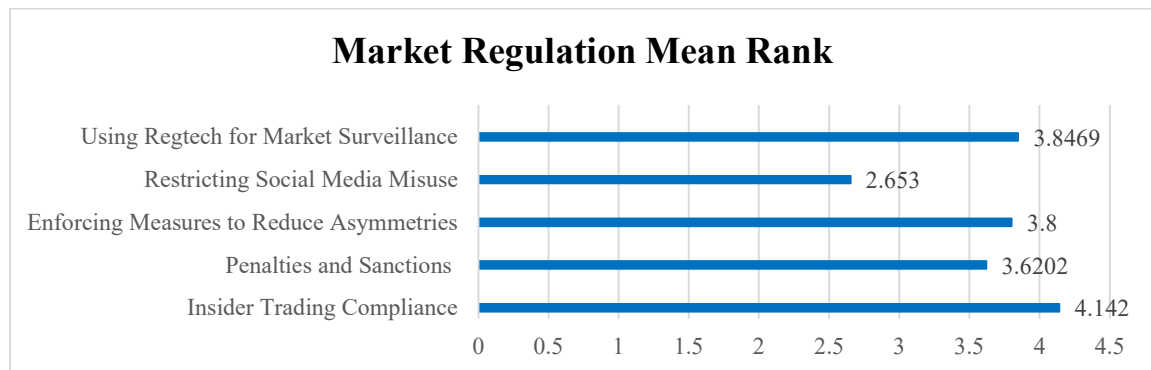


Figure 4.4: Market Regulation Mean Rank

#### **4.4.1 Interpretation**

The table reveals distinct investor perceptions on market regulation. *Insider trading compliance* (Mean 4.142) shows strong consensus with 82% (43% agree, 39% strongly agree) on its importance, highlighting its critical role in maintaining market integrity. Conversely, *restricting social media misuse* (Mean 2.653), indicates significant skepticism with 52 % (28% strongly disagree, 24% disagree), suggesting limited support for such restrictions.

*Penalties and sanctions* (Mean 3.6202), have a balanced response, with 62% (28% agree, 34% strongly agree) endorsing their role, though 23% (11% strongly disagree, 12% disagree) disagree, reflecting varied perspectives on their effectiveness. Measures to *reduce asymmetries* (Mean 3.8) receive substantial agreement with 71% (37% agree, 34% strongly agree) agree, but 18% (7% strongly disagree, 11% disagree) dissent, indicating some disagreement.

Using *regtech for market surveillance* (Mean 3.8469), shows strong support 73% (39% agree, 34% strongly agree) for leveraging technology in regulation, though 15% (8% strongly disagree, 7% disagree) oppose, highlighting a need for careful implementation.

#### **4.5 Firm Accountability and Responsibility**

This section gives a bird's eye view on the "Firm Accountability and Responsibility" by providing all the firm related challenges in a consolidated manner. The overall mean has been calculated for all the parameters in order to give clearer picture of the most significant challenges. This has been done by calculating the mean rank for each of the 5 parameters within the "Firm Accountability and Responsibility".

The present section gives overview of the "Firm Accountability and Responsibility" and where 5 major components are covered:

Table 4.5: Firm Accountability and Responsibility Components

Descriptive Statistics								
Firm Accountability and Responsibility	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Median	S.D
Business Segment Disclosures	79 22%	38 10%	83 23%	70 19%	96 26%	3.18	3	1.4748
Separate Chairperson and CEO Roles	41 11%	44 12%	21 6%	123 34%	137 37%	3.7404	4	1.3614
Board Meeting Attendance	55 15%	69 19%	49 13%	101 28%	92 25%	3.2896	4	1.4097
Conflict of Interest Disclosures	35 10%	39 11%	22 6%	143 39%	127 35%	3.7868	4	1.284
Consistency of Dividend payments	14 4%	30 8%	37 10%	122 33%	163 45%	4.0655	4	1.1019

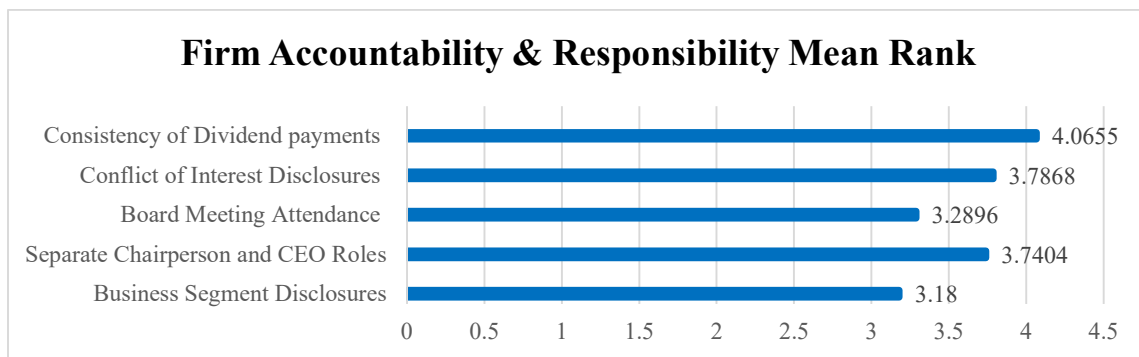


Figure 4.5: Firm Accountability and Responsibility Mean Rank

#### 4.5.1 Interpretation

The data on firm accountability and responsibility reveals significant patterns in investor perceptions. *Consistency of dividend payments* (Mean 4.0655) reveals the highest mean, indicating strong support of 78% (45% strongly agree, 33% agree) for reliable financial returns.

Conversely, *business segment disclosures* (Mean 3.18) have the lowest mean score reflecting divided opinions. While 45% (26% strongly agree, 19% agree) see value in detailed segment reporting, 32% (22% strongly disagree, 10% disagree) disagree, suggesting concerns about the transparency or utility of such disclosures.

Board meeting attendance and conflict of interest disclosures fall in the middle. *Board meeting attendance* (Mean 3.2896), with 53% (25% strongly agree, 28% agree)

recognizing its importance, though 34% (15% strongly disagree, 19% disagree) disagree, indicating that while valued, it may not be seen as the most critical governance aspect. *Conflict of interest disclosures* (Mean 3.7868), show strong support 74% (35% strongly agree, 39% agree), highlighting the importance of transparency and ethical conduct in corporate governance.

The separation of *chairperson and CEO roles* (Mean 3.7404), also shows significant support 71 % (37% strongly agree, 34% agree), reflecting a preference for checks and balances within corporate leadership to avoid power concentration and enhance decision-making.

## Section B

The analysis of Objective 1 has been presented in this section.

**Objective 1:** *To determine the set of generic factors as well as latent factors hindering market efficiency in Indian Capital markets.*

### (Exploratory Factor Analysis)

#### 4.6 Use of Exploratory Factor Analysis (EFA) technique

The present study uses a descriptive and exploratory research design. From an exploratory point of view, the study attempts to identify the latent constructs which enhance or inhibit market efficiency. From a conceptual point of view, it is important to understand that the researcher has explored factors which impact market efficiency that is either drive or augment market efficiency or hinder it. A rigorous bibliometric analysis revealed that there are multitude of factors which impact market efficiency characteristics (stock price movements, information dissemination and investor behaviour) in the capital markets. These aspects range from historic prices to something more complex like investor behaviour. they could range from routine firm level disclosures to something more sophisticated like market regulations. In the presence of such substantial number of underlying but interrelated factors it was essential to use a data reduction technique such



as factor analysis to arrive at only those critical constructs that significantly explain the variation in market efficiency and could be further tested empirically.

*"Factor analysis is a method for identifying clusters or groups of variables related to a specific entity"* (Basilevsky, 2009). These clusters are defined as factors, and subsequent interpretations involve isolating items with high loadings, ultimately extracting a smaller set of pertinent factors (Tucker and MacCallum, 1997). The choice of EFA was hence important as it is one of the foundational techniques for extracting latent factors from observed variables and serves as a robust groundwork for other factor analysis techniques for subsequent model validation (Bartholomew *et al.*, 2011). The EFA was applied using Principal Component Analysis (PCA) method to conduct the factor analysis. The PCA technique has gained popularity in the social sciences and is applicable to both ordinal and presence-absence data (Fong, 2019).

The study decodes the underlying factors of market efficiency using the EFA technique. Furthermore, the resulting latent components have been utilized to propose a conceptual framework for crucial market efficiency variables.

This suggested framework is then evaluated for relevance using multiple regression analysis. Additionally, goodness-of-fit indices are calculated to assess the model's strength.

#### **4.6.1 Scale Development**

The survey data has been collected from 357 trading members using purposive sampling technique to understand the various factors (drivers and barriers) which impact market efficiency.

The scale questions used to elicit responses from trading members were developed after conducting a thorough literature research and extensive conversations with subject matter experts in the capital markets domain. This was further supplemented by the author's prolonged professional experience and understanding on the subject. Following (Edwards, 1957) criteria, these items were developed to create a standardized instrument using (Likert, 1932) scaling technique which was administered to the respondents as a questionnaire via google form. An initial draft consisting of 53 assertions was created and

this subsequently underwent item analysis through feedback gathered from five domain SME's.

#### 4.6.2 Analysis of Items

The purpose of this study is to evaluate the scale's adequacy for measuring the construct. It was important to check the suitability of scale as well as the constituent items for factor analysis. Subject matter experts were asked to rate their agreement with statements on a five-point continuum that went from "strongly agree" to "strongly disagree," with scores of 5, 4, 3, 2, and 1 assigned, accordingly, to assess the validity of the scale. The researcher deliberately opted for a five-point scale for its clarity, particularly beneficial in social science investigations. The final score for each expert was calculated by summing their responses across all statements. The top and worst 25% of the scores were classified as NH = 25 and NL = 25, respectively.

These groupings served as benchmarks against which individual statements expressing various aspects were measured. The crucial ratio formula proposed by Edwards (1957) was used to determine the degree to which individual statements strayed from the criteria statements.

The formula that was applied was as follows:

$$t = \frac{\bar{X}_H - \bar{X}_L}{\sqrt{\frac{\Sigma(X_H - \bar{X}_H)^2 + \Sigma(X_L - \bar{X}_L)^2}{n(n-1)}}$$

where  $\bar{X}_H$  = the mean score on a given statement for the high group;

$\bar{X}_L$  = the mean score on a same statement for the low group;

$n$  = the number of subjects in the upper and lower groups;

$X_H$  = score for a given statement in the high group; and

$X_L$  = score for a given statement in the low group.

The 48 items that showed a crucial ratio and "t-value" larger than 1.75 were then chosen for additional study out of the initial 53 assertions. As a rule, statements with a "t-value" below 1.75 were excluded, resulting in 48 items being chosen for validity testing.

#### **4.6.3 Translational Validity**

Translational validity assesses whether the operationalization effectively represents the construct. Using a psychometric tool, this method seeks to capture the abstract idea and presupposes a precise, comprehensive specification of the construct. Face validity and content validity are the main techniques used to demonstrate translational validity.

#### **4.6.4 Face validity**

This assesses the instrument's general suitability within its field. It entails evaluating elements including viability, readability, formatting and style consistency, and linguistic clarity (Haladyna, 1999; Trochim, 2001; DeVon *et al.*, 2007). This ensures the instrument appears suitable for data collection, identifying and correcting major flaws to elicit intended responses. Using a five-point Likert scale continuum, 30 randomly chosen respondents who were not part of the sample group were given the constructed measure to assess its face validity.

#### **4.6.5 Content validity**

This ensures that the instrument comprehensively covers all relevant attributes of the studied domain. Typically, this involves validation by seven or more subject matter experts (Lawshe, 1975; DeVon *et al.*, 2007). Eight experts rated the final set of 48 items to ensure alignment with the conceptual framework, and the Content Validity Index (CVI) was calculated to estimate the validity of the items by checking its relevance on a scale of 1 – “*not relevant*” to 4 – “*highly relevant*”. CVI measures the item level content validity which means “the proportion of content experts giving item a relevance rating of 3 or 4” (Yusoff, 2019). To arrive at the CVI, each relevant rating (3 and 4) was assigned a value of “1” and each non relevant rating (1 and 2) was assigned a value of “0”. Table 4.6 outlines the suggested number of experts and its acceptable cutoff score of CVI, respectively.

Table 4.6: Content Validity Index

Number of Experts	Acceptable CVI Values	Source of Recommendation
Two domain experts	At least 0.80	(Davis, 1992)
Three to five domain experts	Should be 1	(Polit and Beck, 2006; Polit <i>et al.</i> , 2007)
At least six domain experts	At least 0.83	(Polit and Beck, 2006; Polit <i>et al.</i> , 2007)
Six to eight domain experts	At least 0.83	(Lynn, 1986)
At least nine domain experts	At least 0.78	(Lynn, 1986)

Source: Yusoff, 2019<sup>3</sup>

Since the 48 statements were validated with the help of eight experts, the acceptable level of CVI value is a minimum of 0.83. The summary of responses for all 48 items are summarized in Table 4.7

Table 4.7: Summary of Relevancy Score by Domain Experts

Item No.	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Expert 7	Expert 8	I-CVI = (agreed item)/ (number of expert)
Q-1	1.0	1.0	1.0	0	1.0	1.0	1.0	1.0	0.875
Q-2	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Q-3	0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.875
Q-4	0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.875
Q-5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Q-6	0	1.0	1.0	1.0	0	1.0	1.0	1.0	0.75
Q-7	1.0	0	1.0	1.0	1.0	1.0	1.0	1.0	0.875
Q-8	1.0	1.0	0	1.0	0	1.0	1.0	1.0	0.75
Q-9	1.0	1.0	1.0	1.0	1.0	0	1.0	1.0	0.875
Q-10	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Q-11	1.0	1.0	0	1.0	1.0	1.0	1.0	1.0	0.875
Q-12	0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.875
Q-13	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Q-14	1.0	1.0	1.0	1.0	0	1.0	1.0	1.0	0.875
Q-15	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

<sup>3</sup> Retrieved from: Yusoff, M. S. B. (2019). ABC of content validation and content validity index calculation. *Education in medicine journal*, 11(2), 49-54.

Q-16	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Q-17	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Q-18	0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.875
Q-19	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Q-20	1.0	1.0	1.0	1.0	1.0	1.0	0	1.0	0.875
Q-21	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Q-22	1.0	1.0	1.0	0	1.0	1.0	1.0	1.0	0.875
Q-23	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Q-24	1.0	1.0	0	1.0	1.0	1.0	1.0	1.0	0.875
Q-25	1.0	0	1.0	1.0	1.0	1.0	1.0	1.0	0.875
Q-26	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Q-27	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Q-28	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Q-29	1.0	1.0	1.0	1.0	0	1.0	1.0	1.0	0.875
Q-30	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Q-31	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Q-32	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Q-33	1.0	1.0	1.0	1.0	1.0	0	1.0	1.0	0.875
Q-34	1.0	0	1.0	1.0	1.0	1.0	1.0	1.0	0.875
Q-35	1.0	1.0	1.0	1.0	1.0	1.0	0	1.0	0.875
Q-36	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0	0.875
Q-37	<b>1.0</b>	<b>0</b>	<b>1.0</b>	<b>1.0</b>	<b>0</b>	<b>1.0</b>	<b>1.0</b>	<b>1.0</b>	<b>0.75</b>
Q-38	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Q-39	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Q-40	1.0	1.0	1.0	0	1.0	1.0	1.0	1.0	0.875
Q-41	1.0	1.0	1.0	1.0	1.0	0	1.0	1.0	0.875
Q-42	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Q-43	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Q-44	<b>1.0</b>	<b>1.0</b>	<b>0</b>	<b>1.0</b>	<b>0</b>	<b>1.0</b>	<b>1.0</b>	<b>0</b>	<b>0.625</b>
Q-45	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Q-46	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Q-47	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Q-48	1.0	1.0	0	1.0	1.0	1.0	1.0	1.0	0.875

As evident from the above table, 44 out of 48 items have a CVI of more than 0.875. Hence, 44 statements passed the content validity test and were included for factor analysis. Items Q6, Q8, Q37 and Q44 were dropped for the final analysis as they lacked relevancy in the

overall context of market efficiency. The list of included and excluded items have been summarized in Table 4.8..and Table 4.9, respectively.

Table 4.8: List of Items from Questionnaire

Q No.	Items
Q1	Adequate disclosures by firms on business segment information can lead to efficient markets
Q2	Distinctive and separated roles of the Chairperson and the CEO can reduce chances of manipulative behaviour
Q3	Higher attendance in board meetings can curb insider trading
Q4	Adequate disclosures on potential conflicts of interest among board members and key executives can lead to better investment decisions
Q5	Consistency of dividend payment is relevant in making sound investment decisions
Q6	Information asymmetries exist in capital markets where some participants have more information than others
Q7	Information asymmetries can lead to market inefficiencies and unfair advantages for certain market participants
Q8	The intricate, nonlinear, and non-stationary character of the stock market makes it challenging to identify instances of illicit insider trading..
Q9	Access to timely and accurate information is crucial for maintaining a level playing field in capital markets
Q10	Advances in technology have increased the availability and accessibility of information in capital markets, reducing information asymmetries.
Q11	The use of algorithmic trading and high-frequency trading exacerbates information asymmetries in capital markets
Q12	Traders can benefit by creating false sentiments in markets by placing bids to buy or offers to sell
Q13	Social media plays a positive role in information dissemination in stock markets
Q14	It is difficult to inflate the price of a security by spreading misleading information
Q15	Traders can often create market illusion by placing counteractive buy and sell orders
Q16	Adequate powers with Regulatory bodies is important to enforce strict compliance standards with respect to insider trading
Q17	Quantum of penalties and sanctions significantly lower market manipulative activities
Q18	It is important to enforce regulatory measures which reduce information asymmetries
Q19	Regulatory powers can restrict misuse of social media to address manipulative behaviour in markets
Q20	Regulators should use advanced regtech technology and AI driven tools to improve market surveillance
Q21	Herd mentality amongst investors is a major impediment to efficient investments
Q22	Investors personal biases and perception about specific sectors and firms can lead to bad trades decisions
Q23	Investors interpretation and financial analysis skills are important to make sound investments in capital market
Q24	Influence of peers and family members may lead to suboptimal investments in stock markets
Q25	Educational Qualification and Professional experience of investors are important factors affecting market related decisions
Q26	The general investor sentiment in the market determines the level of market efficiency
Q27	Investors perceived superiority of their own knowledge and overconfidence may lead to excessive bad trades

<b>Q28</b>	Excessive reliance on fin influencers may be an impediment to rational investment decisions
<b>Q29</b>	Investors sentiments towards accumulated savings often impact the nature and quantum of investments
<b>Q30</b>	Investors attitude towards booking losses and profits can lead to irrational trade transactions
<b>Q31</b>	Most of the investors are guided by emotions like greed and fear
<b>Q32</b>	Trading volume affects stock market efficiency
<b>Q33</b>	Trading volume during market open and close affects stock market efficiency
<b>Q34</b>	Bid-Ask spread is an important indicator of market sentiment
<b>Q35</b>	A good market depth indicates a more efficient market
<b>Q36</b>	Price manipulation can affect stock marker efficiency
<b>Q37</b>	Historic price movements are predictors of future market returns
<b>Q38</b>	Volatility in stock prices influences future stock price movements
<b>Q39</b>	Annual GDP growth rate can significantly drive stock price movements
<b>Q40</b>	Banking liquidity and availability of funds is a key driver of market performance
<b>Q41</b>	Industry specific policies and regulations of the government can greatly impact investment decisions
<b>Q42</b>	Monetary Policy of Central Bank (RBI) can significantly drive stock price movements
<b>Q43</b>	International geopolitical conditions (e.g., international conflicts, trade policies etc.) determines the level of market efficiency
<b>Q44</b>	Overall stability of the financial system within the economy is a precondition to market efficiency

Table 4.9: List of Excluded Items from Questionnaire

<b>Sr No.</b>	<b>Excluded Items</b>
<b>1.</b>	Absence of women directors on the board from non-promoter families can lead to price manipulation
<b>2.</b>	Encouraging shareholder participation via video or tele-conferencing or via advance question submissions can foster investor trust
<b>3.</b>	Transparent and regular corporate communication with investors leads to rational investor behaviour
<b>4.</b>	Fiscal policy (government spending and taxation) of the Government is an important consideration in investment decisions

#### 4.7 Factor Analysis using Principal Component Analysis

The essential elements of market efficiency are made up of several different components. Here, it indicates how closely the target independent variable (construct) corresponds to the proxy independent variable (indicator) (Hunter and Schmidt, 1990). Consequently, factor analysis proved to be the most appropriate method for analyzing the subsequent items. The dataset obtained from 366 respondents were subject to factor analysis (Table 4.13) using the Principal Component Analysis (PCA).

#### 4.8 Results and Discussion

In the very first run of PCA, it was found that all but seven items had communalities greater than 0.4, indicating substantial correlations between the variables and the factors (Hair *et al.*, 2011). The factor loadings of 37 items were above 0.4. This testified good interrelatedness between individual items in relation to other items within the same subscale. The items' cumulative variance explanation was 68.734%, suggesting that more than half of the variance could be attributed to shared factors, which was deemed reasonable (Field, 2005). The appropriate number of components to describe market efficiency was determined by assessing variables with eigenvalues  $\geq 1$ .

Five components with eigenvalues  $\geq 1$  were finally extracted in the final PCA analysis. This decision was based on considerations such as the scree plot and the conceptual framework emphasizing the most influential factors driving or hindering market efficiency in capital markets. The latent constructs identified were named as: "*Firm Accountability and Responsibility*," "*Market Misconduct*," "*Investor Behaviour*," "*Market Regulations*," and "*Historical Prices*."

The communalities have been depicted in Table 4.11. The five-factor solution in the final PCA, with 37 constituent items, explained 68.734% of the total variance (refer Table 4.12). The five-factor solution and factor loadings along with their respective factorial weights have been depicted in Table 4.13

The Cronbach alpha was determined to be 0.802, indicating that the survey questions had reasonable internal consistency and reliability (Trobias, 2008). It was concluded that the scale created to capture the essential determinants of market efficiency was internally



consistent and trustworthy, and that all 37 items were closely connected in order to quantify the underlying latent construct.

Table 4.10: Reliability Statistics

<b>Cronbach's Alpha</b>	<b>Cronbach's Alpha Based on Standardized Items</b>	<b>N of Items</b>
.802	.800	37

Table 4.11: Communalities

<b>Items</b>	<b>Initial</b>	<b>Extraction</b>
Adequate disclosures by firms on business segment information can lead to efficient markets	1	0.766
Distinctive and separated roles of the Chairperson and the CEO can reduce chances of manipulative behaviour	1	0.930
Higher attendance in board meetings can curb insider trading	1	0.464
Adequate disclosures on potential conflicts of interest among board members and key executives can lead to better investment decisions	1	0.481
Consistency of dividend payment is relevant in making sound investment decisions	1	0.553
Information asymmetries exist in capital markets where some participants have more information than others	1	0.762
Market inefficiencies and unfair advantages for some market participants can result from information asymmetries.	1	0.544
The intricate, nonlinear, and non-stationary character of the stock market makes it challenging to identify instances of illicit insider trading.	1	0.802
Access to timely and accurate information is crucial for maintaining a level playing field in capital markets	1	0.888
Advances in technology have increased the availability and accessibility of information in capital markets, reducing information asymmetries.	1	0.900
The use of algorithmic trading and high-frequency trading exacerbates information asymmetries in capital markets	1	0.768
Traders can benefit by creating false sentiments in markets by placing bids to buy or offers to sell	1	0.772
Social media plays a positive role in information dissemination in stock markets	1	0.630
Spreading false information about a security makes it hard to drive up its price.	1	0.802

Traders can often create market illusion by placing counteractive buy and sell orders	1	0.565
Adequate powers with Regulatory bodies is important to enforce strict compliance standards with respect to insider trading	1	0.775
Quantum of penalties and sanctions significantly lower market manipulative activities	1	0.458
It is important to enforce regulatory measures which reduce information asymmetries	1	0.448
Regulatory powers can restrict misuse of social media to address manipulative behaviour in markets	1	0.870
Regulators should use advanced regtech technology and AI driven tools to improve market surveillance	1	0.454
Herd mentality amongst investors is a major impediment to efficient investments	1	0.832
Investors personal biases and perception about specific sectors and firms can lead to bad trades decisions	1	0.900
Investors interpretation and financial analysis skills are important to make sound investments in capital market	1	0.978
Influence of peers and family members may lead to suboptimal investments in stock markets	1	0.624
Educational Qualification and Professional experience of investors are important factors affecting market related decisions	1	0.450
The general investor sentiment in the market determines the level of market efficiency	1	0.728
Investors perceived superiority of their own knowledge and overconfidence may lead to excessive bad trades	1	0.534
Excessive reliance on fin influencers may be an impediment to rational investment decisions	1	0.846
Investors sentiments towards accumulated savings often impact the nature and quantum of investments	1	0.560
Investors attitude towards booking losses and profits can lead to irrational trade transactions	1	0.667
Most of the investors are guided by emotions like greed and fear	1	0.775
Trading volume affects stock market efficiency	1	0.630
Trading volume during market open and close affects stock market efficiency	1	0.956
Bid-Ask spread is an important indicator of market sentiment	1	0.535
A good market depth indicates a more efficient market	1	0.770
Historic price movements are predictors of future market returns	1	0.850

Volatility in stock prices influences future stock price movements	1	0.468
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Table 4.12: Total Variance Explained

Initial Eigen values			Extraction Sums of Squared Loadings		
Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
6.856	22.528	22.528	5.256	18.427	18.427
5.659	17.763	40.291	4.619	13.223	31.65
3.34	14.342	54.633	2.87	10.34	41.99
3.016	7.954	62.587	1.86	5.4	47.39
1.714	6.147	68.734	0.514	2.656	50.046
0.8	2.483	71.217			
0.777	2.121	73.338			
0.727	2.469	75.807			
0.7	2.236	78.043			
0.687	2.156	80.199			
0.635	2.024	82.223			
0.611	2.011	84.234			
0.602	1.754	85.988			
0.498	1.412	87.4			
0.5425	1.176	88.576			
0.353	1.032	89.608			
0.334	1.015	90.623			
0.264	0.998	91.621			
0.261	0.732	92.353			
0.222	0.721	93.074			
0.198	0.696	93.77			
0.191	0.687	94.457			
0.142	0.658	95.115			
0.091	0.645	95.76			
0.085	0.632	96.392			
0.085	0.631	97.023			
0.07	0.602	97.625			
0.04	0.589	98.214			
0.03	0.534	98.748			
0.03	0.526	99.274			
0.001	0.323	99.597			
0.001	0.153	99.75			
0.001	0.102	99.852			
0.001	0.073	99.925			

0.001	0.045	99.97			
0.001	0.021	99.991			
0.001	0.009	100			

Table 4.13: Five Factor Solution Using PCA through Varimax Rotation

Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
<b>Investor Behavior</b>	<b>Loadings</b>				
Herd mentality amongst investors is a major impediment to efficient investments	0.837				
Investors attitude towards booking losses and profits can lead to irrational trade transactions	0.786				
Investors interpretation and financial analysis skills are important to make sound investments in capital market	0.669				
The general investor sentiment in the market determines the level of market efficiency	0.635				
Excessive reliance on fin influencers may be an impediment to rational investment decisions	0.622				
Influence of peers and family members may lead to suboptimal investments in stock markets	0.576				
Most of the investors are guided by emotions like greed and fear	0.552				
Investors sentiments towards accumulated savings often impact the nature and quantum of investments	0.498				
Educational Qualification and Professional experience of investors are important factors affecting market related decisions	0.476				
Investors personal biases and perception about specific sectors and firms can lead to bad trades decisions	0.43				
Investors perceived superiority of their own knowledge and overconfidence may lead to excessive bad trades	0.4				
<b>Market Misconduct</b>		<b>Loadings</b>			
Market inefficiencies and unfair advantages for some market participants can result from information asymmetries.		0.86			
Traders can often create market illusion by placing counteractive buy and sell orders		0.842			
The intricate, nonlinear, and non-stationary character of the stock market makes it challenging to identify instances of illicit insider trading.		0.717			
Advances in technology have increased the availability and accessibility of information in capital markets, reducing information asymmetries.		0.7			
Social media plays a positive role in information dissemination in stock markets		0.61			
Traders can benefit by creating false sentiments in markets by placing bids to buy or offers to sell		0.6			
The use of algorithmic trading and high-frequency trading exacerbates information asymmetries in capital markets		0.578			

Information asymmetries exist in capital markets where some participants have more information than others		0.512			
Spreading false information about a security makes it hard to drive up its price.		0.448			
Access to timely and accurate information is crucial for maintaining a level playing field in capital markets		0.405			
<b>Historical Prices</b>			<b>Loadings</b>		
Trading volume affects stock market efficiency			0.828		
Trading volume during market open and close affects stock market efficiency			0.716		
Bid-Ask spread is an important indicator of market sentiment			0.654		
A good market depth indicates a more efficient market			0.535		
Historic price movements are predictors of future market returns			0.427		
Volatility in stock prices influences future stock price movements			0.414		
<b>Market Regulations</b>				<b>Loadings</b>	
Adequate powers with Regulatory bodies are important to enforce strict compliance standards with respect to insider trading				0.817	
Quantum of penalties and sanctions significantly lower market manipulative activities				0.811	
It is important to enforce regulatory measures which reduce information asymmetries				0.65	
Regulatory powers can restrict misuse of social media to address manipulative behaviour in markets				0.478	
Regulators should use advanced regtech technology and AI driven tools to improve market surveillance				0.437	
<b>Firm Accountability and Responsibility</b>					<b>Loadings</b>
Adequate disclosures by firms on business segment information can lead to efficient markets					0.855
Consistency of dividend payment is relevant in making sound investment decisions					0.75
Adequate disclosures on potential conflicts of interest among board members and key executives can lead to better investment decisions					0.562
Higher attendance in board meetings can curb insider trading					0.515
Distinctive and separated roles of the Chairperson and the CEO can reduce chances of manipulative behaviour					0.45

After factor loadings, the items were matched to the recovered components, and five significant components were identified that sufficiently capture the latent determinants influencing market efficiency.

The detailed discussion on each component has been presented in subsequent sections.

### **Component 1: Investor Behaviour**

"Investor Behavior," which accounts for 22.528 % of the variation overall, was the most important element in the 5-factor solution. There were 11 entries in this component. The products that loaded the highest were: "Herd mentality amongst investors is a major impediment to efficient investments" (factor loading of 0.837), "Investors attitude towards booking losses and profits can lead to irrational trade transactions" (factor loading of 0.786) and "Investors interpretation and financial analysis skills are important to make sound investments in capital market" (factor loading 0.669). This reveals that investor behaviour is the most critical factor affecting efficiency of capital markets. Many factors such as peer behaviour, interpretation skills, attitude towards profits and loss shape up investor beliefs and perceptions. This may lead investors to make biased or irrational decisions. Despite having knowledge of capital markets, the financial analysis skills of an investor highly contribute to investor behaviour thereby affecting transactions. As a critical factor investor behaviour should be explored further to get deep insights on its impact on stock price movements and subsequently market efficiency

### **Component 2: Market Misconduct**

The second constituent derived was "*Market Misconduct*" which accounted for 17.76 % of the total variance. This constituent comprised of 10 items. The product that loaded the highest were: "*Information asymmetries can lead to market inefficiencies and unfair advantages for certain market participants*" (factor loading of 0.860) followed by "*Traders can often create market illusion by placing counteractive buy and sell orders*" (factor loading of 0.842) followed by "*The intricate, nonlinear, and non-stationary character of the stock market makes it challenging to identify instances of illicit insider trading.*" (factor loading of 0.717) followed by "*Advances in technology have increased the availability and accessibility of information in capital markets, reducing information asymmetries*" (factor loading of 0.700). Market misconduct in any form is detrimental to efficiency and integrity of capital markets. It may be in the form of insider trading, price manipulation, false trade orders etc.

The situation is exacerbated due to information asymmetry wherein market players have differential access and exposure to superior, timely and accurate information.

### **Component 3: Historical Prices**

The third constituent derived was “*Historical Prices*” which accounted for 14.34% of the total variance. This component contained six items. The product that loaded the highest were: “*Trading volume affects stock market efficiency*” (factor loading of 0.828) followed by “*Trading volume during market open and close affects stock market efficiency*” (factor loading of 0.716) followed by “*Bid-Ask spread is an important indicator of market sentiment*” (factor loading of 0.654). There is ample amount of literature available on how historical prices affect future stock price movements and returns. The findings of this analysis corroborate with the well-established literature that past returns hugely impact future market expectations. However, it is evident that there is a need to look at more granular aspects like trading volume, trading volume during open and close, bid ask spreads, volatility, market depth etc. to understand the market pulse and the sentiments of buy side and sell side.

### **Component 4: Market Regulations**

The fourth constituent derived was “*Market Regulations*” which accounted for 7.954% of the total variance. This component comprised of five items. The product that loaded the highest were: “*Adequate powers with Regulatory bodies are important to enforce strict compliance standards with respect to insider trading*” (factor loading of 0.817) followed by “*Quantum of penalties and sanctions significantly lower market manipulative activities*” (factor loading of 0.811) followed by “*It is important to enforce regulatory measures which reduce information asymmetries*” (factor loading of 0.650). It is interesting to note that market regulations are one of the latent factors impacting market efficiency. It plays an integral role in curbing market misconduct and reducing information asymmetries, both of which are major inhibitors to market efficiency. Studies have hardly explored areas such as market regulations, surveillance, regulatory compliance etc. which have an important bearing on the strength and integrity of capital markets.

### **Component 5: Firm Accountability and Responsibility**

The fifth constituent derived was “*Firm Accountability and Responsibility*” which accounted for 7.954% of the total variance. This component contained five items. The product that loaded the highest were: “*Adequate disclosures by firms on business segment information can lead to efficient markets*” (factor loading of 0.855) and “*Consistency of dividend payment is relevant in making sound investment decisions*” (factor loading of 0.750). Adequate business disclosures and consistency in dividend payments is an important hall mark of sound business administration and good corporate governance. Other important factors are distinguished roles of CEOs and chairperson, participation of board members, disclosures on potential conflicts of interest etc. Well managed firms are less susceptible to insider trading and market misconduct. Availability of adequate information about a firm’s business helps investors in fundamental analysis and take proper investment decisions. Greater the corporate governance, higher are the chances that stock prices are fairly valued, reflecting all relevant information related to the security. The findings are in line with extant literature.

#### **4.8.1 Interpretation**

The study indicates that all five components play crucial roles in assessing the market efficiency of Indian capital markets. Market efficiency is characterized by the widespread availability of information, rational decision-making by investors, stable profits, and predictable returns. According to existing literature, numerous factors influence stock price movements, and this exploratory analysis highlights significant underlying constructs that either enhance or hinder market efficiency.

The comprehensive list of 37 factors connects with five principal constructs: “*Investor Behaviour*,” “*Market Misconduct*,” “*Historical Prices*,” “*Market Regulations*,” and “*Firm Accountability and Responsibility*.” These constructs collectively represent the essential factors driving or impeding market efficiency.

Therefore, from a practical standpoint, investors need a thorough understanding of the aforementioned areas to gain better insights into capital markets. Market misconduct and investor behaviour demand significant policy attention because they can cause substantial



deviations in capital markets, leading to heightened volatility, speculation, and irrationality. Furthermore, market regulations warrant increased research focus as they have received limited attention in existing literature to date. Exploratory factor analysis indicates that market regulations can significantly influence market efficiency, which is crucial as more capital flows into equity investments. In addition to historical market data, other market characteristics such as depth, volume, and volatility also impact market sentiments and are reciprocally affected by them. Understanding these intervening variables is critical for assessing the efficiency of market segments accurately. Lastly, firm-level disclosures and governance practices affect the price movements of a firm's securities by reducing information asymmetries and enabling more informed investment decisions. The overall findings with regards to the research objectives have been dovetailed in *Chapter No 6* along with a detailed conclusion of the present study. Subsequently, suggestions have been put forth to assess and enhance the market efficiency of Indian capital markets by addressing the critical factors which have been identified through this research investigation. These have also been presented in *Chapter No 6* after the analysis of results and careful study of published literature.

## Section C

### Statistical Hypotheses Testing

**Objective 2:** *To analyze the perception of market participants with respect to critical factors of market efficiency.*

**Research Hypotheses:** In the context of Objective 2, twelve research hypotheses have been framed. These hypotheses have been mentioned below along with the respective statistical tests applied to them (Refer Table 4.14)

Table 4.14: Research Hypotheses and Tests

Hypotheses	Null Hypothesis	Tests Used
<b>Hypothesis 1</b>	<b>(Null) H1:</b> There is no significant association between “Investor Behaviour” and “Market Efficiency” in mid cap segment.	Chi square test of Association and Bivariate Correlation Test
<b>Hypothesis 2</b>	<b>(Null) H2:</b> There is no significant association between “Market Misconduct” and “Market Efficiency” in mid cap segment.	Chi square test of Association and Bivariate Correlation Test
<b>Hypothesis 3</b>	<b>(Null) H3:</b> There is no significant association between “Historical Price Movement” and “Market Efficiency” in mid cap segment.	Chi square test of Association and Bivariate Correlation Test
<b>Hypothesis 4</b>	<b>(Null) H4:</b> There is no significant association between “Market Regulation” and “Market Efficiency” in mid cap segment.	Chi square test of Association and Bivariate Correlation Test
<b>Hypothesis 5</b>	<b>(Null) H5:</b> There is no significant association between “Firm Accountability and Responsibility” and “Market Efficiency” in mid cap segment.	Chi square test of Association and Bivariate Correlation Test
<b>Hypothesis 6</b>	<b>(Null) H6:</b> There is no significant association between “Investor Behaviour” and “Market Efficiency” in small cap segment.	Chi square test of Association and Bivariate Correlation Test
<b>Hypothesis 7</b>	<b>(Null) H7:</b> There is no significant association between “Market Misconduct” and “Market Efficiency” in small cap segment.	Chi square test of Association and Bivariate Correlation Test

<b>Hypothesis 8</b>	<b>(Null) H8:</b> There is no significant association between “Historical Price Movement” and “Market Efficiency” in small cap segment.	Chi square test of Association and Bivariate Correlation Test
<b>Hypothesis 9</b>	<b>(Null) H9:</b> There is no significant association between “Market Regulation” and “Market Efficiency” in small cap segment.	Chi square test of Association and Bivariate Correlation Test
<b>Hypothesis 10</b>	<b>(Null) H10:</b> There is no significant association between “Firm Accountability and Responsibility” and “Market Efficiency” in small cap segment.	Chi square test of Association and Bivariate Correlation Test
<b>Hypothesis 11</b>	<b>(Null) H11:</b> There is no significant difference between market efficiency of mid cap and small cap segment.	The Mann-Whitney U test
<b>Hypothesis 12</b>	<b>(Null) H12:</b> There is no significant relationship between “Overall Market Efficiency” with “Critical Factors”	Multiple Regression

## Brief Description of Statistical Tests for Hypothesis Testing

### 1. Chi Square Test of Association

Chi Square Test of Association has been applied for testing Hypothesis 1, Hypothesis 2, Hypothesis 3, Hypothesis 4 and Hypothesis 5.

The Chi-square statistic belongs to the non-parametric (distribution free) family of tests and is designed to analyze group differences when the dependent variable is measured at a nominal level. It is particularly applied when dealing with categorical data or when the scale of measurement of all the variables is either nominal or ordinal. As regards hypotheses testing, the Chi Square test of association infers whether there is an association or relationship between two variables and whether the relationship is statistically significant or not. This test of association also serves as a screening test and is often used along with more specific tests like correlation and regression which analyze interrelationships among different variables.

After exploring the critical factors of market efficiency, the hypotheses were tested to check the association between the factors and the dependent variable “market efficiency” of mid cap and small cap indices. Chi square test was deemed to be useful because it is a distribution free test and is well suited to ordinal scale.

## **2. Bivariate Correlation Test**

Bivariate correlation test is a statistical test used to assess the interrelationship between two continuous variables. It examines whether and to what extent changes in one variable are associated with changes in another variable. The correlation coefficient ranges from -1 to +1. A value of +1 signifies a perfect positive relationship, while a value of -1 signifies a perfect negative relationship. A correlation coefficient of 0 indicates the absence of a linear relationship between the variables. Bivariate correlation tests are important in social science investigations to understand the interrelationships between variables. Understanding the degree and direction of correlations between variables is beneficial for further research and hypothesis testing. Like the Chi square test, this test also serves as a screening test before moving on to regression and other causal analysis.

Bi variate correlation test was employed to examine the relationship between all independent critical factors and the dependent variable “market efficiency” of mid cap and small cap indices.

## **3. The Mann-Whitney U test**

This test is a distribution free non-parametric statistical test that used to compare two independent groups. This is frequently used when the dependent variable is ordinal or continuous but not normally distributed. It does not require test of normality and provides robust results even when the assumptions of normality are not met. It is considered as an alternative to the independent samples t-test for checking difference between central tendencies (mean and median).

Since the primary data was gathered using nonprobability sampling (purposive sampling), non-parametric tests were selected for hypothesis testing. Further, as all the variables were measured on an ordinal scale (Likert Scale), this test was found to be more suitable for testing the hypothesis statistically. The test was used to examine the difference between means of market efficiency of mid cap and small cap indices.

#### **4. Multiple Regression Analysis**

A plethora of studies are available describing a range of factors that either enhance market efficiency or inhibit market efficiency and increase inefficiency in capital markets. A careful analysis of literature reveals that very few studies have explored those factors whose presence inhibit or enhance capital market efficiency. Especially in the Indian context not many studies have been conducted to examine the impact of critical factors on the overall efficiency level of stock market indices. From an exploratory viewpoint, the present study has identified five critical components which are relevant in explaining the underlying factors of market efficiency.

This analysis is important to analyze the impact of predictor variables on the dependent variable. However, sometimes in the presence of large number of predictors variables, it is important to select only those which can best predict the dependent variable. Furthermore, there may not be enough research to comprehend the relationship between independent and dependent variables.

In such situations regression analysis provides concrete results. The goal of using this statistical approach was to investigate the influence of five critical components on overall market efficiency in Indian capital markets.

Therefore, regression analysis was used to fit a model for “Overall Market Efficiency” and factor scores with respect to five critical factors.

#### **4.9 Hypotheses Testing Results**

##### **4.9.1 Hypothesis 1**

**(Null) H1:** There is no significant association between “Investor Behaviour” and “Market Efficiency” in mid cap segment.

**(Alternative) HA1:** There is a significant association between “Investor Behaviour” and “Market Efficiency” in mid cap segment.

**Tests Applied** – Chi square test of Association and Bivariate Correlation Test

The association of “Market Efficiency (Mid Cap segment)” was tested with each of the parameters of “Investor Behaviour.” The eleven parameters of “Investor Behaviour” considered for the study are as follows.

- i. Herd Mentality
- ii. Investor Biases
- iii. Financial Analysis Skills
- iv. Peer and Family Influence
- v. Educational Qualification and Professional experience
- vi. General investor sentiment
- vii. Overconfidence
- viii. Reliance on Fin Influencers
- ix. Sentiments towards accumulated savings
- x. Attitude towards booking losses and profits
- xi. Greed and Fear

#### 4.9.1.1 Chi square test of Association – Investor Behaviour (Midcap Indices)

The results of hypothesis testing for each of the above-mentioned parameters are presented in the Table 4.15 below:

Table 4.15: Results of Chi Square Test (Investor Behaviour Midcap Indices)

Investor Behaviour Parameters	p value	Null Hypothesis	Statistically significant at 5% level of significance
<b>Herd Mentality</b>	0.00000	Reject	Significant
<b>Investor Biases</b>	0.00000	Reject	Significant
<b>Financial Analysis Skills</b>	0.00000	Reject	Significant
<b>Peer and Family Influence</b>	0.00007	Reject	Significant
<b>Educational Qualification and Professional experience</b>	0.00000	Reject	Significant
<b>General investor sentiment</b>	0.00000	Reject	Significant
<b>Overconfidence</b>	0.00008	Reject	Significant
<b>Reliance on Fin Influencers</b>	0.00000	Reject	Significant
<b>Sentiments towards accumulated savings</b>	0.00000	Reject	Significant
<b>Attitude towards booking losses and profits</b>	0.00005	Reject	Significant
<b>Greed and Fear</b>	0.00000	Accept	Significant

#### 4.9.1.2 Chi square test Interpretation – Investor Behaviour

The results of hypothesis testing reveal that the Null Hypothesis is rejected in case of 10 investor behaviour parameters as the p value is less than 0.05.

Thus, it is stated that there is a statistically significant association between “*Market Efficiency (Mid Cap segment)*” and 10 investor behaviour parameters that is “*Herd Mentality, Investor Biases, Financial Analysis Skills, Peer and Family Influence, Educational Qualification and Professional experience, General investor sentiment, Overconfidence, Reliance on Fin Influencers, Sentiments towards accumulated savings, Attitude towards booking losses and profits*”

The null hypothesis is accepted in case of “*Greed and Fear*” parameter that is there is no significant association between “*Market Efficiency (Mid Cap segment)*” and “*Greed and Fear*” as the p value of 0.6561340 is greater than 0.05.

#### 4.9.1.3 Bivariate Correlation Test – Investor Behaviour (Midcap Indices)

The results of bivariate correlation for eleven parameters of “Investor Behaviour” along with “*Market Efficiency (Mid Cap segment)*” are presented in the Table 4.16 below:

Table 4.16: Results of Bivariate Correlation Test (Investor Behaviour Midcap Indices)

Pair	Correlation Value	p value	Null Hypothesis	Result
<b>Herd Mentality - Market Efficiency (Mid Cap segment)</b>	-0.461	0.00001	Reject	There is a relationship
<b>Investor Biases - Market Efficiency (Mid Cap segment)</b>	- 0.516	0.00067	Reject	There is a relationship
<b>Financial Analysis Skills - Market Efficiency (Mid Cap segment)</b>	0.653	0.00019	Reject	There is a relationship
<b>Peer and Family Influence - Market Efficiency (Mid Cap segment)</b>	-0.233	0.00000	Reject	There is a relationship
<b>Educational Qualification and Professional experience - Market Efficiency (Mid Cap segment)</b>	0.365	0.00233	Reject	There is a relationship
<b>General investor sentiment - Market Efficiency (Mid Cap segment)</b>	0.761	0.00043	Reject	There is a relationship

<b>Overconfidence - Market Efficiency (Mid Cap segment)</b>	-0.221	0.00000	Reject	There is a relationship
<b>Reliance on Fin Influencers - Market Efficiency (Mid Cap segment)</b>	-0.349	0.00002	Reject	There is a relationship
<b>Sentiments towards accumulated savings - Market Efficiency (Mid Cap segment)</b>	-0.215	0.00000	Reject	There is a relationship
<b>Attitude towards booking losses and profits - Market Efficiency (Mid Cap segment)</b>	0.336	0.00016	Reject	There is a relationship
<b>Greed and Fear - Market Efficiency (Mid Cap segment)</b>	0.0000001	0.287	Accept	There is no significant relationship

#### 4.9.1.4 Bivariate Correlation Interpretation – Investor Behaviour

The above table examines the correlation between eleven parameters of investor behaviour and market efficiency with the market efficiency of mid cap segment. Out of eleven, ten parameters have significant correlations. These are *herd mentality* (correlation value - 0.461,  $p = 0.00001$ ), *Investor Biases* (correlation value - 0.516,  $p = 0.00067$ ), *Financial Analysis Skills* (correlation value 0.653,  $p = 0.00019$ ), *Peer and Family Influence* (correlation value - 0,  $p = 0.00000$ ), *Educational Qualification and Professional Experience* (correlation value 0.365,  $p = 0.00233$ ), *General Investor Sentiment* (correlation value 0.761,  $p = 0.00043$ ), *Overconfidence* (correlation value - 0.221,  $p = 0.00000$ ), *Reliance on Financial Influencers*: A statistically significant and negative relationship (correlation value - 0.349,  $p = 0.00002$ ), *sentiments towards Accumulated Savings* (correlation value -0.215,  $p = 0.00000$ ) and *Attitude towards Booking Losses and Profits* (correlation value,  $p = 0.00016$ ). This implies that for the mentioned parameters the correlations are statistically significant and therefore all the ten parameters have a relationship with market efficiency of mid cap segment. Since the  $p$  values are much less than 0.05, the null hypothesis stands rejected.

However, in the case of parameter *Greed and Fear* (correlation value 0.0000001,  $p = 0.287$ ), no statistically significant relationship was observed with Market Efficiency (Mid



Cap segment) Therefore, the null hypothesis that Greed and Fear do not significantly impact Market Efficiency in the mid cap segment is accepted.

#### **4.9.2 Hypothesis 2**

**(Null) H2:** There is no significant association between “Market Misconduct” and “Market Efficiency” in mid cap segment.

**(Alternative) HA2:** There is a significant association between “Market Misconduct” and “Market Efficiency” in mid cap segment.

**Tests Applied** – Chi square test of Association and Bivariate Correlation Test

The association of “Market Efficiency (Mid Cap segment)” was tested with each of the parameters of “Market Misconduct.” The ten parameters of “Market Misconduct” considered for the study are as follows

- i. Presence of Information Asymmetries
- ii. Unfair Advantage to Certain Market Participants
- iii. Detection of Insider Trading
- iv. Access to timely and accurate information
- v. Reduction of Information Asymmetries through Technology
- vi. Increase in Information Asymmetries through algorithmic trading
- vii. False Market Sentiments from Traders
- viii. Social media and Information Dissemination
- ix. Price Inflation through Misinformation
- x. Market Illusion from Counteractive Orders

##### **4.9.2.1 Chi square test of Association – Market Misconduct (Midcap Indices)**

The results of hypothesis testing for each of the above-mentioned parameters are presented in the Table 4.17 below:

Table 4.17: Results of Chi Square Test (Market Misconduct Midcap Indices)

Market Misconduct Parameters	p value	Null Hypothesis	Statistically significant at 5% level of significance
<b>Presence of Information Asymmetries</b>	0.00004	Reject	Significant
<b>Unfair Advantage to Certain Market Participants</b>	0.00001	Reject	Significant
<b>Detection of Insider Trading</b>	0.00002	Reject	Significant
<b>Access to timely and accurate information</b>	0.00000	Reject	Significant
<b>Reduction of Information Asymmetries through Technology</b>	0.00002	Reject	Significant
<b>Increase in Information Asymmetries through algorithmic trading</b>	0.00000	Reject	Significant
<b>False Market Sentiments from Traders</b>	0.00001	Reject	Significant
<b>Social media and Information Dissemination</b>	0.00000	Reject	Significant
<b>Price Inflation through Misinformation</b>	0.00000	Reject	Significant
<b>Market Illusion from Counteractive Orders</b>	0.00007	Reject	Significant

#### 4.9.2.2 Chi square test Interpretation – Market Misconduct

The results of hypothesis testing reveal that the Null Hypothesis is rejected for all the 10 Market Misconduct parameters as the p value is less than 0.05. This means that all market misconduct parameters have a significant association with “Market Efficiency (Mid Cap segment).”

Thus, it is stated that there is a statistically significant association between “Market Efficiency (Mid Cap segment)” and 10 market misconduct parameters that is “*Presence of Information Asymmetries, Unfair Advantage to Certain Market Participants, Detection of Insider Trading, Access to timely and accurate information, Reduction of Information Asymmetries through Technology, Increase in Information Asymmetries through algorithmic trading, False Market Sentiments from Traders, Social media and Information Dissemination, Price Inflation through Misinformation, Market Illusion from Counteractive Orders*”.

#### 4.9.2.3 Bivariate Correlation Test – Market Misconduct (Midcap Indices)

The results of bivariate correlation for ten parameters of “Market Misconduct” along with “*Market Efficiency (Mid Cap segment)*” are presented in the Table 4.18 below:

Table 4.18: Results of Bivariate Correlation Test (Market Misconduct Midcap Indices)

Pair	Correlation Value	p value	Null Hypothesis	Result
<b>Presence of Information Asymmetries - <i>Market Efficiency (Mid Cap segment)</i></b>	-0.511	0.00006	Reject	There is a relationship
<b>Unfair Advantage to Certain Market Participants - <i>Market Efficiency (Mid Cap segment)</i></b>	-0.230	0.00000	Reject	There is a relationship
<b>Detection of Insider Trading - <i>Market Efficiency (Mid Cap segment)</i></b>	0.453	0.00001	Reject	There is a relationship
<b>Access to timely and accurate information - <i>Market Efficiency (Mid Cap segment)</i></b>	0.563	0.00000	Reject	There is a relationship
<b>Reduction of Information Asymmetries through Technology - <i>Market Efficiency (Mid Cap segment)</i></b>	0.116	0.00000	Reject	There is a relationship
<b>Increase in Information Asymmetries through algorithmic trading - <i>Market Efficiency (Mid Cap segment)</i></b>	-0.562	0.00000	Reject	There is a relationship
<b>False Market Sentiments from Traders - <i>Market Efficiency (Mid Cap segment)</i></b>	-0.321	0.00000	Reject	There is a relationship
<b>Social media and Information Dissemination - <i>Market Efficiency (Mid Cap segment)</i></b>	0.215	0.00000	Reject	There is a relationship
<b>Price Inflation through Misinformation - <i>Market Efficiency (Mid Cap segment)</i></b>	-0.436	0.00000	Reject	There is a relationship
<b>Market Illusion from Counteractive Orders - <i>Market Efficiency (Mid Cap segment)</i></b>	- 0.512	0.00000	Reject	There is a relationship

#### 4.9.2.4 Bivariate Correlation Test Interpretation – Market Misconduct

The correlation analysis reveals statistically significant correlations between all ten market misconduct parameters and market efficiency of mid cap segment. Six market misconduct parameters exhibit statistically significant negative correlation with market efficiency of mid cap segment. These are *Presence of Information Asymmetries* (correlation value - 0.511,  $p = 0.00006$ ), *Unfair Advantage to Certain Market Participants* (correlation value -0.230,  $p = 0.00000$ ), *Increase in Information Asymmetries through Algorithmic Trading* (correlation value -0.562,  $p = 0.00000$ ), *False Market Sentiments from Traders* (correlation value -0.321,  $p \text{ value} = 0.00000$ ), *Price Inflation through Misinformation* (correlation value – 0.436,  $p \text{ value} = 0.00000$ ) and *Market Illusion from Counteractive Orders* (correlation value – 0.512,  $p \text{ value} = 0.00000$ ).

On the contrary the rest of the four parameters demonstrate statistically significant and positive correlation with market efficiency of mid cap segment. These are *Detection of Insider Trading* (correlation value 0.453,  $p \text{ value} = 0.00001$ ), *Access to Timely and Accurate Information* (correlation value 0.563,  $p \text{ value} = 0.00000$ ), *Reduction of Information Asymmetries through Technology* (correlation value 0.116,  $p \text{ value} = 0.00000$ ) and *social media and Information Dissemination* (correlation value 0.215,  $p \text{ value} = 0.00000$ ).

Since all the  $p$  values are less than 0.05, the null hypothesis stands rejected for all the ten parameters of market misconduct. Hence all parameters of market misconduct are reported to have a significant relationship with market efficiency in the mid cap segment.

#### 4.9.3 Hypothesis 3

**(Null) H3:** There is no significant association between “Historical Price Movement” and “Market Efficiency” in mid cap segment.

**(Alternative) HA3:** There is a significant association between “Historical Price Movement” and “Market Efficiency” in mid cap segment.

**Tests Applied** – Chi square test of Association and Bivariate Correlation Test

The association of “Historical Price Movement (Mid Cap segment)” was tested with each of the parameters of “Historical Price Movement.” The six parameters of “Historical Price Movement” considered for the study are as follows

- i. Trading Volume
- ii. Volume at Market Open and Close
- iii. Bid-Ask Spread
- iv. Market Depth
- v. Historic Prices
- vi. Volatility

#### 4.9.3.1 Chi square test of Association - Historical Price Movement (Midcap Indices)

The results of hypothesis testing for each of the above-mentioned parameters are presented in the Table 4.19 below:

Table 4.19: Results of Chi Square Test (Historical Price Movement Midcap Indices)

Historical Price Movement Parameters	p value	Null Hypothesis	Statistically significant at 5% level of significance
Trading Volume	0.00010	Reject	There is a relationship
Volume at Market Open and Close	0.38060	Accept	There is no significant relationship
Bid-Ask Spread	0.00000	Reject	There is a relationship
Market Depth	0.00000	Reject	There is a relationship
Historic Prices	0.60088	Accept	There is no significant relationship
Volatility	0.00000	Reject	There is a relationship

#### 4.9.3.2 Chi square test Interpretation - Historical Price Movement

The results of hypothesis testing for historical price movement parameters with market efficiency reveals that *trading volume* (p-value of 0.00010), shows a statically significant relationship. However, *volume at market open and close*, (p-value of 0.38060), does not bear a significant relationship, implying that volume fluctuations during these times have no significant impact market efficiency. The *bid-ask spread*, (p-value of 0.00000), also shows a significant relationship with market efficiency. Similarly, *market depth*, (p-value

of 0.00000), also bears a significant relationship to market efficiency. *Historic prices*, (p-value of 0.60088), has no significant relationship with market efficiency. Finally, *volatility*, (p-value of 0.00000), also indicates a significant relationship indicating that the parameter is closely interlinked to market efficiency. Overall, the null hypothesis stands rejected for *trading volume, bid-ask spread, market depth and volatility* and null hypothesis has been accepted for *volume at market open and close* and *historic prices*.

#### 4.9.3.3 Bivariate Correlation Test - Historical Price Movement (Midcap Indices)

The results of bivariate correlation for six parameters of “Historical Price Movement” along with “*Market Efficiency (Mid Cap segment)*” are presented in the Table 4.20 below:

Table 4.20: Results of Bivariate Correlation Test (Historical Price Movement Midcap Indices)

Pair	Correlation Value	p value	Null Hypothesis	Result
<b>Trading Volume - Market Efficiency (Mid Cap segment)</b>	0.46130	0.00000	Reject	There is a relationship
<b>Volume at Market Open and Close - Market Efficiency (Mid Cap segment)</b>	0.00000	0.12060	Accept	There is no significant relationship
<b>Bid-Ask Spread - Market Efficiency (Mid Cap segment)</b>	-0.21366	0.00000	Reject	There is a relationship
<b>Market Depth - Market Efficiency (Mid Cap segment)</b>	0.26700	0.00000	Reject	There is a relationship
<b>Historic Prices - Market Efficiency (Mid Cap segment)</b>	0.00000	0.2655	Accept	There is a relationship
<b>Volatility - Market Efficiency (Mid Cap segment)</b>	-0.18250	0.00001	Reject	There is a relationship

#### 4.9.3.4 Bivariate Correlation Test Interpretation - Historical Price Movement

The correlations between historical price movement parameters and market efficiency in the mid-cap segment shows that *Trading volume* (correlation value of 0.46130, p -value of 0.00000), highlights a strong and positive correlation with market efficiency. The *volume at market open and close* shows no significant relationship (correlation value of 0, p-value of 0.12060). The *bid-ask spread*, exhibits a negative correlation (correlation value of -

0.21366 and p-value of 0.00000) with market efficiency. *Market depth* has a positive correlation (correlation value of 0.26700 and p-value of 0.00000) with market efficiency. *Historic prices* do not show any significant relationship with market efficiency (correlation value of 0 and p-value of 0.2655). Finally, volatility presents a negative correlation (correlation value of -0.18250 and p-value of 0.00001) indicating that higher volatility is often associated with reduced market efficiency. Overall, *trading volume* and *market depth* are positively correlated with market efficiency while *volatility* and *bid ask spread* are negatively correlated. *Historical prices* and *volume at open and close* do not bear any significant relationship or correlation with market efficiency.

#### 4.9.4 Hypothesis 4

**(Null) H4:** There is no significant association between “Market Regulation” and “Market Efficiency” in mid cap segment.

**(Alternative) HA4:** There is a significant association between “Market Regulation” and “Market Efficiency” in mid cap segment.

**Tests Applied** – Chi square test of Association and Bivariate Correlation Test

The association of “Market Regulation (Mid Cap segment)” was tested with each of the parameters of “Market Regulation.” The five parameters of “Market Regulation” considered for the study are as follows

- i. Insider Trading Compliance
- ii. Penalties and Sanctions
- iii. Enforcing Measures to Reduce Asymmetries
- iv. Restricting Social Media Misuse
- v. Using Regtech for Market Surveillance

##### 4.9.4.1 Chi square test of Association – Market Regulation (Midcap Indices)

The results of hypothesis testing for each of the above-mentioned parameters are presented in the Table 4.21 below:

Table 4.21: Results of Chi Square Test (Market Regulation Midcap Indices)

Market Regulation Parameters	p value	Null Hypothesis	Statistically significant at 5% level of significance
<b>Insider Trading Compliance</b>	0.00001	Reject	There is a relationship
<b>Penalties and Sanctions</b>	0.21850	Accept	There is no significant relationship
<b>Enforcing Measures to Reduce Asymmetries</b>	0.00000	Reject	There is a relationship
<b>Restricting Social Media Misuse</b>	0.33830	Accept	There is no significant relationship
<b>Using Regtech for Market Surveillance</b>	0.00000	Reject	There is a relationship

#### 4.9.4.2 Chi square test Interpretation – Market Regulation

The analysis of market regulation parameters with market efficiency reveal that *Insider trading* compliance demonstrates a significant relationship ( $p = 0.00001$ ) with market efficiency, thereby rejecting the null hypothesis. Contrary to this, *penalties and sanctions* show no significant relationship ( $p = 0.21850$ ) with market efficiency leading to the acceptance of the null hypothesis. Statistically significant relationships are observed for measures to reduce information asymmetries and the *use of Regtech for market surveillance* ( $p = 0.00000$  for both) and the null hypothesis is therefore rejected for both these parameters. Finally, restricting *social media misuse* does not exhibit any significant relationship ( $p = 0.33830$ ) and hence the null hypothesis is accepted for this parameter.

#### 4.9.4.3 Bivariate Correlation Test – Market Regulation (Midcap Indices)

The results of bivariate correlation for five parameters of “Market Regulation” along with “*Market Efficiency (Mid Cap segment)*” are presented in the Table 4.22 below:

Table 4.22: Results of Bivariate Correlation Test (Market Regulation Midcap Indices)

Pair	Correlation Value	p value	Null Hypothesis	Result
<b>Insider Trading Compliance - Market Efficiency (Mid Cap segment)</b>	0.31000	0.00000	Reject	There is a relationship
<b>Penalties and Sanctions - Market Efficiency (Mid Cap segment)</b>	0.00000	0.27000	Accept	There is no significant relationship



<b>Enforcing Measures to Reduce Asymmetries - Market Efficiency (Mid Cap segment)</b>	0.36600	0.00000	Reject	There is a relationship
<b>Restricting Social Media Misuse - Market Efficiency (Mid Cap segment)</b>	0.00000	0.36800	Accept	There is no significant relationship
<b>Using Regtech for Market Surveillance - Market Efficiency (Mid Cap segment)</b>	0.22528	0.00000	Reject	There is a relationship

#### 4.9.4.4 Bivariate Correlation Test Interpretation – Market Regulation

The correlations between market regulation parameters and market efficiency in the mid-cap segment shows that *Insider trading compliance* (correlation value of 0.31000, p-value of 0.00000) has a significant positive relationship with market efficiency. Conversely, *penalties and sanctions* show no significant relationship with market efficiency as correlation value is 0 and the p-value is 0.27000. *Enforcing measures to reduce asymmetries* (correlation value of 0.36600, p-value of 0.00000) has a significant positive correlation with market efficiency. *Restricting social media misuse* does not exhibit any significant relationship (correlation value 0, p-value of 0.36800) with market efficiency. The use of *Regtech for market surveillance* (correlation value of 0.22528, p-value of 0.00000) also has a significant positive relationship with market efficiency. Overall, insider trading compliance, enforcement of measures to reduce information asymmetries, *use of regtech for market surveillance* have a positive and significant correlation with market efficiency and so the null hypothesis is rejected. Penalties and sanctions and restricting misuse of social media do not exhibit any significant correlation or relationship with market efficiency and hence the null hypothesis is accepted for these two parameters.

#### 4.9.5 Hypothesis 5

**(Null) H5:** There is no significant association between “Firm Accountability and Responsibility” and “Market Efficiency” in mid cap segment.

**(Alternative) HA5:** There is a significant association between “Firm Accountability and Responsibility” and “Market Efficiency” in mid cap segment.

**Tests Applied** – Chi square test of Association and Bivariate Correlation Test

The association of “Firm Accountability and Responsibility (Mid Cap segment)” was tested with each of the parameters of “Firm Accountability and Responsibility.” The five parameters of “Firm Accountability and Responsibility” considered for the study are as follows

- i. Business Segment Disclosures
- ii. Separate Chairperson and CEO Roles
- iii. Board Meeting Attendance
- iv. Conflict of Interest Disclosures
- v. Consistency of Dividend payments

##### 4.9.5.1 Chi square test of Association - Firm Accountability and Responsibility (Midcap Indices)

The results of hypothesis testing for each of the above-mentioned parameters are presented in the Table 4.23 below:

Table 4.23: Results of Chi Square Test (Firm Accountability and Responsibility Midcap Indices)

Firm Accountability and Responsibility Parameters	p value	Null Hypothesis	Statistically significant at 5% level of significance
Business Segment Disclosures	0.00000	Reject	There is a relationship
Separate Chairperson and CEO Roles	0.00000	Reject	There is a relationship
Board Meeting Attendance	0.36600	Accept	There is no significant relationship
Conflict of Interest Disclosures	0.00002	Reject	There is a relationship
Consistency of Dividend payments	0.00000	Reject	There is a relationship

#### 4.9.5.2 Chi square test Interpretation - Firm Accountability and Responsibility

The analysis of firm accountability and responsibility parameters reveal that *Business segment disclosures* (p-value of 0.00000) show a significant relationship with market efficiency. Similarly, the *separation of chairperson and CEO roles* (p-value of 0.00000), also shows a significant relationship with market efficiency. *Conflict of interest disclosures* (p-value of 0.00002), and *Consistency in dividend payments* (p-value of 0.00000), also demonstrates a significant relationship with market efficiency. However, *board meeting attendance* (p-value of 0.36600), does not show a statistically significant relationship with market efficiency. Overall, the null hypothesis has been rejected for four parameters that is Business segment disclosures, separation of chairperson and CEO roles, Conflict of interest disclosures, and Consistency in dividend payments. The null hypothesis has been accepted for the parameter board meeting attendance meaning that this does not show any significant relationship with market efficiency.

#### 4.9.5.3 Bivariate Correlation Test - Firm Accountability and Responsibility (Midcap Indices)

The results of bivariate correlation for five parameters of “Firm Accountability and Responsibility” along with “*Market Efficiency (Mid Cap segment)*” are presented in the Table 4.24 below:

Table 4.24: Results of Bivariate Correlation Test (Firm Accountability and Responsibility Midcap Indices)

Pair	Correlation Value	p value	Null Hypothesis	Result
<b>Business Segment Disclosures</b> - <i>Market Efficiency (Mid Cap segment)</i>	0.16760	0.00007	Reject	There is a relationship
<b>Separate Chairperson and CEO Roles</b> - <i>Market Efficiency (Mid Cap segment)</i>	0.20850	0.00001	Reject	There is a relationship
<b>Board Meeting Attendance</b> - <i>Market Efficiency (Mid Cap segment)</i>	0.00000	0.21560	Accept	There is no significant relationship

<b>Conflict of Interest Disclosures - Market Efficiency</b> (Mid Cap segment)	0.36000	0.00000	Reject	There is a relationship
<b>Consistency of Dividend payments - Market Efficiency</b> (Mid Cap segment)	0.51560	0.00000	Reject	There is a relationship

#### 4.9.5.4 Bivariate Correlation Test Interpretation - Firm Accountability and Responsibility

The correlation values between firm accountability and responsibility parameters and market efficiency in the mid cap segment reveals significant relationships with four parameters. *Business segment disclosures* have a positive correlation with market efficiency (correlation value = 0.16760,  $p = 0.00007$ ). Similarly, the *separation of chairperson and CEO roles* also shows a positive correlation (correlation value = 0.20850,  $p = 0.00001$ ) with market efficiency. *Conflict of interest disclosures* has a strong positive correlation with market efficiency (correlation value = 0.36000,  $p = 0.00000$ ) and *consistency of dividend payments* also stands out with the highest correlation value (correlation value = 0.51560,  $p = 0.00000$ ), indicating a positive and significant relationship with market efficiency. Contrary to the above, the parameter *board meeting attendance* does not exhibit a significant relationship with market efficiency (correlation value = 0.00000,  $p = 0.21560$ ). Overall, the null hypothesis of no significant relationship is rejected for four parameters that is Business segment disclosures, separation of chairperson and CEO roles, Conflict of interest disclosures, and Consistency in dividend payments. The null hypothesis has been accepted for the parameter board meeting attendance meaning as this parameter does not show any significant relationship with market efficiency.

#### 4.9.6 Hypothesis 6

**(Null) H6:** There is no significant association between “Investor Behaviour” and “Market Efficiency” in small cap segment.

**(Alternative) HA6:** There is a significant association between “Investor Behaviour” and “Market Efficiency” in small cap segment.

**Tests Applied** – Chi square test of Association and Bivariate Correlation Test

The association of “Market Efficiency (Small Cap segment)” was tested with each of the parameters of “Investor Behaviour.” The eleven parameters of “Investor Behaviour” considered for the study are as follows

- i. Herd Mentality
- ii. Investor Biases
- iii. Financial Analysis Skills
- iv. Peer and Family Influence
- v. Educational Qualification and Professional experience
- vi. General investor sentiment
- vii. Overconfidence
- viii. Reliance on Fin Influencers
- ix. Sentiments towards accumulated savings
- x. Attitude towards booking losses and profits
- xi. Greed and Fear

#### 4.9.6.1 Chi square test of Association – Investor Behaviour (Smallcap Indices)

The results of hypothesis testing for each of the above-mentioned parameters are presented in the Table 4.25 below:

Table 4.25: Results of Chi Square Test (Investor Behaviour Smallcap Indices)

Investor Behaviour Parameters	p value	Null Hypothesis	Statistically significant at 5% level of significance
<b>Herd Mentality</b>	0.00000	Reject	There is a relationship
<b>Investor Biases</b>	0.00000	Reject	There is a relationship
<b>Financial Analysis Skills</b>	0.00007	Reject	There is a relationship
<b>Peer and Family Influence</b>	0.00021	Reject	There is a relationship
<b>Educational Qualification and Professional experience</b>	0.00000	Reject	There is a relationship
<b>General investor sentiment</b>	0.00000	Reject	There is a relationship
<b>Overconfidence</b>	0.00001	Reject	There is a relationship
<b>Reliance on Fin Influencers</b>	0.00008	Reject	There is a relationship
<b>Sentiments towards accumulated savings</b>	0.00000	Reject	There is a relationship

<b>Attitude towards booking losses and profits</b>	0.00000	Reject	There is a relationship
<b>Greed and Fear</b>	0.00000	Reject	There is a relationship

#### 4.9.6.2 Chi square test Interpretation - Investor Behaviour

The analysis of investor behaviour parameters in the small cap segment reveals that all the parameters of investor behaviour hold a statistically significant relationship with market efficiency. The eleven parameters subject to hypothesis testing include *herd mentality*, *investor biases*, *educational qualifications and professional experience*, *general investor sentiment*, *sentiments towards accumulated savings*, *attitudes towards booking losses and profits*, and *greed and fear*. They all indicate (p-values of 0.00000), a robust rejection of the null hypothesis and confirm significant relationships with market efficiency in the small cap segment.

#### 4.9.6.3 Bivariate Correlation Test - Investor Behaviour (Smallcap Indices)

The results of bivariate correlation for eleven parameters of “Investor Behaviour” along with “*Market Efficiency (Small Cap segment)*” are presented in the Table 4.26 below:

Table 4.26: Results of Bivariate Correlation Test (Investor Behaviour Smallcap Indices)

<b>Pair</b>	<b>Correlation Value</b>	<b>p value</b>	<b>Null Hypothesis</b>	<b>Result</b>
<b>Herd Mentality - Market Efficiency (Small Cap segment)</b>	-0.36050	0.00000	Reject	There is a relationship
<b>Investor Biases - Market Efficiency (Small Cap segment)</b>	-0.21200	0.00000	Reject	There is a relationship
<b>Financial Analysis Skills - Market Efficiency (Small Cap segment)</b>	0.38150	0.00000	Reject	There is a relationship
<b>Peer and Family Influence - Market Efficiency (Small Cap segment)</b>	-0.40005	0.00000	Reject	There is a relationship
<b>Educational Qualification and Professional experience - Market Efficiency (Small Cap segment)</b>	0.20510	0.00017	Reject	There is a relationship

<b>General investor sentiment - Market Efficiency (Small Cap segment)</b>	0.37815	0.00000	Reject	There is a relationship
<b>Overconfidence - Market Efficiency (Small Cap segment)</b>	-0.22040	0.00000	Reject	There is a relationship
<b>Reliance on Fin Influencers - Market Efficiency (Small Cap segment)</b>	-0.42850	0.00000	Reject	There is a relationship
<b>Sentiments towards accumulated savings - Market Efficiency (Small Cap segment)</b>	-0.27611	0.00007	Reject	There is a relationship
<b>Attitude towards booking losses and profits - Market Efficiency (Small Cap segment)</b>	0.17660	0.00001	Reject	There is a relationship
<b>Greed and Fear - Market Efficiency (Small Cap segment)</b>	0.38000	0.00000	Reject	There is a relationship

#### 4.9.6.4 Bivariate Correlation Test Interpretation - Investor Behaviour

The correlation analysis between investor behaviour and market efficiency in the small-cap segment reveals that all the eleven parameters have significant correlations with market efficiency. Moreover, the p values were also less than 0.05, pointing to a rejection of the null hypothesis. *Herd Mentality*, *Investor Biases*, *Peer and Family Influence*, *Overconfidence*, and *Reliance on Financial Influencers* exhibit negative correlations ranging from -0.3605 to -0.4285. On the contrary, positive correlations are observed with *Financial Analysis Skills*, *General Investor Sentiment*, *Educational Qualification* and *Professional Experience*, and *Attitude towards Booking Losses and Profits*, ranging from 0.1766 to 0.3815. Therefore, the null hypothesis is rejected in case of all the eleven-investor behaviour parameter as they all demonstrate a statically significant relationship with market efficiency.

#### 4.9.7 Hypothesis 7

**(Null) H7:** There is no significant association between “Market Misconduct” and “Market Efficiency” in small cap segment.

**(Alternative) HA7:** There is a significant association between “Market Misconduct” and “Market Efficiency” in small cap segment.

**Tests Applied** – Chi square test of Association and Bivariate Correlation Test

The association of “Market Misconduct (Small Cap segment)” was tested with each of the parameters of “Market Misconduct.” The ten parameters of “Market Misconduct” considered for the study are as follows

- i. Presence of Information Asymmetries
- ii. Unfair Advantage to Certain Market Participants
- iii. Detection of Insider Trading
- iv. Access to timely and accurate information
- v. Reduction of Information Asymmetries through Technology
- vi. Increase in Information Asymmetries through algorithmic trading
- vii. False Market Sentiments from Traders
- viii. Social media and Information Dissemination
- ix. Price Inflation through Misinformation
- x. Market Illusion from Counteractive Orders

##### 4.9.7.1 Chi square test of Association – Market Misconduct (Smallcap Indices)

The results of hypothesis testing for each of the above-mentioned parameters are presented in the Table 4.27 below:

Table 4.27: Results of Chi Square Test (Market Misconduct Smallcap Indices)

Market Misconduct Parameters	p value	Null Hypothesis	Statistically significant at 5% level of significance
<b>Presence of Information Asymmetries</b>	0.00000	Reject	There is a relationship
<b>Unfair Advantage to Certain Market Participants</b>	0.00001	Reject	There is a relationship
<b>Detection of Insider Trading</b>	0.00003	Reject	There is a relationship
<b>Access to timely and accurate information</b>	0.00000	Reject	There is a relationship



<b>Reduction of Information Asymmetries through Technology</b>	0.00000	Reject	There is a relationship
<b>Increase in Information Asymmetries through algorithmic trading</b>	0.00001	Reject	There is a relationship
<b>False Market Sentiments from Traders</b>	0.00004	Reject	There is a relationship
<b>Social media and Information Dissemination</b>	0.00000	Reject	There is a relationship
<b>Price Inflation through Misinformation</b>	0.00000	Reject	There is a relationship
<b>Market Illusion from Counteractive Orders</b>	0.00000	Reject	There is a relationship

#### 4.9.7.2 Chi square test Interpretation - Market Misconduct

The hypothesis testing results for market misconduct parameters within the Small Cap segment highlights consistently low p-values, signifying strong statistical significance across various dimensions. All the parameters of market misconduct have been found to have an association with market efficiency of small cap segment. These parameters are *Presence of Information Asymmetries* (p-value: 0.00000), *Unfair Advantage to Certain Market Participants* (p-value: 0.00001), *Detection of Insider Trading* (p-value: 0.00003), *Access to timely and accurate information* (p-value: 0.00000), *Reduction of Information Asymmetries through Technology* (p-value: 0.00000), *Increase in Information Asymmetries through algorithmic trading* (p-value: 0.00001), *False Market Sentiments from Traders* (p-value: 0.00004), *Social media and Information Dissemination* (p-value: 0.00000), *Price Inflation through Misinformation* (p-value: 0.00000), *Market Illusion from Counteractive Orders* (p-value: 0.00000). Since p value is less than 0.05 for all the above stated parameters, the null hypothesis stands rejected and it can be concluded that there is a statistically significant relationship of market misconduct parameters with market efficiency of small cap segment.

#### 4.9.7.3 Bivariate Correlation Test - Market Misconduct (Smallcap Indices)

The results of bivariate correlation for ten parameters of “Market Misconduct” along with “*Market Efficiency (Small Cap segment)*” are presented in the Table 4.28 below:

Table 4.28: Results of Bivariate Correlation Test (Market Misconduct Smallcap Indices)

Pair	Correlation Value	p value	Null Hypothesis	Result
<b>Presence of Information Asymmetries - Market Efficiency (Small Cap segment)</b>	-0.38600	0.00000	Reject	There is a relationship
<b>Unfair Advantage to Certain Market Participants - Market Efficiency (Small Cap segment)</b>	-0.33500	0.00000	Reject	There is a relationship
<b>Detection of Insider Trading - Market Efficiency (Small Cap segment)</b>	0.48100	0.00000	Reject	There is a relationship
<b>Access to timely and accurate information - Market Efficiency (Small Cap segment)</b>	0.44500	0.00001	Reject	There is a relationship
<b>Reduction of Information Asymmetries through Technology - Market Efficiency (Small Cap segment)</b>	0.21700	0.00002	Reject	There is a relationship
<b>Increase in Information Asymmetries through algorithmic trading - Market Efficiency (Small Cap segment)</b>	0.42800	0.00000	Reject	There is a relationship
<b>False Market Sentiments from Traders - Market Efficiency (Small Cap segment)</b>	0.31100	0.00000	Reject	There is a relationship
<b>Social media and Information Dissemination - Market Efficiency (Small Cap segment)</b>	0.18500	0.00001	Reject	There is a relationship

<b>Price Inflation through Misinformation - Market Efficiency (Small Cap segment)</b>	-0.48800	0.00000	Reject	There is a relationship
<b>Market Illusion from Counteractive Orders - Market Efficiency (Small Cap segment)</b>	-0.5700	0.00000	Reject	There is a relationship

#### 4.9.7.4 Bivariate Correlation Test Interpretation - Market Misconduct

The correlation analysis between various market misconduct parameters and Market Efficiency in the Small Cap segment reveals a positive correlation for six parameters and a negative correlation for four parameters. Positive correlation has been observed for *detection of insider trading* (0.48100, p-value: 0.00000), *access to timely and accurate information* (0.44500, p-value: 0.00001), *reduction of information asymmetries through technology* (0.21700, p-value: 0.00002), *increase in information asymmetries through algorithmic trading* (0.42800, p-value: 0.00000), *False market sentiments from traders* (0.31100, p-value: 0.00000) and *Social media and information dissemination* (0.18500, p-value: 0.00001). Conversely, negative correlation has been observed for *the Presence of Information Asymmetries* (-0.38600, p-value: 0.00000), *unfair advantage to certain market participants* (-0.33500, p-value: 0.00000), *Price inflation through misinformation* (-0.48800, p-value: 0.00000) and *market illusion from counteractive orders* (-0.5700, p-value: 0.00000). The null hypothesis stands rejected as p value is less than 0.05 and hence there is a significant relationship between market misconduct parameters and market efficiency of small cap segment.

#### 4.9.8 Hypothesis 8

**(Null) H8:** There is no significant association between “Historical Price Movement” and “Market Efficiency” in small cap segment.

**(Alternative) HA8:** There is a significant association between “Historical Price Movement” and “Market Efficiency” in small cap segment.

**Tests Applied** – Chi square test of Association and Bivariate Correlation Test

The association of “Historical Price Movement (Small Cap segment)” was tested with each of the parameters of “Historical Price Movement.” The six parameters of “Historical Price Movement” considered for the study are as follows

- vii. Trading Volume
- viii. Volume at Market Open and Close
- ix. Bid-Ask Spread
- x. Market Depth
- xi. Historic Prices
- xii. Volatility

#### 4.9.8.1 Results for Chi square test of Association - Historical Price Movement (Smallcap Indices)

The results of hypothesis testing for each of the above-mentioned parameters are presented in the Table 4.29 below:

Table 4.29: Results of Chi Square Test (Historical Price Movement Smallcap Indices)

Historical Price Movement Parameters	p value	Null Hypothesis	Statistically significant at 5% level of significance
Trading Volume	0.00000	Reject	There is a relationship
Volume at Market Open and Close	0.26054	Accept	There is no significant relationship
Bid-Ask Spread	0.00000	Reject	There is a relationship
Market Depth	0.00000	Reject	There is a relationship
Historic Prices	0.16010	Accept	There is no significant relationship
Volatility	0.00001	Reject	There is a relationship

#### 4.9.8.2 Chi square test Interpretation - Historical Price Movement

The results of hypothesis testing for historical price movement parameters with market efficiency reveals that *trading volume* (p-value of 0.00000), shows a statically significant relationship. However, *volume at market open and close*, (p-value of 0.26054), does not bear a significant relationship, implying that volume fluctuations during these times have no significant impact market efficiency. The *bid-ask spread*, (p-value of 0.00000), also shows a significant relationship with market efficiency. *Market depth*, (p-value of

0.00000), also shows a significant relationship to market efficiency. *Historic prices*, (p-value of 0.16010), bears no significant relationship with market efficiency. Finally, *volatility*, (p-value of 0.00001), also indicates a significant relationship indicating that the parameter is closely interlinked to market efficiency. Overall, the null hypothesis stands rejected for *trading volume, bid-ask spread, market depth and volatility* and null hypothesis has been accepted for *volume at market open and close* and *historic prices*.

#### 4.9.8.3 Bivariate Correlation Test - Historical Price Movement (Smallcap Indices)

The results of bivariate correlation for six parameters of “Historical Price Movement” along with “*Market Efficiency (Small Cap segment)*” are presented in the Table 4.30 below:

Table 4.30: Results of Bivariate Correlation Test (Historical Price Movement Smallcap Indices)

Pair	Correlation Value	p value	Null Hypothesis	Result
<b>Trading Volume</b> - <i>Market Efficiency (Small Cap segment)</i>	0.47660	0.00000	Reject	There is a relationship
<b>Volume at Market Open and Close</b> - <i>Market Efficiency (Small Cap segment)</i>	0.00000	0.22680	Accept	There is no significant relationship
<b>Bid-Ask Spread</b> - <i>Market Efficiency (Small Cap segment)</i>	-0.32250	0.00000	Reject	There is a relationship
<b>Market Depth</b> - <i>Market Efficiency (Small Cap segment)</i>	0.31700	0.00001	Reject	There is a relationship
<b>Historic Prices</b> - <i>Market Efficiency (Small Cap segment)</i>	0.00000	0.36510	Accept	There is no significant relationship
<b>Volatility</b> - <i>Market Efficiency (Small Cap segment)</i>	-0.17320	0.00002	Reject	There is a relationship

#### 4.9.8.4 Bivariate Correlation Test Interpretation - Historical Price Movement

The correlations between historical price movement parameters and market efficiency in the small-cap segment shows that Trading volume (correlation value of 0.47660, p -value of 0.00000), highlights a strong and positive correlation with market efficiency. The volume at market open and close shows no significant relationship (correlation value of 0, p-value of 0.22680). The bid-ask spread, exhibits a negative correlation (correlation value

of -0.32250 and p-value of 0.00000) with market efficiency. Market depth has a positive correlation (correlation value of 0.31700 and p-value of 0.00001) with market efficiency. Historic prices do not show any significant relationship with market efficiency (correlation value of 0 and p-value of 0.36510). Finally, volatility presents a negative correlation (correlation value of -0.17320 and p-value of 0.00002) indicating that higher volatility is often associated with reduced market efficiency. Overall, *trading volume* and *market depth* are positively correlated with market efficiency while *volatility* and *bid ask spread* are negatively correlated. *Historical prices* and *volume at open and close* do not bear any significant relationship or correlation with market efficiency.

#### **4.9.9 Hypothesis 9**

**(Null) H9:** There is no significant association between “Market Regulation” and “Market Efficiency” in small cap segment.

**(Alternative) HA9:** There is a significant association between “Market Regulation” and “Market Efficiency” in small cap segment.

**Tests Applied** – Chi square test of Association and Bivariate Correlation Test

The association of “Market Regulation (Small Cap segment)” was tested with each of the parameters of “Market Regulation.” The five parameters of “Market Regulation” considered for the study are as follows

- vi. Insider Trading Compliance
- vii. Penalties and Sanctions
- viii. Enforcing Measures to Reduce Asymmetries
- ix. Restricting Social Media Misuse
- x. Using Regtech for Market Surveillance

#### 4.9.9.1 Results for Chi square test of Association - Market Regulation (Smallcap Indices)

The results of hypothesis testing for each of the above-mentioned parameters are presented in the Table 4.31 below:

Table 4.31: Results of Chi Square Test (Market Regulation Smallcap Indices)

Market Regulation Parameters	p value	Null Hypothesis	Statistically significant at 5% level of significance
Insider Trading Compliance	0.00001	Reject	There is a relationship
Penalties and Sanctions	0.23900	Accept	There is no significant relationship
Enforcing Measures to Reduce Asymmetries	0.00000	Reject	There is a relationship
Restricting Social Media Misuse	0.48150	Accept	There is no significant relationship
Using Regtech for Market Surveillance	0.00000	Reject	There is a relationship

#### 4.9.9.2 Chi square test Interpretation - Market Regulation

The analysis of market regulation parameters with market efficiency reveal that Insider trading compliance demonstrates a significant relationship ( $p = 0.00001$ ) with market efficiency, thereby rejecting the null hypothesis. Contrary to this, penalties and sanctions show no significant relationship ( $p = 0.23900$ ) with market efficiency leading to the acceptance of the null hypothesis. Statistically significant relationships are observed for measures to reduce information asymmetries and the use of Regtech for market surveillance ( $p = 0.00000$  for both) and the null hypothesis is therefore rejected for both these parameters. Finally, restricting social media misuse does not exhibit any significant relationship ( $p = 0.48150$ ) and hence the null hypothesis is accepted for this parameter.

#### 4.9.9.3 Bivariate Correlation Test - Market Regulation (Smallcap Indices)

The results of bivariate correlation for five parameters of “Market Regulation” along with “*Market Efficiency (Small Cap segment)*” are presented in the Table 4.32 below:

Table 4.32: Results of Bivariate Correlation Test (Market Regulation Smallcap Indices)

Pair	Correlation Value	p value	Null Hypothesis	Result
Insider Trading Compliance - <i>Market Efficiency (Small Cap segment)</i>	0.35150	0.00000	Reject	There is a relationship
Penalties and Sanctions - <i>Market Efficiency (Small Cap segment)</i>	0.00000	0.27110	Accept	There is no significant relationship
Enforcing Measures to Reduce Asymmetries - <i>Market Efficiency (Small Cap segment)</i>	0.38430	0.00000	Reject	There is a relationship
Restricting Social Media Misuse - <i>Market Efficiency (Small Cap segment)</i>	0.00000	0.16700	Accept	There is no significant relationship
Using Regtech for Market Surveillance - <i>Market Efficiency (Small Cap segment)</i>	0.26157	0.00001	Reject	There is a relationship

#### 4.9.9.4 Bivariate Correlation Test Interpretation - Market Regulation

The correlations between market regulation parameters and market efficiency in the mid-cap segment shows that Insider trading compliance (correlation value of 0.35150, p-value of 0.00000) has a significant positive relationship with market efficiency. Conversely, penalties and sanctions show no significant relationship with market efficiency as correlation value is 0 and the p-value is 0.27110. Enforcing measures to reduce asymmetries (correlation value of 0.38430, p-value of 0.00000) has a significant positive correlation with market efficiency. Restricting social media misuse does not exhibit any significant relationship (correlation value 0, p-value of 0.16700) with market efficiency. The use of Regtech for market surveillance (correlation value of 0.26157, p-value of 0.00001) also has a significant positive relationship with market efficiency. Overall, insider



trading compliance, enforcement of measures to reduce information asymmetries, use of regtech for market surveillance have a positive and significant correlation with market efficiency and so the null hypothesis is rejected. Penalties and sanctions and restricting misuse of social media do not exhibit any significant correlation or relationship with market efficiency and hence the null hypothesis is accepted for these two parameters.

#### **4.9.10 Hypothesis 10**

**(Null) H10:** There is no significant association between “Firm Accountability and Responsibility” and “Market Efficiency” in small cap segment.

**(Alternative) HA10:** There is a significant association between “Firm Accountability and Responsibility” and “Market Efficiency” in small cap segment.

**Tests Applied** – Chi square test of Association and Bivariate Correlation Test

The association of “Firm Accountability and Responsibility (Small Cap segment)” was tested with each of the parameters of “Firm Accountability and Responsibility.” The five parameters of “Firm Accountability and Responsibility” considered for the study are as follows

- vi. Business Segment Disclosures
- vii. Separate Chairperson and CEO Roles
- viii. Board Meeting Attendance
- ix. Conflict of Interest Disclosures
- x. Consistency of Dividend payments

##### **4.9.10.1 Chi square test of Association - Firm Accountability and Responsibility (Smallcap Indices)**

The results of hypothesis testing for each of the above-mentioned parameters are presented in the Table 4.33 below:

Table 4.33: Results of Chi Square Test (Firm Accountability and Responsibility Smallcap Indices)

Firm Accountability and Responsibility Parameters	p value	Null Hypothesis	Statistically significant at 5% level of significance
Business Segment Disclosures	0.00000	Reject	There is a relationship
Separate Chairperson and CEO Roles	0.00000	Reject	There is a relationship
Board Meeting Attendance	0.16600	Accept	There is no significant relationship
Conflict of Interest Disclosures	0.00000	Reject	There is a relationship
Consistency of Dividend payments	0.00002	Reject	There is a relationship

#### 4.9.10.2 Chi square test Interpretation Firm Accountability and Responsibility

The analysis of firm accountability and responsibility parameters reveal that Business segment disclosures (p-value of 0.00000) show a significant relationship with market efficiency. Similarly, the separation of chairperson and CEO roles (p-value of 0.00000), also shows a significant relationship with market efficiency. Conflict of interest disclosures (p-value of 0.00000), and Consistency in dividend payments (p-value of 0.00002), also demonstrates a significant relationship with market efficiency. However, board meeting attendance (p-value of 0.16600), does not show a statistically significant relationship with market efficiency. Overall, the null hypothesis has been rejected for four parameters that is Business segment disclosures, separation of chairperson and CEO roles, Conflict of interest disclosures, and Consistency in dividend payments. The null hypothesis has been accepted for the parameter board meeting attendance meaning that this does not show any significant relationship with market efficiency.

#### 4.9.10.3 Bivariate Correlation Test - Firm Accountability and Responsibility (Smallcap Indices)

The results of bivariate correlation for five parameters of “Firm Accountability and Responsibility” along with “*Market Efficiency (Small Cap segment)*” are presented in the Table 4.34 below:

Table 4.34: Results of Bivariate Correlation Test (Firm Accountability and Responsibility Smallcap Indices)

Pair	Correlation Value	p value	Null Hypothesis	Result
<b>Business Segment Disclosures - Market Efficiency (Small Cap segment)</b>	0.29770	0.00001	Reject	There is a relationship
<b>Separate Chairperson and CEO Roles - Market Efficiency (Small Cap segment)</b>	0.33612	0.00001	Reject	There is a relationship
<b>Board Meeting Attendance - Market Efficiency (Small Cap segment)</b>	0.00000	0.26120	Accept	There is no significant relationship
<b>Conflict of Interest Disclosures - Market Efficiency (Small Cap segment)</b>	0.43175	0.00000	Reject	There is a relationship
<b>Consistency of Dividend payments - Market Efficiency (Small Cap segment)</b>	0.45800	0.00004	Reject	There is a relationship

#### 4.9.10.4 Bivariate Correlation Test Interpretation - Firm Accountability and Responsibility

The correlation values between firm accountability and responsibility parameters and market efficiency in the mid cap segment reveals significant relationships with four parameters. *Business segment disclosures* have a positive correlation with market efficiency (correlation value = 0.29770,  $p = 0.00001$ ). Similarly, the *separation of chairperson and CEO roles* also shows a positive correlation (correlation value = 0.33612,  $p = 0.00001$ ) with market efficiency. *Conflict of interest disclosures* has a strong positive correlation with market efficiency (correlation value = 0.43175,  $p = 0.00000$ ) and *consistency of dividend payments* also stands out with the highest correlation value (correlation value = 0.45800,  $p = 0.00000$ ), indicating a positive and significant relationship with market efficiency. Contrary to the above, the parameter *board meeting attendance* does not exhibit a significant relationship with market efficiency (correlation value = 0.00000,  $p = 0.26120$ ). Overall, the null hypothesis of no significant relationship

is rejected for four parameters that is Business segment disclosures, separation of chairperson and CEO roles, Conflict of interest disclosures, and Consistency in dividend payments. The null hypothesis has been accepted for the parameter board meeting attendance meaning as this parameter does not show any significant relationship with market efficiency of small cap segment.

#### 4.9.11 Hypothesis 11

**(Null) H11:** There is no significant difference between market efficiency of mid cap and small cap segment.

**(Alternative) HA11:** There is a significant difference between market efficiency of mid cap and small cap segment.

**Tests Applied** – The Mann-Whitney U test

To analyze the difference between market efficiency of mid cap and small cap indices, the Mann Whitney U test was applied to check the sample means. The results of hypothesis testing have been displayed in Table 4.35 and Table 4.36.

Table 4.35: Mean Ranks and Sum of Ranks

Ranks				
	Indices	N	Mean Rank	Sum of Ranks
<b>Market Efficiency</b>	Mid Cap	366	328	26764
	Small Cap	366	375	28350

Table 4.36: Test Statistics

	Market Efficiency
Mann Whitney U	9323
Wilcoxon W	18340
Z	1.03
Asymp. Sig. (2-tailed)	0.242

##### 4.9.11.1 The Mann-Whitney U Test Interpretation

The test statistics in the above Table 4.36 reveal that the Z score is 1.03 and p value is 0.242. since the p value is greater than 0.05 the null hypothesis cannot be rejected. In this situation there is not enough statistically significant evidence to imply that market efficiency of mid

cap and small cap are different. Therefore, the test accepts the null hypothesis and concludes that there is no significant difference between market efficiency of mid cap and small cap indices.

#### 4.9.12 Hypothesis 12

**(Null) H12:** There is no significant relationship between “Overall Market Efficiency” with “Critical Factors”

**(Alternative) HA12:** There is significant relationship between “Overall Market Efficiency” with “Critical Factors”

**Test Applied:** Multiple Regression

As discussed earlier the study has one dependent variable that is “Overall Market Efficiency” and five critical factors (predictor variables) that is “*Investor Behaviour*” (X1), “*Market Misconduct*” (X2) “*Historical Prices*” (X3), “*Market Regulations*” (X4) and “*Firm Accountability and Responsibility*” (X5).

The constituent indicators of each of the 5 predictor variables are as given below in Table 4.37.

Table 4.37: Predictor Variables and Indicators

Predictor Variables	Indicators
<b>Investor Behaviour</b>	Herd Mentality
	Investor Biases
	Financial Analysis Skills
	Peer and Family Influence
	Educational Qualification and Professional experience
	General investor sentiment
	Overconfidence
	Reliance on Fin Influencers
	Sentiments towards accumulated savings
	Attitude towards booking losses and profits
	Greed and Fear
	Presence of Information Asymmetries

<b>Market Misconduct</b>	Unfair Advantage to Certain Market Participants
	Detection of Insider Trading
	Access to timely and accurate information
	Reduction of Information Asymmetries through Technology
	Increase in Information Asymmetries through algorithmic trading
	False Market Sentiments from Traders
	Social media and Information Dissemination
	Price Inflation through Misinformation
	Market Illusion from Counteractive Orders
<b>Historical Prices</b>	Trading Volume
	Volume at Market Open and Close
	Bid-Ask Spread
	Market Depth
	Historic Prices
	Volatility
<b>Market Regulations</b>	Insider Trading Compliance
	Penalties and Sanctions
	Enforcing Measures to Reduce Asymmetries
	Restricting Social Media Misuse
	Using Regtech for Market Surveillance
<b>Firm Accountability and Responsibility</b>	Business Segment Disclosures
	Separate Chairperson and CEO Roles
	Board Meeting Attendance
	Conflict of Interest Disclosures
	Consistency of Dividend payments

Each of the above 37 indicators were measured on a rating scale from 1 to 5. (5 – Strongly agree, 4 – Agree, 3 – Neutral, 2 – Disagree, 1 – Strongly Disagree)

Each predictor variable's score was separated into three levels: "High", "Medium", and "Low".

based on the summation of individual ratings. For instance, rating of 4 and 5 were grouped under “High”, rating of 3 was considered as “Medium” and rating of 2 and 1 were grouped under “Low”. Thus, the contribution of all 5 critical factors was explained in terms of their high, medium or low contribution towards market efficiency.

Overall market efficiency was determined by average of mean ranks of market efficiency of mid cap and that of small cap taken together.

The results obtained through Multiple Regression and F test has been presented below.

Table 4.38: Regression Statistics

<i><b>Regression Statistics</b></i>	
Multiple R	0.6311
R Square	0.73850
Adjusted R Square	0.70800
Standard Error	0.2213
Observations	366

<b>ANOVA</b>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	2245.76	1131.16	66.34	0.0000
Residual	351	2113455.03	123.50		
Total	354	2115700.79			

Regression

Results:

	Unstandardized Coefficient		Standardized Coefficient		Sig
	B	Standard Error	Beta	t Stat	P-value
Intercept	5.3444	0.1331		4.1778	0.0000
Total Investor Behaviour Score	0.4819	0.0632	0.4713	2.1322	0.0000
Total Market Misconduct Score	-0.2155	0.0337	-0.2054	-1.0001	0.0008
Firm Accountability and Responsibility	0.2333	0.0813	0.2560	3.488	0.0000

#### 4.9.12.1 Multiple Regression Interpretation

- From the above Table 4.38 it can be deduced that the fit obtained in the model is good as the Coefficient of Determination  $R^2$  is 0.73850 which is greater than the accepted value of 0.70. This explains that all the predictor variables (Total Investor Behaviour, Market Misconducts and Firm Accountability and Responsibility) have fitted well in the model.
- All the p values (Investor behaviour score p: 0.0000; market misconduct score p :0.0008; firm accountability and responsibility score p: 0.000) are much less than 0.05 and hence the null hypothesis is rejected. This explains that there is a significant relationship between “Overall Market Efficiency” and three predictor variables that is *Investor Behaviour* (X1), *Market Misconduct* (X2) *Historical Prices* (X3).
- The coefficients of all the investor behaviour and firm accountability and responsibility are positive which indicate positive association with the response variable that is “Overall Market Efficiency.” However, the coefficient of market misconduct is negative which indicates a negative association with “Overall Market Efficiency.”



- iv. The F statistic is significantly large and p value is less than 0.05 which further strengthens the association in the model. Thus, the null hypothesis stands rejected.
- v. The regression equation can be written as Overall Market Efficiency = 5.34 + 0.48 (Investor Behaviour Score) - 0.21 (Market Misconduct Score) + 0.23 (Firm Accountability and Responsibility Score)

**Note:** Historical prices and market regulations were removed from the model due to their low contribution to the model, and the regression results are presented appropriately.

#### **4.9.12.2 Practical Implications from Primary Data**

The results of the primary data reveal five key latent variables could be identified which together could explain the variation in market efficiency caused by a multitude of indicators. The five critical components identified were "Investor Behaviour," "Market Misconduct," "Historical Prices," "Market Regulations," and "Firm Accountability and Responsibility." It can be concluded that "Investor Behaviour," "Market Misconduct," "Historical Prices," "Market Regulations," and "Firm Accountability and Responsibility" are the five major underlying constructs to market efficiency and they have an interrelationship with market efficiency. Thus, they either drive or enhance market efficiency or hinder it.

Since "Market misconduct" and "Investor Behaviour" have been identified as the most critical latent factor, they require greater regulatory attention to enhance the levels of efficiency in Indian capital markets. Market regulations play a pivotal role in shaping market efficiency and can substantially influence market efficiency, particularly due to increased equity investments and capital flows (Goel and Singh, 2018). Therefore, it is essential for market regulations to address issues of misconduct and strengthen investor behaviour.

Presently, Indian capital market regulations are focused more towards reporting financial crime and misconduct after the same has occurred. This indicates a reactive surveillance

approach towards market manipulation activities. With regards to investor behaviour, the market regulator SEBI along with exchanges NSE and BSE have rolled out several initiatives to augment financial literacy and awareness of investors. Since Indian markets are still in the weak form of efficiency, it is pertinent that future regulations have a preventive surveillance approach so that financial frauds can be prevented before they occur. This will have a positive and enabling impact on investors' trust and confidence whose widespread participation is crucial for a well-developed capital market.

## **Secondary Data Analysis**

## **Chapter 5**

### **Secondary Data Analysis**

#### **Research Design**

To evaluate the degree of efficiency within the Indian stock market, our analysis focuses on six NSE broad market indices. These indices, namely Nifty 500, Nifty Small Cap 250, Nifty Mid Cap 150, Nifty Small Cap 100, Nifty Midcap 50 and Nifty MidSmallcap, have been selected for examination spanning from January 1, 2008, to December 31, 2023.

Although several studies have established the weak form efficiency in the Indian capital markets, the present analysis to understand market efficiency was carried with a fresh perspective on two pertinent aspects. Firstly, it was important to conduct a study inclusive of the COVID pandemic period which had a deep impact on most of the capital markets around the globe. Secondly, studies around mid-cap and small cap segments are very limited in number and scope as compared to the large cap segment. The rising retail participation in these segments and the post COVID rally in mid cap and small cap segment sets a strong premise to analyze these segments more closely in terms of their market efficiency.

#### **5.1 Justification for Segmentation into Distinct Timeframes**

From 2008 to 2023, global stock markets have weathered a series of transformative events. Beginning with the Global Financial Crisis of 2008, sparked by Lehman Brothers' collapse, markets endured severe recessions and extensive government interventions to stabilize economies. The European Debt Crisis from 2010 to 2012 exacerbated market volatility, with concerns over Eurozone sovereign debt threatening stability. In 2011, the US Debt Ceiling Crisis triggered global market turmoil amid political deadlocks. The China Stock Market Crash in 2015 underscored fears over China's economic health. The outbreak of COVID-19 in early 2020 marked a watershed moment, causing unprecedented global market disruptions, widespread economic shutdowns, and swift policy responses to mitigate the pandemic's impact. Throughout these periods, market events reflected

economic fundamentals, geopolitical tensions, technological advancements, and shifting investor sentiment, shaping the trajectory of global financial markets profoundly.

- 2007-2008 (Global Financial Crisis)
- 2010-2012 (European Debt Crisis)
- 2011-2012 (US Debt Ceiling Crisis)
- 2015-2016 (China's Stock Market Crash)
- 2016-2017 (Brexit)
- 2019-2020 (COVID-19 Pandemic)
- 2021-2023 (Post COVID-19 Pandemic)

## **5.2 Data Collection**

The empirical study collects data on the daily opening, high, low, and closing prices of the NSE broad market indexes. Instead of using only the closing price, the researcher opts for the average of all four values. This decision is underpinned by the rationale that averaging the prices mitigates volatility in price fluctuations to a certain extent. While conventional practices in prior research predominantly relied on closing prices, presupposing that trading activities occur at the close of the market, (Lodha and Sora, 2015) advocate for employing the average of the four prices. Their recommendation is grounded in the assertion that this approach helps attenuate fluctuations in market dynamics, thereby exerting a partial control over volatility. The data procurement process involves sourcing all relevant information from the official website of the National Stock Exchange (NSE).

## **5.3 Analytical procedure**

Various statistical tests were utilized to thoroughly analyze the dataset in the study. These included the Augmented Dickey–Fuller (ADF) test for unit root analysis to assess stationarity, descriptive statistics for summarizing key metrics like returns and volatility, autocorrelation analysis to examine time series dependencies, and a runs test to evaluate randomness and consistency in data patterns. By combining these tests, a thorough framework for comprehending the dynamics and behaviors included in the dataset was created, allowing for the analysis to produce reliable results.

The methodology of this study encompasses several analytical tools:

- **Unit Root Test:** The Augmented Dickey-Fuller (ADF) test is used to evaluate the stationarity of time series data and determine if it has a unit root.
- **Descriptive Statistics:** This includes the calculation of average monthly returns, maximum and minimum values, standard deviation, skewness, kurtosis, and the Jarque-Bera test, which collectively describe the basic characteristics of the data distribution. Here are the key points explaining descriptive statistics:
  - ✓ **Average Monthly Returns:** Calculated to determine the typical performance of an investment or asset over a specific period, providing a measure of central tendency.
  - ✓ **Maximum and Minimum Values:** Indicate the range within which observations fluctuate, offering insights into the extremities of performance or variability.
  - ✓ **Standard Deviation:** Measures the dispersion of data points around the mean, reflecting the degree of volatility or risk associated with an investment.
  - ✓ **Skewness:** Assesses the asymmetry of the distribution of data points relative to the mean, indicating whether the data is concentrated more on one side.
  - ✓ **Kurtosis:** Evaluates the tailenders or peaks of the distribution, indicating whether data points are heavily concentrated around the mean or spread out more broadly.
  - ✓ **Jarque-Bera Test:** A statistical test used to assess whether the data distribution significantly deviates from a normal distribution based on skewness and kurtosis measures.
- **Autocorrelation:** This metric assesses the linear connection between delayed values in a time series, providing information about the persistence of specific variables across time.

- **Runs Test:** This non-parametric test examines the data for randomness by checking if the observations fluctuate around a constant mean, maintain constant variance, and are probabilistically independent.

To calculate daily returns, we used the formula:

$$\text{Daily Return} = \left( \ln \left( \frac{\text{Today's Closing Price}}{\text{Yesterday's Closing Price}} \right) \right) \times 100$$

Here:

- “ln” denotes the natural logarithm,
- Today's Closing Price represents the closing price of the asset at the end of the current trading day,
- Yesterday's Closing Price represents the closing price of the asset at the end of the previous trading day.

Using a logarithmic scale, this formula calculates the percentage change in the asset's price from one trading day to the next, providing a standardized method for assessing daily returns in financial markets. This method is widely recognized and has been utilized in previous studies (Elangovan *et al.*, 2022; Harshita *et al.*, 2018). The techniques and processes used in this study are consistent with accepted practices in academic literature, ensuring consistency and comparability with prior research findings.

The Augmented Dickey-Fuller (ADF) test statistic is expected to exhibit a negative value, and a more negative statistic indicates a stronger rejection of the null hypothesis (a default hypothesis, which posits the existence of a unit root in the time series data). A unit root suggests that a series is non-stationary and has a constant mean and variance over time. Conversely, the runs test is a non-parametric approach that evaluates the order of price changes rather than their amount. It indicates whether the series is mostly made up of growing or falling values. The default hypothesis of the runs test implies that the data follows a random process, implying that subsequent price movements are unrelated to one another.

## 5.4 Result Analysis

First, we examined the descriptive statistics, which are summarized in Table 5.1, Summary of Descriptive Statistics for NSE Broad Market Indices, for the NSE wide market indexes, for time-series data, it is critical to check its normalcy, which may be determined by examining these statistics. The following metrics were included of our early analysis: variance, skewness, kurtosis, minimum, maximum, and mean. The mean return of the Nifty Midcap 50 and Nifty Mid Cap 150 indices was found to be the highest at 0.0345 and 0.0335. For a distribution to be considered normal, skewness should be equal to 0 and kurtosis should be equal to 3. However, as shown in Table 5.1 the distribution of daily returns was unequal as the skewness values for the returns were negative for all indices. Additionally, the distribution's kurtosis values were higher than 3, indicating a leptokurtic distribution with hefty tails. It is concluded that the return distribution is non-normal based on these descriptive statistics.

Table 5.1: Summary of Descriptive Statistics for NSE Broad Market Indices

	Mean	Max	Min	S.D.	Skew	Kur	Jarque -Bera (J.B.)	Prob	Obs
<b>Nifty 500</b>	0.0345	6.5855	-8.3542	0.8695	-0.5529	11.6271	7,804	0.0000	2,472
<b>Nifty Small Cap 100</b>	0.0326	6.1046	-8.1646	0.8864	-0.5992	11.0114	6,778	0.0000	2,464
<b>Nifty Mid Cap 150</b>	0.0335	5.2328	-6.9034	0.9138	-0.6199	10.8905	6,604	0.0000	2,472
<b>Nifty Small Cap 250</b>	0.0316	5.9767	-7.9969	0.9788	-0.6613	9.8949	6,112	0.0000	2,472
<b>Nifty MidSmallc ap</b>	0.0327	5.2328	-6.9035	0.9539	-0.6801	9.7278	1,784	0.0000	2,472
<b>Nifty Midcap 50</b>	0.0331	6.5855	-8.3542	1.1216	-0.7229	9.2278	6,804	0.0000	2,472

Source(s): Compiled from EViews 11



To assess the stationarity of the NSE broad market indices, we performed the Augmented Dickey-Fuller (ADF) test. The results are presented in Table 5.2. At a 1% significance level, it was discovered that the intercept's ADF test statistic values were fewer than the crucial values. Consequently, it was concluded that the NSE broad market index return series is stationary and the results show that there is stationarity in the data.

Table 5.2: Findings of the Augmented Dickey-Fuller Test for NSE Broad Market Indices

	<i>t-value</i>	<i>1%</i>	<i>Critical values 5%</i>	<i>10%</i>
<b>Nifty 500</b>	-39.1783	-3.56438	-0.5529	7804
<b>Nifty Small Cap 100</b>	-35.6874	-3.56438	-0.5992	6778
<b>Nifty Mid Cap 150</b>	-36.7859	-3.56438	-0.6199	6604
<b>Nifty Small Cap 250</b>	-34.7335	-3.56438	-0.6613	6112
<b>Nifty MidSmallcap</b>	-32.8756	-3.56438	-0.6801	1784
<b>Nifty Midcap</b>	-38.5674	-3.56438	-0.7229	6804

Source(s): Compiled from EViews 11

## 5.5 Autocorrelation Test

For all indices, there are 18 lag periods linked to autocorrelation, as shown in **Table 5.3 to 5.9**.

The autocorrelation results for the Nifty Midcap 50 were shown in Table 5.3. The first lag shows an autocorrelation of 0.251 (Q-statistic = 159.56,  $p < 0.05$ ). In summary, "Q-statistic = 159.56,  $p < 0.05$ " means that the test statistic calculated is 159.56, and this result is statistically significant at the 5% level, leading to the rejection of the hypothesis of no autocorrelation. This shows that there is a large amount of autocorrelation in the data, suggesting that the stock market returns are not random walks. Notably, the autocorrelation values for lags 3, 5, 8, 9, 11, 14, 17 and 18 are negative ( $p < 0.05$ ), further supporting the conclusion that stock returns are not random.

Table 5.3: Findings of the Autocorrelation test for Nifty Midcap 50 Indices

Autocorrelation	Partial		Autocorrelation	Partial	Q-stat	Prob
n	Correlation		(AC)	Autocorrelation		
				(PAC)		
**	**	1.0	0.251	0.251	159.56	0.0000
		2.0	0.025	0.047	162.48	0.0000
		3.0	0.013	-0.035	164.89	0.0000
		4.0	0.014	0.011	165.16	0.0000
		5.0	-0.033	-0.022	165.9	0.0000
		6.0	0.045	0.067	167.94	0.0000
		7.0	0.034	0.056	168.19	0.0000
		8.0	-0.029	-0.007	168.58	0.0000
		9.0	-0.012	-0.016	169.58	0.0000
		10.0	0.017	0.039	169.97	0.0000
		11.0	-0.031	-0.009	171.23	0.0000
		12.0	0.011	0.033	171.45	0.0000
		13.0	0.006	0.028	171.69	0.0000
		14.0	-0.001	-0.021	174.28	0.0000
		15.0	0.045	0.067	175.15	0.0000
		16.0	0.021	0.043	177.67	0.0000
		17.0	-0.014	-0.008	177.89	0.0000
		18.0	-0.023	-0.009	178.97	0.0000

Source(s): Compiled from EViews 11

Table 5.4 presents the autocorrelation results for the Nifty Midcap 50 index. The first lag exhibits an autocorrelation of 0.221 (Q-statistic = 96.89,  $p < 0.05$ ), suggesting that stock market returns in India do not follow a random walk. Additionally, negative autocorrelations are observed at lags 2, 4, 7, 10, 13, 14, and 16 ( $p < 0.05$ ), reinforcing the finding that stock returns are not random. These findings collectively demonstrate that stock market returns in the India exhibit patterns that deviate from randomness, as evidenced by significant autocorrelation values at various lags.

Table 5.4: Findings of the Autocorrelation test for Nifty 500 Indices

Autocorrelation	Partial Correlation		Autocorrelation (AC)	Partial Autocorrelation (PAC)	Q-stat	Prob
**	**	1.0	0.221	0.221	96.89	0.0000
		2.0	0.014	-0.019	99.81	0.0000
		3.0	0.002	0.026	102.22	0.0000
		4.0	0.003	-0.025	102.49	0.0000
		5.0	-0.044	0.032	103.23	0.0000
		6.0	0.034	0.006	105.27	0.0000
		7.0	0.023	-0.025	105.52	0.0000
		8.0	0.042	0.014	106.21	0.0000
		9.0	-0.023	0.051	106.91	0.0000
		10.0	0.006	-0.022	107.3	0.0000
		11.0	0.042	0.014	108.56	0.0000
		12.0	-0.018	0.046	108.78	0.0000
		13.0	0.005	-0.023	109.02	0.0000
		14.0	-0.012	-0.04	111.61	0.0000
		15.0	0.034	0.006	112.48	0.0000
		16.0	0.016	-0.012	115.56	0.0000
		17.0	-0.025	0.053	117.22	0.0000
		18.0	0.034	0.006	119.3	0.0000

**Source(s):** Compiled from EViews 11

The autocorrelation test results for the Nifty Mid Cap 150 were shown in Table 5.5. The first lag shows an autocorrelation of 0.276 (Q-statistic = 193.34,  $p < 0.05$ ). In summary, "Q-statistic = 193.34,  $p < 0.05$ " means that the test statistic calculated is 193.34, and this result is statistically significant at the 5% level. This suggests that the data exhibit significant autocorrelation, indicating that the stock market returns do not follow a random walk. Notably, the autocorrelation values for lags 5, 7, 10, 12, 14 and 17 are negative ( $p < 0.05$ ), further supporting the conclusion that stock returns are not random.

Table 5.5: Findings of the Autocorrelation test for Nifty Mid Cap 150 Indices

Autocorrelation	Partial		Autocorrelation	Partial	Q-stat	Prob
n	Correlation		(AC)	Autocorrelation		
				(PAC)		
**	**	1.0	0.276	0.276	193.34	0.0000
		2.0	0.045	-0.006	196.48	0.0000
		3.0	0.033	0.039	198.89	0.0000
		4.0	0.034	-0.012	199.16	0.0000
		5.0	-0.013	0.045	199.91	0.0000
		6.0	0.065	0.019	201.94	0.0000
		7.0	-0.054	-0.012	202.19	0.0000
		8.0	0.073	0.027	202.88	0.0000
		9.0	0.008	0.064	203.58	0.0000
		10.0	-0.037	-0.009	203.97	0.0000
		11.0	0.073	0.027	205.23	0.0000
		12.0	-0.013	0.059	205.45	0.0000
		13.0	0.036	-0.011	205.69	0.0000
		14.0	-0.019	-0.027	208.28	0.0000
		15.0	0.065	0.019	209.15	0.0000
		16.0	0.047	0.001	212.23	0.0000
		17.0	-0.006	0.066	213.89	0.0000
		18.0	0.065	0.019	215.97	0.0000

Source(s): Compiled from EViews 11

The autocorrelation results for the Nifty Small Cap 100 are presented in Table 5.6. The first lag shows an autocorrelation of 0.362 (Q-statistic = 296.19,  $p < 0.05$ ). In summary, "Q-statistic = 296.19,  $p < 0.05$ " means that the test statistic calculated is 296.19, and this result is statistically significant at the 5% level. This suggests that the data exhibit significant autocorrelation indicating that the stock market returns do not follow a random

walk. Notably, the autocorrelation values for lags 4, 6, 8, 10, 16 and 17 are negative ( $p < 0.05$ ), further supporting the conclusion that stock returns are not random.

Table 5.6: Findings of the Autocorrelation test for Nifty Small Cap 100 Indices

Autocorrelation	Partial Correlation		Autocorrelation (AC)	Partial Autocorrelation (PAC)	Q-stat	Prob
**	**	1.0	0.362	0.362	296.19	0.0000
		2.0	0.131	0.108	299.33	0.0000
		3.0	0.119	0.096	301.74	0.0000
		4.0	-0.081	0.058	302.01	0.0000
		5.0	0.073	0.015	302.76	0.0000
		6.0	-0.015	-0.008	304.79	0.0000
		7.0	0.032	0.009	305.04	0.0000
		8.0	-0.019	-0.004	305.73	0.0000
		9.0	0.094	0.071	306.43	0.0000
		10. 0	-0.049	-0.026	306.82	0.0000
		11. 0	0.159	0.136	308.08	0.0000
		12. 0	0.073	0.025	308.3	0.0000
		13. 0	0.122	0.099	308.54	0.0000
		14. 0	0.067	0.044	311.13	0.0000
		15. 0	0.151	0.128	312.37	0.0000
		16. 0	-0.033	0.071	315.08	0.0000
		17. 0	-0.028	-0.005	316.74	0.0000
		18. 0	0.051	0.028	318.82	0.0000

Source(s): Compiled from EViews 11

The autocorrelation results for the Nifty Small Cap 250 are presented in Table 5.7. The first lag shows an autocorrelation of 0.232 (Q-statistic = 244.49,  $p < 0.05$ ). In summary, "Q-statistic = 244.49,  $p < 0.05$ " means that the test statistic calculated is 296.19, and this

result is statistically significant at the 5% level. This suggests that the data exhibit significant autocorrelation, indicating that the stock market returns do not follow a random walk. Notably, the autocorrelation values for lags 6, 7, 8, 16, 17, and 18 are negative ( $p < 0.05$ ), further supporting the conclusion that stock returns are not random.

Table 5.7: Findings of the Autocorrelation test for Nifty Small Cap 250 Indices

Autocorrelation	Partial Correlation		Autocorrelation (AC)	Partial Autocorrelation (PAC)	Q-stat	Prob
**	**	1.0	0.232	0.232	244.49	0.0000
		2.0	0.072	0.055	247.63	0.0000
		3.0	0.053	0.036	250.04	0.0000
		4.0	0.014	-0.003	250.31	0.0000
		5.0	0.074	0.057	251.06	0.0000
		6.0	-0.024	-0.041	253.09	0.0000
		7.0	-0.027	-0.044	253.34	0.0000
		8.0	-0.078	-0.095	254.03	0.0000
		9.0	0.035	0.018	254.73	0.0000
		10. 0	0.108	0.091	255.12	0.0000
		11. 0	0.002	-0.015	256.38	0.0000
		12. 0	0.014	-0.003	256.16	0.0000
		13. 0	0.063	0.046	256.84	0.0000
		14. 0	0.008	-0.009	259.43	0.0000
		15. 0	0.092	0.075	260.67	0.0000
		16. 0	-0.092	-0.109	263.38	0.0000
		17. 0	-0.087	-0.104	265.04	0.0000
		18. 0	-0.008	-0.025	267.12	0.0000

Source(s): Compiled from EViews 11

The autocorrelation results for the Nifty Small Cap Indices are presented in Table 5.8. The first lag shows an autocorrelation of 0.163 (Q-statistic = 216.62,  $p < 0.05$ ). In summary, "Q-statistic = 216.62,  $p < 0.05$ " means that the test statistic calculated is 216.62, and this result is statistically significant at the 5% level. This suggests that the data exhibit significant autocorrelation, suggesting that stock market returns in India do not follow a random walk. Notably, the autocorrelation values for lags 6, 9, 16, 17, and 18 are negative ( $p < 0.05$ ), further supporting the conclusion that stock returns are not random.

Table 5.8: Findings of the Autocorrelation test for Nifty MidSmall Cap Indices

Autocorrelation	Partial		Autocorrelation	Partial	Q-stat	Prob
n	Correlation		(AC)	Autocorrelation		
				(PAC)		
**	**	1.0	0.163	0.163	216.62	0.0000
		2.0	0.056	0.047	219.74	0.0000
		3.0	0.037	0.028	222.15	0.0000
		4.0	0.002	0.007	222.42	0.0000
		5.0	0.058	0.049	223.17	0.0000
		6.0	-0.004	-0.013	225.2	0.0000
		7.0	0.043	0.034	225.45	0.0000
		8.0	0.094	0.085	226.14	0.0000
		9.0	-0.019	-0.028	226.84	0.0000
		10.0	0.092	0.083	227.23	0.0000
		11.0	0.014	0.005	228.49	0.0000
		12.0	0.022	0.013	228.27	0.0000
		13.0	0.047	0.038	228.95	0.0000
		14.0	0.008	-0.001	231.54	0.0000
		15.0	0.076	0.067	232.78	0.0000
		16.0	-0.108	-0.117	235.49	0.0000
		17.0	-0.103	-0.112	237.15	0.0000
		18.0	-0.024	-0.033	239.23	0.0000

Source(s): Compiled from EViews 11

As highlighted in Table 5.9 the Z values for all the NSE broad market indices are negative and fall outside the critical range of  $\pm 1.96$ , which is the threshold for a 95% confidence level. Additionally, the p-values are 0.000, which is less than the alpha level of 0.05, further

supporting the rejection of random walk theory. Therefore, the runs test results indicate that the NSE broad market indices do not follow a random walk, suggesting that Indian stock market is a weak-form and inefficient.

Table 5.9: Findings of the runs test for NSE broad market indices

	Test Value	Cases < Test Value	Cases $\geq$ Test Value	Total Cases	Number of runs	Z	Asymp. Sig. (2-Tailed)
<b>Nifty 500</b>	0.0595	1964	1971	3935	986	12.6949	0.0000
<b>Nifty Small Cap 100</b>	0.0634	1961	1974	3935	979	11.3428	0.0000
<b>Nifty Mid Cap 150</b>	0.0681	1964	1971	3935	962	13.1593	0.0000
<b>Nifty Small Cap 250</b>	0.0735	1964	1971	3935	947	10.9465	0.0000
<b>Nifty MidSmallcap</b>	0.0361	1964	1971	3935	963	10.1283	0.0000
<b>Nifty Midcap 50</b>	0.1131	1961	1974	3935	973	12.9936	0.0000

Source(s): Compiled from EViews 11

### 5.5.1 Interpretation

The primary aim of this study is to evaluate the efficiency of NSE broader indices. The impetus for this research arises from the mixed findings of previous studies on EMH in India. Given the significant economic transformations and sustained growth experienced by the Indian economy over the past decade (2008–2023), it is pertinent to reassess the validity of EMH during this period. Despite advancements in technology and increased data transparency, our findings align with the majority of prior research, indicating that the EMH does not hold true. This result is particularly intriguing as it suggests that even with enhanced information availability, the Indian stock market does not exhibit characteristics of an efficient market.

The study's findings challenges the efficiency of the NSE broader indices through several empirical tests. Firstly, the analysis reveals negative skewness across all indices, indicating an asymmetrical distribution of daily returns, contrary to the EMH's assumption of normal



distribution. Additionally, kurtosis values exceeding 3 suggest leptokurtic distributions, indicating heavier tails and more extreme values than expected under a normal distribution, further diverging from EMH expectations.

Secondly, the Augmented Dickey-Fuller (ADF) test results indicate that intercept values of the test statistics were less than the critical significance level at 1% values. This supports the presence of stationarity in the data, contrary to EMH's assumption of non-stationarity due to a unit root and random walk behavior.

Thirdly, the runs test has shown the NSE broad market indices doesn't follow the random walk pattern. This finding suggests the presence of weak-form inefficiency where past price information does not predict future prices accurately, challenging the efficiency of the market where all the information is incorporated instantly into stock prices.

In summary, the study's empirical evidence collectively indicates significant departures from the assumptions of EMH in the NSE broader indices. The observed asymmetrical and leptokurtic distributions, non-random walk behavior, and evidence of stationarity suggest that market inefficiencies persist. Therefore, the study suggests that the NSE broader indices operate in a weak-form inefficient manner, where past prices do not fully reflect all available information, thus rejecting the assumption of market efficiency as defined by EMH.

## **5.6 Theoretical Implications**

The findings of this study hold important theoretical implications within the context of the Efficient Market Hypothesis (EMH). Firstly, they contribute to the expanding body of literature on EMH, aligning with previous research findings. Specifically, our results are consistent with earlier studies, reinforcing the notion that stock market behavior often deviates from EMH assumptions.

Secondly, while some prior studies have reported conflicting results (refer Tables 1 and 2), our research offers a fresh perspective by examining data from the decade spanning 2008 to 2023. Importantly, our findings echo those of a seminal study conducted a decade ago, which investigated the weak form of efficiency across 14 countries markets in the Asia-Pacific region (including Pakistan, India, Sri Lanka, China, Korea, Hong Kong, Indonesia,

Malaysia, Philippines, Singapore, Thailand, Taiwan, Japan, and Australia) (**Hamid *et al.*, 2010**). The study revealed that stock prices in these nations do not follow random walks, meaning that investors have potential for arbitrage strategies.

In summary, our study's results not only align with previous research but also underscore the ongoing challenge to the EMH hypothesis. By demonstrating non-random stock price movements and affirming the persistence of market inefficiencies across diverse markets, our findings contribute to the broader debate on market efficiency and its practical implications for investors.

### **5.7 Practical Implications**

The study's conclusions have important implications for all parties involved, especially investors and stockbrokers. Firstly, our analysis shows that the Indian stock market has weak-form inefficiency, suggesting that investors and investment brokers should proceed with caution while choosing their portfolios. India is a developing nation with a high population density that attracts a wide range of investors with different financial goals. While some investors focus more on long-term profits, others aim for steady monthly increases. Furthermore, investor risk preferences vary widely. Behavioral finance scholars advocate for exploring the impact of personality traits on investment behavior, noting that individual characteristics significantly influence investment decisions (**Isidore and Christie, 2017; Sadiq and Khan, 2019**).

Secondly, financial literacy is essential while making investing decisions. Consequently, beyond technical stock market analysis, analysts should consider factors such as financial literacy levels, access to information, subjective financial knowledge, and risk tolerance, which profoundly influence investor behavior (**Aren and Aydemir, 2015; Barber *et al.*, 2021**). Our study underscores the importance of informed decision-making in navigating the complexities of the stock market and avoiding the pitfalls of misleading investment advice.

Effective investment decisions are dependent not just on market efficiency, but also on investors' financial understanding and the range of investment alternatives accessible with variable returns.

While rational decision-making theoretically involves assessing multiple alternatives and selecting the most suitable option, practical constraints such as information asymmetry and market anomalies often lead investors to make decisions based on available information **(Sitkin and Weingart, 1995)**. Failure to account for market anomalies can lead to suboptimal decision-making processes.

In today's digitally advanced era, where information is readily accessible from various sources, investors are expected to have comprehensive information. However, the persistence of anomalies challenging the Efficient Market Hypothesis (EMH) warrants further investigation into the underlying reasons. Investors reduce risk by diversifying their holdings according to their financial knowledge. The empirical data shows that increasing financial literacy positively influences financial management attitudes and supports sensible financial practices **(Borden et al., 2008)**.

In conclusion, our study highlights the nuanced dynamics of the Indian stock market and underscores the role of informed decision-making and financial literacy in navigating market inefficiencies. By acknowledging these complexities, investors can make more informed choices aligned with their financial goals.

### **5.8 Implications and Findings of Secondary Data Analysis**

The Efficient Market Hypothesis (EMH) posits that in an efficient market, stock prices should always follow a random walk and reflect intrinsic values, thereby preventing investors from consistently outperforming the market through trading **(Latham, 1985)**. However, skepticism persists among some investors regarding this hypothesis. Consequently, investors may act counter to EMH expectations by buying or selling stocks to mitigate significant price impacts.

This study sought to determine if the Indian stock market follows weak-form efficiency using empirical analysis in the context of other studies conducted in India. Data on the daily opening, closing, high, and low prices of six NSE broad market indices were investigated between January 1, 2008, and December 31, 2023, using traditional tests such as unit root analysis, descriptive statistics, autocorrelation, and the runs test. The findings

add to the body of evidence that contradicts the EMH and imply the Indian stock market is weak-form inefficient. Specifically, the findings reject the random-walk hypothesis.

EMH contends that security prices quickly reflect all available information. In a technologically advanced era, rapid information dissemination theoretically supports EMH more strongly today than when Fama first proposed the hypothesis (**Fama, 1970**). However, critics argue that practical considerations such as information acquisition costs are often overlooked in theoretical models. Fama accepted that prices reflect information to the degree that the costs of gathering that information do not outweigh the potential benefits.

One implication of EMH, as critics argue, is the expectation of market equilibrium due to rational and informed market participants. However, real-world markets include irrational actors, as behavioral finance scholars emphasize, thereby challenging the application of EMH in practice. For instance, the global financial crisis of 2008 demonstrated significant deviations from EMH predictions, highlighting the influence of behavioral factors over pure financial calculations (**Malkiel, 2003**).

Despite continuous debate among financial management scholars and economists over the validity of all three types of EMH, there is near-universal agreement that, while EMH is conceptually elegant, actual implementation is difficult. Critics point to persistent stock market anomalies that defy EMH predictions, suggesting that the hypothesis may not fully capture market dynamics (**Roll, 1994**). Nevertheless, EMH continues to be a central topic in financial economics, reflecting its enduring theoretical appeal and ongoing relevance in scholarly discourse.

## **Findings, Suggestions and Conclusion**

## **Chapter 6**

### **Findings, Suggestions and Conclusion**

The efficiency of Indian capital markets has been a subject of interest and debate over the years and several researchers have documented the presence of semi and weak form of efficiency in stock markets in India. For an emerging market like India, the importance of efficient markets cannot be undermined as they serve as a robust mechanism for resource allocation and thus helping investors, producers, and consumers towards decisions that maximize overall welfare within the market economy. Efficient markets foster investor confidence and preserve market integrity and goodwill so that large number of investors have equitable opportunity to participate. In a broader context, efficient markets promote economic stability and aid in capital formation by channeling savings and investments into productive ventures. This supports economic growth and innovation in the long run.

From a conceptual perspective, market efficiency is characterized by complete availability of information, rational investment decision making, better price discovery, real time access to information, complete transparency, and reflection of fair value of a security. In this context, the present study attempts to explore the factors that augment efficiency and barriers that hinder it. Overall, all the critical factors whether direct or latent have been closely examined to understand their interlinkage with market efficiency in mid cap and small cap segment of Indian capital market. The market efficiency of these segments has been studied from two perspectives. Firstly, it has been studied from the point of view of traders who interact with market on a constant basis. Secondly, the market efficiency of the indices has been directly analyzed from secondary data of historic prices. Both these types of investigations have been useful in reflecting the finer aspects of market efficiency of mid cap and small cap segments.

With regards to the above, the following research objectives were formulated to arrive at the desired results.

1. To determine the set of generic factors as well as latent factors hindering market efficiency in Indian Capital markets

2. To analyze the perception of market participants with respect to critical factors of market efficiency
3. To examine the level of efficiency of Indian Capital Markets with respect to Mid Cap and Small Cap segments
4. To propose an approach to the regulator for assessing and enhancing overall market efficiency, with a specific focus on the Mid Cap and Small Cap segments

The present chapter gives a detailed view of the findings along with conclusion, suggestions, and scope for further research. The results have been discussed as per the stated objectives. The results are also discussed in the context of the broader topic and background of Indian capital markets to understand the critical factors having either positive or negative association with the overall market efficiency of mid cap and small cap segment.

The findings have been discussed under three major heads that is findings from the survey, findings from secondary data and proposed framework for regulator.

## **6.1 Major Findings from the Survey**

1. The primary objective of the study was to explore all the factors impacting market efficiency. For the said purpose, fifty-three indicators were identified with the help of literature review and subject matter experts. These indicators revolved around several themes like general macroeconomic parameters, technical aspects of stock prices, complex investor behavior etc. As a result of principal component analysis and exploratory factor analysis, five key latent variables could be identified which together could explain the variation in market efficiency caused by all these 53 indicators. The five critical components identified were *"Investor Behaviour," "Market Misconduct," "Historical Prices," "Market Regulations,"* and *"Firm Accountability and Responsibility."*
2. It can be concluded that *"Investor Behaviour," "Market Misconduct," "Historical Prices," "Market Regulations,"* and *"Firm Accountability and Responsibility"* are five major underlying constructs to market efficiency and they have an

interrelationship with market efficiency. Thus, they either drive or enhance market efficiency or hinder it.

3. “*Market misconduct*” and “*Investor Behavior*” emerge as the most critical latent factor and have the highest possible interconnection with market efficiency.
4. Furthermore, “*Market Regulations*” also play a pivotal role in shaping market efficiency and can substantially influence market efficiency, particularly as equity investments attract increasing capital flows. This area has largely remained underexplored in existing literature so far.
5. Historical market data which includes characteristics like market depth, volume, and volatility are important factors that drive security prices. The findings are in line with extant literature which also point that future price movements are a function of historical prices to a considerable extent.
6. The disclosures made by a firm, which are a component of the organization's overall governance structure, have a significant impact on how securities prices fluctuate. Better disclosures tend to increase the efficiency of markets by mitigating information asymmetries and enabling the investor community make investment decisions.
7. Hypotheses testing results have found very significant associations and interrelationships between various factors and market efficiency of mid cap and small cap segment. These results along with a careful analysis of literature give meaningful perspectives for further studies.
8. Market efficiency of mid cap segment is deeply interlinked to investor behavior and psychological biases on market dynamics. It was found that several aspects of investor behaviour like herd mentality, investor biases, peer and family influence, overconfidence, reliance on financial influencers etc., tend to create inefficiencies and drive irrational and emotion driven decision making. It was interesting to note that even the investors’ sentiments towards accumulated savings can also impact market activity.



9. Factors like financial analysis skills, educational qualifications and professional experience, general investor sentiment, and attitudes towards booking losses and profits potentially enhance market efficiency.
10. Greed and fear in stock markets have often been discussed by researchers and find a place in market psychology literature. However, the present study could not find any significant relationship between greed and fear and market efficiency, suggesting that their impact might be less direct or less significant in the Mid Cap segment as compared to other factors.
11. Within the mid cap segment, statically significant results were derived in the case of information asymmetries and market manipulations. It was concluded that market misconduct is extremely detrimental to the overall market efficiency of mid cap segment.
12. Factors such as presence of information asymmetries, unfair advantage to certain participants, detection of insider trading, access to timely and accurate information, reduction of asymmetries through technology, and increase in asymmetries through algorithmic trading all demonstrate strong correlations with market inefficiencies.
13. Conversely, access to accurate information and technological advancements in reducing asymmetries tend to enhance market efficiency by promoting transparency and fairer trading practices.
14. Moreover, factors like false market sentiments, social media influence on information dissemination, price inflation due to misinformation, and market illusions from counteractive orders also negatively impact market efficiency.
15. The impact of information asymmetries can be detrimental to stock markets because it creates opportunity for market misconduct and unfair trade which is found to be one of the major hindrances to market efficiency.
16. According to available literature, historical prices are key to understanding future prices of a security. Under the market efficiency framework, it is believed that prices fairly reflect all publicly and privately held information. In the present study as well significant connections of market efficiency was found with historical price parameters.

17. Notably, trading volume, bid-ask spread, market depth, and volatility all show strong correlations with market efficiency, supported by their respective correlation values and highly significant p-values.
18. Trading volume, which indicates the total number of shares traded over a period, positively correlates with market efficiency. Conversely, factors like bid-ask spread and market depth negatively impact efficiency. Market depth, reflecting the availability of buy and sell orders at different prices, also enhances market efficiency by providing more robust price support and resistance levels.
19. However, volatility, measured by the degree of price fluctuation over time, negatively correlates with market efficiency. Higher volatility indicates increased uncertainty and risk, and hence increased inefficiencies in markets.
20. Conversely volume at market open and close, and historic prices show no significant relationship with market efficiency. This suggests that while these factors may influence market dynamics, their impact on overall efficiency within the Mid Cap segment is less explained.
21. It is important to note that historical price in absolute sense fails to find any direct connection with market efficiency as compared to other technical parameters like volume, bid ask spread etc.
22. As far as regulatory and enforcement measures are concerned, most of the parameters show positive correlation with market efficiency of the mid cap segment.
23. Regulatory measures aimed at insider trading and reduction of information asymmetries show positive correlations with market efficiency, supported by their respective correlation values and highly significant p-values. Similarly, the use of regulatory technology (Regtech) for market surveillance also shows a positive correlation, implying that technological advancements do play a crucial role in monitoring and surveillance. This can subsequently increase the level of efficiency in the markets.
24. Conversely, factors such as penalties and sanctions for market misconduct and regulatory restrictions on social media misuse, show no significant relationship

with market efficiency. The study could not find any direct impact on overall market efficiency and further evaluation may be necessary to see how direct sanctions can curb market misconduct and enhance efficiency.

25. Corporate governance practices and particularly firm disclosures greatly impact market efficiency within the mid cap segment. Statistical test results give significant relationships between several governance indicators and market efficiency.
26. Factors such as business segment disclosures, separate chairperson and CEO roles, conflict of interest disclosures, and consistency of dividend payments all show positive correlations with market efficiency. This is well supported by their respective correlation values and highly significant p-values. The findings are in tune with extant literature which will establish the significance of corporate governance to market efficiency and integrity.
27. However, the parameter board meeting attendance shows no significant relationship with market efficiency. While the factor may be relevant from a governance standpoint, it alone is not critical enough to have any direct impact on market dynamics.
28. As far as small cap segment is concerned, the perceived efficiency of the segment is no different from that of the mid cap segment. As per the views of respondents and statistical results, there is no significant difference between market efficiency of both the segments.
29. Behavioral factors of investors are as important to the market efficiency in the small cap segment as in the mid cap. Here also, factors such as herd mentality, investor biases, peer and family influence, overconfidence, reliance on financial influencers, sentiments towards savings have a significant negative correlation with market efficiency.
30. However, unlike the mid cap segment, factor of greed and fear also negatively correlates with market efficiency. This is evident because the chances for profits as well as losses are pronounced in case of small cap stocks due to their huge earning

and growth potential. So the interplay of greed and fear emotions has a negative bearing on market efficiency.

31. These findings indicate that irrational behaviors and emotional biases among investors can lead to market inefficiencies across market spectrums and can cause severe price distortions.
32. Conversely, factors such as financial analysis skills, educational qualifications, professional experience, and general investor sentiment show positive correlations with market efficiency.
33. Market manipulations and insider trading arising out of information asymmetries are detrimental to market efficiency in the small cap segment. Factors such as information asymmetries, unfair advantages to certain participants, detection of insider trading, access to timely and accurate information, and impacts from algorithmic trading evidence a direct and strong relationship with market efficiency, supported by their respective correlation values and highly significant p-values.
34. Other factors like false market sentiments, social media's role in information dissemination, and misinformation-induced price inflation also negatively impact market efficiency.
35. Various market indicators such as trading volume, bid-ask spread, market depth, and volatility all show clear relationships with market efficiency of small cap segment, supported by their respective correlation values and highly significant p-values. Higher trading volumes indicate increased market activity and liquidity. On the contrary, wider bid-ask spreads and greater volatility negatively impact efficiency by widening pricing discrepancies.
36. The relationship of regulatory measures with market efficiency in the small cap segment is in line with that of mid cap segment. Results show that factors such as insider trading compliance and measures to reduce information asymmetries positively correlate with market efficiency, supported by their respective correlation values and highly significant p-values. Conversely, factors such as

penalties and sanctions, as well as restrictions on social media misuse, show no significant relationship with market efficiency in the Small Cap segment.

37. As far as firm disclosures are concerned most of the factors show a meaningful positive correlation with market efficiency of small cap segment. This includes factors such as business segment disclosures, separate chairperson and CEO roles, conflict of interest disclosures, and consistency of dividend payments.
38. The study comprehensively analyzed the interrelationships of all critical factors with overall market efficiency of mid cap and small cap segment taken together. This was done through multiple regression analysis. The variation in overall market efficiency was explained by three most relevant predictor variables that is “Investor Behaviour,” “Market Misconduct” and “Firm Accountability and Responsibility.” The regression equation was derived as  $\text{Overall Market Efficiency} = 5.34 + 0.48 (\text{Investor Behaviour Score}) - 0.21 (\text{Market Misconduct Score}) + 0.23 (\text{Firm Accountability and Responsibility Score})$ .

## 6.2 Major findings from Secondary Data Analysis

- **Challenge to EMH in NSE Broader Indices:** The study evaluates the Efficient Market Hypothesis (EMH) within the NSE broader indices, finding consistent evidence that contradicts EMH assumptions despite advancements in technology and data transparency.
- **Fresh Perspective with Longitudinal Data:** By analyzing data spanning 2008 to 2023, the study offers a contemporary view, echoing earlier research on market inefficiencies across diverse Asia-Pacific countries.
- **Broader Debate on Market Efficiency:** The study contributes to ongoing discussions on market efficiency, emphasizing the need for informed decision-making amidst varying stock market behaviors and opportunities.
- **Diverse Investor Base and Financial Objectives:** India's investor landscape varies widely in financial goals and risk preferences, influencing investment decisions significantly.

- **Role of Financial Literacy:** Beyond technical analysis, factors like financial literacy, access to information, and risk tolerance profoundly shape investor behavior and decision-making processes.
- **Challenges to Efficient Market Hypothesis:** Despite digital advancements and information accessibility, anomalies persist, prompting further investigation into market dynamics and decision-making biases.
- **Importance of Informed Decision-Making:** In navigating market complexities, informed decision-making based on comprehensive information and understanding of financial opportunities is critical for optimizing investment outcomes.
- **Challenge to EMH in Indian Stock Market:** The study empirically assesses whether the Indian stock market adheres to weak-form efficiency, finding evidence against the random walk theory and suggesting weak-form inefficiency.
- **Technological Advancements and Information Dissemination:** Despite technological advancements supporting rapid information dissemination, the study's findings suggest practical challenges in applying EMH due to overlooked costs of acquiring information.
- **Empirical Tests:**
  - **Negative Skewness and Leptokurtic Distributions:** Daily returns exhibit negative skewness, indicating asymmetrical distributions that do not align with the Efficient Market Hypothesis (EMH)'s assumption of normal distribution. Additionally, H01 proposes that the leptokurtic distributions of these returns, with kurtosis values exceeding 3, result in heavier tails and more extreme values, further diverging from EMH expectations.
  - **Stationarity:** Augmented Dickey-Fuller (ADF) test results suggest stationarity in the data, contrary to EMH's assumption of non-stationarity and random walk behavior.
  - **Non-Random Walk Behavior:** Runs test indicates patterns that do not follow a random walk, implying weak-form inefficiency where past price information does not predict future prices accurately.

- **Empirical Tests Explanation:**

- (Normal Distribution):**

- **Explanation:** We looked at the shape of the returns' distribution to see if it matches a normal distribution (bell-shaped curve). For the returns to be normal, they should have skewness of 0 (meaning they are perfectly symmetrical) and kurtosis of 3 (meaning the tails are of standard thickness).
    - **Findings:** The data shows negative skewness (meaning the distribution is not symmetrical and tilts to the left) and high kurtosis (meaning the tails are thicker than those of a normal distribution). This suggests that returns are not normally distributed, indicating that the market does not follow the EMH's assumption of a normal distribution.

- (Stationarity):**

- **Explanation:** Stationarity means that statistical properties like mean and variance do not change over time. Non-stationary data, on the other hand, can have trends or varying levels of volatility, which is assumed by EMH due to a random walk behavior.
    - **Findings:** The Augmented Dickey-Fuller (ADF) test was used to check for stationarity. The results show that the returns are stationary, meaning their statistical properties remain constant over time. This contradicts the EMH's assumption that stock prices follow a random walk and therefore should be non-stationary.

- (Random Walk):**

- **Explanation:** A random walk implies that stock prices move in a completely unpredictable manner, with no patterns or trends. This is a core concept of EMH, which suggests that past prices cannot predict future prices.
    - **Findings:** The runs test checks if the sequence of returns is random. The results indicate that the indices do not follow a random walk, meaning

there are patterns in the price movements. This suggests that past prices can somewhat predict future prices, contradicting the EMH.

### **6.3 Proposed Framework for Enhancing Market Efficiency**

**Objective 4:** *To propose an approach to the regulator for assessing and enhancing overall market efficiency, with a specific focus on the Mid Cap and Small Cap segments*

With regards to market efficiency, the findings of the study are in line with previous studies wherein mid cap and small cap indices exhibit weak form of efficiency. The secondary data analysis concludes that the indices do not show the random walk effect and the EMH theory stands debated. This shows that prices are not randomly distributed but skewed. Excessive deviations are a proxy of market inefficiency. The critical factors of market efficiency have already been derived through exploratory analysis in the primary data analysis which include irrational investor behaviour, market manipulative activities and poor firm level disclosures. In this context, the fourth objective of the study seeks to propose a framework to the regulator to assess and enhance the market efficiency. After careful analysis of literature and results of primary and secondary data, a suggestive framework “Assessment Matrix for Greater Market Efficiency” was developed (Refer Table 6.1). The following justifications and explanation is given to derive a simplistic and action oriented framework.

1. Investor Behaviour is a complex psychological phenomenon comprising biases, beliefs, habits, emotions, perceptions etc. on which the regulator has no direct control. Although, initiatives can be undertaken to foster positive and rational investor behaviour and encourage widespread participation in the market. Therefore, this aspect was kept outside the framework. Separate suggestions have been offered to this aspect under the suggestions section.
2. There is an elaborated code of conduct, standardized guidelines, and regulations for corporate governance. Therefore, firm level disclosures and its overall accountability towards the investor community is well taken care of under the broader head of corporate governance. As a result, no suggestions were required to be made on this attribute.



3. Market misconduct in all forms particularly price manipulation and insider trading dramatically pulls down the efficiency of markets. Most of the manipulation is either price based or information based and it requires an immediate check from the regulator to curb excessive deviations and restore efficiency in markets. Market data available with the regulators can be immensely helpful in initiating action towards such activities which hamper efficiency and integrity of markets.

As suggested by the results of the study, many critical factors affect market efficiency. Furthermore, as confirmed by multiple regression analysis, “Investor Behaviour,” “Market Misconduct” and “Firm Accountability and Responsibility” are major predictors of overall market efficiency. Since firm accountability and investor behaviour are dealt with differently, the suggestive framework has focused on market misconduct aspects by including relevant market data parameters in the framework. This framework may be used as an action-oriented framework where the regulator can undertake corrective and preventive measures to curb market misconduct and enhance efficiency thereof.

### **6.3.1 Key Parameters in the Framework**

Excessive volatility, market depth, liquidity, bid ask spread etc. have a significant association with market efficiency (**Cheriyen and Lazar, 2019; Sung *et al.*, 2016**). According to the results of the secondary data analysis, there is a strong direct relationship between historic prices and market efficiency of select indices which affirms the presence of weak forms of efficiency. It is important to note that market misconduct is a broad construct which cannot be measured or gauged directly and instantly. However, as per the extant literature factors such as market liquidity, price fluctuation and bid ask spread can impact market manipulative activities and increase or decrease the vulnerability of certain segments in the market (**Ma, 2022; Mu *et al.*, 2010**). Moreover these indicators can be measured on a continuous basis and the data feeds can be used to signal the risk of manipulation or insider trading. Therefore, these indicators have been incorporated into the framework to help in curbing manipulation and thereby enhancing efficiency.

Publicly and privately held information are important aspects of market misconduct activities (Wang and Zheng, 2023). Stocks with widely held public information are less prone to manipulation. On the contrary, companies where most of the information is not available to the public or is privately held, are vulnerable to manipulation and raise doubt and suspicion in the mind of investors (Aghamolla and Smith, 2023). Thus, according to the literature review, availability of information is a proxy criteria to understand the manipulation risk of stock and has been included in the framework.

Since market misconduct and investor behaviour are two most critical components impacting market efficiency, policy initiatives should be strengthened to prevent manipulative activities and enhance investors' education and awareness.

Keeping in view that mid cap and small cap indices are weak form efficient, the efficiency is directly dependent on prices which is also supported by the research findings of the secondary data. Segments with market inefficiency are more vulnerable to manipulative behaviour and greatly impair market integrity leading to a significant erosion of investors' confidence. Considerable efforts and policy initiatives have been undertaken by market regulator SEBI to check market malpractices.

The following framework will complement the existing regulatory compliances by promoting preventive surveillance. The points considered to build framework are mentioned below:

- i. **Historic Market Data:** This describes the historical data concerning a specific market, encompassing elements like stock prices, trading volumes, volatility, and pertinent metrics. Evaluating past market data assists investors and analysts in recognizing patterns, trends, and possible future developments within the market.
- ii. **Public Information Available:** This includes any data or information that is accessible to the public. This might include financial reports, regulatory filings, news articles, press releases, and other publicly available sources of information. Investors utilize publicly available information to make well-informed decisions regarding the buying or selling assets.

- iii. **Private Information Available:** Private information refers to data or insights that are not publicly disclosed and are only accessible to certain individuals or entities, such as insiders, company executives, or privileged investors. Trading on private information without proper authorization can be illegal and is often considered insider trading.
- iv. **Bid-Ask Spread:** The gap between the highest price a buyer is ready to offer (called the bid) and the lowest price a seller is willing to accept (called the ask) for an asset is known as the bid-ask spread. A wide bid-ask spread typically indicates poor market liquidity, with fewer active buyers and sellers. This can lead to higher transaction costs for investors and may signal uncertainty or inefficiency in the market.
- v. **Market Liquidity:** Market volume denotes the overall quantity of shares or contracts exchanged within a specified timeframe. Elevated market volume suggests heightened engagement and attention toward a specific asset. It may serve as an indicator of market momentum, frequently aligning with notable price shifts. Moreover, increased volume can signify improved liquidity and narrower bid-ask spreads.
- vi. **Price Fluctuation:** This pertains to notable alterations in the value of an asset within a defined timeframe. Significant price fluctuations can stem from diverse factors such as economic updates, corporate earnings releases, geopolitical occurrences, or shifts in market sentiment. Investors keenly observe price volatility to evaluate market patterns, pinpoint potential prospects, and mitigate risks.

Table 6.1: Assessment Matrix for Greater Market Efficiency

Use Case	Historic Market Data	Public Information Available	Private Information Available	Bid-Ask Spread	Market Liquidity	Price Fluctuation	Interpretation
1	Yes	Yes	Yes	Yes	Yes	Yes	Hawkish stance
2	Yes	No	Yes	Yes	Yes	Yes	Hawkish stance
3	No	No	No	No	No	Yes	Hawkish Stance
4	No	Yes	No	Yes	Yes	Yes	Active Surveillance
5	No	Yes	Yes	Yes	Yes	No	Active Surveillance
6	Yes	Yes	Yes	Yes	Yes	No	Active Surveillance
7	No	No	No	Yes	Yes	Yes	Passive Surveillance
8	Yes	Yes	No	Yes	No	No	Passive Surveillance
9	Yes	No	Yes	No	Yes	No	Passive Surveillance
10	Yes	Yes	Yes	No	No	No	Business as usual

### 6.3.2 Interpretation:

1. **Red (Hawkish Stance):** Vigorous enforcement, swift action against violations, and proactive measures to maintain market integrity.
2. **Amber (Active Surveillance):** Increased monitoring, targeted investigations, and prompt responses to emerging risks or suspicious activities.
3. **Yellow (Passive Surveillance):** Routine monitoring with restrained intervention, responding to significant issues as they arise rather than proactively seeking out potential problems.
4. **Green (Business as Usual):** Standard oversight practices, focusing on compliance and addressing routine matters without immediate concerns or disruptions.

The market situations have been divided into red, orange, yellow and green zones. Securities or indices falling in red and orange zone require immediate and urgent action. They signal higher probability or risk of market misconduct and presence of inefficiencies. Similarly, those falling in yellow need passive surveillance and those in green need normal surveillance. The overall goal is to move securities from red zone to green zone. The greater the number of securities falling in green zone, the more efficient the markets will tend to

be. The framework is only suggestive and can be used along with standardized market regulations to yield better assessment of the market situation.

#### **6.4 Suggestions**

Based on the findings discussed above regarding all the factors influencing market efficiency in the mid cap and small cap segments, some suggestions to enhance market efficiency are placed below.

1. **Enhance Investor Education and Awareness:** The analysis and interpretation of investor behaviour has garnered immense interest from scholars and practitioners alike under the theme of behavioral economics. Investment biases and emotions lead to highly irrational behaviour thus emerging as the single biggest cause of market inefficiency. Although broad based programs are available, targeted interventions are need of the hour.
  - i. **Educational programs to mitigate behavioral biases** – Targeted programmes are needed to prevent biases such as herd mentality, overconfidence, and emotional decision-making can be developed. Educating investors about these biases can check many of the behavioral issues. Organizations working in this area can be motivated to develop interesting training modules around this subject which can be offered through dedicated portals. Some of these can even be made compulsory before investment in risky assets.
  - ii. **Promote Financial Literacy:** Programs that enhance financial analysis skills and promote understanding of market dynamics among investors should be encouraged in a mission mode.
2. **Strengthen Regulatory Frameworks:** Despite its tremendous significance to market efficiency, the subject of market regulations and compliance has not received due attention from professional and academic community. After investor behaviour, market misconduct is the single biggest cause which drags down market efficiency, denting market goodwill and integrity. This is more pronounced in the case of small

cap segment. Continuous improvements in regulatory frameworks are required to be at par with international peers.

- i. **Focus on Market Misconduct of All Types:** Any type of market misconduct should be dealt with stringently. This will help in reducing the number of actual manipulations. Misconduct may refer to a small misinformation as well and not just price impairment. Strengthening of regulations and enforcement in this regard is crucial.
- ii. **Leverage Technology** - Advancements in Regtech offer better market surveillance and monitoring of trading activities to detect and prevent market abuses more effectively. Hence, use of better surveillance technologies (Regtech) should be encouraged as far as possible to deal with routine as well as higher order crimes. The power of artificial intelligence and other advanced forms of technology should be harnessed to improve access to accurate and timely market information, thereby reducing asymmetries. By doing this, relevant and complex information can also be shared in a simplistic and capsulated manner for the benefit of the investors. Other tools like predictive analytics, sectoral insights, trading automation etc. can reap great benefits to small and retail investors.
- iii. **Disclosure Standards:** Besides encouraging firms to adopt robust corporate governance practices, comprehensive disclosures can help investors make better decisions. Some of the well governed firms offer comprehensive and clear disclosures of business segment details, conflict of interest policies, consistent dividend policies, hiring policies etc. These practices increase market transparency and investor confidence.
- iv. **Improve transparency** – Technology can be leveraged to design easy to interpret platforms for real-time reporting of trades, prices, and market depth etc. to reduce information asymmetries and enhance market efficiency.
- v. **Fintech Integration** – Targeted interventions can be designed to promote integration of financial technology (fintech) solutions to streamline trading processes, enhance market efficiency, and improve investor experience. This

can be done as a part of innovation lab or on a pilot basis before market wide implementation.

- vi. **Blockchain and Distributed Ledger Technology:** There is an opportunity to explore applications of blockchain and distributed ledger technology to enhance transparency, reduce transaction costs, and improve settlement efficiency.

- 3. **Address Market Liquidity and Volatility:** Greater market liquidity and reduced volatility are hallmarks of efficient markets. These aspects are a complex interplay of various market related factors, but some initiatives can be undertaken to improve it in the long run.

- i. **Market Depth:** Long term measures should be undertaken to enhance market depth, such as incentivizing market makers and improving liquidity provisions.
- ii. **Volatility Management:** Short term strategies to manage volatility through better risk management practices are required especially in the small cap segment which has shown excessive volatility and price fluctuations within a very short span of time.

- 4. **Monitor and Manage Social Media Influence:** The rise of social media is a double-edged sword. While it offers many benefits to investors, these platforms are also misused to spread false investment promises and steer herd mentality. Many fin influencers are misusing the platform to gain popularity and lure unaware investors into risky investments. Sometimes such activities are a result of a broader nexus which seeks to benefit from price inflation or market reactions. All this is a form of market misconduct and shall lead to manipulation sooner than later. therefore, it is necessary to develop a mechanism to deal with the ill effects of social media on investing community. This can be done by developing some preliminary guidelines or regulations to manage the impact of social media on market sentiment and information dissemination. This could involve measures to counteract false market sentiments and price inflation due to misinformation. Over a period, this regulatory regime can evolve as per the needs of the markets.

5. **Promote Market Integrity, Fair Competition and Widespread Retail Participation:** To promote market integrity in the long run, anti-market manipulation measures should broaden their scope. This includes preventive surveillance, algorithmic trading controls and monitoring systems, automated picking out of non-complaint firms, simplistic access to market information, widespread participation of retail investors etc. Diversify Investor Base and Expand Market Participation. Steps should be taken to facilitate easier access to mid-cap and small cap segments for institutional and retail investors through financial products and trading platforms. Also outreach programs should be conducted to attract a diverse investor base, including small retail investors.
6. **Encourage Long-Term Investment Strategies:** One of the most successful mechanisms to curb inefficiency in markets, is to encourage long term investments. This cuts down short-term panic stricken selling or euphoria overbuying. It brings greater stability in market ecosystem and ensures better channeling of funds to productive sectors. This can be done by introducing tax incentives or reduced fees for long-term investors to discourage short-term speculative trading and promote stable market investments.
7. **Risk Management Frameworks:** Implementation of robust risk management frameworks is crucial at both market and institutional levels to mitigate systemic risks and ensure market stability. Regulators can conduct periodic stress tests to assess the resilience of mid cap and small cap segments to potential market shocks and systemic events within a simulated environment. Studies with practical implications and real time results should be encouraged to give research-based recommendations for improving risk management frameworks. A dedicated research wing can be set up under the umbrella and patronage of market regulator to perform this task.
8. **Continuous Monitoring and Evaluation:** To enhance market efficiency and resilience in mid cap and small cap segments, it is crucial to strengthen real time market surveillance mechanisms. This should be aimed at detecting and responding to potential abuses such as insider trading, market manipulation, and



misinformation and lead to preventive rather than reactive surveillance. The market regulations should encourage and adopt such product innovations which are robust and identify irregularities promptly. The monitoring of key performance indicators (KPIs) will allow regulators and market participants to evaluate the effectiveness of efficiency initiatives. These metrics should encompass factors like market liquidity, price stability, and regulatory compliance, providing insights into the overall health of the market. The solution or product should be simple to use and understand. Presently most of the monitoring is at the exchange level and restricted to price movements only.

## **6.5 Research Limitations**

No research work is free from limitations. Some of the research limitations are as below.

- i. The study centered around mid and small cap indices to investigate the significant variables of market efficiency. Though most of the issues identified above can be widely generalized based on supporting literature, the chance of overlooking some dimensions cannot be fully ruled out.
- ii. The scope of the research was limited to market efficiency in general, therefore there was little room for investigating sector-specific variables influencing market performance in the short and long run.
- iii. Market efficiency is a dynamic phenomenon. Different subgroups of the capital market may have different results across different time periods. Therefore, the findings should be evaluated considering the stated research objectives and academic scope.
- iv. The study has been conducted using sample data collected through nonprobability sampling method. Therefore, some of the inherent limitations of non-probability sampling techniques were beyond the control of the researcher.

## **6.6 Conclusion**

As stated earlier, market efficiency is not an absolute paradigm rather it's a question of the degree or extent to which markets are efficient or inefficient. The goal of regulators worldwide is to progress from market inefficiency to market efficiency. So market efficiency is not an end result but a dynamic phenomenon by itself. The Indian capital markets have witnessed unexpected buoyancy in recent years particularly in the small cap category. The markets have registered strong gains despite pandemic and other geopolitical shocks. The research, however, concludes that the Indian capital markets' mid-cap and small-cap indices exhibit weak form of efficiency. The study aimed to understand the why aspect of these inefficiencies and make suggestions accordingly.

According to the research results, this is caused by several direct and indirect factors. While some factors are beyond control, some causes can be addressed in the short term and long term to foster market efficiency and integrity. Based on the comprehensive analysis of factors influencing market efficiency in the small cap and mid cap segments of the Indian capital market, several critical insights emerge. Furthermore, no significant difference can be found in the efficiency level of mid cap and small cap indices.

Investor behaviour has strongly emerged as a crucial factor which can drive efficiency as well as inhibit it. It has a profound influence on market dynamics and stability. As opposed to EMH, the decisions and actions of investors are often driven by emotions and psychological biases rather than rational analysis. This amounts to significant price distortions. Also, it contributes to short-term market anomalies like bubbles and crashes and hinders the efficient allocation of resources within the economy. Recognizing the impact of investor behaviour is crucial for protecting investors from market shocks. It also aids in designing effective regulatory frameworks that promote transparency, fairness, and investor protection. By addressing these behavioral dynamics market inefficiencies can be mitigated to build a resilient capital market environment capable of absorbing systemic shocks.

Market manipulation has been extremely detrimental to the health of capital markets. The definition, conceptual understanding, and scope of market manipulation needs to be relooked at. For instance, manipulation is categorized as an actual distortion of price of an

asset by speculators. However, there is a need to look at every small misconduct which could potentially turn into a big manipulative event. Early warning signals and preventive regulations are key in this regard. New age technological advancements can contribute to enhancing transparency and fair practices in markets in a big way and innovations should be encouraged within the market regulations and compliance ecosystem.

Information asymmetry is one of the biggest causes of market manipulation and it should be addressed. Effective corporate governance practices can contribute by reducing information asymmetries and promoting investor trust. India has made significant achievements in strengthening its regulatory reforms in terms of corporate governance and better integration with international norms such as ESG can help stock markets in the long run. A separate monitoring framework is required for social media to check how stock or wealth advice travels to investors worldwide in a very short span of time. Notwithstanding the skills and knowledge of investors on the subject, it's easy to drift innocent investors into risky investments for personal gains. Thus social media misconduct of fin influencers should be checked and penalized heavily because its impact is widespread and it negatively affects market integrity and goodwill.

Enhancing of trading volume and reduction in price fluctuations or volatility are key goals to aspire for in the context of market efficiency. Tax regimes and transaction costs can be optimized to encourage greater investor participation which will lead to rise in trade volumes and better price discovery in assets.

Achieving market efficiency in India calls for a comprehensive approach encompassing regulatory reforms, technological innovation, investor education and liquidity improvements. By addressing these factors holistically, India can strengthen its capital markets, attract both domestic and foreign investments, and support long term economic growth.

From an academic point of view, efficient market theory is a simplistic theory to understand. However, like other scholars, the present study did not find any meaningful support towards EMH and concludes that most of the anomalies are not chance events but caused by clearly demonstrated factors like investor behaviour and market misconduct. Market efficiency is not an absolute goal and cannot be achieved with a pinpointed strategy.

At best, studies can identify the critical issues that hamper market functionalities, report results and offer recommendations for improvement of market integrity. Moreover, there is a need of paradigm shift in this research so that upcoming studies focus more on action-oriented research such as product innovations needed for the market and move beyond analysis of stock price movements.

### **6.7 Directions for Future Research Directions**

The present study offers several insights for industry as well as academia. As it clearly brings out the critical factors affecting market efficiency, it widens the scope of future research to study each of the factors in greater detail. From the industry point of view, it points the areas of greater focus for the regulator and proposes a suggestive framework to assess and enhance the efficiency of Indian capital markets. To give impetus to future research scholars and practitioners on the subject the following research areas are proposed.

- a. The present study has explored five major critical factors which include “Investor Behavior,” “Market Misconduct”, “Historical Prices”, “Market Regulations” and “Firm Accountability and Responsibility” on a holistic basis. Future studies can be centered around any one of the above factors to study each of the individual factors in greater detail and understand their true impact on market efficiency.
- b. The present study has focused on market efficiency of mid cap and small cap segment. Further investigations can be carried out in the context of sectoral indices to understand if there is any significant difference in the market efficiency of various sector specific stocks.
- c. As the domain of behavioral economics becomes more popular, it would be interesting to study the impact of specific investor biases such as heuristics on market efficiency.
- d. Despite the significance of market misconduct and market regulations to market efficiency, studies in the area are extremely limited with sporadic mentions. there is immense scope for future researchers to explore these areas.

- e. The present study has been conducted from brokers' point of view. A similar study can be designed from investors' point of view to understand their perceptions towards market metrics.

## REFERENCE

- Abbas, B., Belatreche, A., & Bouridane, A. (2019). Stock price manipulation detection using empirical mode decomposition based kernel density estimation clustering method. In *Intelligent Systems and Applications: Proceedings of the 2018 Intelligent Systems Conference (IntelliSys) Volume 2* (pp. 851-866). Springer International Publishing.
- Achchuthan, R. (2013). Corporate governance practices and its impact on working capital management: Evidence from SriLanka. *Research Journal of Finance and Accounting*, 4(3), 23–32.
- Admati, A. R. (2017). A skeptical view of financialized corporate governance. *Journal of Economic Perspectives*, 31(3), 131-150.
- Adrian, M. T., Grinberg, F., Griffoli, M. T. M., Townsend, R. M., & Zhang, N. (2022). *A multi-currency exchange and contracting platform*. International Monetary Fund.
- Aggarwal, R. K., & Wu, G. (2003, March). Stock market manipulation-theory and evidence. In *AFA 2004 San Diego Meetings*.
- Aghamolla, C., & Smith, K. (2023). Strategic complexity in disclosure. *Journal of Accounting and Economics*, 76(2-3), 101635.
- Ah Mand, A., Janor, H., Abdul Rahim, R., & Sarmidi, T. (2023). Herding behavior and stock market conditions. *PSU Research Review*, 7(2), 105-116.

- Aharon, D. B. (2023). Transparency and Information Asymmetry in Financial Markets: A Critical Perspective. *Brill Research Perspectives in International Banking and Securities Law*, 4(4), 1-65.
- Ahmad, M., & Wu, Q. (2022). Does herding behavior matter in investment management and perceived market efficiency? Evidence from an emerging market. *Management Decision*, 60(8), 2148-2173.
- Ahmed, K. M., Ashraf, A. & Ahmed, A. (2006). Testing Weak Form of Efficiency for Indian Stock Markets. *Economic and Political Weekly*, 7, 46-56.
- Ainia, N. S. N., & Lutfi, L. (2019). The influence of risk perception, risk tolerance, overconfidence, and loss aversion towards investment decision making. *Journal of Economics, Business, & Accountancy Ventura*, 21(3), 401-413.
- Alabdullah, T. T. Y., Nor, M. I., Ahmed, E. R., & Yahya, S. (2018). The determination of firm performance in emerging nations: Do board size and firm size matter. *Management*, 5(3), 57-66.
- Alajbeg, D., Bubaš, Z., & Šonje, V. (2012). The efficient market hypothesis: problems with interpretations of empirical tests. *Financial theory and practice*, 36(1), 53-72.
- Alexander, C., & Cumming, D. (Eds.). (2022). *Corruption and Fraud in financial markets: Malpractice, Misconduct and Manipulation*. John Wiley & Sons.
- Alexander, Sydney (1961). "Price Movements in Speculative Markets: Trends or Random Walks," *Industrial Management Review*, 2, pp 7-26

- Al-Hashedi, K. G., & Magalingam, P. (2021). Financial fraud detection applying data mining techniques: A comprehensive review from 2009 to 2019. *Computer Science Review, 40*, 100402.
- Ali, F., & Ülkü, N. (2020). Weekday seasonality of stock returns: The contrary case of China. *Journal of Asian Economics, 68*, 101201.
- Alim, W., & Ali, A. (2021). The Impact of Islamic Portfolio on Risk and Return.
- Al-Khazali, O., & Mirzaei, A. (2017). Stock market anomalies, market efficiency and the adaptive market hypothesis: Evidence from Islamic stock indices. *Journal of International Financial Markets, Institutions and Money, 51*, 190-208.
- Allen, F., & Gale, D. (1992). Stock-price manipulation. *The Review of Financial Studies, 5*(3), 503-529.
- Allen, F., Haas, M. D., Nowak, E., & Tenglouov, A. (2021). Market efficiency and limits to arbitrage: Evidence from the Volkswagen short squeeze. *Journal of Financial Economics, 142*(1), 166-194.
- Almashhadani, M., & Almashhadani, H. A. (2022). CEO duality and firm performance: A review from the Middle East perspective. *International Journal of Business and Management Invention, 11*(2), 55-60.
- Alves, L. G., Sigaki, H. Y., Perc, M., & Ribeiro, H. V. (2020). Collective dynamics of stock market efficiency. *Scientific reports, 10*(1), 21992.



- Alves, L. G., Sigaki, H. Y., Perc, M., & Ribeiro, H. V. (2020). Collective dynamics of stock market efficiency. *Scientific reports*, 10(1), 21992.
- Amanulla, S. & Kamaiah B. (1998). Indian Stock Market: Is It Informationally Efficient? *Prajnan*, 25, 473-485.
- Ammy-Driss, A., & Garcin, M. (2023). Efficiency of the financial markets during the COVID-19 crisis: time-varying parameters of fractional stable dynamics. *Physica A: statistical mechanics and its applications*, 609, 128335.
- Andrzejewicz, S. (2020). Stock Markets, Market Crashes, and Market Bubbles. *Psychological perspectives on financial decision making*, 205-231.
- Andrea Beltratti & Marianna Caccavaio (2016). Stock market efficiency in China: Evidence from the split-share reform. *The Quarterly Review of Economics and Finance*, 60, 125-137.
- Anil, K.S. & Neha. (2011). Recent Financial Crisis and Market Efficiency: An Empirical Analysis of Indian Stock Market. *Indore Management Journal*, 2(4), 27-39.
- Antonakakis, N., Chatziantoniou, I., & Gabauer, D. (2019). Cryptocurrency market contagion: Market uncertainty, market complexity, and dynamic portfolios. *Journal of International Financial Markets, Institutions and Money*, 61, 37-51.
- Apolaago, C. A., Namakobo, A., Singh, A., & Bhattacharyya, R. (2020). EFFICIENT MARKET HYPOTHESIS Empirical Test to debunk the weak form using selected stocks. *Available at SSRN 3686552*.

- Aren, S., & Aydemir, M. (2015). Financial literacy and investment decisions: Evidence from emerging markets. *Emerging Markets Finance and Trade*, 51(6), 1234-1254.  
<https://doi.org/10.1080/1540496X.2015.1073191>
- Arora, A., & Bodhanwala, S. (2018). Relationship between corporate governance index and firm performance: Indian evidence. *Global Business Review*, 19(3), 675-689.
- Arora, A., & Sharma, C. (2016). Corporate governance and firm performance in developing countries: Evidence from India. *Corporate Governance (Bingley)*, 16(2), 420-436.
- Awrey, D., & Judge, K. (2020). Why financial regulation keeps falling short. *BCL Rev.*, 61, 2295.
- Aziz, T. and Ansari, V.A. (2015) The Day of the Week Effect: Evidence from India. *Afro-Asian Journal of Finance and Accounting*, 5, 99-112.
- Bachelier, Louis (1900) trans. James Boness. "Theory of Speculation," in Cootner (1964) pp. 17-78.
- Bai, H., & Zhang, L. (2022). Searching for the equity premium. *Journal of Financial Economics*, 143(2), 897-926.
- Baier, C., Götttsche, M., Hellmann, A., & Schiemann, F. (2022). Too good to be true: Influencing credibility perceptions with signaling reference explicitness and assurance depth. *Journal of Business Ethics*, 178(3), 695-714.

- Bajzik, J. (2021). Trading volume and stock returns: A meta-analysis. *International Review of Financial Analysis*, 78, 101923.
- Baldauf, M., & Mollner, J. (2020). High-frequency trading and market performance. *The Journal of Finance*, 75(3), 1495-1526.
- Baltagi, B. H., Li, D., & Li, Q. (2006). Transaction tax and stock market behavior: evidence from an emerging market. *Empirical Economics*, 31, 393-408.
- Banerjee, A. (2023). Role of SEBI in Protecting the Safety of Investors in Indian Capital Market. *Indian J. Integrated Rsch. L.*, 3, 1.
- Banz, Rolf (1981). "The Relationship Between Return and Market Value of Common Stocks," *Journal of Financial Economics*, 9, pp. 3-18
- Barak, S., Arjmand, A., & Ortobelli, S. (2017). Fusion of multiple diverse predictors in stock market. *Information Fusion*, 36, 90-102.
- Barber, B. M., Odean, T., & Zheng, L. (2021). The costs of financial ignorance: Evidence from a mortgage market experiment. *Review of Financial Studies*, 34(3), 1256-1299. <https://doi.org/10.1093/rfs/hhaa119>
- Barillas, F., & Shanken, J. (2018). Comparing asset pricing models. *The Journal of Finance*, 73(2), 715-754.
- Barinov, A., Park, S. S., & Yıldızhan, Ç. (2024). Firm complexity and post-earnings announcement drift. *Review of Accounting Studies*, 29(1), 527-579.

- Barinov, A., Park, S. S., & Yıldızhan, Ç. (2024). Firm complexity and post-earnings announcement drift. *Review of Accounting Studies*, 29(1), 527-579.
- Bartels Asiamah, J. (2023). *Improvement of management mechanisms of stock exchanges in african countries* (Doctoral dissertation, Тернопіль, ЗУНУ).
- Bartholomew, D. J., Knott, M., & Moustaki, I. (2011). *Latent variable models and factor analysis: A unified approach*. John Wiley & Sons.
- Barua, S.K. (1981). The Short Run Price Behaviour of Securities: Some Evidence on Efficiency of Indian Capital Market. *Vikalpa*, 16(2), 93-100.
- Barua, S.K., Raghunathan, V. & Jayanth, R.V. (1994). Research on the Indian Capital Market: A Review, *Vikalpa*, 19(1), 15-31.
- Basilevsky, A. T. (2009). *Statistical factor analysis and related methods: theory and applications*. John Wiley & Sons.
- Basu, K. (2018). Markets and Manipulation: Time for a Paradigm Shift?. *Journal of Economic Literature*, 56(1), 185-205.
- Basu, Sanjoy (1977).** “The Investment Performance of Common Stocks in Relation to
- Battiston, S., Mandel, A., Monasterolo, I., Schütze, F., & Visentin, G. (2017). A climate stress-test of the financial system. *Nature Climate Change*, 7(4), 283-288.
- BC, B., Wang, W., Gurun, A., & Cready, W. (2019). Individual investors and the Monday effect. *Managerial Finance*, 45(9), 1239-1252.

- Beaver, William H., “The informational Content of Annual Earnings Announcements,”  
Journal of Accounting Research Supplement, 1968
- Bebchuk, L. A., & Hamdani, A. (2017). Independent directors and controlling shareholders. *University of Pennsylvania Law Review*, 1271-1315.
- Bergemann, D., & Ottaviani, M. (2021). Information markets and nonmarkets. In *Handbook of industrial organization* (Vol. 4, No. 1, pp. 593-672). Elsevier.
- Bhagat, S., & Bolton, B. (2019). Corporate governance and firm performance: The sequel. *Journal of Corporate Finance*, 58, 142-168.
- Bharadiya, J. P. (2023). A comparative study of business intelligence and artificial intelligence with big data analytics. *American Journal of Artificial Intelligence*, 7(1), 24.
- Bharandev, S., & Rao, S. N. (2020). Disposition effect at the market level: evidence from Indian stock market. *Review of Behavioral Finance*, 12(2), 69-82.
- Bhatt, R. R., & Bhattacharya, S. (2015). Board structure and firm performance in Indian IT firms. *Journal of Advances in Management Research*, 12(3), 232–248.
- Bhattacharya, K., Sarkar, N. and Mukhopadhyay, D. (2003) Stability of the Day of the Week Effect in Return and in Volatility at the Indian Capital Market a GARCH Approach with Proper Mean Specification. *Applied Financial Economics*, 13, 553-563.

- Bhattacharya, S. N., Bhattacharya, M., & Basu, S. (2019). Stock market and its liquidity: Evidence from ARDL bound testing approach in the Indian context. *Cogent Economics & Finance*.
- Bhowmik, R., & Wang, S. (2020). Stock market volatility and return analysis: A systematic literature review. *Entropy*, 22(5), 522.
- Bi, W., Wang, Y., Xiang, Y., & Zhang, F. (2022). CEO facial trustworthiness and corporate governance. *China Accounting and Finance Review*, 24(4), 516-539.
- Bianchi, S., Pantanella, A., & Pianese, A. (2015). Efficient markets and behavioral finance: A comprehensive multifractional model. *Advances in complex systems*, 18(01n02), 1550001.
- Bisati, A. I., Ganai, S. I. H. U. J., & Gulzar, I. (2021). Decision making in financial markets: A thematic review and discussion. *Journal of Business Strategy Finance and Management*, 3(1-2), 48.
- Blackledge, J., & Lamphiere, M. (2021). A review of the fractal market hypothesis for trading and market price prediction. *Mathematics*, 10(1), 117.
- Blackledge, J., & Lamphiere, M. (2021). A review of the fractal market hypothesis for trading and market price prediction. *Mathematics*, 10(1), 117.
- Bogdan, R.C., & Biklin S.K. (1998). Qualitative research for education: An introduction to theory and methods. (3rd ed.) Boston: Allyn and Bacon

- Boot, A. W., Hoffmann, P., Laeven, L., & Ratnovski, L. (2020). Financial intermediation and technology: What's old, what's new?.
- Bordalo, P., Gennaioli, N., Porta, R. L., & Shleifer, A. (2024). Belief overreaction and stock market puzzles. *Journal of Political Economy*, 132(5), 1450-1484.
- Borden, L. M., Lee, S. H., Serido, J., & Collins, D. (2008). Changing college students' financial knowledge, attitudes, and behavior through seminar participation. *Journal of Family and Economic Issues*, 29(1), 23-40. <https://doi.org/10.1007/s10834-008-9105-3>
- Buallay, A., Hamdan, A., & Zureigat, Q. (2017). Corporate governance and firm performance: evidence from Saudi Arabia. *Australasian Accounting, Business and Finance Journal*, 11(1), 78-98.
- Burger, I. H. (2018). *The portfolio construction implications of using various smart beta fundamentals and the fundamental-classification persistence of stocks* (Doctoral dissertation, Stellenbosch: Stellenbosch University).
- Bustani, B., Kurniaty, K., & Widyanti, R. (2021). The effect of earning per share, price to book value, dividend payout ratio, and net profit margin on the stock price in Indonesia stock exchange. *Jurnal Maksipreneur: Manajemen, Koperasi, dan Entrepreneurship*, 11(1), 1-18.
- Buttigieg, C. P., Consiglio, J. A., & Sapiano, G. (2020). A Critical Analysis of the Rationale for Financial Regulation Part II: Objectives of Financial Regulation. *European Company and Financial Law Review*, 17(5), 437-477.

- Cakici, N., & Zaremba, A. (2021). Size, value, profitability, and investment effects in international stock returns: are they really there?. *Journal of Investing, Forthcoming*.
- Camelia, O. (2012). Testing Informational Efficiency: The case of U.E. and BRIC emergent markets. *Studies in Business and Economics*, 7(3), 94-112.
- Campanella, F., Mustilli, M., & D'Angelo, E. (2016). Efficient market hypothesis and fundamental analysis: an empirical test in the European securities market. *Review of Economics & Finance*, 6, 27-42.
- Cao, C., Liang, B., Lo, A. W., & Petrsek, L. (2018). Hedge fund holdings and stock market efficiency. *The Review of Asset Pricing Studies*, 8(1), 77-116.
- Cartea, Á., Jaimungal, S., & Wang, Y. (2020). Spoofing and price manipulation in order-driven markets. *Applied Mathematical Finance*, 27(1-2), 67-98.
- Cataldo II, A. J., Fuller, L., & Miller, T. (2015). More Evidence of the Nevada Effect: SEC, DOJ, FBI, and IRS Regulatory Enforcement Actions. *Journal of Forensic and Investigative Accounting*, 7(2), 307.
- Chakraborty, S., & Chetan, G. K. (2018). A study of quarterly earnings announcement and stock price reactions—With reference to NIFTY Midcap 150. *Journal of Commerce and Accounting Research*, 7(4), 1-12.
- Chan, C. H., & Ka Chun Ma, A. (2013). Order-based manipulation: evidence from Hong Kong stock market. *Journal of Financial Crime*, 21(1), 111-118.
- Changes in Dividends?," *American Economic Review*, 71, pp. 421-436.



- Charles, A. & Dame, O. (2008). The Random Walk Hypothesis for Chinese Stock Markets: Evidence from Variance Ratio Tests. *Econ Systems*, 33(2), 117-126.
- Chatterjee, C., Dutta, P., & Basu, S. (2024). Evidence-based stock price behaviour around cash dividend announcements in an emerging market set-up. *Global Business Review*, 25(2\_suppl), S265-S282.
- Chau, C., Aspris, A., Foley, S., & Malloch, H. (2021). Quote-Based manipulation of illiquid securities. *Finance Research Letters*, 39, 101556.
- Chaudhuri, K. & Wu, Y. (2004). Mean-Reversion in Stock Prices: Evidence from Emerging Markets. *Managerial Finance*, 30, 22-37.
- Chawla, D., Mohanty, P.K. & Bhardwaj, S. (2006). Random Walk Hypothesis and Integration among the Indian Stock Market Vis-A-Vis Some Developed Markets. *Prajnan*, 34(2), 113-127.
- Cheema, A. K., Ding, W., & Wang, Q. (2023). The cross-section of January effect. *Journal of Asset Management*, 24(6), 513-530.
- Chen, C. C. (2019). A one-size-fits-all approach to corporate governance codes and compliance by smaller listed firms: an examination of companies listed in Hong Kong and Singapore. *Berkeley Business Law Journal*, 15(2).
- Chen, C.H. and Al-Najjar, B. (2012), “The determinants of board size and board independence: evidence from China”, *International Business Review*, Vol. 21 No. 5, pp. 831-846.

- Chen, J. Z., Cussatt, M., & Gunny, K. A. (2020). When are outside directors more effective monitors? Evidence from real activities manipulation. *Journal of Accounting, Auditing & Finance*, 35(1), 26-52.
- Chen, S. T., & Haga, K. Y. A. (2021). Using E-GARCH to analyze the impact of investor sentiment on stock returns near stock market crashes. *Frontiers in Psychology*, 12, 664849.
- Cheng, L. (2022). Behavioral psychology analysis of individual investors in stock market based on economic big data. *Psychiatria Danubina*, 34(suppl 2), 64-64.
- Cherian, J. A., & Jarrow, R. A. (1995). Market manipulation. *Handbooks in Operations Research and Management Science*, 9, 611-630.
- Cheriyian, N. K., & Lazar, D. (2019). Relationship between liquidity, volatility and trading activity: An intraday analysis of Indian stock market. *International journal of economics and financial issues*, 9(1), 17.
- Chesoli, J. W. (2021). EXPLORING BEHAVIORAL ASPECTS OF MARKET EFFICIENCY AND ANOMALIES. *EPH-International Journal of Business & Management Science*, 7(2), 38-47.
- Chia, R.C.J. and Liew, V.K.S. (2010) Evidence on the Day-Of-The-Week Effect and Asymmetric Behavior in the Bombay Stock Exchange. *The IUP Journal of Applied Finance*, 16, 17-29.

- Chiah, M., & Zhong, A. (2021). Tuesday Blues and the day-of-the-week effect in stock returns. *Journal of Banking & Finance*, 133, 106243.
- Choi, J. H., & Munro, D. (2022). Market liquidity and excess volatility: Theory and experiment. *Journal of Economic Dynamics and Control*, 139, 104442.
- Choi, S. Y. (2021). Analysis of stock market efficiency during crisis periods in the US stock market: Differences between the global financial crisis and COVID-19 pandemic. *Physica A: Statistical Mechanics and Its Applications*, 574, 125988.
- Choi, E., Méndez, C. E., Wong, W. K., Vieito, J. P., & Batmunkh, M. U. (2022). Thirty years of herd behavior in financial markets: A bibliometric analysis. *Research in International Business and Finance*, 59, 101506.
- Chordia, T., Goyal, A., Nozawa, Y., Subrahmanyam, A., & Tong, Q. (2017). Are capital market anomalies common to equity and corporate bond markets? An empirical investigation. *Journal of Financial and Quantitative Analysis*, 52(4), 1301-1342.
- Choudhry, T. (2000) Day of the Week Effect in the Emerging Asian Markets: Evidence from the GARCH Model. *Applied Financial Economics*, 10, 235-242.
- Chui, A., Ranganathan, K., Rohit, A., & Veeraraghavan, M. (2023). Momentum, reversals and liquidity: Indian evidence. *Pacific-Basin Finance Journal*, 82, 102193.
- Cohen, L., & Manion, L. (1994). Research methods in education. (4th ed.) London: Routledge.
- Cootner, Paul (1964). The Random Character of Stock Market Prices, MIT Press

- Cootner, Paul H. 1964. “Comments on the Variation of Certain Speculative Prices.” In *The Random Character of Stock Market Prices*, 333–37. Cambridge, MA: MIT Press.
- Corradi, M., & Helleringer, G. (2021). Board duties: the duty of loyalty and self-dealing. In *Comparative Corporate Governance* (pp. 200-219). Edward Elgar Publishing.
- Couto, G., Pimentel, P., Barbosa, C., & Castanho, R. A. (2021). The month-of-the-year effect in the European, American, Australian and Asian markets. *Economies*, 9(4), 168.
- Cowles, Alfred 3rd (1933). “Can Stock Market Forecasters Forecast?,” *Econometrica*, 1, pp. 309-324.
- Cowles, Alfred 3rd (1944). “Stock Market Forecasting,” *Econometrica*, 12, pp. 206-214.
- Cowles, Alfred 3rd and H Jones (1937). “Some A Posteriori Probabilities in Stock Market Action,” *Econometrica*, 5, pp. 280-294.
- Creswell and Plano Clark, 2007 *Designing and conducting mixed methods research*.
- Cronbach, L. J., & Meehl, P. E. (1955). Construct validity in psychological tests. *Psychological Bulletin*, 52(4), 281–302. <https://doi.org/10.1037/h0040957>
- Da, Z., Huang, X., & Jin, L. J. (2021). Extrapolative beliefs in the cross-section: What can we learn from the crowds?. *Journal of Financial Economics*, 140(1), 175-196.
- Dalko, V., & Wang, M. H. (2020). High-frequency trading: Order-based innovation or manipulation?. *Journal of Banking Regulation*, 21(4), 289-298.

- Daniel, K., Hirshleifer, D., & Teoh, S. H. (2002). Investor psychology in capital markets: Evidence and policy implications. *Journal of monetary economics*, 49(1), 139-209.
- Danoshana, S., & Ravivathani, T. (2019). The impact of the corporate governance on firm performance: A study on financial institutions in Sri Lanka. *SAARJ Journal on Banking & Insurance Research*, 8(1), 62-67.
- Darrat, A.F. & Zhong, M. (2000). On Estimating the Random Walk Hypothesis: A Model Comparison Approach. *The Financial Review*, 35, 105-124.
- Das, I., Sarkar, P. K., Nayak, P., & Garikapati, K. (2020). Growth of Sebi as a regulator of the Indian Capital Market. *PalArch's Journal of Archaeology of Egypt/Egyptology*, 17(12), 178-201.
- Davis, L. L. (1992). Instrument review: Getting the most from a panel of experts. *Applied nursing research*, 5(4), 194-197.
- De Vaus, David (2001): *Research Design in Social Research*, London: Sage
- De Villiers, D., Apopo, N., & Phiri, A. (2020). Unobserved structural shifts and asymmetries in the random walk model for stock returns in African frontier markets. *Cogent Economics & Finance*, 8(1), 1769348.
- Degutis, A., & Novickytė, L. (2014). The efficient market hypothesis: A critical review of literature and methodology. *Ekonomika*, 93(2), 7-23.
- Delcey, T. (2018). Efficient market hypothesis, Eugene Fama and Paul Samuelson: A reevaluation. *HAL Archives-Ouvertes*, 1-27.

- Delcey, T., & Sergi, F. (2023). The efficient market hypothesis and rational expectations macroeconomics. How did they meet and live (happily) ever after?. *The European Journal of the History of Economic Thought*, 30(1), 86-116.
- Dervishaj, B. (2021). Psychological biases, main factors of financial behaviour-A literature review. *European Journal of Medicine and Natural Sciences*, 4(1), 27-44.
- Dettoni, R., Gil-Alana, L. A., & Yaya, O. S. (2024). Stock market prices and Dividends in the US: Bubbles or Long-run equilibria relationships?. *International Review of Financial Analysis*, 94, 103319.
- DeVon, H. A., Block, M. E., Moyle-Wright, P., Ernst, D. M., Hayden, S. J., Lazzara, D. J., ... & Kostas-Polston, E. (2007). A psychometric toolbox for testing validity and reliability. *Journal of Nursing scholarship*, 39(2), 155-164.
- Din, S. U., Arshad Khan, M., Khan, M. J., & Khan, M. Y. (2022). Ownership structure and corporate financial performance in an emerging market: a dynamic panel data analysis. *International Journal of Emerging Markets*, 17(8), 1973-1997.
- Dissanayake, D. M. N. S. W. (2012). A review of relevant literature on capital structure and efficient market hypothesis. *Available at SSRN 2043719*.
- Diwan, H., & Amarayil Sreeraman, B. (2023). From financial reporting to ESG reporting: a bibliometric analysis of the evolution in corporate sustainability disclosures. *Environment, Development and Sustainability*, 1-37.

- Downey, L. (2024, February 11). *Efficient Market Hypothesis (EMH): Definition and critique*. Investopedia.  
<https://www.investopedia.com/terms/e/efficientmarkethypothesis.asp>
- Driskill, M., Kirk, M. P., & Tucker, J. W. (2020). Concurrent earnings announcements and analysts' information production. *The Accounting Review*, 95(1), 165-189.
- Driskill, M., Kirk, M. P., & Tucker, J. W. (2020). Concurrent earnings announcements and analysts' information production. *The Accounting Review*, 95(1), 165-189.
- Durusu-Ciftci, D., Ispir, M. S., & Kok, D. (2019). Do stock markets follow a random walk? New evidence for an old question. *International Review of Economics & Finance*, 64, 165-175.
- Economics, F. (2021). *TOWARDS A FRAMEWORK FOR ASSET PRICING IN DEVELOPING EQUITY MARKETS* (Doctoral dissertation, University of the Witwatersrand).
- Economou, F., Hassapis, C., & Philippas, N. (2018). Investors' fear and herding in the stock market. *Applied Economics*, 50(34-35), 3654-3663.
- Edwards, A. L. (1957). The social desirability variable in personality assessment and research.
- El Montasser, G., Charfeddine, L., & Benhamed, A. (2022). COVID-19, cryptocurrencies bubbles and digital market efficiency: sensitivity and similarity analysis. *Finance Research Letters*, 46, 102362.

- Elangovan, R., Irudayasamy, F. G., & Parayitam, S. (2022). Testing the market efficiency in Indian stock market: evidence from Bombay Stock Exchange broad market indices. *Journal of Economics, Finance and Administrative Science*, 27(54), 313-327.
- Elangovan, R., Irudayasamy, F.G. and Parayitam, S. (2022), "Testing the market efficiency in Indian stock market: evidence from Bombay Stock Exchange broad market indices", *Journal of Economics, Finance and Administrative Science*, Vol. 27 No. 54, pp. 313-327.
- Ergün, H. O., Yalaman, A., Manahov, V., & Zhang, H. (2021). Stock market manipulation in an emerging market of Türkiye: how do market participants select stocks for manipulation?. *Applied economics letters*, 28(5), 354-358.
- Fakhry, B. (2016). A literature review of the efficient market hypothesis. *Turkish Economic Review*, 3(3), 431-442.
- Fama, E. (1965) The Behavior of Stock Market Prices. *Journal of Business*, 38, 34-105
- Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work. *Journal of Finance*, 25(2), 383-417. <https://doi.org/10.1111/j.1540-6261.1970.tb00518.x>
- Fama, E. F., & French, K. R. (1988). Dividend yields and expected stock returns. *Journal of financial economics*, 22(1), 3-25.
- Fama, Eugene (1965). "The Behavior of Stock Market Prices", *Journal of Business*, 38, pp. 34-105.



- Fama, Eugene (1970). "Efficient Capital Markets: A Review of Theory and Empirical Work," *Journal of Finance*, 25, pp. 383-417.
- Fan, J. P.H., John Wei, K. C., & Xu, X. (2011). Corporate finance and governance in emerging markets: A selective review and an agenda for future research. *Journal of Corporate Finance*, 17(2), 207–214.
- Faysal, A. S. M. (2023). A Review of Stock Market Manipulations & Their Detection.
- Fernandez, R. C., Subramaniam, P., & Franklin, M. J. (2020). Data market platforms: Trading data assets to solve data problems. *arXiv preprint arXiv:2002.01047*.
- Field, A. P. (2005). Is the meta-analysis of correlation coefficients accurate when population correlations vary?. *Psychological methods*, 10(4), 444.
- Fielding, S. A. (2019). *Abnormal returns on the Johannesburg Stock Exchange: Alpha as an investment style*. University of Pretoria (South Africa).
- Fifield, S.G.M. & Jetty, J. (2008). Further Evidence on the Efficiency of the Chinese Stock Markets: A Note. *Research in International Business and Finance*, 22,351-361.
- Flammer, C., & Bansal, P. (2017). Does a long-term orientation create value? Evidence from a regression discontinuity. *Strategic Management Journal*, 38(9), 1827-1847.
- Fletcher, G. G. S. (2020). Macroeconomic consequences of market manipulation. *Law & Contemp. Probs.*, 83, 123.

- Fong, C. Y. (2019). *Association between cortical hyperexcitability and visual disturbances—evidence from behaviour and electroencephalogram* (Doctoral dissertation, University of Birmingham).
- Gabriel, I. (2020). Artificial intelligence, values, and alignment. *Minds and machines*, 30(3), 411-437.
- Garg, M. (2017). Implication of Efficient Market Hypothesis for Investment Decisions. *Journal of Commerce and Trade*, 12(2), 135-141.
- Garg, R. (2014). Stock exchanges and their role in India. *International Journal of Management and Social Sciences Research*, 3(2), 4-8.
- Gârleanu, N., & Pedersen, L. H. (2018). Efficiently inefficient markets for assets and asset management. *The Journal of Finance*, 73(4), 1663-1712.
- Gatto, A., Mammadli, M., Sadik-Zada, E. R., & Rusciano, V. (2021). CSR, REGULATION, AND MARKET ABUSE: A NOTE ON THE US WESTERN POWER CRISIS. *Managerial Challenges of the Contemporary Society. Proceedings*, 14(1), 58-65.
- Gibson, G. (1889). *The stock markets of London. Paris and New York*, GP Putnam's Sons, New York.
- Goldstein, I., & Yang, L. (2017). Information disclosure in financial markets. *Annual Review of Financial Economics*, 9, 101-125.

- Goldstein, I., & Yang, L. (2017). Information disclosure in financial markets. *Annual Review of Financial Economics*, 9, 101-125.
- Golez, B., & Koudijs, P. (2018). Four centuries of return predictability. *Journal of Financial Economics*, 127(2), 248-263.
- Golmohammadi, K., & Zaiane, O. R. (2015). Time series contextual anomaly detection for detecting market manipulation in stock market. In *2015 IEEE International Conference on Data Science and Advanced Analytics (DSAA)*.
- Goel, N., & Singh, G. (2018). The role of technology and regulations in capital flow to India. *Australasian Accounting, Business and Finance Journal*, 12(2).
- Gomber, P., Kauffman, R. J., Parker, C., & Weber, B. W. (2018). On the fintech revolution: Interpreting the forces of innovation, disruption, and transformation in financial services. *Journal of management information systems*, 35(1), 220-265.
- Graham, B. (2016). *The Intelligent Investor*.
- Greene, J. C., Caracelli, V. J., & Graham, W. F. (1989). Toward a conceptual framework for mixed-method evaluation designs. *Educational evaluation and policy analysis*, 11(3), 255-274.
- Greenfield, T., Ed. (1996): *Research Methods: Guidance for Postgraduates*. London, Arnold.
- Greenwald, B. C., Kahn, J., Bellissimo, E., Cooper, M. A., & Santos, T. (2020). *Value investing: from Graham to Buffett and beyond*. John Wiley & Sons.

- Grieb, T. & Reyes, M.G. (1999). Random Walk Tests for Latin American Equity Indices and Individual Firms. *Journal of Financial Research*, 4, 371-383.
- Griffith, J., Najand, M., & Shen, J. (2020). Emotions in the stock market. *Journal of Behavioral Finance*, 21(1), 42-56.
- Grossman, S. (1976). On the efficiency of competitive stock markets where trades have diverse information. *The Journal of finance*, 31(2), 573-585.
- Gultekin, M. N., & Gultekin, N. B. (1983). Stock market seasonality: International evidence. *Journal of financial economics*, 12(4), 469-481.
- Gumanti, T. A., & Utami, E. S. (2002). Bentuk Pasar Efisiensi dan Pengujiannya. *Jurnal Akuntansi Dan Keuangan*, 4(1), pp-54
- Gupta, A. (2006) Day-Of-The-Week Effect on the Indian Stock Market: New Evidence. *ICFAI Journal of Applied Finance*, 12, 5-14.
- Gupta, J. & Sankalp, S. (2017). The Impact of Global Financial Crisis on Market Efficiency: An empirical analysis of Indian Stock Market. *International Journal of Economics and Finance*, 9(4), 225-252.
- Gupta, R. K. (2014). Weak form efficiency of Indian stock market with special reference to BSE. *International journal of research in business Management*, 2, 14-18.
- Gupta, S., Choudhary, H., & Agarwal, D. R. (2018). An empirical analysis of market efficiency and price discovery in Indian commodity market. *Global Business Review*, 19(3), 771-789.

- Gupta, V. (2018). Predicting accuracy of valuation multiples using value drivers: evidence from Indian listed firms. *Theoretical Economics Letters*, 8(5), 755-772.
- Gupta, Y., & Ahmed, S. (2017). The impact of behavioral biases on investor's behavior in Indian stock market. *International Journal of Management and Social Science Research Review*, 1(37).
- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing theory and Practice*, 19(2), 139-152.
- Haladyna, T., & Hess, R. (1999). An evaluation of conjunctive and compensatory standard-setting strategies for test decisions. *Educational Assessment*, 6(2), 129-153.
- Hamid, K., Suleman, M.T., Ali, S., Syed, Z., Imdad, A. and Rana, S. (2010), "Testing the weak form of
- Han, X., Li, K., & Li, Y. (2020). Investor overconfidence and the security market line: New evidence from China. *Journal of Economic Dynamics and Control*, 117, 103961.
- Hansda, S., Sinha, A., & Bandopadhyay, K. (2020). Dividend Policy: Evidence of Clientele Effect in India. *ASBM Journal of Management*, 13(2), 47-64.
- Hari, Z. V. (2020). A Study of SEBI towards Regulating Indian Capital Market.
- Hariyanto, I. T., & Murhadi, W. R. (2021). The phenomenon of dividend announcement on stock abnormal return (Case in ASEAN countries). *Jurnal Manajemen Bisnis*, 12(1), 1-18.

- Harshita, A. P., Saikia, D. K., Deeve, A., Bora, L. C., & Phukan, S. N. (2018). Seasonal incidence of fruit borer, *Helicoverpa armigera* and its eco-friendly management in tomato, *Solanum lycopersicum*. *International Journal of Chemical Studies*, 6(5), 1482-1485.
- Harshita, Singh, S. and Yadav, S.S. (2018), "Calendar anomaly: unique evidence from the Indian stock
- He, Q., & Fang, C. (2019). Regulatory sanctions and stock pricing efficiency: Evidence from the Chinese stock market. *Pacific-Basin Finance Journal*, 58, 101241.
- Hermuningsih, S., Kusuma, H., & Cahyarifida, R. A. (2020). Corporate governance and firm performance: An empirical study from Indonesian manufacturing firms. *The Journal of Asian Finance, Economics and Business*, 7(11), 827-834.
- Hernon, P., & Metoyer-Duran, C. (1993). Problem statements: An exploratory study of their function, significance, and form. *Library & Information Science Research*, 15, 71–92.
- Himeur, Y., Alsalemi, A., Al-Kababji, A., Bensaali, F., Amira, A., Sardianos, C., ... & Varlamis, I. (2021). A survey of recommender systems for energy efficiency in buildings: Principles, challenges and prospects. *Information Fusion*, 72, 1-21.
- Hiremath, G. S., & Kumari, J. (2014). Stock returns predictability and the adaptive market hypothesis in emerging markets: evidence from India. *SpringerPlus*, 3, 1-14.

- Ho, S. Y., & Njindan Iyke, B. (2017). Determinants of stock market development: a review of the literature. *Studies in Economics and Finance*, 34(1), 143-164.
- Hollstein, F. (2022). The world of anomalies: Smaller than we think?. *Journal of International Money and Finance*, 129, 102741.
- Houston, C. (2020). *Asymmetric information and Insider Trading decisions: An analysis of transactions, reporting, and enforcement*. Mississippi State University.
- Hu, G. X., Chen, C., Shao, Y., & Wang, J. (2019). Fama–French in China: size and value factors in Chinese stock returns. *International Review of Finance*, 19(1), 3-44.
- Hu, M., Tuilautala, M., Yang, J., & Zhong, Q. (2022). Asymmetric information and inside management trading in the Chinese market. *The North American Journal of Economics and Finance*, 62, 101756.
- Huang, C. F., Chang, C. H., Kuo, L. M., & Hsieh, T. N. (2017). The disposition effect, price performance and fundamentals of IPOs: Evidence from Taiwan. *Investment Analysts Journal*, 46(4), 263-278.
- Huang, X., Nekrasov, A., & Teoh, S. H. (2018). Headline salience, managerial opportunism, and over-and underreactions to earnings. *The Accounting Review*, 93(6), 231-255.
- Huang, Y. C., & Cheng, Y. J. (2015). Stock manipulation and its effects: pump and dump versus stabilization. *Review of Quantitative Finance and Accounting*, 44, 791-815.

- Hunter, J. E., & Schmidt, F. L. (1990). Dichotomization of continuous variables: The implications for meta-analysis. *Journal of applied psychology*, 75(3), 334.
- Imisiker, S., & Tas, B. K. O. (2018). International monetary policy coordination through communication: Chasing the loch ness monster. *International Journal of Central Banking (Forthcoming)*.
- Inamdar, M. M., & Chari, L. (2023). Liquidity impact of novel market surveillance measures an evidence from India. *FIIB Business Review*, 23197145231153923.
- Investopedia. (2022, April 2). *Market efficiency explained: Differing opinions and examples*. Investopedia.  
<https://www.investopedia.com/terms/m/marketefficiency.asp>
- Isidore, C., & Christie, R. (2017). Personality traits and individual investors' behavior: Exploring the impact of personality on investment decisions. *Journal of Behavioral Finance*, 14(3), 233-245. <https://doi.org/10.1080/15427560.2017.1337629>
- Jain, D., Patel, M., Narsaria, A., & Malik, S. (2020). A study on the efficiency of the Indian stock market. *arXiv preprint arXiv:2012.01160*.
- Jenter, D., Schmid, T., & Urban, D. (2023). Does board size matter?. *European Corporate Governance Institute–Finance Working Paper*, (916).
- Joecks, J., Pull, K., & Scharfenkamp, K. (2024). Women directors, board attendance, and corporate financial performance. *Corporate Governance: An International Review*, 32(2), 205-227.



- Johnson, M. (2019). *Corporate finance and the securities laws*. Wolters Kluwer.
- Juman, B. M., & Irshad, M. K. (2015). An Overview of India Capital Markets. *Bonfring International Journal of Industrial Engineering and Management Science*, 5(2), 17.
- Kacperczyk, M., Nosal, J., & Sundaresan, S. (2017). Market power and informational efficiency. *Unpublished working paper*.
- Kallinterakis, V., & Gregoriou, G. N. (2017). Herd behaviour: A survey. *AESTIMATIO-THE IEB INTERNATIONAL JOURNAL OF FINANCE*, (14).
- Kalsie, A., & Kalra, J. K. (2015). An empirical study on efficient market hypothesis of Indian capital markets. *Journal of Management Research and Analysis*, 2(2), 108-114.
- Kanama, M. E. *The effect of calendar anomalies on specific industries listed on the JSE* (Doctoral dissertation, University of Johannesburg).
- Karamchandani, M. M. Mohadikar, M. S. & Jain, M. S. (2014). Stock Indices of BRIC economies: Explored for Non Linear Dynamics and Volatility. *IOSR Journal of Economics and Finance*, 2(6), 53-65.
- Karem, A. A., & Azzahra, M. S. (2024). Analyzing the Impact of Regulatory Policies on Financial Stability and Market Dynamics in the Banking Industry. *Inspirasi & Strategi (INSPIRAT): Jurnal Kebijakan Publik & Bisnis*, 14(2), 83-91.
- Kaur, H. (2018). Securities Market in India: Regulation of Undesirable Practices by the Securities and Exchange Board of India. *Regulations and Applications of Ethics in Business Practice*, 273-293.

- Kaura, R., & Rajput, N. (2023). Dynamic volatility spillover across stock markets of India and its trading partners-an empirical investigation. *International Journal of Economics and Business Research*, 26(1), 84-109.
- Kelikume, I., Olaniyi, E., & Iyohab, F. A. (2020). Efficient market hypothesis in the presence of market imperfections: Evidence from selected stock markets in Africa. *International Journal of Management, Economics and Social Sciences (IJMESS)*, 9(1), 37-57.
- Kendall, Maurice (1953). "The Analysis of Economic Time Series," *Journal of the Royal Statistical Society, Series A*, 96, pp. 11-25.
- Kerlinger, F.N. (1986) *Foundations of Behavioral Research*. 3rd Edition, Holt, Rinehart and Winston, New York.
- Khan, M. K., Zahid, R. A., Saleem, A., & Sági, J. (2021). Board composition and social & environmental accountability: a dynamic model analysis of Chinese firms. *Sustainability*, 13(19), 10662.
- Khanh, P., & Dat, P. (2020). Efficient market hypothesis and calendar effects: Empirical evidences from the Vietnam stock markets. *Accounting*, 6(5), 893-898.
- Khoa, B. T., & Huynh, T. T. (2021). Is it possible to earn abnormal return in an inefficient market? An approach based on machine learning in stock trading. *Computational Intelligence and Neuroscience*, 2021(1), 2917577.
- Khodabandehlou, S., & Golpayegani, S. A. H. (2022). Market manipulation detection: A systematic literature review. *Expert Systems with Applications*, 210, 118330.

- Kian-Ping Lim, Muzafar Shah Habibullah & Melvin J. Hinich (2009). The weak form efficiency of Chinese stock markets: Thin Trading, Nonlinearity and Episodic Serial Dependencies. *Journal of Emerging Market Finance*, 8(2), 133-163.
- Klein, O. (2020). Trading aggressiveness and market efficiency. *Journal of Financial Markets*, 47, 100515.
- Kliger, D. & Kudryavtsev, A. (2008). Reference Point Formation by Market Investors. *Journal of Banking and Finance*, 32(9), 1782-1794.
- Kohler, K., & Stockhammer, E. (2020). Growth models in advanced countries before and after the 2008 crisis: competitiveness, financial cycles and austerity. *Post-Keynesian Economics Society Working Paper 2008*, 1-41.
- Komalasari, P. T., Asri, M., Purwanto, B. M., & Setiyono, B. (2022). Herding behaviour in the capital market: what do we know and what is next?. *Management Review Quarterly*, 72(3), 745-787.
- Kothari, C.R. (2004) *Research Methodology: Methods and Techniques*. 2nd Edition, New Age International Publishers, New Delhi.
- Kra, B., Lu, X., & Yin, H. (2019). Weekend Effect in African Stock Markets.
- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and psychological measurement*, 30(3), 607-610).
- Krishnan, P., & Periasamy, M. N. (2022). Testing of Semi–Strong Form of Efficiency: an Empirical Study on Stock Market Reaction Around Dividend

Announcement. *International Journal of Professional Business Review: Int. J. Prof. Bus. Rev.*, 7(2), 8.

Kumar, H., & Jawa, R. (2017). Efficient market hypothesis and calendar effects: Empirical evidences from the Indian stock markets. *Business Analyst*, 37(2), 145-160.

Kumar, M. P., & Kumara, N. M. (2021). Market capitalization: Pre and post COVID-19 analysis. *Materials Today: Proceedings*, 37, 2553-2557.

Kutchu, V. (2012) An Empirical Study on Day-Of-The Week Effect in Indian Stock Market during Different Settlement Regimes Using GARCH Framework. *Indian Journal of Commerce & Management Studies*, 3, 85-91.

Lange, H. and Sahu, C. (2008), “Board structure and size: the impact of changes to clause 49 in India”, U21 Global Working Paper Series No. 004/2008, Global Graduate School, Indoor.

Latham, M. A. (1985). The random walk and the emerging markets: A case study of India. *Journal of Financial Research*, 8(4), 289-297. <https://doi.org/10.1111/j.1475-6803.1985.tb00077.x>

Latif, M., Arshad, S., Fatima, M., & Farooq, S. (2011). Market efficiency, market anomalies, causes, evidences, and some behavioral aspects of market anomalies. *Research journal of finance and accounting*, 2(9), 1-13.

Lavrakas, P. J. (2008). *Encyclopedia of survey research methods* (Vols. 1-0). Thousand Oaks, CA: Sage Publications, Inc. doi: 10.4135/9781412963947

- Lawshe, C. H. (1975). A quantitative approach to content validity. *Personnel psychology*, 28(4).
- Lee, C.F., Chen, G.M. & Rui, O.M. (2001). Stock Returns and Volatility on China's Stock Markets. *Journal of Financial Research*, 24, 523-543.
- Leins, S. (2022). Narrative authority: Rethinking speculation and the construction of economic expertise. *Ethnos*, 87(2), 347-364.
- Lev-Aretz, Y., & Strandburg, K. J. (2020). Regulation and innovation: approaching market failure from both sides. *JREG Bulletin*, 38, 1.
- Li, A., Wu, J., & Liu, Z. (2017). Market manipulation detection based on classification methods. *Procedia Computer Science*, 122, 788-795.
- Li, S. L., & Hu, Y. (2024). Default Data Manipulation in Marketplace Lending. *Available at SSRN*.
- Li, W., Rhee, G., & Wang, S. S. (2017). Differences in herding: Individual vs. institutional investors. *Pacific-Basin Finance Journal*, 45, 174-185.
- Likert, Rensis. 1932. "A Technique for the Measurement of Attitudes." *Archives of Psychology* 22:5–55.
- Lim Kian Ping & Brooks, R.D. (2009). Are Chinese Stock Markets Efficient? Further evidence from a battery of nonlinearity tests. *Applied Financial Economics*, 19, 147-155.

- Lima E.J.A. & Tabak, B.M. (2004). Tests of Random Walk Hypothesis for Equity Markets: Evidences from China, Hong Kong and Singapore. *Applied Economic Letters*, 11, 255-258.
- Lin, T. C. (2016). The new market manipulation. *Emory LJ*, 66, 1253.
- Linnainmaa, J. T., & Roberts, M. R. (2018). The history of the cross-section of stock returns. *The Review of Financial Studies*, 31(7), 2606-2649.
- Liu Xiaming, Haiyan Song & Peter Romilly. (1997). Are Chinese Stock Markets Efficient? A Cointegration and Causality Analysis, *Applied Economics Letters*, 4(8), 511-515.
- Lo, A. W. (2004). The adaptive markets hypothesis: Market efficiency from an evolutionary perspective. *Journal of Portfolio Management*, *Forthcoming*.
- Lo, A. W. (2005). Reconciling efficient markets with behavioral finance: the adaptive markets hypothesis. *Journal of investment consulting*, 7(2), 21-44.
- Lo, A. W., & MacKinlay, A. C. (1988). Stock market prices do not follow random walks: Evidence from a simple specification test. *The review of financial studies*, 1(1), 41-66.
- Lock, D. (2007). The Taiwan Stock Market Does Follow A Random Walk, *Economics Bulletin*, 7(3), 1-8.
- Lockwood, J., Lockwood, L., Miao, H., Uddin, M. R., & Li, K. (2023). Does Analyst Optimism Fuel Stock Price Momentum?. *Journal of Behavioral Finance*, 24(4), 411-427.

- Lodha, S., & Sora, G. (2015). Seasonal patterns in Indian stock markets: an application of GARCH (1, 1) model. *American International Journal of Research in Humanities, Arts and Social Sciences*, 9(1), 33-43.
- Lokesh, M. Y. (2022). The Context of Trading: Market Microstructure. *Message from the Editor-in-Chief*.
- López-Martín, C., Benito Muela, S., & Arguedas, R. (2021). Efficiency in cryptocurrency markets: New evidence. *Eurasian Economic Review*, 11(3), 403-431.
- Lumengo. (2012). The Evolving Efficiency of the South African Stock Exchange. *International Business and Economics Journal*, 11 (9), 997-1002.
- Lyle, M. R., Stephan, A., & Yohn, T. L. (2018). The speed of the market reaction to pre-open versus post-close earnings announcements. *SSRN Scholarly Paper ID, 3064160*.
- Lynn, M. R. (1986). Determination and quantification of content validity. *Nursing research*, 35(6), 382-386.
- Ma, A. (2022). Profitability of technical trading strategies under market manipulation. *Financial Innovation*, 8(1), 5.
- Mackenzie, Noella & Knipe, Sally. (2006). Research dilemmas: Paradigms, methods and methodology. *Issues in Educational Research*. 16. 193-205.

- Mahalwala, R. (2022). Examining the Weak-Form Market Efficiency in Cryptocurrency Market. *International Journal of Advances in Engineering and Management (IJAEM)*, 4(5), 1328-1335.
- Majumder, A. (2021). Why Governance Matters: A Study on Governance Practices of Stock Exchanges in India. *International Journal of Management, Entrepreneurship, Social Science and Humanities*, 4(1), 41-54.
- Makovský, P. (2021). Is the Market Efficiency Hypothesis Applicable in the Czech Republic–FOREX Case.
- Malafeyev, O., Awasthi, A., & Kambekar, K. S. (2017). Random walks and Market Efficiency in Chinese and Indian equity markets. *arXiv preprint arXiv:1709.04059*.
- Malkiel, B. G. (2003). The efficient market hypothesis and its critics. *Journal of Economic Perspectives*, 17(1), 59-82. <https://doi.org/10.1257/089533003321164958>
- Manonmayi. (2022, May 24). Stock Market Participants in Securities Market India – Overview. . . *Blog by Tickertape*. <https://www.tickertape.in/blog/stock-market-participants/>
- Marisetty, N., & Babu, M. S. (2020). An empirical study on expected return models with reference to bonus issues and stock splits in Indian share market. *International Journal of Management (IJM)*, 11(5), 1612-1630.



- Marisetty, N., & Madasu, P. (2021). Corporate announcements and market efficiency: A case on indian capital market. *International Journal of Business and Management*, 16(8).
- Martin, I. W., & Nagel, S. (2022). Market efficiency in the age of big data. *Journal of financial economics*, 145(1), 154-177.
- Martin, I. W., & Nagel, S. (2022). Market efficiency in the age of big data. *Journal of financial economics*, 145(1), 154-177.
- Maurer, T., Levite, A., & Perkovich, G. (2017). *Toward a global norm against manipulating the integrity of financial data* (No. 2017-38). Economics Discussion Papers.
- Maxwell, J. A. (1996). *Applied social research methods series, Vol. 41. Qualitative research design: An interactive approach*. Sage Publications, Inc.
- Mazumder, s. (2017). *A study of efficient market hypothesis and its impact on valuation models in Indian stock market, with specific reference to post liberalization period* (doctoral dissertation, ICFAI university, Jharkhand).
- Mc Gowan, Jr., C. B. (2011). An Analysis of the Technical Efficiency of the Russian Stock Market. *International Business & Economics Research Journal (IBER)*, 10(10), 31-44. <https://doi.org/10.19030/iber.v10i10.5977>
- McManus, P. M. (2020). How Efficient is Market Pricing: Can Investors Beat the Market? Further, are Prices Always Right as Stated in the Efficient Market Hypothesis?

- McMillan, D. G., & Thupayagale, P. (2008). Efficiency of the South African equity market. *Applied Financial Economics Letters*, 4(5), 327-330.
- Memon, B. A., Yao, H., & Naveed, H. M. (2022). Examining the efficiency and herding behavior of commodity markets using multifractal detrended fluctuation analysis. Empirical evidence from energy, agriculture, and metal markets. *Resources Policy*, 77, 102715.
- Metoyer-Duran, C., & Hernon, P. (1994). Problem statements in research proposals and published research: A case study of researchers' viewpoints. *Library & Information Science Research*, 16, 105–118.
- Min, B. S., & Chizema, A. (2018). Board meeting attendance by outside directors. *Journal of Business Ethics*, 147, 901-917.
- Mishra, M. K., Ghose, S. M., Ravikumar, J. S., Pathak, A. K., & Kumar, H. (2023). Corporate Governance Practices and their Impact on Attracting Investment and Capital. *European Economic Letters (EEL)*, 13(4), 445-453.
- Mishra, P. K., & Mishra, S. K. (2023). Do banking and financial services sectors show herding behaviour in Indian stock market amid COVID-19 pandemic? Insights from quantile regression approach. *Millennial Asia*, 14(1), 54-84.
- Miss, S., Charifzadeh, M., & Herberger, T. A. (2020). Revisiting the monday effect: a replication study for the German stock market. *Management review quarterly*, 70(2), 257-273.

- Mitra, P. (2016) Day-Of-The-Week Effect on Stock Market Return and Volatility: Evidence from Indian Stock Market. *IOSR Journal of Economics and Finance*, 7, 99-107.
- Mitra, S.K. (2000). Profitable Trading Opportunity in Indian Stock Market: An Empirical Study with BSE-Sensex, *Applied Finance*, 6(3), 36-52.
- Mittal, S. K. (2022). Behavior biases and investment decision: theoretical and research framework. *Qualitative Research in Financial Markets*, 14(2), 213-228.
- Mobarek, A. & Angelo. (2014). The prospects of BRIC countries: Testing weak form market efficiency. *Research in International Business and Finance*, 30(C), 217-232.
- Moffatt, M. (1980, October 4). If peer review is acceptable for evaluating research, why shouldn't it also be used to evaluate teaching? *The Chronicle of Higher Education*, 36, B1–B2.
- Molina-Azorin, 2011. The use and added value of mixed methods in management research.
- Monem, R.M. (2013), “Determinants of board structure: evidence from Australia”, *Journal of Contemporary Accounting & Economics*, Vol. 9 No. 1, pp. 33-49.
- Mu, G. H., Zhou, W. X., Chen, W., & Kertész, J. (2010). Order flow dynamics around extreme price changes on an emerging stock market. *New Journal of Physics*, 12(7), 075037.

- Mwenye, R. (2020). Wavelet analysis of Stock Market trends: Investigating behavioural patterns in the Johannesburg and London Stock Markets.
- Mylonakis, J., Tserkezos, D. (2008), The January effect results in the Athens Stock Exchange (ASE). *Global Journal of Finance and Banking Issues*, 2(2), 44-55.
- Nageswari, P., Selvam, M. and Gayathri, J. (2011) Analysis of Monday Effect in Indian Stock Market. *Research Journal of Business Management*, 5, 170-177.
- Naseer, M., & Bin Tariq, D. Y. (2015). The efficient market hypothesis: A critical review of the literature. *The IUP journal of financial risk management*, 12(4), 48-63.
- Natalia Abrosimova, Gishan Dissanaiké & Dirk Linowski (2002). Testing WeakForm Efficiency of the Russia Stock Market, EFA 2002 Berlin Meetings Presented Paper, <http://dx.doi.org/10.2139/ssrn.302287>
- Neupane, S., Rhee, S. G., Vithanage, K., & Veeraraghavan, M. (2017). Trade-based manipulation: Beyond the prosecuted cases. *Journal of corporate finance*, 42, 115-130.
- Nguyen, H., Pham, A. V., Pham, M. D. M., & Pham, M. H. (2023). Business resilience: lessons from government responses to the global COVID-19 crisis. *International Business Review*, 32(5), 102166.
- Ningrum, M. L., & Risman, A. (2022). Semi-Strong Efficient Market Hypothesis In Dividend Announcements At Indonesia Stock Exchange (Idx). *The EURASEANs: journal on global socio-economic dynamics*, (2 (33)), 23-34.

- Norvaisiene, R., & Stankeviciene, J. (2022). The month effect in the Baltic and Nordic stock markets at market-level and sector-level. *Inžinerinė ekonomika*, 33(5), 473-485.
- NSEIX. (2021). NSE IFSC. <https://www.nseix.com/aboutus/nse>
- Nur'ainy, R., Nurcahyo, B., Sri Kurniasih, A., & Sugiharti, B. (2013). Implementation of good corporate governance and its impact on corporate performance: The mediation role of firm size (empirical study from Indonesia). *Global Business & Management Research*, 5.
- Nurdina, N., Sidharta, R. Y., & Mochklas, M. (2021). Inefficient markets, anomalies, and investor behavior: a literature review. *International Journal of Economics, Business and Accounting Research (IJEBAR)*, 5(2) of Finance, 32, pp. 663-682.
- Osborne, M F M (1959). "Brownian Motion in the Stock Market," *Operations Research*, 7, pp. 145-173.
- Ozkan, O. (2021). Impact of COVID-19 on stock market efficiency: Evidence from developed countries. *Research in international business and finance*, 58, 101445.
- Palmié, M., Wincent, J., Parida, V., & Caglar, U. (2020). The evolution of the financial technology ecosystem: An introduction and agenda for future research on disruptive innovations in ecosystems. *Technological forecasting and social change*, 151, 119779.
- Parizad, P. D., Singh, K., & Pai, R. (2022). An analytical study of equity derivatives traded on the NSE of India. *Cogent Business & Management*, 9(1).

- Parnes, D. (2020). Exploring economic anomalies in the S&P500 index. *The Quarterly Review of Economics and Finance*, 76, 292-309.
- Parthsarathy, S. (2016), “Test of weak form efficiency of the emerging Indian stock market using the non-parametric rank and sign variance ratio test”, *Global Journal of Finance and Management*, Vol. 8 No. 1, pp. 49-64.
- Patel, R. and Patel, M. (2011) An Econometric Analysis of Bombay Stock Exchange: Annual Returns Analysis, Day of the Week Effect and Volatility of Returns. *Research Journal of Finance and Accounting*, 2, 1-10.
- Pathak, S. (2022, February 10). *Market Efficiency*. WallStreetMojo. <https://www.wallstreetmojo.com/market-efficiency/>
- Patra, S., & Hiremath, G. S. (2022). An entropy approach to measure the dynamic stock market efficiency. *Journal of Quantitative Economics*, 20(2), 337-377.
- Pearson, Karl (1905). “The Problem of the Random Walk,” *Nature*, 72, p. 342.
- Peillex, J., El Ouadghiri, I., Gomes, M., & Jaballah, J. (2021). Extreme heat and stock market activity. *Ecological economics*, 179, 106810.
- Petajisto, A. (2023). Underperformance of Concentrated Stock Positions. *Available at SSRN 4541122*.
- Phan, T. N. T., Bertrand, P., Phan, H. H., & Vo, X. V. (2023). The role of investor behavior in emerging stock markets: Evidence from Vietnam. *The Quarterly Review of Economics and Finance*, 87, 367-376.

- Plastun, A., Kozmenko, S., Plastun, V., & Filatova, H. (2019). Market anomalies and data persistence: The case of the day-of-the-week effect. *Journal of International Studies*, 12(3).
- Polillo, S. (2018). Market efficiency as a revolution in data analysis. *Economic Anthropology*, 5(2), 198-209.
- Polit, D. F., & Beck, C. T. (2006). The content validity index: are you sure you know what's being reported? Critique and recommendations. *Research in nursing & health*, 29(5), 489-497.
- Polit, D. F., Beck, C. T., & Owen, S. V. (2007). Is the CVI an acceptable indicator of content validity? Appraisal and recommendations. *Research in nursing & health*, 30(4), 459-467.
- Poshakwale, S. (2002). The Random Walk Hypothesis in the Emerging Indian Stock Market. *Journal of Business finance and Account*, 29, 1275-1299.
- Potocki, T., & Swist, T. (2012). Empirical test of the strong form efficiency of the Warsaw stock exchange: the analysis of WIG 20 index shares. *South-Eastern Europe Journal of Economics*, 10(2).
- Prakash, S. (2024). Unveiling The Past: A Historical Exploration Of Insider Trading In India And Its Implications On Securities Markets And National Economies. *Indian Journal of Law and Legal Research*, 6(1), 726-735.

- Prasanna, P. K. (2013). Impact of corporate governance regulations on Indian stock market volatility and efficiency. *International Journal of Disclosure and Governance*, 10, 1-12.
- Priem, R. (2024). Enhanced Transparency on Single-Name Credit Default Swaps: A Comparison Between the US and the EU. *Available at SSRN 4822488*.
- Procasky, W. J. (2023). The relative efficiency of investment grade credit and equity markets. *International Journal of Financial Markets and Derivatives*, 9(1-2), 43-58.
- Putniņš, T. J. (2012). Market manipulation: A survey. *Journal of economic surveys*, 26(5), 952-967.
- Putniņš, T. J. (2020). An overview of market manipulation. *Corruption and Fraud in Financial Markets: Malpractice, Misconduct and Manipulation*, 13.
- Rahmani, A. M., Rezazadeh, B., Haghparast, M., Chang, W. C., & Ting, S. G. (2023). Applications of artificial intelligence in the economy, including applications in stock trading, market analysis, and risk management. *IEEE Access*.
- Raimundo Júnior, G. D. S., Palazzi, R. B., Tavares, R. D. S., & Klotzle, M. C. (2022). Market stress and herding: a new approach to the cryptocurrency market. *Journal of Behavioral Finance*, 23(1), 43-57.
- Raju, M. A. (2015). Efficient Capital Market Hypothesis. *International Journal of Exclusive Management Research*, 5(4), 1-21.



- Rakesh Gupta & Parikshit, K. B. (2007). Weak Form Efficiency in Indian Stock Markets, *Journal of International Business Studies*, 6(3), 57-64.
- Rashid Khan, H. U., Khidmat, W. B., Hares, O. A., Muhammad, N., & Saleem, K. (2020). Corporate governance quality, ownership structure, agency costs and firm performance. Evidence from an emerging economy. *Journal of Risk and Financial Management*, 13(7), 154.
- Raut, R. K. (2020). Past behaviour, financial literacy and investment decision-making process of individual investors. *International Journal of Emerging Markets*, 15(6), 1243-1263.
- Reddy, K., Qamar, M. A. J., Mirza, N., & Shi, F. (2021). Overreaction effect: evidence from an emerging market (Shanghai stock market). *International Journal of Managerial Finance*, 17(3), 416-437.
- Regin, R., Rajest, S. S., Shynu, T., & Steffi, R. (2024). Factors Influencing the Efficient Market Hypothesis: A Stock Exchange Case Study. *American Journal of Economics and Business Management*.
- Rewaria, S. (2021). An Analysis of Insider Trading in India. *International Journal of Research Publication and Reviews*, 2(7), 815-821.
- Richards, D. W., Rutterford, J., Kodwani, D., & Fenton-O'Creevy, M. (2017). Stock market investors' use of stop losses and the disposition effect. *The European Journal of Finance*, 23(2), 130-152.

- Riju, M. (2022). Insider Trading and Market Manipulation: A Menace or a Strategy. *Issue 1 Indian JL & Legal Rsch.*, 4, 1.
- Robert D. Gay (2016). Effect of Macroeconomic Variables on Stock Market Returns for four Emerging Economies: Brazil, Russia, India and China. *International Business & Economic Research Journal*, 15(3), 119-126.
- Roberts, Harry (1959). "Stock Market 'Patterns' and Financial Analysis: Methodological Suggestions," *Journal of Finance*, 44, pp. 1-10.
- Rocchi, M., & Thunder, D. (2019). Can a good person be a good trader? An ethical defense of financial trading. *Journal of Business Ethics*, 159(1), 89-103.
- Roll, R. (1994). What do market efficiency tests really tell us? *Journal of Portfolio Management*, 20(4), 9-17. <https://doi.org/10.3905/jpm.1994.409462>
- Rossi, M. (2015). The efficient market hypothesis and calendar anomalies: a literature review. *International Journal of Managerial and Financial Accounting*, 7(3-4), 285-296.
- Rossi, M., & Gunardi, A. (2018). Efficient market hypothesis and stock market anomalies: Empirical evidence in four European countries. *Journal of Applied Business Research*, 34(1).
- SABIR, D. S. A., Javed, T. A. S. A. W. A. R., Khan, S. A., & Javed, M. Z. (2021). Investment behaviour of individual investors of Pakistan stock market with moderating role of financial literacy. *The journal of contemporary issues in business and government*, 27(2), 1155-1165.

- Sachdeva, T. (2020). Analysing impact of S&P midcap and small cap returns on BSE Sensex returns. *International Journal of Technology Transfer and Commercialisation*, 17(2-3), 168-178.
- Sadat, A., Hiremath, G. S., & Kamaiah, B. (2012). Do stock returns in India follow a random walk?. *The IUP Journal of Applied*, 56.
- Sadhwani, R., & Bhayo, M. U. R. (2021). Momentum and disposition effect in the US stock market. *Cogent Economics & Finance*, 9(1), 1999004.
- Sadiq, R., & Khan, A. (2019). The influence of personality traits on investment decision-making: Evidence from emerging markets. *Emerging Markets Review*, 36, 1-16.  
<https://doi.org/10.1016/j.ememar.2018.07.002>
- Saha, R., & Kabra, K. C. (2019). Does corporate governance influence firm performance? Evidence from India. *Economics and Business Review*, 5(4), 70-89.
- Said Ali & Alan H. H. (2015). The Efficiency of the Russian Stock Market: A Revisit of the Random Walk Hypothesis, *Academy of Accounting and Financial Studies Journal*, 19(1), 48-56.
- Salkind, N. J. (2010). *Encyclopedia of research design* (Vols. 1-0). Thousand Oaks, CA: SAGE Publications, Inc. doi: 10.4135/9781412961288
- Samuelson, Paul (1965). "Proof That Properly Anticipated Prices Fluctuate Randomly," *Industrial Management Review*, 6, pp. 41-49.
- Santos, F. (2017). IPO market timing with uncertain aftermarket retail demand. *Journal of Corporate Finance*, 42, 247-266.

- Schmidt, R. (2023). Are Business Ethics Effective? A Market Failures Approach to Impact Investing. *Journal of Business Ethics*, 184(2), 505-524.
- Schwartz, R. A., Francioni, R., & Weber, P. (2020). Market Liquidity: An Elusive Variable. *The Journal of Portfolio Management*.
- SEBI | About SEBI. (2023). Wwww.sebi.gov.in. <https://www.sebi.gov.in/about-sebi.html>
- Seddighi, H. R. & Nian, W. (2004). The Chinese Stock Exchange Market: Operations and Efficiency. *Applied Financial Economics*, 14(11), 785-797
- Sehgal, S., & Bijoy, K. (2015). Stock price reactions to earnings announcements: Evidence from India. *Vision*, 19(1), 25-36.
- Shah, D., Isah, H., & Zulkernine, F. (2019). Stock market analysis: A review and taxonomy of prediction techniques. *International Journal of Financial Studies*, 7(2), 26.
- Sharma, G., Subramaniam, S., & Sehgal, S. (2021). Are prominent equity market anomalies in India fading away?. *Global Business Review*, 22(1), 255-270.
- Sharma, J. L. & Kennedy, R.E. (1977). A Comparative Analysis of Stock Price Behavior on the Bombay, London, and New York Stock Exchanges. *Journal Finance Quantitative Analysis*, 12, 391-413.
- Shekhar, C., & Rai, P. (2021). A Study of Market Efficiency-Indian Stock Market.
- Shiller, R. J. (2003). From efficient markets theory to behavioral finance. *Journal of economic perspectives*, 17(1), 83-104.
- Shiller, Robert (1981). "Do Stock Prices Move Too Much to be Justified by Subsequent

- Shternshis, A., Mazzarisi, P., & Marmi, S. (2022). Measuring market efficiency: The Shannon entropy of high-frequency financial time series. *Chaos, solitons & fractals*, 162, 112403.
- Siegel, J. J. (2021). *Stocks for the long run: The definitive guide to financial market returns & long-term investment strategies*. McGraw-Hill Education.
- Sikalidis, A., & Leventis, S. (2017). The impact of unrealized fair value adjustments on dividend policy. *European Accounting Review*, 26(2), 283-310.
- Singh, A., Solanki, N., Mathur, P., Repalli, V., & Shaik, J. M. P. (2023). Insider Trading and Its Implications for Corporate Governance and Market. *European Economic Letters (EEL)*, 13(3), 1707-1716.
- Singh, D., & Delios, A. (2017). Corporate governance, board networks and growth in domestic and international markets: Evidence from India. *Journal of World Business*, 52(5), 615-627.
- Singh, M. (2024, January 30). *Indian Stock Market: Exchanges and indexes*. Investopedia. <https://www.investopedia.com/articles/stocks/09/indian-stock-market.asp#:~:text=India%20has%20two%20primary%20stock,indexes%20are%20Sensex%20and%20Nifty>.
- Singh, S. (2021). Capital Market Frauds: Concepts and Cases. In *Handbook of Research on Theory and Practice of Financial Crimes* (pp. 332-354). IGI Global.

- Singh, S. K., & Singh, K. B. (2017). Market reaction around mergers and acquisitions announcements in India: a test of Efficient Market Hypothesis. *Gurukul Business Review-Gbr*, 13, 37-41.
- Singh, S., Sarva, M., & Gupta, N. (2024). Capital market manipulation and regulatory compliance—a bibliometric analysis of scholarly research in the post-2000 era. *Qualitative Research in Financial Markets*.
- Sitkin, S. B., & Weingart, L. R. (1995). Determinants of risky decision-making behavior: A test of the mediating role of risk perceptions and propensity. *Academy of Management Journal*, 38(6), 1573-1592. <https://doi.org/10.5465/256890>
- Sivaramakrishnan, S., Srivastava, M., & Rastogi, A. (2017). Attitudinal factors, financial literacy, and stock market participation. *International journal of bank marketing*, 35(5), 818-841.
- Smith, G., Jefferis, K. & Ryoo, H. J. (2002). African Stock Markets: Multiple Variance Ratio Tests of Random Walks. *Applied Financial Economics*, 12, 475-484.
- Söderström, R. (2011). *Regulating Market Manipulation: An Approach to designing Regulatory Principles*. Juridiska fakulteten, Uppsala universitet.
- Sofat, R., & Singh, S. (2017). Determinants of capital structure: an empirical study of manufacturing firms in India. *International Journal of Law and Management*, 59(6), 1029-1045.
- Somekh, B., & Lewin, C. (2005). *Research methods in the social sciences*. Thousand Oaks: Sage.

- Srinivasan, P. and Kalaivani, M. (2013) Day of the Week Effects in the Indian Stock Market. MPRA Paper No. 46805.
- Stambaugh, R. F., & Yuan, Y. (2017). Mispricing factors. *The review of financial studies*, 30(4), 1270-1315.
- Steffen, V. (2023). A literature review on extreme price movements with reversal. *Journal of Behavioral and Experimental Finance*, 100806.
- Stojkoski, V., Sandev, T., Kocarev, L., & Pal, A. (2021). Geometric Brownian motion under stochastic resetting: A stationary yet nonergodic process. *Physical Review E*, 104(1), 014121.
- Stosic, D., Stosic, D., Vodenska, I., Stanley, H. E., & Stosic, T. (2022). A New Look at Calendar Anomalies: Multifractality and Day-of-the-Week Effect. *Entropy*, 24(4), 562.
- Sumathi, D. (2018). Stock price volatility in national stock exchange of India. *International Journal of Research in Economics and Social Sciences (IJRESS)*, 8(12).
- Sun, B. (2021). An empirical analysis of regulation on open-market manipulation in China: An effect-based approach. *US-China L. Rev.*, 18, 109.
- Sung, M. C., Johnson, J. E., & McDonald, D. C. (2016). Informed trading, market efficiency and volatility. *Economics Letters*, 149, 56-59.
- Tarbert, H. P. (2020). Self-Regulation in the Derivatives Markets: Stability Through Collaboration. *Nw. J. Int'l L. & Bus.*, 41, 175.

- Thaler, R. H. (1987). Anomalies: the January effect. *Journal of economic perspectives*, 1(1), 197-201.
- Theckanathukaduppil, A. S. (2021). An Empirical Study on Impact of Stock Split Announcement in the Indian Stock Market. *Available at SSRN 3896945*.
- Țițan, A. G. (2015). The efficient market hypothesis: Review of specialized literature and empirical research. *Procedia Economics and Finance*, 32, 442-449.
- Tiwari, A. K., Jena, S. K., Aikins Abakah, E. J., & Yoon, S. M. (2023). Do the dynamics between government bond and equity markets validate the adaptive market hypothesis? Evidence from transfer entropy. *Applied Economics*, *Forthcoming*.
- Tiwari, Kumar, A., Kyophilavong & Phouphet. (2014). New evidence from the random walk hypothesis for BRICS stock indices: a wavelet unit root test approach. *Economic Modelling*, 43(c), 38-41.
- Trebbi, F., & Xiao, K. (2019). Regulation and market liquidity. *Management Science*, 65(5), 1949-1968.
- Trehan, B., & Sinha, A. (2019). Investigating Investors' Herd Behavior. *Amity Business Journal*, 8(1), 31-36.
- Trobia, A. (2008). Ombre e nebbia. La difficile vicenda della sociologia del cinema e il posto del fantastico. In *Sociologia del cinema fantastico. Il Signore degli Anelli in Italia: audience, media, mercato* (pp. 13-57). Kaplan.



- Trochim, W. M., & Donnelly, J. P. (2001). *Research methods knowledge base* (Vol. 2). Cincinnati, OH: Atomic dog publishing.
- Trochim, William. (2007). The Research Methods Knowledge Base.
- Tucker, L. R., & MacCallum, R. C. (1997). Exploratory factor analysis. *Unpublished manuscript, Ohio State University, Columbus*, 1-459.
- Urrutia, J. L. (1995). Tests of Random Walk and Market Efficiency for Latin American Emerging Equity Markets. *Journal of Financial Restructure*, 18(3), 299-309.
- Van Driel, H. (2018). Financial fraud, scandals, and regulation: A conceptual framework and literature review. *Business History*.
- Vasileiou, E. (2022). Behavioral finance and market efficiency in the time of the COVID-19 pandemic: does fear drive the market?. In *The Political Economy of Covid-19* (pp. 116-133). Routledge.
- Vasileiou, E. (2022). Behavioral finance and market efficiency in the time of the COVID-19 pandemic: does fear drive the market?. In *The Political Economy of Covid-19* (pp. 116-133). Routledge.
- Verrecchia, R. E., & Zhu, C. (2022). Liquidity, Trade, and Investor-Identity Disclosure. *Available at SSRN 4001932*.
- Vidal-García, Javier, and Marta Vidal. (2024) "Financial market anomalies." *Available at SSRN 4036943* (2024).

- Wang, J., & Wang, X. (2021). COVID-19 and financial market efficiency: Evidence from an entropy-based analysis. *Finance Research Letters*, 42, 101888.
- Wang, X., Hoang, C., & Wellman, M. P. (2020, October). Learning-based trading strategies in the face of market manipulation. In *Proceedings of the First ACM International Conference on AI in Finance* (pp. 1-8).
- Wang, B., & Zheng, S. (2023). Public information manipulation in the financial market. *Finance Research Letters*, 51, 103463.
- Wats, S. (2019). Calendar anomalies in the Indian stock market-An empirical study. *NMIMS Management Review*, 37(2), 56-76.
- Weant III, R. A. (2020). *The Decline in the P/E Ratio Effect* (Master's thesis, The University of North Carolina at Charlotte).
- Weixiang, S., Qamruzzaman, M., Rui, W., & Kler, R. (2022). An empirical assessment of financial literacy and behavioral biases on investment decision: Fresh evidence from small investor perception. *Frontiers in psychology*, 13, 977444.
- Wermers, R. (2020). Active investing and the efficiency of security markets. *The Journal of Investment Management*.
- Wong, W. K., Yin, W. K., Kwong, A. W., HON Tai Yuen, K., & McAleer, M. (2022). Market efficiency, behavioural finance, and anomalies.
- Woo, K. Y., Mai, C., McAleer, M., & Wong, W. K. (2020). Review on efficiency and anomalies in stock markets. *Economies*, 8(1), 20.

- Working, H. (1949). The theory of price of storage. *The American Economic Review*, 39(6), 1254-1262.
- Working, Holbrook (1934). "A Random Difference Series for Use in the Analysis of Time Series." *Journal of the American Statistical Association*, 29, pp. 11-24.
- Working, Holbrook (1960). "Note on the Correlation of First Differences of Averages in a Random Chain." *Econometrica*, 28, pp. 916-918.
- Xu, J. (2021). An Empirical Analysis of the Efficient Market Hypothesis in China's Stock Market. *Proceedings of Business and Economic Studies*, 4(3), 1-5.
- Yadav, S. (2017). Stock Market Volatility-A Study of Indian Stock market. *Global Journal for Research Analysis*, 6(4), 629-632.
- Ye, J., Li, D., & Cao, Y. (2020). Investor irrational selection bias in stock market based on cognitive psychology: Evidence from herding behaviour. *Revista Argentina de Clínica Psicológica*, 29(1), 90.
- Yildirim, H. (2017). Behavioral finance or efficient market hypothesis. *International Journal of Academic Value Studies*, 3(11), 151-158.
- Ying, Q., Yousaf, T., Ain, Q. U., Akhtar, Y., & Rasheed, M. S. (2019). Stock investment and excess returns: a critical review in the light of the efficient market hypothesis. *Journal of risk and financial management*, 12(2), 97.
- Yu, M. (2023). CEO duality and firm performance: A systematic review and research agenda. *European Management Review*, 20(2), 346-358.

- Yusoff, M. S. B. (2019). ABC of content validation and content validity index calculation. *Education in medicine journal*, 11(2), 49-54.
- Zahera, S. A., & Bansal, R. (2018). Do investors exhibit behavioral biases in investment decision making? A systematic review. *Qualitative Research in Financial Markets*, 10(2), 210-251.
- Zaremba, A., Long, H., & Karathanasopoulos, A. (2019). Short-term momentum (almost) everywhere. *Journal of International Financial Markets, Institutions and Money*, 63, 101140.
- Zhang, J., Lai, Y., & Lin, J. (2017). The day-of-the-week effects of stock markets in different countries. *Finance Research Letters*, 20, 47-62.
- Zhou, G. (2018). Measuring investor sentiment. *Annual Review of Financial Economics*, 10, 239-259.
- Ziemba, W. T. (2023). Pari-mutuel betting markets: racetracks and lotteries revisited. *Annual Review of Financial Economics*, 15, 641-662.

## **APPENDIX**

### **Critical Factors Affecting Market Efficiency in Indian Midcap and Small cap Indices**

#### **PART A**

1. Broker's Organization (Name of the Trading Member) –
2. Location of the Trading Member
3. Email Id Trading Member
4. SEBI Registration Number of Trading Member
5. Trading in Segment
  - (a) Equity
  - (b) Derivative
  - (c) Fixed Income
  - (d) Commodity
  - (e) Forex
  - (b) Crypto
  - (c) Swap
6. How many years of experience do you have in the capital markets industry?
  - (a) 5-10 years
  - (b) 10-20 years
  - (c) 20-30 years
  - (d) More than 30 years

## PART B

1. The section below has some statements regarding your perception about factors affecting capital market efficiency in Indian equity markets. Each statement has five alternatives. Please select the one alternative that best reflects your response to each statement, ensuring you have responded to all statements.

**(Rating Scale: 5 - strongly agree, 4 - agree, 3 - neither agree nor disagree, 2 - disagree and 1 -strongly disagree)**

Sr No.	Items	1	2	3	4	5
1.	Adequate disclosures by firms on business segment information can lead to efficient markets	1	2	3	4	5
2.	Absence of women directors on the board from non-promoter families can lead to price manipulation	1	2	3	4	5
3.	Distinctive and separated roles of the Chairperson and the CEO can reduce chances of manipulative behaviour	1	2	3	4	5
4.	Higher attendance in board meetings can curb insider trading	1	2	3	4	5
5.	Encouraging shareholder participation via video or tele-conferencing or via advance question submissions can foster investor trust	1	2	3	4	5

6.	The functioning of audit committee does not significantly impact firm level information dissemination	1	2	3	4	5
7.	Adequate disclosures on potential conflicts of interest among board members and key executives can lead to better investment decisions	1	2	3	4	5
8.	Consistency of dividend payment is relevant in making sound investment decisions	1	2	3	4	5
9.	Transparent and regular corporate communication with investors leads to rational investor behaviour	1	2	3	4	5
10.	Information asymmetries exist in capital markets where some participants have more information than others	1	2	3	4	5
11.	Information asymmetries can lead to market inefficiencies and unfair advantages for certain market participants	1	2	3	4	5
12.	The intricate, nonlinear, and non-stationary character of the stock market makes it challenging to identify instances of illicit insider trading..	1	2	3	4	5
13.	Market participants with superior information are more likely to make profitable investment decisions	1	2	3	4	5
14.	Access to timely and accurate information is crucial for maintaining a level playing field in capital markets	1	2	3	4	5

15.	Advances in technology have increased the availability and accessibility of information in capital markets, reducing information asymmetries.	1	2	3	4	5
16.	The use of algorithmic trading and high-frequency trading exacerbates information asymmetries in capital markets	1	2	3	4	5
17.	Traders can benefit by creating false sentiments in markets by placing bids to buy or offers to sell	1	2	3	4	5
18.	Social media plays a positive role in information dissemination in stock markets	1	2	3	4	5
19.	High frequency trades allow greater scope for market manipulation	1	2	3	4	5
20.	It is difficult to inflate the price of a security by spreading misleading information	1	2	3	4	5
21.	Traders can often create market illusion by placing counteractive buy and sell orders	1	2	3	4	5
22.	Adequate powers with Regulatory bodies is important to enforce strict compliance standards with respect to insider trading	1	2	3	4	5
23.	Quantum of penalties and sanctions significantly lower market manipulative activities	1	2	3	4	5
24.	It is important to enforce regulatory measures which reduce information asymmetries	1	2	3	4	5
25.	Regulatory powers can restrict misuse of social media to address manipulative behaviour in markets	1	2	3	4	5



26.	Regulators should use advanced regtech technology and AI driven tools to reduce market surveillance	1	2	3	4	5
27.	A preventive approach to market manipulation is better than imposing sanctions and penalties after occurrence of manipulative activity	1	2	3	4	5
28.	Herd mentality amongst investors is a major impediment to efficient investments	1	2	3	4	5
29.	Investors personal biases and perception about specific sectors and firms can lead to bad trades decisions	1	2	3	4	5
30.	Investors interpretation and financial analysis skills are important to make sound investments in capital market	1	2	3	4	5
31.	Influence of peers and family members may lead to suboptimal investments in stock markets	1	2	3	4	5
32.	Educational Qualification and Professional experience of investors are important factors affecting market related decisions	1	2	3	4	5
33.	The general investor sentiment in the market determines the level of market efficiency	1	2	3	4	5
34.	Investors perceived superiority of their own knowledge and overconfidence may lead to excessive bad trades	1	2	3	4	5
35.	Excessive reliance on fin influencers may be an impediment to rational investment decisions	1	2	3	4	5

36.	Investors sentiments towards accumulated savings often impact the nature and quantum of investments	1	2	3	4	5
37.	Investors attitude towards booking losses and profits can lead to irrational trade transactions	1	2	3	4	5
38.	Most of the investors are guided by emotions like greed and fear	1	2	3	4	5
39.	Trading volume affects stock market efficiency	1	2	3	4	5
40.	Trading volume during market open and close affects stock market efficiency	1	2	3	4	5
41.	Bid-Ask spread is an important indicator of market sentiment	1	2	3	4	5
42.	A good market depth indicates a more efficient market	1	2	3	4	5
43.	Price manipulation can affect stock marker efficiency	1	2	3	4	5
44.	Historic price movements are predictors of future market returns	1	2	3	4	5
45.	Volatility in stock prices influences future stock price movements	1	2	3	4	5
46.	Annual GDP growth rate can significantly drive stock price movements	1	2	3	4	5
47.	Banking liquidity and availability of funds is a key driver of market performance	1	2	3	4	5

48.	Industry specific policies and regulations of the government can greatly impact investment decisions	1	2	3	4	5
49.	Fiscal policy (government spending and taxation) of the Government is an important consideration in investment decisions	1	2	3	4	5
50.	Monetary Policy of Central Bank (RBI) can significantly drive stock price movements	1	2	3	4	5
51.	International geopolitical conditions (e.g., international conflicts, trade policies etc.) determines the level of market efficiency	1	2	3	4	5
52.	Overall stability of the financial system within the economy is a precondition to market efficiency	1	2	3	4	5
53.	Levels of Foreign Institutional Investment can significantly predict future market outcomes	1	2	3	4	5

2. With regards to “mid cap indices” indicate the level of agreement with regards to the following statements.

**(Rating Scale: 5 - strongly agree, 4 - agree, 3 - neither agree nor disagree, 2 - disagree and 1 -strongly disagree)**

Sr No.	Efficiency of Mid Cap indices					
1.	Mid cap indices are fairly valued	1	2	3	4	5

2.	Material information about all mid-cap companies is adequately disclosed	1	2	3	4	5
3.	Mid cap indices are not vulnerable to market manipulation and insider trading	1	2	3	4	5
4.	I have easy access to real-time market data for mid-cap investments.	1	2	3	4	5
5.	Mid cap indices offer opportunity for abnormal returns	1	2	3	4	5
6.	Volatility in mid cap indices is within acceptable limits for potential risk returns trade off.	1	2	3	4	5

3. With regards to “small cap indices” indicate the level of agreement with regards to the following statements.

**(Rating Scale: 5 - strongly agree, 4 - agree, 3 - neither agree nor disagree, 2 - disagree and 1 -strongly disagree)**

Sr No.	Efficiency of Small Cap indices					
1.	Small cap indices are fairly valued	1	2	3	4	5
2.	Material information about all small-cap companies is adequately disclosed	1	2	3	4	5
3.	Small cap indices are not vulnerable to market manipulation and insider trading	1	2	3	4	5

4.	I have easy access to real-time market data for small-cap investments.	1	2	3	4	5
5.	Small cap indices offer opportunity for abnormal returns	1	2	3	4	5
6.	Volatility in small cap indices is within acceptable limits for potential risk returns trade off.	1	2	3	4	5

4. Rate the level of efficiency of mid cap indices in Indian stock markets on between 1-5 where “1” represents the lowest level of efficiency and “5” represents the highest level of efficiency.

**Rating** \_\_\_\_\_

5. Rate the level of efficiency of small cap indices in Indian stock markets between 1-5 where “1” represents the lowest level of efficiency and “5” represents the highest level of efficiency.

**Rating** \_\_\_\_\_

\*\*\*\*\*

## **List of Publication**

### **Paper 1**

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**Paper Title:** Changing face of capital market manipulation through application of Fintech and AI based tools

**Conference Date:** 22nd Sept 2023

### **Conference 2**

**Conference Name:** 14SBD-2024, SRM University

**Theme:** Sustainable Business Development

**Paper Title:** Deepfake Technology and Insider Trading: A Fintech Threat

**Conference Date:** 29th and 30th April 2024