IMPACT OF CORPORATE GOVERNANCE AND CORPORATE SOCIAL RESPONSIBILITY ON FINANCIAL PERFORMANCE

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By

Vuppuluri Ramakrishna

Registration Number: 42000494

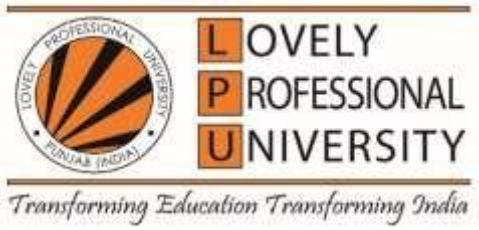
Supervised By

Dr. Abhishek Pandey (21930)

Associate Professor

Mittal School of Business

Lovely Professional University



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2025

DECLARATION

I, hereby declare that the presented work in the thesis entitled **"IMPACT OF CORPORATE GOVERNANCE AND CORPORATE SOCIAL RESPONSIBILITY ON FINANCIAL PERFORMANCE "** in fulfillment of the degree of **Doctor of Philosophy (Ph.D.)** is the outcome of research work carried out by me under the supervision of **Dr. Abhishek Pandey**, working as **Associate Professor**, Mittal School of Business, of Lovely Professional University, Punjab, India. In keeping with the general practice of reporting scientific observations, due acknowledgments have been made whenever the work described here has been based on the findings of another 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)
Vuppuluri Ramakrishna
Reg. No. 42000494
Mittal School of Business,
Lovely Professional University,
Punjab, India.

CERTIFICATE

This is to certify that the work reported in the Ph.D. thesis entitled **"IMPACT OF CORPORATE GOVERNANCE AND CORPORATE SOCIAL RESPONSIBILITY ON FINANCIAL PERFORMANCE"** submitted in fulfillment of the requirement for the award of the degree of **Doctor of Philosophy (Ph.D.)** in the Department of Commerce, is a research work carried out by **Vuppuluri Ramakrishna, (Registration No. 42000494)**, is a bonafide record of his original work carried out under my supervision and that no part of the thesis has been submitted for any other degree, diploma or equivalent course.

(Signature of Supervisor)

Dr. Abhishek Pandey

Associate Professor

Mittal School of Business

Lovely Professional University, Phagwara, 144 411, Punjab.

Abstract

The relationship between Corporate Governance (CG), Corporate Social Responsibility (CSR), and Financial Performance (FP) has been widely debated in academic and professional circles, with varying findings influenced by macroeconomic and industry-specific factors. This research examines the influence of CG and CSR on FP in the Indian context, particularly after the regulatory reforms introduced by the Companies Act 2013. Employing a dual-method approach—qualitative content analysis to construct CG and CSR indices (CGI and CSRI) and advanced statistical and predictive modeling techniques—the research provides a nuanced understanding of these relationships. Machine learning (ML) tools, including decision trees and random forests, were utilized to uncover complex, nonlinear associations that traditional methods might overlook.

The study reveals a mild relationship between CG and FP. CG exhibited a stronger positive influence on "market-based performance metrics (e.g., Tobin's Q)", suggesting that robust governance enhances investor confidence and market valuations. However, its effect on accounting-based metrics (e.g., ROA, ROCE) was less pronounced, indicating that governance improvements may not immediately translate into operational efficiency. Ownership structure emerged as a key contributor to better financial outcomes, reinforcing the long-term value of strong governance frameworks in strategic decision- making and risk mitigation.

CSR demonstrated a positive association with accounting-based performance, aligning with stakeholder theory. CSR initiatives were found to enhance operational efficiency and profitability, particularly in industries with high social and environmental stakes. However, their impact on market-based metrics was weaker, suggesting that investors may not yet fully recognize CSR's financial benefits. The variability in CSR scores during the COVID-19 pandemic further states the sensitivity of CSR commitments to external economic and regulatory pressures.

A key contribution of this study is its exploration of the mediating role of CSR in the CG-FP relationship. The analysis revealed a partial positive mediation effect for accounting-based performance, where CSR activities amplified governance's financial benefits. However, CSR exhibited negative partial mediation for market-based performance, implying that CSR-related costs or strategic trade-offs may dilute governance's positive market impact. These findings underscore the need for firms to align CG and CSR strategies with financial objectives, adopting a context-specific approach rather than a uniform model.

The research has significant theoretical and practical implications. Theoretically, it bridges agency and stakeholder theories, demonstrating their complementary rather than conflicting roles in enhancing FP. Practically, it offers actionable insights for business leaders, investors, and policymakers. For managers, the study emphasizes integrating CSR within governance frameworks as a strategic lever for sustainable growth, rather than treating it as a regulatory burden. Investors can leverage these insights to refine investment strategies, while policymakers may use them to design regulations that incentivize responsible corporate behavior.

Despite its contributions, the study has limitations, including reliance on annual reports for CG/CSR measurement, exclusion of financial firms and small enterprises, and

the absence of non-linear regression or advanced ML techniques like LSTM for temporal analysis. Future research could expand on these findings by incorporating cross-country comparisons, and sector-specific analyses.

Ultimately, this study reinforces that strong governance and genuine CSR commitment are not just ethical imperatives but also drivers of sustainable financial success. By aligning CG and CSR with business strategy, firms can achieve both operational efficiency and long-term market resilience, benefiting shareholders and society alike.

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I bow in reverence to Goddess Saraswati, the divine source of knowledge and wisdom, for bestowing upon me the ability to learn, think, and persevere through this academic endeavor. First and foremost I extend my heartfelt gratitude to the founders of Lovely Professional University, including the scholars and administrators, of this emerging center of excellence in intellectual development for providing me with the opportunity to fulfill my long-held aspiration at the age of 65. I am indebted to our Chairman and Man- aging Director Mr. P Jairaj Kumar for encouraging me and permitting me to pursue my ambition while I was still working for Ocean Sparkle Limited as CFO. I am also deeply thankful to the Mittal School of Business for fostering a culture of intellectual curiosity and academic excellence, which has greatly enriched my learning experience. My deep- est appreciation goes to my supervisor, Dr. Abhishek Pandey, whose invaluable guidance, insightful feedback, and constant encouragement have played a pivotal role in shaping this research. I also extend my sincere thanks to my ETP panel members, whose discussions and suggestions have provided me with new perspectives and deeper insights into my research. I acknowledge the great support extended by my niece and Dr. B A Bhavani in collection of data and guidance in the analysis of data. I am immensely grateful to my family for their unwavering support, patience, and belief in me throughout this journey. In particular I express my heartfelt thanks to my wife, Uma, whose strength and encouragement have been a constant source of motivation in this academic pursuit. I sincerely extend my profound appreciation to all individuals, whether mentioned or not, for their substantial understanding, cooperation, and enduring moral support in achieving this otherwise challenging endeavor.

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ABBREVIATIONS

AI	Artificial Intelligence
BFSI	Banking, Financial Services and Insurance
BIFR	Board for Industrial and Financial Reconstruction
BRSR	Business Responsibility and Sustainability Reporting
BSE	Bombay Stock Exchange
CMIE	Centre for Monitoring Indian Economy
CDP	Carbon Disclosure Project
CFP	Corporate Financial Performance
CG	Corporate Governance
CGI	Corporate Governance Index
CR	Current Ratio
CSR	and Corporate Social Responsibility
CSRI	Corporate Social Responsibility Index
DFI	Development Finance Institutions
DE	Debt Equity Ratio
EFA	Exploratory Factor Analysis
EPS	Employee Pension Scheme
ES	Earnings Per Share
ESG	Environmental, Social, and Governance
EVA	Economic Value Added
FP	Financial Performance
GICS	Global Industry Classification Standard
GRI	Global Reporting Initiative
LODR	Listing Obligations and Disclosure Requirements
MAE	Mean Absolute Error
MAD	Median Average Deviation

MC	Market Capitalisation
MCA	Ministry Of Corporate Affairs
ML	Machine Learning
MSCI	Morgan Stanley Capital International
MSE	Mean Square Error
NCF	Net Cash Flow
NSE	National Stock Exchange
OECD	Organization for Economic Cooperation and Development
PAT	Profit After Tax
PE ratio	Price to Earnings Ratio
QR	Quick Ratio
RBV	Resource-Based View
RDE	RD Expenses
ROA	Return on assets
ROCE	Return on capital employed
ROIC	Return on Invested Capital
RONW	Return on Net Worth
RMSE	Root Mean Squared Error
SASB	Sustainability Accounting Standards Board
SEM	Structural Equation Model
SEBI	Securities and Exchange Board of India
SHAP	SHapley Additive Explanations
SRI	Socially Responsible Investment
TSR	Total Stock Returns
XAI	eXplainable Artificial Intelligence
XGBoost	eXtreme Gradient Boosting

Chapter 1

Introduction

1.1 Background

As the global business atmosphere changes, companies that balance the financial performance (FP) with excellent CG(corporate governance) and CSR(corporate social responsibility) or socially responsible exercises are expected to increase. These three aspects are connected and together affect its contribution to corporate stability and long-term success (Prakash, 2022; Al-Homaidi et al., 2021). The CSR may indicate the moral and social responsibility of a firm, while CG holds the managers and other administrative accountable and transparent (Arora, 2024; Thaker et al., 2022). The well-developed systems of governance can increase the implementation of CSR by aligning the interests of stakeholders with corporate strategies, increasing the level of trust and validity (Jumde & Du Plessis, 2022; Sharma & Satish, 2022). CSR initiatives that are responsible affect the brand image and positively affect risk reduction and affect better financial results (Anas et al., 2023; Kumar et al., 2022). Examples of Indian companies, namely Tata Group and Infosys, suggest that the combination of governance and CSR approaches can lead to repute and financial benefits (Sarkar et al., 2021). This literature provides a conceptual base, CG, CSR, and FP co-dependence in the Indian context (Jarboui et al., 2022).

1.2 Overview of Corporate Governance

Corporate governance has been defined by different scholars and agencies differently. The Cadbury Report and OECD Principles focus on the structural and contextual underpinnings of

governance. SEBI, on the other hand, focuses on the ethical and management duties of company executives. CII, on the other hand, takes a broader view of stakeholders. These concepts all point to the same thing: good corporate governance requires a mix of systems, values, following the rules, and being accountable to both shareholders and society.

Compliance with effective CG structures has a powerful direct effect on corporate financial prosperity. CG is a major component of corporate management that has a great impact on the behaviour of organisations in both developing and developed economies, organisations' value and long-term strategic development (Abhilash et al., 2023; Biswas et al., 2022). According to Yurtoglu & Claessens (2013), CG is a system that includes principles, processes and controls that regulate decision making and behavior by managers. Objective of these governance structures is to assure that there is harmony between major stakeholders, i.e., shareholders, officers, employees and general public, which eventually leads to a better operating performance and strategic resource access (Saha and Kabra, 2022).

The theoretical basis of CG is largely anchored on the agency principle that is related to the difference in interests among principals (shareholders) and agents (managers). Jensen & Meckling (1976) claim that in the absence of proper governance systems, managers operate in accordance with their own interests contrary to the optimal interests of shareholders. Cost of the agency is minimized through governance structures that increase transparency, accountability and moral behavior. These features play an important role in the building trust, which improves the organization's image and smoothens the capital flow between investors and financial organizations (Thomas et al., 2023; Prakash, 2022).

CG's practicality in commercial prosperity is also supported by real-life conditions. Examples of Indian groups such as Infosys or Tata Group have demonstrated that properly developed CG practices (eg, independent directors, transparency), and interactions with stakeholders can help them to achieve investors’ trust and international investment (Arora, 2024; Kumar et al., 2022). Empirical research is also in support of this. In one example, Siagian et al. (2013) said that good governance system is always ranked greater in matters related to profitability and efficiency.

Similarly, Subramanyam & Dasaraju (2014) also observe that comprehensive reporting of CG may be relevant in stabilising financial environment through reduction of information asymmetry and commitment to long-term investment relationships (Al-Homaidi et al., 2021).

Further financial performance, effective CG strengthens flexibility and regulatory compliance. Firms with strong governance mechanisms are often better equipped to navigate uncertainties and regulatory challenges. For example, emphasizing the diverse board structure and compliance by Larsen and Toubro has helped the company to maintain operating continuity between policy reforms and economic disruption (Thaker et al., 2022). Similarly, research by Gompers et al. (2003) and Bhagat & Bolton (2008) shows that companies with well-developed governance structures experience better returns and coherent performances in volatile conditions (Anas et al., 2023).

In addition, CG is vital in instilling sustainability into corporate strategy. With the growing demands of global stakeholders on environmentally and socially responsible behaviour, companies are likely to implement ESG(Environmental, Social and Governance) standards. A good CG will make sure that these expectations are achieved without undermining the financial ambitions. As an example, the sustainability programs of Governance by Hindustan Unilever have been able to not only enhance the environmental performance indicators but also enhance brand loyalty and the market domination (Arora, 2024; Kumar et al., 2022).

CG have crucial function in providing longevity, and moral trade practices. CG helps build both profitable and socially responsible institutions by aligning the efforts of the management with the expectations of various stakeholders as well as fostering transparency and supporting ethical behavior. Research confirms that the greater the focus of governance in an organization, the higher the chances of it remaining stable in its financial performance, becoming operationally efficient, and remaining credible to the general population (Thomas et al., 2023; Biswas et al., 2022; Prakash, 2022). In a business environment marked by increasing scrutiny and complexity, the strategic role of CG continues to grow in both scope and significance.

1.2.1 Historical Evolution of Corporate Governance in India

Pre-Liberalization Era (Post-Independence to 1991)

After 1947 independence, India's industrial landscape was characterized by a modest factory sector contributing about 10 percent to the national income, a functioning network of four regional stock exchanges, and an established though state-controlled banking system (Biswas et al., 2022). The legislative foundation for corporate regulation was laid following the implementation of the Companies Act of 1956, which aimed to institutionalise corporate governance (CG) by regulating joint-stock companies and safeguarding investor interests (Saha and Kabra, 2022). While this framework was progressive in its structure, the prevailing economic ideology was centered on socialism and state ownership, which introduced inefficiencies, limited competition, and encouraged bureaucratic favoritism in corporate decision-making.

DFIs(Development Finance Institutions), including entities like the "Industrial Finance Corporation of India" and the "Industrial Development Bank of India," were tasked with providing long-term financing under a German-inspired bank-centric financial model (Prakash, 2022). However, the effectiveness of governance oversight was compromised, as the government-nominated directors appointed to corporate boards failed to exercise stringent supervision. Business promoters often retained majority control despite holding limited financial stakes, a practice that diluted board accountability and eroded investor confidence (Al-Homaidi et al., 2021).

Weak enforcement of regulatory norms posed another major concern. Although India had developed financial disclosure standards that were considered superior to those of many other Asian economies of the time, compliance mechanisms were largely ineffective. Companies incurred minimal penalties for failing to meet statutory obligations, and minority shareholders faced systemic barriers to transferring shares and exercising their rights. The boards of directors had limited autonomy and were frequently subservient to management, undermining the checks and balances necessary for robust CG (Thomas et al., 2023).

1.2 Overview of Corporate Governance

In 1985, the Sick Industrial Companies Act brought in the Board for Industrial and Financial Reconstruction (BIFR) owing to persistent corporate failures and defaults. It was an effort to cushion the creditors and reorganise the firms that were in a bad financial state, but failed to be proactive enough to deal with the causes of the failure of governance (Anas et al., 2023). Political intervention in association with the absence of accountability in the boardroom brought about a corporate culture where transparency was limited and long-term stability was not a priority.

Post-Liberalisation Era (1991 Onwards)

The economic reforms that began in 1991 saw a paradigm change in the outlook of India's economic policy and led to liberalization, privatization and globalization. These changes in the structure required that CG practices be significantly changed to align with international investors and institutions (Thaker et al., 2022). Another milestone in the development of CG in India was the establishment of SEBI (Securities and Exchange Board of India) in 1992. SEBI was made responsible for regulating the securities market and enhancing transparency, accountability and investor protection (Saha and Kabra, 2022).

A catalyst to reform CG was the 1992 Harshad Mehta stock market scandal that unveiled major loopholes in the financial control and brokerage activity. The fraud led to establishment of series of regulations and effective disclosure control, that defined Indian modern CG architecture (Prakash, 2022). The answer provided by SEBI includes the beginning of better disclosure standards, restructuring corporate boards, and the onset of a more rigorous audit environment to eliminate the recurrence of such financial abnormalities (Biswas et al., 2022).

Post liberalization CG reforms were formulated in different stages from voluntary rules to compulsory regulations. The changes have not only brought Indian corporate practices to the global standards, but they have also encouraged foreign direct investment and have made Indian firms more reliable in international markets. To give an example, Infosys, in its own initiative, implemented stringent governance standards in advance and became a role model for corporate

responsibility in the international field (Thomas et al., 2023).

Transition to a market-oriented economy emphasized management's moral behavior, shareholder trust and stakeholder involvement. The emergence of private businesses, public listing and cross-border growth forced companies to make CG institutionalised as a strategic requirement and not a compliance measure (Anas et al., 2023; Al-Homaidi et al., 2021). Therefore, the period after 1991 not only opened the economy but also prepared the groundwork for a governance regime to promote transparency, efficiency in the market, and sustainable growth.

First Phase (1996-2008)

The first CG code in India was the "CII (Confederation of Indian Industry)" Code of Desirable Corporate Governance, that had been launched in 1998 and aimed at ensuring the protection of investors and enhancing transparency. In 1999, the Kumar Mangalam Birla Committee suggested that best governance practices and protection against insider trading should be included in Clause 49. In 2000, the Department of Corporate Affairs (DCA) suggested some changes in the Companies Act, 1956, to meet the modern standards of governance. In 2003, the Narayan Murthy Committee emphasized risk management, boards' accountability and high disclosure standards. Between 2004 and 2005, J.J. Iranian committee suggested that the Companies Act should be simplified to be flexible and provide more shareholder protection. In 2004, additional amendments to Clause 49 were also introduced.

Second Phase (2009-2013)

The 2009 Satyam scam exposed gross CG failures, leading to the implementation of large-scale reforms in India's governance system. In turn, CII, the NASSCOM(National Association of Software and Service Companies) and SEBI also started working on ways to increase corporate accountability. These included the establishment of more rigorous disclosure standards, more accountability of chief financial officers and the establishment of a whistleblower policy to

promote moral behavior. In addition, the Ministry of Corporate Affairs presented voluntary guidelines of the CG in 2009, which focused more on board autonomy, increasing the audit committee supervision, and the directors' performance evaluation to increase transparency and accountability in the operation of the board.

Third Phase (2013-Present)

The new 2013 Companies Act has strengthened governance requirements such as board structure, audit committees and disclosure requirements. The "Listing Obligations and Disclosure Requirements (LODR) Regulations of 2015," as well as the 2023 amendments by the SEBI, further enhanced the transparency and board's responsibilities. In 2017, the Kotak Committee Report made recommendations for enhancing the functioning of independent directors, the effectiveness of the boards and the disclosure standards. Such big companies as the Tata Group, Birla Group, and Infosys have established a high standard of ethical governance. Nevertheless, scandals like ICICI Bank, Kingfisher Airlines, Punjab National Bank, IL and FS, and the Adani Group provoked major changes in the regulation in order to seal the loopholes of governance.

1.2.2 Technological Advancements and Corporate Governance

This digital age is completely disrupting the business community in India through blockchain, artificial intelligence and smart contracts. Anas et al. (2023) claim that these technologies are modifying the board's strategy, increasing transparency, increasing compliance, and increasing risk assessment. Firms such as Infosys and TCS are using AI to analyze performance, and banks such as ICICI are embracing blockchain for payment systems (Biswas et al., 2022). With the increasing trend in digital disruption, cybersecurity and data privacy have become the main subjects of governance, especially in such industries as finance and telecommunications (Arora, 2024). In addition, the issues of ESG have gained prominence, and stakeholders are demanding sustainability and moral business management (Jarboui et al., 2022). Law on CSR in India is

progressive; however, there are flaws in its implementation (Jumde & Du Plessis, 2022). Innovation based on ESG is on the increase, especially in the energy sector, where companies switch to green technology (Dahiya et al., 2023; Gangopadhyay & Homroy, 2023; Bansal et al., 2021).

1.2.3 Agency Theory and the Role of AI in Corporate Governance

Agency theory by Jensen and Meckling explains how separation among control and ownership results in challenges like adverse selection and moral hazard. In India, traditional governance tools such as board monitoring and incentive-based pay are widely used but face issues of bias and weak enforcement (Saha & Kabra, 2022). Emerging technologies, especially AI, offer better accuracy and transparency. For example, Indian banks use AI to flag unusual transactions, enhancing fraud detection and oversight (Thaker et al., 2022). AI also supports real-time performance evaluation and risk prediction in large corporations such as Reliance and Wipro (Thomas et al., 2023). These tools improve governance efficiency by limiting subjective judgment and enhancing data reliability. As CSR grows in scope, AI further helps link social initiatives to measurable outcomes (Sharma & Sathish, 2022; Sarkar et al., 2021; Shirodkar & Shete, 2021).

1.2.4 Digital Transformation in Corporate Governance

The rapid pace of technological advancements has brought CG into sharp focus, with stakeholders progressing at varying speeds and limited consensus on how digital transformation will reshape business models and governance frameworks (Sharma & Sathish, 2022). Technologies such as blockchain, artificial intelligence, robotics, and advanced sensors are transforming how information is produced, consumed, and communicated, generating powerful synergies (Saha & Kabra, 2022). While some believe traditional regulatory structures can absorb these changes, others argue for a re-evaluation of governance systems (Al-Homaidi et al., 2021). Blockchain, originally developed for cryptocurrencies, now extends into banking and financial sectors, with

potential to address principal-agent conflicts in governance (Abhilash et al., 2023; Kumar et al., 2022). The combination of Big Data, analytics, and human-machine interfaces is re-establishing organizational boundaries and defying traditional governance models (Thomas et al., 2023; Acharyya & Agarwala, 2022; Oware & Mallikarjunappa, 2022; Prakash, 2022; Thaker et al., 2022; Sarkar et al., 2021; Shirodkar & Shete, 2021).

1.3 Overview of Corporate Social Responsibility

Despite the absence of a universally accepted definition of Corporate Social Responsibility (CSR), current interpretations focus on the impact of businesses on society and the expectations society has of them. Dahlsrud (2008) identified 37 different definitions of CSR, highlighting ongoing debates regarding its clear definition. Previous literature has provided various interpretations, but no single consensus has emerged (Rahim and Alam 2014, Amaeshi et al., 2016). Notably, CSR is not explicitly defined under the Companies Act, 2013. Sheehy (2015) states that the definition of CSR varies based on perspective, while Okoye (2009) argues that no single definition can encompass all aspects of CSR.

The classical theory of economics, that the maximisation of shareholder value is the primary goal of a company, was famously explained by Milton Friedman (1970). This school of thought suggests that profit-making is still the main reason why most businesses, especially in the private sector, operate. Nonetheless, corporate strategy today is realising the fact that monetary success does not imply the disregard of other stakeholders or those of society at large. In the modern globalised world, companies are conducting business in a multifaceted setting that is determined by environmental degradation, socio-political turmoil, cultural dynamics, and varying economic conditions (Jumde & Du Plessis, 2022; Sharma & Sathish, 2022). These forces are global and affect the current business practices as well as determine future strategies, as a result of which the relevance of alignment between the business operations and the societal expectations and sustainable development goals is significant.

Modern organisational performance is no longer considered on financial indicators only.

1.3 Overview of Corporate Social Responsibility

Companies have to be evaluated regarding their environmental and social results along with profitability (Seto-Pamies, 2015). This change is part of a larger social agreement that businesses are part of the communities in which they take their resources and legitimacy. Therefore, rising pressure is on businesses to become responsible corporate citizens. Sustainability practices, which involve ethical labour practices, transparent governance, and non-discriminatory development models, have been enshrined in many organisations, including Infosys and Mahindra Group (Sarkar et al., 2021; Shirodkar & Shete, 2021). CSR in this regard includes activities which encourage good moral practices, environmental safety, social justice and inclusive economic growth.

Environmental stewardship is one of the pillars of CSR. Businesses are being more and more inclined towards adopting practices that can decrease their ecological footprint. As an illustration, Tata Power has taken a huge step in its renewable energy portfolio, and ITC has deployed water-positive and carbon-positive business (Dahiya et al., 2023). This is driven by regulatory requirements and increased sensitivity among greener consumers. Some of the aspects of environmental responsibility in CSR involve the utilization of renewable energy sources, recycling and waste management systems, and development of sustainable supply chains.

Another important aspect of CSR is social responsibility. It is about upholding fair practices at the workplace, diversity and engaging in philanthropic work. Most companies are now investing in the professional development of their workers, they have inclusive work environments, and they give back to society in terms of specific community programmes. An example of how corporations can be agents of social change is the investments that Wipro has undertaken in education and health projects (Gangopadhyay & Homroy, 2023). These programmes increase morale, corporate image, and trust among employees and stakeholders.

The third component of CSR is ethical governance. This encompasses open decision-making, compliance with laws, and following fair trade practices. The more companies maintain ethical standards, the more they may expect to gain consumer trust and build a sustainable relationship with stakeholders. Indian companies like Infosys and TCS have preserved their reputations by

means of strict CG systems and anti-corruption principles (Acharyya & Agarwala, 2022; Jarboui et al., 2022). To counter rising demands, most companies have incorporated CSR disclosures in annual reports, especially in industrialised economies. Such disclosures report on the ESG activities of firms, improving the level of investor trust and customer retention (Oware & Mallikarjunappa, 2022).

There is an emerging popularity of ESG issues in terms of corporate performance measurement. These dimensions are currently viewed as crucial factors of enduring value generation in addition to the financial returns (Jitmaneeroj, 2016; Muñoz-Torres, 2015; Ferrero-Ferrero et al., 2015). CSR, as typically defined by the "Triple Bottom Line approach," requires businesses for evaluating their actions' influence on the environment, society and their economic well-being. Aupperle et al. (1985) were able to prove that the financial outcome of different levels of CSR investments is different. In addition, CSR has been indicated to support the long-term sustainability and financial health (Babola, 2012; Preston & Bannon, 1997). Bhunia (2012) further claimed that CSR is a mechanism that is strategic in increasing corporate profitability when it aligns organisational goals with societal values.

Given such developments, companies in developed and emerging markets are currently appreciating the need to have transparent ESG disclosures. These reports provide information about what the firm is doing to develop employees, support the community and conduct ethical business (Bansal et al., 2021). Open reporting on CSR activities not only enhances corporate responsibility but also fosters investor confidence and consumer loyalty, thus adding to corporate sustainability in the long term.

1.3.1 Corporate Social Responsibility in Indian Framework

CSR in India is not a new concept but a long-standing tradition rooted in the country's socio-economic and cultural fabric. Historically, CSR has influenced how businesses interact with the government, communities, and one another (Balasubramanian, 2005). The philosophy of

businesses contributing to societal welfare originates from centuries and has been shaped by moral and cultural ideologies, particularly the Gandhian principle of trusteeship and the ethical framework of dharma.

A prime example of early adoption of socially responsible business practices is Tata Steel, India's oldest and most esteemed steel enterprise. Its visionary founder, Jamsetji Tata, is widely recognized as a nation-builder who prioritized societal advancement over commercial gain (Singh, 2008). Long before CSR gained prominence in academic and managerial discourse, Tata Steel was actively involved in promoting education, healthcare, and employee well-being. The company constructed schools, hospitals, and residential facilities for its workers. This commitment to social development was so profound that Tata Steel earned the reputation of being "the firm that also produced steel," highlighting its identity as a socially driven institution more than a profit-centred enterprise (Singh, 2008).

Since the Industrial Revolution, the development of CSR has been accompanied by constant discussions regarding the scope and definition of CSR. CSR has been interpreted differently by different stakeholders such as businesses, governments and civil society. According to the scholars, there are four major models of CSR that still guide corporate conduct in India today (Balasubramanian, 2005; Kumar, 2001).

The first is the Ethical Model, based on the Gandhian conception of business as a trustee of social wealth. This model suggests that corporations should guarantee the fairness of resource allocation and make contributions that would benefit society. Tata Group is a good example of this model by investing in rural education, livelihood improvement, and community health through the Tata Trusts.

The second one is the Statist Model that focuses on the state-enhanced implementation of social responsibilities. Within this context, CSR is viewed as a requirement that is enforced by regulating practices. This model is reflected in introducing necessary CSR expenditure as the idea that "the Companies Act, 2013," underlines, where the government requires businesses to

spend their resources on the development of society (Sharma & Sathish, 2022).

The third is Liberal Model which is based on classical economics. It concludes that the main goal of a firm has been to maximize shareholder wealth and that CSR is an optional and minor undertaking. Many of the multinational corporations working in India, particularly those that have headquarters in liberal economies, tend to streamline their activities in India under this model by making CSR discretionary and market-based.

The fourth and the most modern model is the Stakeholder Model, and it acknowledges the inter-relationship of businesses to different stakeholder groups such as employees, customers, suppliers and the local communities. This practice makes CSR a part of the organisational strategy. Infosys, in particular, has implemented such a model by integrating sustainability and community development into its fundamental corporate policies, which means that all stakeholders will enjoy the prosperity of the company (Jarboui et al., 2022; Jumde & Du Plessis, 2022).

One of the changes that happened in the world of CSR in India was the introduction of the Companies Act in 2013. This law had a compulsory section according to which eligible companies should dedicate ≥ 2% of their average three-year net profit for CSR activities. The policy has increased corporate activity in areas such as education, environmental stability, rural development, healthcare and women empowerment (Sarkar et al., 2021).

Since then, the CSR has been given institutional forms in organized structures. An example of this is Reliance Industries, with Reliance Foundation, involved in rural changes, disaster response and health outreach. On the same note, Mahindra and Mahindra have come up with programs that specialize in vocational training and environmental leadership. These initiatives are part of a big innings in corporates, as CSR has become a strategically harmonious responsibility rather than a charitable activity (Shirodkar & Shete, 2021).

CSR in today's India is no longer a peripheral or alternative work. It is now a part and parcel of CG and corporate strategy, which encourages inclusive growth and sustainable development. As the commercial objectives of Indian corporations become more responsible for social needs, CSR

promises to create more fair and equal society in the coming years.

Table 1.1: Corporate Responsibility Models (Kumar *et al.*., 2001)

Model	**Focus**	**Champions**
Stakeholder	Companies address the requirements of stakeholders– communities, customers, employees, and so on.	R. Edward Freeman
Statist	'State ownership and legal requirements determine ' 'corporate responsibilities	Jawaharlal Nehru
Liberal	'Corporate responsibilities are limited to private owners ' '(shareholders)'	Milton Friedman
Ethical	'Voluntary commitment by companies to public welfare '	M. K. Gandhi

Table 1.1 shows four distinct models of corporate responsibility, each with a unique focus and associated champions.

1.4 The Interplay Between CG, CSR and Firm Performance

CG and FP have a relationship that has been widely researched, and many studies have highlighted its extreme importance. Makhdoom and Malik (2016) found that sound governance practices and high financial performance were strongly correlated, and firms exhibiting sound governance strategies have higher chances of attaining sustainable profitability. Bhatt and Bhatt (2017) affirmed that good CG frameworks are central to the value of the firm. Collectively consistent with these results, Abdallah and Ismail (2017) claimed that the existence of thorough governance mechanisms is directly related to better performance in the organization. All these findings indicate that clear, transparent governance practices are essential to achieve financial success in a long term.

The CSR has become an integral component of the CG system in the modern business environment. CSR initiative has not only become a social development tool, but is also a way to strengthen moral behavior, transparency and accountability within the corporate structure (Shirodkar & Shete, 2021). Elite companies like Infosys and Hindustan Unilever have incorporated CSR in the model of governance, so their business goals are in line with the expectations of stakeholders. Nevertheless, in spite of this development, the exact character of the connection between CG and CSR remains a subject of discussion in the scholarly literature. Jo and Harjoto (2011) determined that CSR activities have the potential to drive firm value positively, but the interactive relations between CSR and governance practices are still ambiguous. This uncertainty is also reflected by Gangopadhyay & Homroy (2023), who state that, as much as CSR helps in stakeholder engagement and transparency of governance, the

nature of their interaction should be further explained.

Additionally, although CSR is a well-recognised cause of corporate legitimacy and reputation, its empirical relationship with governance has not been well examined. Dahiya et al. (2023) believe that CSR can positively influence CG by making ethical behaviour and stakeholder-related policies institutionalised. The literature has, however, not generally proven how CSR, when incorporated in the governance systems, results in excellent FP. Oware and Mallikarjunappa (2022) emphasise that despite the fact that CSR and CG have been linked to better corporate performance on an individual basis, their joint effect on FP has not been thoroughly studied.

Although the literature highlights the individual significance of CG and CSR, the need to examine their interface becomes increasingly important in the contemporary corporate environment. The interface also represents a critical yet underexplored dimension of corporate value creation. Corporate governance provides the structural and monitoring mechanisms through which managerial decisions are made and controlled, while CSR reflects how firms operationalise their responsibilities toward stakeholders through resource allocation and strategic initiatives. Firm performance captures the economic consequences of these governance-driven CSR decisions. Examining these constructs independently fails to explain why similar levels of CSR or CG often lead to different performance outcomes across firms. Therefore, studying the interface among corporate governance, CSR, and FP is necessary to understand not only whether these mechanisms matter, but how and under what conditions they jointly influence financial outcomes, particularly in the context of India's mandatory CSR framework.

This is an important gap in the current research. Bansal et al. (2021) emphasises the need to investigate the interdependence of the governance systems and CSR initiatives, especially in the emerging market, as in India, where the regulatory environments and stakeholder expectations are changing rather quickly. Even though there are organised CSR strategies and formal governance policies in place at companies like Reliance

Industries and Mahindra and Mahindra, the interaction between these two mechanisms and their effects on the financial measures of firms is not well documented. Acharyya & Agarwala (2022) also suggest that the incorporation of a combined methodology is needed in the future to explore the interaction between CG and CSR so that the combined effects on firm performance can be revealed.

To summarise, the correlation between CG, CSR and FP is complex and multidimensional. Although the current research proves the stand-alone benefits of good governance and active participation in CSR, it has not been sufficiently investigated in the empirical studies about their combined impact. With the growing pressure on corporate entities by regulators, investors and society, the integration of CG and CSR will probably be at the forefront of strategic decision-making. The combination of these frameworks will be essential to promote stakeholder trust and enhance organisational resilience as well as secure financial sustainability in the long term (Dahiya et al., 2023; Gangopadhyay & Homroy, 2023; Acharya & Agarwala, 2022; Oware and Mallikarjunappa, 2022; Bansal et al., 2021; Shirodkar & Shete, 2021).

1.5 A Transformative Analysis of CG, CSR and Financial Performance in India

India is a unique and useful background in studying the relationship between CG, CSR, and FP. Over the last ten years (2013 to 2023), the nation has undergone significant economic, regulatory and social changes that have positioned it as a significant jurisdiction of interest in terms of empirical research. One of the developments was the recent addition of mandatory CSR spending in 2014 in Section 135 of the Companies Act, 2013. This legislative change emphasised the enhanced strategic importance of CSR to corporate activity in India in general and particularly in a country with strong socio-economic inequalities (Dahiya et al., 2023; Sharma & Sathish, 2022). The mandatory CSR requirement established a legal framework that forced companies with specific financial requirements to distribute a section of profits to socially responsible activities, which drastically changed corporate responsibility in India (Shirodkar &

Shete, 2021).

In spite of being ranked as one of the top ten economies based on GDP, India still has significant issues with regard to development. The GDP per capita of the country has been low, adult literacy is just 74 percent and child labour abuse is being reported at an alarming rate[1]. Grover (2021) also describes India as a country that is still poor and highly unequal, with an elite group of affluent people, which indicates the presence of enduring income and gender inequality. These disparities are significant obstacles to the successful practice of CSR programmes because companies have to juggle the tricky balancing between shareholder and community interests (Santos, 2012). India is still at position 90 in 2024 Global Sustainability Competitiveness Index[2], despite 10 years of mandatory CSR participation. All these factors contribute to the growth of stress between financial objectives and corporate social responsibility. (Sarkar et al., 2021; Jumde & Du Plessis, 2022).

India's macroeconomic performance provides additional substance for analysis by scholars in this context. Between 2014 and 2023[3], the country's economy experienced an average growth rate of 5.98 percent, which still indicates inconsistent growth. Complex corporate ecosystems that are the result of co-existence of family-run groups, multinational corporations and public sector enterprises are characterized by a wide range of governance structures. For example, Infosys and Wipro demonstrate refined governance practices that include corporate social responsibility (CSR) in the strategic scheme, while many small and medium-sized enterprises face difficulties with fundamental compliance. This diversity provides a comprehensive framework to assess the impact of various governance mechanisms on financial results and the impact of CSR (Gangopadhyay & Homroy, 2023; Bansal et al., 2021).

Additionally, India has made significant progress in the growth of its CG rule. The Indian Corporate Governance has been brought with the global benchmark as a result of the enactment of the Companies Act, 2013, and subsequent measures. The corporate sector has experienced an increase in transparency, board independence and

accountability as a result of these reforms. This regulatory development, as noted by Jarboui et al. (2022), when combined with sound regime, establishes a strong institutional basis for the promotion of CSR. It is important to note that these mechanisms are not only keeping in mind the conservation of investors, but also wide developmental objectives, which strengthen the argument that the government's framework can encourage more meaningful CSR engagement and, as a result, financial performance improvement (Dahiya et al., 2023; Sharma and Satish, 2022).

Additionally, major scholars have emphasized the importance of focusing research on emerging economies. Chatterjee & Mitra (2017); Ghosh (2014); and Khan (2008) claim that specific institutional, economic and social configurations of developing markets require more complete empirical examination. India, in particular, provides a compelling reference to investigate the complex relationship between financial results, social responsibility and governance. Innovative corporate reactions that integrate economic competition with moral responsibility are required in response to the dual appearance of regulatory rigor and market volatility (Jumde and Du Plessis, 2022; Shirodkar & Shete, 2021).

In conclusion, the relationship between CG, CSR, and FP is best examined in terms of India's specific socio-economic profile, which is defined by developmental challenges, corporate practices and transformative regulatory reforms. For policymakers, investors and corporate leaders who are trying to understand ways in which governance and responsibility can promote permanent and inclusive financial development, this intersection has important implications. Comprehensive global discussions about corporate accountability and long-term value construction in emerging markets can be informed by insights obtained from Indian experience. (Gangopadhyay & Homroy, 2023; Bansal et al., 2021; Sarkar et al., 2021).

[1]https://globalmarch.org/76-countries-rank-high-in-child-labour-violations/; accessed on 13th Feb 2025

[2]https://solability.com/the-global-sustainable-competitiveness-index/downloads accessed on 13th Feb 2025

[3]https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=IN accessed on 13th Feb 2025

1.6 Statement of problem

The main dimensions of strategic trade decision-making are depicted by CG, CSR and FP. Not only do these components affect the perceptions of stakeholders and promote regulatory compliance, but they also ensure long-term stability of the organization (Prakash, 2022; Al-Homaidi et al., 2021). The analysis of interpretation among these components is of more importance in the Indian context, where economic, regulatory and social structures are going through rapid growth. Companies Act, 2013, especially Section 135 CSR expenditure, is an important regulatory milestone that aims to establish moral conduct and accountability in Corporate work (Jumde and Du Plessis, 2022; Sharma & Satish, 2022). However, despite these legislative efforts, the initiative of governance and social responsibility remains contested in influencing corporate financial results.

Empirical literature on CG-CSR-FP offers a diverse array of findings about the nexus. As a depiction, the stability initiative of the Tata group and the transparency of Infosys are cited by some scholars as examples of how a sound CG regime and CSR engagement can increase the profitability of the company by maintaining consumer and investor trusts in its practices (Arora, 2024; Thakker et al, 2022). In developing economies like India, where capital deficiency and resource inefficiencies are serious, some argue that compulsory compliance keeps an additional financial burden (Anas et al., 2023; Kumar et al., 2022). Further complexity is introduced by structural challenges to investigate these relationships, including income inequality, educational inequalities, and recurring violations of labor rights (Shirodkar & Shete, 2021; Sarkar et al., 2021).

The active economic development of India and the diverse corporate system- consisting of state-owned companies, family-owned enterprises, multinational corporations- offers a special ecosystem to explore these interactions. But the lack of consistency in the results of research remains because of differences in measurement scale, the industry of interest, or the methodology (Dahiya et al., 2023). An example is that although Jarboui et al. (2022) report a strong positive relationship between the governance scores and the profitability in specific industries, other researchers report the absence of significant correlation or even negative association, which points

out the context-sensitivity of the variables.

In addition, most of the previous studies have been based on conventional econometric models, which might be insufficient to explain the dynamism and interdependence of CG, CSR, and FP. The use of a linear-based statistical framework is not usually effective in capturing non-linear patterns, feedback loops, and sectoral mediations that play a vital role in explaining these multifaceted constructs (Sharma & Sathish, 2022; Al-Homaidi et al., 2021). Thus, an urgent necessity arises to embrace new multi-method analytical approaches based on the application of both traditional statistical methods and modern machine learning algorithms to reveal subtle details about these corporate dimensions (Arora, 2024; Prakash, 2022). The current work aims at filling this essential gap in knowledge by providing the empirical confirmation of the direct and mediating impacts of governance and CSR on financial performance of various Indian companies. The research is likely to update the scholarly literature on sustainable business practices as well as become a resource to policymakers, regulators, corporate strategists, and investors who want to maximise the financial aspects of sustainability-driven and ethical initiatives in the Indian market (Dahiya et al., 2023; Kumar et al., 2022).

1.7 Motivation of study

The impetus behind this research is a set of regulatory, institutional, and practical changes in the Indian corporate environment that have occurred in the last ten years. The introduction of Section 135 in the Companies Act on CSR made a paradigm shift in the way Indian companies interact with their stakeholders, besides shareholders of Indian companies. During the same period, the pressure was increased by SEBI and other regulators to strengthen the CG in terms of board independence, audit committees and disclosure standards. These changes came in the context of a series of CG failures, such as the Satyam crisis, and later IL&FS and DHFL, that shook the investor trust.

Therefore, CG and CSR have become a strategic focal point of improving FP in modern

competitive and socially mindful business worlds. A good CG mechanism promotes transparency, accountability and moral practices that are necessary in improving investors' confidence and efficient operations. Meanwhile, CSR activities demonstrate a company's commitment to socially and environmentally responsible behavior, contribute to establishing better relations with stakeholders and improve corporate image.

Although the significance of CG and CSR is becoming increasingly recognised, the academic literature is still uncertain about how wide and how strong these factors are likely to impact FP. Although some studies have suggested that sound CG can positively influence FP, the possible mediating effect of CSR in this association has not been well studied. Gaining clarity on whether CSR reinforces the governance-performance link could offer valuable strategic insights for firms aiming to improve both financial results and stakeholder trust.

This study is driven by the need to address this knowledge gap by evaluating the direct effects of CG and CSR on FP and examining whether CSR functions as a mediating variable. Additionally, as a commerce and finance scholar, a widening gap is observed between regulatory compliance and actual value creation. Many firms treat CG and CSR as check-box obligations, while others strategically integrate them into business decisions. This led to a curiosity: Do CG and CSR truly impact FP in the Indian context, and if so, how? By illuminating the dynamic interaction between governance, social responsibility, and financial outcomes, the research seeks to deliver actionable insights for corporate leaders, investors, and policymakers, in addition to contributing to academic literature. The findings aim to support the development of integrated strategies that align financial success with ethical, transparent, and socially responsible business practices.

1.8 Research objectives

CG and CSR play crucial roles in shaping FP, influencing stakeholder trust, and long-term sustainability. This study examines the direct effect of CG and CSR on FP, while also assessing the mediating role of CSR in the governance-FP relationship. The research priorities led to the

creation of the following objectives.

- To study the impact of Corporate Governance on Corporate Financial Performance.
- To analyze the impact of Corporate Social Responsibility on Corporate Financial Performance.
- To assess the mediating effect of CSR between Corporate governance and corporate financial performance.

1.9 Research Questions

This research explores the association among CG, CSR, and FP in India. It examines how governance practices, CSR initiatives, and the extent of CSR disclosure influence financial outcomes, providing insights into the economic implications of socially responsible business strategies.

1. How does CG influence FP in Indian companies?
2. What is the effect of CSR on FP?
3. Does CSR mediate the relationship between CG and FP?

1.10 Scope of the study

The scope of this study is centered on examining the impact of CG and CSR on the FP of Indian firms. The research focuses on companies listed in the BSE 500 index, offering a broad representation of the Indian corporate sector. Firms from the banking, finance, and insurance sectors are excluded due to their distinct regulatory environments and financial structures, which differ significantly from non-financial firms and could otherwise distort the analysis. The study covers a ten-year period from 2013-14 to 2022-23, enabling the investigation of long-term trends and the influence of key regulatory developments such as the Companies Act, 2013 and the introduction of Business Responsibility and Sustainability Reporting (BRSR) requirements. To systematically measure CG and CSR practices, a Corporate Governance Index (CGI) and a Corporate Social Responsibility Index (CSRI) are constructed using content analysis of annual reports and CSR disclosures. Financial performance is assessed through both accounting-based indicators, such as Return on Assets and Return on Net Worth, and market-based indicators, including Tobin's Q and Price to Earnings Ratio.

1.11 Significance of the study

This study provides empirical insights into how CG and CSR influence the FP of Indian firms. The significance of this study lies in its ability to provide meaningful academic, regulatory, and practical contributions at a time when corporate accountability and stakeholder inclusiveness are becoming core components of sustainable business practices.

1.11.1 Theoretical contribution

The research integrates multiple theories — Agency Theory, Stakeholder Theory, and Legitimacy Theory — to explain the complex relationships between governance mechanisms, social responsibility initiatives, and firm performance. By positioning CSR as both a governance tool and a stakeholder engagement mechanism, the study addresses the theoretical gap in understanding how CSR may mediate or enhance the effect of governance on financial outcomes. It goes beyond traditional linear approaches by testing mediation and moderation relationships, thereby offering a nuanced view of corporate behavior.

1.11.2 Empirical rigor and innovation

By focusing on BSE 500 companies over a ten-year period, the research captures the long-term effects of key regulatory developments such as the Companies Act, 2013 and BRSR compliance. A key contribution of the study is the construction of two composite indices, a CGI and a CSRI, that enable a structured assessment of firm-level practices. By employing both accounting and market-based measures of financial performance, the study provides a comprehensive evaluation. Furthermore, the study employs a combination of econometric methods (panel regression, fixed and random effects models, mediation analysis) and machine learning algorithms (XGBoost, SHAP, and LIME), which is rare in CG/CSR research in India. These tools help in uncovering non-

linear relationships and interaction effects that are typically overlooked in traditional models.

1.11.3 Sectoral and contextual relevance

By covering companies across multiple sectors and excluding the financial sector for analytical consistency, the study provides generalizable insights while accounting for sector-specific dynamics.

1.11.4 Practical implications for corporate strategy

For corporate managers and board members, the findings suggest that robust CG and meaningful CSR practices are not merely compliance requirements but can act as strategic levers to enhance accounting-based financial performance. The mixed effects on market-based metrics highlight the importance of stakeholder perception and information asymmetry. Understanding how CSR mediates the CG–CFP relationship helps firms design integrated governance and sustainability strategies that align internal controls with external stakeholder expectations.

1.11.5 Policy and regulatory relevance

The findings aim to guide policymakers, investors, and corporate leaders in strengthening governance and CSR strategies to enhance financial outcomes.

1.12 Structure of the Thesis

This thesis is structured as follows:

- The first chapter introduces the research and outlines its overall scope and objectives.
- The second chapter reviews relevant literature, highlights key researchers and their

findings, and presents the theoretical framework and research hypotheses.

- The third chapter details the research methodology, including the database used and the statistical and advanced techniques applied.
- The fourth chapter presents the results and provides a discussion of the findings.
- The fifth chapter concludes the study, summarizing key insights and offering academic and practical implications.

Chapter 2

Literature review & hypotheses development

This literature review begins by examining existing studies that analyze the influence of CG and CSR on firm FP. It further investigates how CSR may act as a mediating factor in the relationship between CG and financial outcomes. The review includes an exploration of key theoretical frameworks that underpin these relationships, supported by empirical findings from previous research. Additionally, the CG and CSR landscape in India is assessed, focusing on regulatory structures, compliance obligations, and emerging trends. The sections that follow provide an in-depth evaluation of literature across these thematic areas.

2.1 Definitions

2.1.1 Corporate Governance

CG has been defined in multiple ways by key organizations and scholars, each emphasizing different dimensions of governance systems. A few prominent definitions are outlined below:

Cadbury Committee (1992): CG is defined as “the system by which companies are directed and controlled.”
Implication: This succinct definition emphasizes the structural and procedural mechanisms that ensure accountability in corporate decision-making.

Organization for Economic Cooperation and Development (OECD): According to the OECD, “Corporate Governance is affected by the relationships among participants in the governance system... including shareholders, legal structures, and societal expectations... it is also shaped by macroeconomic policies, institutional frameworks, and ethical business conduct.”

Implication: The OECD places CG within a broader socio-economic and institutional context, recognizing the influence of controlling shareholders and external regulatory factors on corporate behavior and long-term success.

Securities and Exchange Board of India (SEBI): SEBI defines CG as “the acceptance by management of the inalienable rights of shareholders as the true owners of the corporation and of their own role as trustees... it is about commitment to values, ethical conduct, and distinguishing between personal and corporate funds.”

Implication: SEBI emphasizes fiduciary responsibility, ethical management, and the safeguarding of shareholder rights, thereby framing CG as a value-based and trust-driven system.

Confederation of the Indian industry (CII) (1998): CII defines CG as a “collection of laws, procedures, practices, and inherent rules that determine the ability to make managerial decisions about the company's contenders, including shareholders, creditors, customers, state and staff.”

Implication: This definition broadens the scope of CG beyond shareholders to include other key stakeholders, highlighting the procedural and institutional dimensions of governance.

In summary, while the Cadbury Report and OECD Principles stress the structural and contextual foundations of governance, SEBI focuses on the ethical and managerial obligations of corporate leadership, and CII integrates the broader stakeholder

perspective. Together, these definitions underscore that effective corporate governance involves a blend of systems, values, regulatory compliance, and accountability to both shareholders and society.

2.1.2 Corporate Social Responsibility

Although a singular, globally agreed-upon definition of CSR may not exist, all current definitions emphasize the influence businesses exert on society and the societal expectations placed upon them.

In a comprehensive study, Dahlsrud (2008) analysed existing literature and found 37 varying interpretations of CSR. There is still significant debate about how to define CSR, despite several efforts to provide a clear and unbiased definition. CSR has been given several different definitions in recent academic and commercial literature. A single, broadly recognized definition of CSR has yet to be established (Rahim and Alam 2014, Amaeshi et al., 2016). CSR has not been explicitly defined "under the Companies Act, 2013". Sheehy (2015) asserts that how one defines CSR depends on one's viewpoint. On the other hand, Okoye (2009) contends that there isn't a single, all-encompassing definition of CSR since it covers a range of difficulties.

The European Commission, the EU's principal legislative authority, has proposed a widely cited definition of CSR. According to the Commission, CSR refers to "firm actions above and beyond their legal commitments towards society and the environment." This definition underscores voluntary corporate efforts and aligns with the broader stakeholder perspective, thus resonating with Davis' (1973) view that CSR involves responsibilities beyond profit maximization and includes obligations to a wider group of societal actors.

Another foundational contributor to CSR theory is Carroll (1999), who offered a comprehensive definition: CSR encompasses "the economic, legal, ethical, and discretionary expectations that society has of organizations at a given point in time." This

multidimensional approach was later conceptualized in "Carroll's CSR Pyramid," which remains among the most enduring and frequently cited structures in CSR literature (Visser, Middleton, & McIntosh, 2005). The pyramid visually illustrates the layered nature of CSR obligations, beginning with economic and legal foundations and progressing to ethical and philanthropic responsibilities.

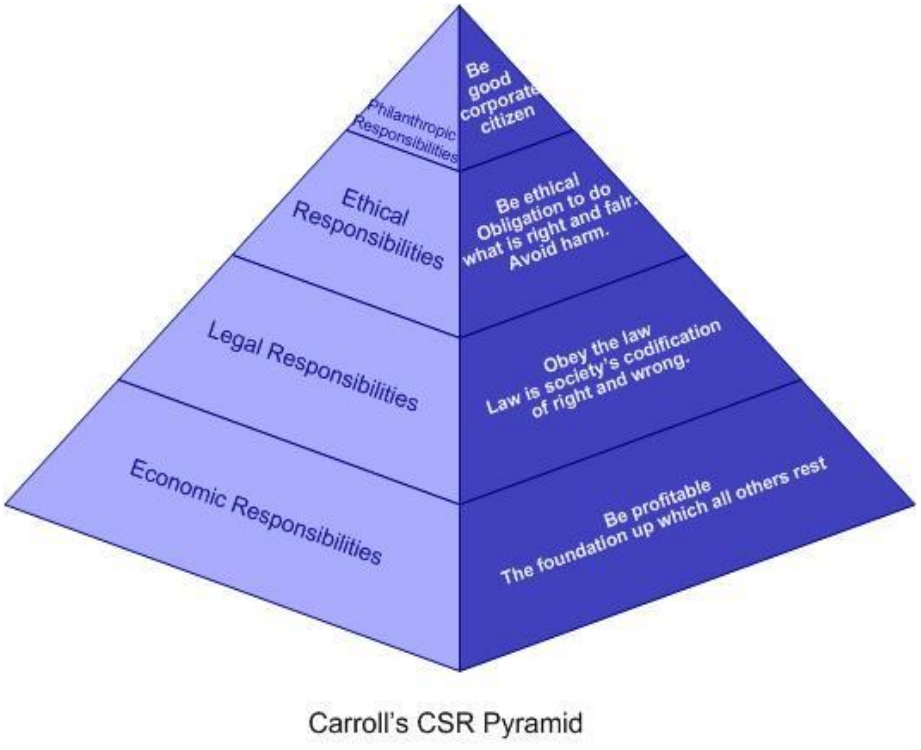

Figure 2.1: Carroll's CSR Pyramid

The CSR pyramid from Carroll is shown in Figure 2.1.

Carroll summarises the pyramid by stating that an organization's CSR is defined as its capacity to concurrently meet its economic, ethical, legal, and charitable obligations. According to him, a business should constantly aim to earn profit while also abiding by the law, acting morally, and being a "responsible corporate citizen "(Carroll 1991, Visser 2005). One of the top organisations in support of CSR is the WBCSD ("World Business

Council for Sustainable Development"). WBCSD's CSR definition may be the most accurate and widely accepted one, which defines it as "the ongoing commitment by business to behave ethically and contribute to sustainable economic development while improving the quality of life of their employees and their families, as well as local communities and society at large" (WBCSD 2001:3). In its study, the United Nations (UN) also made an effort to define CSR, defining it as "the overall contribution of business to sustainable development" (UN 2007: 1).

CSR is a comprehensive framework integrated into a company's core business approach designed to address and mitigate social as well as environmental impacts of its operations. It involves a commitment to the welfare of every stakeholder- including communities, employees, environment—not just the shareholders.

2.1.3 Financial Performance

FP indicates the extent to which a company fulfills its financial goals, commonly evaluated via key indicators like liquidity, profitability, solvency, operational efficiency, and shareholder returns (Brigham & Ehrhardt, 2020; Gitman & Zutter, 2019).

2.2 Corporate Governance Legal Framework in India

India's CG framework is primarily governed by "the Companies Act, 2013," and "(LODR) Regulations, 2015". These regulations establish comprehensive guidelines for companies to ensure transparency, accountability, and protection of stakeholders' interests. They mainly deal with the requirements of a number of boards of directors, independent boards of directors, constituting various committees to oversee certain specific corporate activities, specific disclosure requirements, etc. In addition to "the Companies Act, 2013", and "SEBI (LODR) Regulations, 2015", several other laws, regulatory bodies, and professional standards govern Corporate Governance (CG) requirements in India. These

include "Securities Contracts (Regulation) Act, 1956 (SCRA)", "National Financial Reporting Authority (NFRA) Rules, 2018", "Institute of Chartered Accountants of India (ICAI)" - Auditing & Accounting Standards, "Institute of Company Secretaries of India (ICSI)" - Secretarial Standards, "Insolvency and Bankruptcy Code (IBC), 2016", "Reserve Bank of India (RBI)" - Governance Framework for Banks, Insurance Regulatory and "Development Authority of India (IRDAI)" and "Business Responsibility and Sustainability Reporting (BRSR)" - ESG Disclosures etc.

CG in India is governed by a multi-regulatory framework, covering the "Companies Act", "SEBI regulations", "NFRA rules", "ICSI standards", "IBC", "RBI norms", and "ESG reporting guidelines". These frameworks collectively ensure transparency, accountability, investor protection, and ethical business practices. Figure 2.2 briefly summarises the important provisions of the Companies Act, LIDOR in pictorial form.

Figure 2.2: Corporate Governance Legal Framework in India

2.3 Legal framework of CSR in India

According to "the Companies Act in 2013", India emerged as the 1st nation globally to mandate CSR activity and disclosure norms for companies meeting certain criteria (Section 135). The CSR provisions "under the Indian Companies Act" are designed to ensure that significant companies contribute to societal welfare, as shown in Figure 2.3. Companies that meet specific financial thresholds—having "a net worth of at least Rs 500 crores, a turnover of Rs 1000 crores, or a net profit of Rs 5 crores in the preceding year—are required to establish a CSR committee" (Section 135) This committee, comprising a minimum of three members (with at least one independent member if the CSR expenditure exceeds Rs 50 lakhs), is responsible for recommending CSR policies to the board of directors. Companies must spend minimum 2% of their “average net profits” of last 3 financial years toward CSR activities. Any unspent CSR funds must be conveyed to a specified fund, as "Schedule VII of the Act" outlines. The CSR activities comprise a large range of initiatives like eradicating hunger and poverty, promoting education and skill development, supporting gender equality and environmental sustainability, preserving cultural heritage, and contributing to disaster management efforts. Furthermore, companies must monitor and evaluate their CSR projects and face penalties for non-compliance (Section 135).

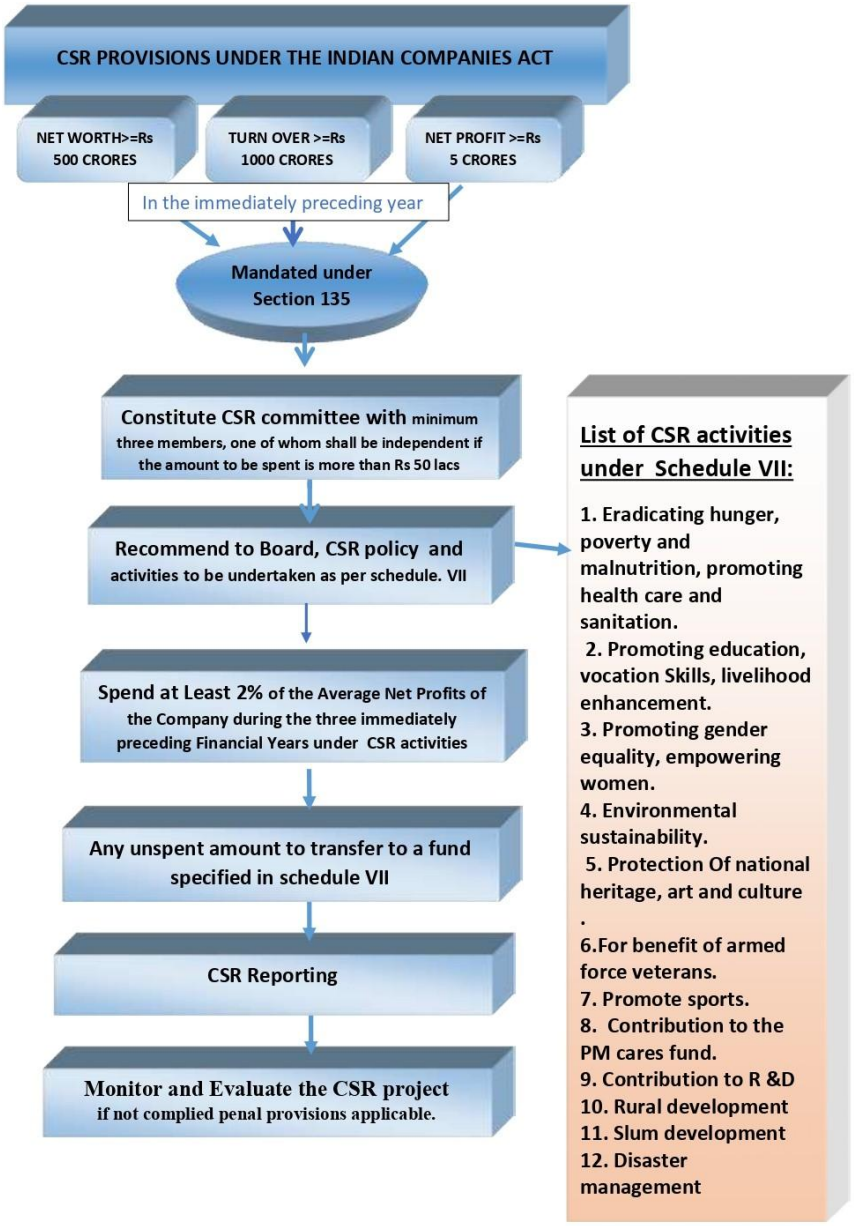

Figure 2.3: Indian CSR legal framework

2.4 Theories

No matter how it's defined, socially responsible business practices show that a company recognizes it has a moral obligation to factor public interests into its operations. There are three main explanations for proactive CSR, as per Moir (2001). In contrast to the "how," which is explained by the stakeholder theory, the "why," which is explained by the social contracts theory, is related to the legitimacy theory (Moir, 2001).

2.4.1 Agency theory

It highlights the evolving interaction among shareholders (principals) and company managers (agents) as defined by an agreement (Gwala & Mashau, 2023). Managers and shareholders may face conflicts of interest. This happens because managers might pursue their own goals instead of maximizing shareholder value. Their personal interests could outweigh the company's best interests. As a result, shareholders may suffer if managers prioritize short-term gains or personal benefits over long-term growth. Conflicts can also emerge as a result of divergent perspectives on "risk tolerance", where varying "levels of comfort" with uncertainty or potential losses may lead to disagreements in "decision-making". In accordance with CG techniques, including "performance-based compensation", "board monitoring", and "external audits", are utilised in aligning managers' interests with shareholders. Such procedures help reduce conflicts. Such a theory suggests that "monitoring expenses" and "costs are needed to enforce discipline on the agent". This helps prevent misuse. These costs are called agency costs (Shleifer & Vishny, 1997).

2.4.2 Stakeholder theory

According to Stakeholder Theory, which was developed by Pirsch and colleagues in 2007, companies can only survive and thrive if they meet both their "economic (such as profit maximization)" and "non-economic (such as corporate social performance)" objectives. The core concern of the stakeholder theory of CG is the influence of a company's activities on any relevant parties involved in the firm. The premise behind this concept is that corporate management (officers and directors) must keep the interests of all stakeholders in mind at all times throughout the governance process (Mahajan et al, 2023). The firm's stakeholder theory is applied to the question of who the firm should be accountable to. Freeman suggests that a firm is best understood as a system of interdependent interactions among many stakeholders. As per Freeman's standard definition, stakeholders consist of 'any person or group that may influence or is impacted by the accomplishment of the organization's objectives' (Freeman, 1984).

- Major and minor stakeholders have been common categories for describing stakeholder involvement. Primary and secondary stakeholders are often identified while doing a stakeholder analysis.
- According to Clarkson (1995), a "primary stakeholder group" is defined as 'one without whose continuing participation the corporation cannot survive as a going concern.' Members of this group include 'shareholders and investors, employees, customers, and suppliers, as well as what is defined as the public stakeholder group: the governments and communities that provide infrastructure and markets, whose laws and regulations must be obeyed, and to whom taxes and obligations are paid.'.
- The definition of the "secondary groups" is "those who affect, or who are affected by, or people are impacted by the company but not involved in transactions involving the firm that are not necessary for its survival."

In his study, Ullmann (1985) discovered a link between stakeholder theory and CSR actions. He demonstrated how the association among a company's social and economic performances depends on the strength of its stakeholders, it's strategic positioning, and its historical and current financial success. The basic assertion made in the literature on stakeholder theory that the firm's decisions are just reflections of its stakeholder groups was adequately supported by this. Each of these traits influences the estimation of the CSR adoption level of a firm. Stakeholder power, the first attribute, demonstrates that the more significant a stakeholder is, the more likely it is that their demands will be considered. The second trait, strategic posture, outlines the company's approach to social concerns, which may be either active or passive. The third factor directly influences the company's ability to engage in CSR. Therefore, it is clear that the stakeholder approach pushes companies to broaden their aims beyond the pursuit of profit maximization (Pirsch, Gupta, & Grau, 2007). Oberseder (2013) further suggested that the degree to which CSR correctly engages with its stakeholders is defined by the interaction between stakeholder theory and CSR. The parties that a company is responsible for are identified under the stakeholder theory. This puts pressure on management to balance the interests of every company's stakeholder within its social system (Oberseder, Schlegelmilch, & Murphy 2013).

2.4.3 Social Contracts Theory

According to Gray, (1996), a society is described as a "series of social contracts between members of society and the society itself,". In addition to serving their own interests, corporations may act ethically because society implicitly expects them to do so, according to the concept of CSR. To help managers make decisions in a principled environment, Dunfee & Donaldson (1999) developed an integrated Social Contracts Theory.

They distinguished between micro social contracts, which support local communities, and macro social contracts, which apply to broader societal contexts. Proponents of social

contract theory describe business involvement as a response to "societal expectations." While the extent of this involvement remains contested, it is generally viewed as only an initial driver of corporate motivation.

According to an Australian study, this corporate advantage is characterized as a "license to operate", and it is especially important to natural resource firms. Even if enhanced reputation is a factor of financial benefit, Suchman (1995) argues that there is a relationship between gaining and maintaining legitimacy (Moir, 2001).

2.4.4 Legitimacy Theory

As per Suchman (1995), legitimacy is "a broad perspective or assumption that an entity's actions are desirable, suitable, or acceptable within any socially constructed system of norms, values, beliefs, and definitions" (Moir, 2001). Stakeholder theory and legitimacy have numerous commonalities. The idea holds that organizations continuously work to function within the predetermined boundaries and societal norms in which they are situated (Olateju et al., 2021). The "legitimacy theory" is based on the concept that "there exists a social contract between the organization and the society in which it operates", according to Guthrie, Petty, Yongvanich, and Ricceri (2004). Reviewing earlier research works on legitimacy management, including institutional traditions (1983) and the strategic tradition of resource dependency theory (1978), three types of organizational legitimacy were identified by Suchman (1995): Pragmatic, moral, and cognitive, and the major issues of legitimacy management identified were repairing, gaining, and maintaining legitimacy.

Legitimacy is often categorized into pragmatic, moral, and cognitive forms.Pragmatic legitimacy is based on self-interest, where stakeholders support firms that serve their needs. Moral legitimacy reflects normative approval of a firm's actions, judged as "the right thing to do."

Cognitive legitimacy arises when a firm is perceived as a natural or necessary part of the social system.

In managing legitimacy, firms engage in strategies such as gaining legitimacy when entering new markets, maintaining it through consistent alignment with stakeholder expectations, and repairing it after a crisis or controversy.

According to Suchman (1995), legitimacy management depends significantly on communication. As a result, in order to comprehend "legitimacy theory", some types of "business communications" need to be reviewed (Moir, 2001). However, Lindblom (1994) believes that for organizations, getting legitimacy from society is not always an easy process. In response to diverse challenges to its legitimacy, she provided four basic legitimation strategies that an organisation may use.

- An organization can first try to inform its stakeholders of its goals for performance enhancement.
- The group may try to influence the "relevant public's" perception of it without improving its operations.
- The business might try to deflect attention from the issue.
- The company may try to sway outside observers' perceptions of its performance (Yongvanich & Ricceri, 2004).

Lindbolm (1994), states that both the basic rationale for participating in corporate social behavior and a move made for publicity or influence may be considered legitimate. Davis (1973) gave an alternative perspective to that put forth by Lindblom (1994). He said that companies don't utilize their influence to defend their actions; Instead, society grants them authority on the condition that it will be used wisely. Therefore, if the company does not

act in a responsive manner, it often loses these powers. As a direct consequence of this development, the concept of a social contract for a firm and society has come into existence. An organization's CSR practices can be shaped by principles of social contract theory, which, as Moir (2001) explains, may be further interpreted through stakeholder theory to enhance the company's reputation and legitimacy.

2.4.5 Gandhian Social Trusteeship Theory

Gandhiji promoted the trusteeship theory. It is founded on the idea that everyone who owns money or property does so out of trust in society. Since society should be seen as a giver to the individual, he or she is obliged to give back to society by contributing a portion of their collective income (Vidaković 2022).

2.4.6 Stewardship theory

Stewardship theory suggests that managers act as responsible stewards. They prioritize the owners' best interests (Donaldson & Davis, 1991). This theory suggests that the manager's part is crucial in an organisation's growth by "safeguarding and enhancing shareholder wealth" through strong firm performance. Unlike agency theory, which focuses on monitoring and controlling managers, stewardship theory argues that CG should support and empower them. It highlights the importance of trust and aligning the goals of managers and shareholders. Fulop (2011) suggests that a board of directors should include corporate interns, as they are better equipped to handle daily company operations and respond swiftly to challenges. In contrast, Solomon (2007) contends that "external directors are limited to overseeing short-term business performance", whereas internal directors are more engaged in long-term organizational success.

2.4.7 Perception of CG and CSR under different theories

Numerous financial performance theories state that there is an association among CSR, CG, and FP. In Table 2.1, all theories, their postulation and their perception of CG and CSR are provided.

CG is an ongoing mechanism that ensures the effective management and guidance of corporations. According to Guthrie and Lee D. Parker (1989), CG is associated with a structure through which corporations are managed and directed. This structure typically comprises three key components: executive management, a board of directors, and a general body of shareholders. These components work together to maximize owners' wealth by ensuring accountability, transparency, and proper governance procedures. In this framework, a company is primarily responsible to its shareholders, who have the authority to nominate directors and oversee governance practices to safeguard their interests.

Yousuf & Islam (2015) describe CG as a comprehensive concept encompassing laws, regulations, practices, institutions, and policies that guide organizations in their operations, management, and governance. Effective CG ensures that organizations act in a manner that is both ethical and efficient, fostering trust and long-term sustainability. Claessens & Yurtoglu (2013) further define CG as a set of methods intended to regulate management behavior along with decision-making processes. These methods aim to enhance a company's performance, increase its market value, further improve access to resources. By synchronizing the interests of management with shareholders, CG helps mitigate conflicts of interest and promotes the efficient use of resources. This alignment is critical for maintaining investor confidence and ensuring the company's market competitiveness.

Table 2.1: Theory and how it perceives CG and CSR

Theory	How CG is perceived	How CSR is perceived
Agency Theory (Jensen and Meckling, 1976): "Agency theory" implies association between shareholders and management. The theory posits that agents may not act in the optimal interests of principals and could instead pursue self-interest, resulting in conflicts.	This theory views CG as a mechanism to control and monitor managerial behaviour, ensuring that management acts in the best interests of shareholders.	Generally regards CSR with skepticism. If CSR programs do not optimise shareholder value, they might be regarded as a resource misallocation.
Stakeholder Theory (Freeman, 1984) underscores the interdependence of a corporation with its employees, consumers, suppliers, communities, and i nvestors, advocating for the necessity of delivering advantages to every stakeholder.	CG must consider the interests of every stakeholder, not solely shareholders, and prioritise ethical considerations and stakeholder well-being in decision-making.	CSR is central to stakeholder theory, as companies are responsible for the broader social and environmental impact of their activities.
Stewardship Theory (Donaldson & Davis, 1991) posits that managers, as stewards of the organization, are intrinsically motivated to behave in the best interests of the company, encompassing shareholders and other stakeholders. Managers are perceived as reliable and proficient in the responsible management of corporate resources.	CG should empower managers and provide them with the autonomy to make decisions that benefit both the company and its stakeholders.	CSR is regarded as a logical extension of stewardship, when managers adopt a long-term perspective on corporate responsibility, prioritizing the welfare of society and future generations.
Resource-Based View Theory, proposed by Jay Barney in 1991, asserts that a firm's competitive advantage derives from its internal capacities and resources rather than external market conditions.	RBV considers governance mechanisms as essential resources that can improve a firm's capacity to manage its assets effectively.	CSR is regarded as an intangible resource that can augment a company's reputation, stakeholder confidence, and customer loyalty.

2.5 Approaches for Measuring Corporate Governance

Signaling Theory proposed by Michael Spence, elucidates how the "signaler" transmits information to the "receiver" under situations characterized by information asymmetry. (Huang et al., 2022)	Strong CG sends positive signals to investors and stakeholders about a firm's credibility, transparency, and ethical conduct.	CSR activities serve as signals to various stakeholders, such as customers, investors, and employees, "about a company's commitment to ethical practices, sustainability, and social responsibility."

2.5 Approaches for Measuring Corporate Governance

CG implies a fundamental aspect of corporate management that ensures accountability, trans- parency, and effective decision-making. Measuring CG is essential for assessing a firm's adherence to best practices and its impact on financial performance (Black et al., 2021). Various methodologies have been developed to evaluate CG, each providing distinct insights. This literature review examines key approaches used to measure CG, with a focus on recent studies to identify pros and cons of each aspect.

2.5.1 Corporate Governance Indices

CGI is widely used to measure the quality of governance in firms and countries. These indicators can add various governance variables, including "the independence of the board", "shareholders' rights, and" disclosure practices", and produce a single overall score (Black et al., 2021). The Governance Matrix International (GMI) and Investor Responsibility Research Center (IRRC) index are famous. However, their efficiency has been debated due to variation in relation to weighting scheme and subjective assessment (Aggarwal et al., 2020). Although CGI is a standardized platform to evaluate the quality of regime, their accuracy decreases through subjective load and incompatible practices. It restricts investors and policymakers from comparing their cross-firm and cross-country companies.

2.5.2 Board Characteristics and Structure

The constitution and effectiveness of the board of directors are also the major determinants of CG quality. Issues such as "Board Independence ", "CEO duality", "gender diversity", and "board size" have been researched (Adams Ferrira, 2019). There is empirical data indicating that companies that have independent boards have a stronger set of governance, and perform better with less risk (Coles et al., 2022). Nevertheless, the board characteristics' influence depends on industries and regulatory conditions (Chen et al., 2021).

2.5.3 Ownership Structure Analysis

Concentration of ownership and the rights of shareholders play an important part in CG measurement. A firm with a dispersed ownership structure is more likely to have more effective governance mechanisms than one with family or state ownership (La Porta et al., 2018). Researchers have employed the ownership concentration measures, including the Herfindahl- Hirschman Index (HHI), to determine whether governance is effective or not (Kumar Singh, 2020). The literature is supportive that concentrated ownership may consolidate or undermine governance based on the intentions of the controlling shareholders (Fahlenbrach Stulz, 2022). The concentration in ownership has a great impact on the outcome of governance since dispersed ownership tends to be associated with enhanced oversight. Nevertheless, concentrated ownership may build up or destroy governance based on shareholder motive and control relationship.

2.5.4 Disclosure and Transparency Metrics

An important indicator of governance is the transparency of financial reporting and

voluntary disclosures. Global Financial Reporting (IFRS) and Global Sustainability Reporting (Global Reporting Initiative (GRI)) standards are often followed to analyze the level of corporate disclosure (Brown et al., 2020). Firms with high disclosure scores are characterized by investor trust and more solid regime (Hassan et al., 2021). However, inter-governmental evaluation is complicated due to inequalities in disclosure practices that exist in different jurisdictions. (Hope et al., 2019).

2.5.5 ESG (Environmental, Social, and Governance) Ratings

With the increasing emphasis on sustainable business practices, ESG ratings have become an important tool for assessing CG. ESG scores consider governance factors such as executive compensation, shareholder rights, and audit committee effectiveness (Eccles et al., 2020). While ESG ratings provide a holistic view of governance, inconsistencies in rating methodologies among agencies like MSCI and Sustainalytics have led to concerns regarding reliability and comparability (Berg et al., 2022). ESG ratings offer a more integrated perspective on governance within broader sustainability frameworks. Yet, methodological discrepancies among rating agencies reduce their reliability, complicating stakeholder efforts to evaluate governance consistently.

2.5.6 Construction of Corporate Governance Index (CGI)

There are many systems that make up CG, both internal and external. External CG mechanisms are the result of support factors that aid in increasing the CG practices of the board members and top management, not from within the firm itself (Payne & Moore, 2022). The market for corporate control and product market competition are the crucial external mechanisms, whilst the board of directors, the audit committee, and other board committees like the nomination committee and remuneration committee are among the essential internal processes. The nation's overarching institutional and legislative framework successively shapes these internal and external systems. A variety of metrics

can be used to assess CG, frequently based on its operating components, including board size, board meetings, board independence, board committees, etc. In order to draw any firm conclusions regarding the general condition of CG for a company, it is necessary to process a huge number of factors and pieces of information. The key lies in delivering comprehensive information in a manner that is both user-friendly and easily accessible. This necessitates the development of a robust Corporate Governance (CG) Index that can effectively and concisely capture the multiple dimensions of governance. As noted by Brown et al. (2011), a company's governance quality is most accurately assessed through its ranking on a composite index constructed from a set of well-defined governance indicators or attributes.

Commercial CG Rating services

CG industry is an important player that contributes to the efficiency of the market by providing two major services Corporate Governance Ratings (CGR) and Proxy Advisory. The practices of governance of firms are assessed by CGRs, providing investors with a reference point to transparency and accountability that helps to decrease risk premiums and minimise price fluctuations. Proxy advisory services, on the other hand, prudently advise the institutional investors on how to exercise their right to vote by aligning the recommendations with the CG standards and policies. Companies that provide both services have strategic power, since they not only evaluate the quality of governance, but also influence the investor behaviour during shareholder meetings. This dual role strengthens the link between governance practices and investor decision-making. However, in India, while a few firms such as IiAS provide proxy advisory services, there is no dedicated agency offering standardized CG Ratings. This creates a significant gap in the governance ecosystem, limiting investors' ability to make informed assessments. The SEBI amendment to Credit Rating Agency regulations in May 2018 reflects a regulatory acknowledgment of this gap, though implementation remains limited.

As per the website of CRISIL accessed on 10th September 2023, CRISIL stopped

the services of "Governance and Valuation Creation Rating" based on the said SEBI circular. However, on an annual basis currently Indian CG Scorecard is being published for BSE 100 companies by Institutional Investor Advisory Services India Limited (IIAS). This is a joint initiative of the International Finance Corporation and the Bombay Stock Exchange. Technical partner- IIAS is in charge of developing the Scorecard methodology and questionnaire. The CG professionals on IFC's team provided input into the creation of the Scorecard's content. When contacted, IIAS for information about the latest ratings, they conveyed through an email dated 19th June 2023 that they can not be shared. The lack of access to updated IIAS Scorecard ratings limits transparency and constrains researchers' ability to evaluate current corporate governance performance in India.

Academic Corporate Governance Rating

Thus, the corporate rating agencies will have their own rationale (Yıldırım et al., 2021). Academia has its own way of constructing the CG index for research purposes. The same is depicted below in figure 2.4.

Indexes based on surveys may be skewed because poorly governed companies do not answer (self-selection bias) or because responding companies overrate the effectiveness of their governance (self-report bias) (Pahlavan et al., 2025). Studies using commercial CG ratings can only be generalized to large-cap companies Since these indices are typically restricted to the largest public firms in the world (Jesuka & Peixoto, 2022). Academic CG indices, in contrast, are based on fewer

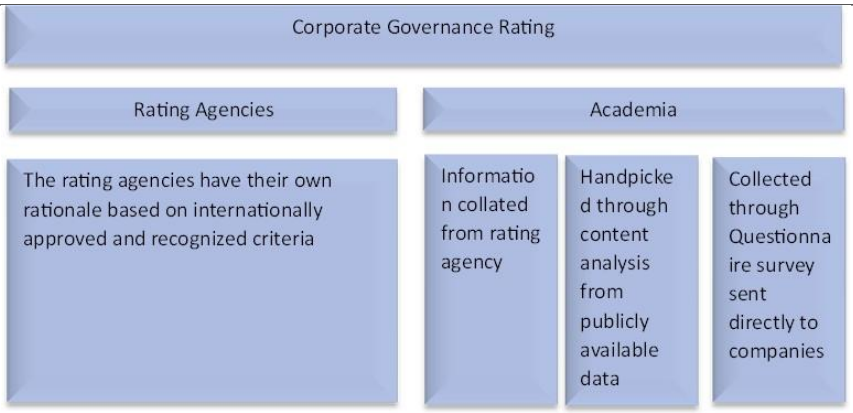

Figure 2.4: Corporate Governance Rating

Equally weighted provisions that are specifically directed at sample enterprises. These clauses are evaluated on a binary scale (1 or 0), which removes subjectivity from them by showing the presence or absence of a practice (Aguilera et al., 2021). They are often expressed as absolute measures and are computed by a straightforward count of the value allocated to each service. Researchers can choose the sample and, in turn, the pertinent governance provisions by using self-constructed indices. The majority of the empirical investigations that were assessed used their indices. A list of Indian researchers who constructed the CG index is listed in Table 2.2:

Table 2.2: **List of Indian researchers who constructed CG index**

Author	**Title**	**Attributes**
Supriti Mishra and Pitabas Mohanty (2014)	CG enhances firm performance in India.	Three subindices - legal compliance, board efficiency, and proactive indicator, and in turn they have two, nine and two components respectively.
Niraj Satnalika, S. Rao (2016)	CG and Value Creation Index	CGI and Value creation subindices comprising ownership, board size, independence, etc. About 12 attributes and weightage are given based on the survey.
Akshita Arora, Shernaz Bodiwala (2018)	Relationship between CGI and Firm Performance: Indian Evidence	Internal mechanisms, board structure, and ownership control, and external mechanisms of the market for corporate control and product market competition.
S. Sandhya, Neha Parashar (2020)	A framework assessing CG in India's banking sector.	Forty-two elements are grouped under six subindices. These 42 elements are based on Clause 49 of the listing agreement in India, OECD principles, Basel Committee's CG principles for banks, and the "Indian Banking Regulation Act". Each element has been given a binary number.
Aswini Kumar Mishra, Shikhar Jain, and R. L. Manogna (2021)	Examining CG's influence on Indian firm performance via a dynamic panel approach	CGI evaluates board composition, ownership, director activity, external oversight, and market competition.

In the current research, instead of using specific board and ownership characteristics as independent determinants, a broad-based CGI is constructed as an independent variable based on past research and in similarity with CG indices constructed by different researchers.

2.6 Approaches for measuring Corporate Social Responsibility

CSR measurement is challenging due to two factors. Firstly, as was previously said, the theoretical relevance of the CSR idea is not universally accepted (Dahlsrud, 2008). Secondly, according to Carroll (1979), the idea is multidimensional with rather varied aspects. Different methodologies were utilised in the literature to measure CSR due to the lack of agreement and complexity of the term. According to Galant and Cadez (2017), 4 different methods were utilised to quantify CSR in the literature. The following groupings of methods, listed here in order of how frequently they are used, can be used to group various strategies: (1) reputation indices; (2) content analyses; (3) one-dimensional measurements; and (4) questionnaire-based surveys. More information on these measurement techniques is covered in the ensuing subsections.

2.6.1 Reputation Indices

Reputation indices developed by specialized rating agencies remain the most widely used tools for assessing CSR. Prominent examples include the Vigeo Index, which emphasizes ESG risk assessment (Jimenez-Garcès, Girerd-Potin, & Louvet, 2014), the Dow Jones Sustainability Index, focusing on economic, environmental, and social criteria (Golja & Skare, 2012), the Fortune magazine reputation index, which ranks firms based on peer perceptions of social responsibility (O'Bannon & Preston, 1997), and the MSCI KLD 400 Social Index, which tracks firms with strong CSR practices and excludes those with negative social impacts (Venkateswaran, Erhemjamts, & Li, 2013). Alongside these, national indices like the CSR Index for Croatian firms and CFIE Index for French companies (Ducassy, 2013) offer country-specific assessments. In contrast, India lacks a formal CSR rating index, although platforms like Karmayog.org made early efforts toward

such initiatives.

The multidimensional character of CSR is often acknowledged by reputation indices. Because of its extensive and well-known data on stakeholder management, MSCI KLD is the most often used index for assessing CSR (Coombs & Gilley, 2005). Data accessibility (which reduces the need for data-gathering effort) and firm-level comparability are the main benefits of indices. The indices also have numerous deficiencies. First of all, they are frequently created by for-profit businesses with their own goals and who may not always adhere to scientific procedures (Eijffinger & SmidJohan, 2004; Unerman, 2000). In connection with this, rating agencies typically only provide aggregated CSR ratings, despite the fact that sometimes just a subset of CSR traits may be of relevance to academics. The second significant deficiency is the restricted coverage of corporations by the rating agencies. Several indices only geographically cover a single nation or area. Such coverage is restricted, and not many companies are rated.

2.6.2 Content Analysis

"Corporate communication content" analysis is the second most well-liked technique for measuring CSR. Generally speaking, content analysis involves identifying the relevant components, gathering data on these constructs, and codifying qualitative data to create quantitative scales for use in subsequent statistical studies (Erin et al., 2022). "Content analyses" differ in terms of the "number of dimensions" assessed and the "amount of coding skill". Two fairly simple coding techniques include counting words or phrases in reports and publications concerning the specific CSR problem under examination (such as air pollution) and assigning binary variables (’0’ and ’1’) if a certain issue is addressed. Before calculating an integrated score when analysing several CSR dimensions, each dimension may be assigned a binary score (Abbott & Monsen, 2004). The flexibility of this approach for the researcher is its key advantage. A researcher may decide which

CSR traits are most important to them; they collect data in line with those dimensions and then numerically code the information for use in statistical analyses in the future. The main shortcomings of this approach are caused by the subjectivity of the researchers, which enters every stage of the research process, including the selection of the CSR "characteristics of interest", "data collection", "interpretation", and "coding". The prejudice in reporting is another significant flaw. Many organizations don't report on their CSR efforts even though they do them since CSR reporting is primarily voluntary. Of course, the researcher is likely to miss such activities. Even if the companies do disclose CSR-related data, this information has to be carefully examined since perception management is a common practice used by companies to skew reporting in their favour (Cadez & Guilding, in press; Turker, 2009). The researcher must be familiar with the CSR efforts. Or, the report should be independently verified.

2.6.3 Questionnaire-based surveys

When a firm is not rated by the "rating agency" and when corporate reports are unavailable or inadequate for meaningful content analysis, a questionnaire-based survey is usually employed. When conducting primary research on CSR through interviews or surveys, researchers receive the benefit of flexibility in data collection in similar relevant dimensions as content analysis. However, this approach has significant limitations, especially response bias and attitude bias. The response comes with prejudice when companies active in socially responsible behavior are more likely to participate in such studies, and less responsible firms may not respond (Cadez & Czerny, 2016). The attitude bias, in turn, is identified when the respondents give socially desirable reactions, which fail to catch their actual practices, thus reducing the validity and reliability of the data collected.

2.6.4 One-Dimensional Measures

- CSR indices that usually focus only on one dimension, such as philanthropy or environmental practices, fail to catch the multidimensional nature of CSR (Sethi et al., 2023; Carroll, 1979).
- These indices are widely used because of the ease of data accessibility, and where complete CSR reporting is unavailable (Nepal and Deb, 2022; Baladur, 2016).
- The use of one-dimensional constructs, however, may be technically incorrect, in that they do not capture the overall CSR engagement in various fields such as employee welfare, community development, or ethical governance (Palaniappan, 2017; Bansal and Sharma, 2016).
- As an illustration, a company may have a high score on employee initiatives but fail to meet environmental obligations, which attracts skewed CSR rating using single-dimensional models (Varshney et al., 2012).
- As a result, such operationalizations risk misclassifying firms as either highly responsible or irresponsible, when in fact their performance may be average across multiple CSR dimensions (Sethi et al., 2023; Black et al., 2015).

Hence, multidimensional frameworks that incorporate economic, legal, ethical, and discretionary dimensions are essential for accurate CSR assessment, particularly in diverse emerging economies like India (Nepal & Deb, 2022; Palaniappan, 2017).In the current research, a comprehensive CSR index is constructed based on CSR disclosures made as per "Schedule VII of the Companies Act" and based on the CSR amount spent. Content analysis is used to construct CSR Index.

2.7 Approaches for measuring Corporate Financial Performance

The performance of a company can be divided into two categories, as per Mowen and

Hansen (2005): financial & non-financial performance. The levels of quality are tied to non-financial performance characteristics such as the productivity of employees and the satisfaction of customers. In a similar fashion, it is common practice to discuss the financial performance of a company in terms of numerical values or metrics that are expressed in monetary units. These values and metrics may include things like turnover, employment growth, sales growth, or profitability during a specific time period (Orlitzky, 2003; Havnes & Senneseth, 2001). According to Al-Soub, Alamro, and Almajali (2012), financial performance measures a firm's accomplishments and performance over a certain time frame. Performance measurement aims to collect useful data to understand the movement of money, its efficiency, and how effectively it is used to make profits. Assessing financial performance inspires supervisors to make wise business decisions.

Usually, accounting—or market-based indicators are utilized to measure FP. Table 2.3 provides an overview of the commonly used indicators by scholars. Each measurement indicator has both a good and a bad quality. The accounting-based metrics are widely available and fairly similar to those of all organizations. Market-based measures have the key advantage of being current. Thus, they examine CSR improvements faster than accounting-based metrics.

Table 2.3: **Financial metrics**

Accounting based	**Market based**	**Accounting cum market-based**
ROA	Stock returns	Tobin's Q
ROE	Market value	MVA
ROCE		
ROS		
Net operating income		
PAT		

Source: Based on literature review, Author's summary.

Measures on the basis of accounting have historical constraints. Additionally, total categories (such as PAT) do not take into account firm size, and relativized accounting ratios like ROA may be prejudiced if the sample contains businesses from various sectors (because of the variable age and structure of assets between industries (Al-Tuwaijri *et al.*, 2004). The biggest disadvantage of market-based measures is that they are only available to publicly listed corporations. For instance, comparing the Return on Assets (ROA) of a capital-intensive steel company with a tech startup may be misleading, as their asset bases differ significantly due to industry structure. Similarly, metrics like Profit After Tax (PAT) may overstate performance for a large firm compared to a smaller one, even if the latter is more efficient. Additionally, market-based measurements are subject to systematic (non-firm-specific) market circumstances, such as recession, than accounting-based indicators, which are too company-specific (unsystematic) opinions of CSR (McGuire, 1988). Indicators like MVA (market value-book value of equity and debt) or Tobin's Q (market value/total assets) have been used by some researchers to combine the two types of measurements (Guiral, Rodgers, & Choy, 2013; Canela, Garcia-Castro, & Ario, 2010). Others have also tried to develop an integrated index by combining several current indicators to provide a thorough evaluation of financial performance. Using multiple FP measures has become more commonplace recently.

Considering the objective of assessing how CG and CSR influence firms' operational effectiveness and shareholder value creation, this research employs PAT, Return on Assets (ROA), ROCE, RONW, EPS to represent operational efficiency and profitability, while Tobin's Q, Stock returns, market capitalization are used to capture market valuation and future growth expectations.

2.8 Research Gap

This literature review identifies key gaps in understanding the intricate relationship between CG, CSR, and FP. Although several research works have been conducted on

these concepts, there has not been a thorough study on how these concepts interact. The study summarises the literature available to identify gaps where future studies are necessary, especially in consideration of the emerging markets. The current literature implies that the relationship between CG and CSR and financial outcomes is complex and multifaceted, and it depends on a number of factors.

2.8.1 The Role of CG, CSR and FP in Emerging Markets

Although several studies explore corporate governance (CG) and its relationship with CSR and financial performance (FP), limited research exists on this interplay in emerging markets, particularly India (Akhter et al., 2024; Kabir & Thai, 2017). Governance structures in developing economies often exhibit unique features shaped by institutional voids, regulatory evolution, and sociocultural dynamics (Vuppuluri & Pandey, 2024; Akhter, 2023). While Vietnam and China have received some attention, the Indian context—especially post-Companies Act 2013—remains underexplored in terms of how board attributes such as size, independence, and gender diversity impact CSR and FP outcomes (Vuppuluri & Pandey, 2025; Kabir & Thai, 2017). A chronological review of regulatory shifts in India (see Appendix I) underscores the need to examine evolving governance norms in relation to CSR mandates and firm performance trajectories.

2.8.2 Mediating Role of CSR in the CG–FP Relationship

CG -FP relations are displayed on a large scale worldwide, although the theoretically undeveloped and experience in India is ambiguous (Vuppuluri & Pandey, 2024; Akhter, 2023). Existing Indian studies confirm partial or full mediation effects depending on financial indicators like PAT and Tobin's Q, yet industry-wide generalizability is lacking. In addition, some work examined how the CSR translates the governance mechanism into tangible financial benefits in regulated areas such as banking and manufacturing (Akhter et al., 2024; Freire et al., 2020). As CSR is now mandatory in India, additional studies are

required to question its sectoral mediation effect in the governance models for Indian industry.

2.8.3 The Industry-Specific Effects on CSR FP relationship

Financial implications of CSR in various sectors are an important yet poorly researched issue, especially in India's asymmetric industrial environment (Kaur and Singh, 2021; Nirino et al., 2020). Indian research highlighted strong CG FP relation in banking and manufacturing (Vuppuluri and Pandey, 2025); However, other industries such as IT, services and heavy industries are not discussed analytically. In addition, the needs of individual stakeholders, regulatory requirements, and ESG risks should be well studied (Kaur and Singh, 2021 2021; Kludacz-Alessandri et al., 2021). Various case studies provided by Indian steel and food industries suggest that CSR effectiveness differs in each industry, which means that the relationship between CSR and FP should be studied more specifically based on the industry.

2.8.4 The Inconsistencies in CG and CSR Measurement

Current measurement techniques for CG and CSR lack standardization, undermining comparability across Indian firms and sectors (Chatterjee & Nag, 2022; Awaysheh et al., 2020). Despite India’s increasing disclosure mandates post-2013, self-constructed indices and inconsistent scoring methods persist, making it difficult to gauge governance quality or CSR efficacy accurately. Moreover, firm-level CSR ratings often cluster around the mean and miss sectoral materiality, limiting their explanatory power in financial analysis (Awaysheh et al., 2020; Prince, 2014). There is an urgent need to develop reliable, context-sensitive CG/CSR indices suited to Indian regulatory, economic, and cultural realities.

2.8.5 Narrow focus on Different Financial Metrics

Most Indian studies use profitability or market-based metrics like ROA and Tobin's Q, ignoring broader financial dimensions such as liquidity, solvency, and efficiency (Vuppuluri & Pandey, 2024; Freire et al., 2020). CSR's multifaceted financial effects—especially short-term costs versus long-term value creation—are rarely captured through these narrow indicators (Kludacz-Alessandri et al., 2021; Nirino et al., 2020). After ESG integration and after post-COVID financial pressures, multidimensional financial models that assess the impact of CSR on liquidity, asset use and risk profiles within Indian contexts are required.

2.8.6 Limited use of AI/ML in predictive modelling

While AI and ML techniques have been deployed internationally to assess the CG and Financial Crisis (Meng et al., 2024), the Indian CG Research remains largely statistical and regression-based. This gap in methodology limits the future understanding of CG-CSR-FP relationship under the complexity of the real world. No known Indian studies have employed models like XGBoost, Random Forest, or SHAP for interpreting firm-level performance outcomes driven by governance or CSR factors (Meng et al., 2024; Awaysheh et al., 2020). Bridging this gap through AI-enhanced modeling will enable better forecasting and policy alignment in India's fast-digitizing corporate environment.

Literature in the last decade, mainly in the Indian context, has identified the primary research gaps, which are summarized in Table 2.4 along with how this research addresses them.

Table 2.4: Research Gap Identification

S no	Research Gap	References	How this research has addressed
1	Assessing the influences of CG practices on different sectors of the Indian economy.	Anas & Alam (2019); Kavitha and Nandagopal (2013); Sultana (2020); Bag & Omnare (2022); Vuppuluri & Pandey (2025)	Impact on different industries is analysed
2	Conduct longitudinal approaches to observe the effect of CG practices on CFP over time.	Raithatha & Bapat (2012); Bijalwan & Madan (2013); Padhi (2019) Jarboui *et al.* (2023) Rui Coelho et al. (2023)	Ten years of data is analysed from 2014 to 2023 since the introduction of new Companies Act
3	The research is based on data from a limited sample size, which may not be representative of all Indian companies.	Raithatha & Bapat (2012)	Total of 357 companies are studied from BSE 500, representing 11 industry sectors.
4	Examining the implications of ESG factors on CG in India.	Kavitha and Nandagopal (2013); Rajiah-Benett (2020)	The interplay of CG, CSR, and CFP is analysed

5	Extend the study to include additional performance measures like EPS and EVA.	Mishra, Jain, & Manogna (2021)	Seven dependent variables are taken for analysis, for which factor analysis is done.
6	Broader spectrum of variable for constructing CGI	Arora & Bodhanwala (2018)	Wide spectrum of attributes is taken by content analysis to construct the CGI.
7	Use of AI for predictive modelling	Meng et al. (2024)	Three different ML methods are used along with innovative stacking ensemble.

2.8.7 Novelty of the Study

- **Mediating Role of CSR** – Most existing studies focus on the direct relationship between CG and CFP, but very few have explored the mediating effect of CSR. This research highlights the gap by examining whether CSR acts as a bridge between CG and CFP.
- **Comprehensive Approach** – Previous studies primarily used individual FP indicators such as ROA, ROE, or Tobin's Q. This study adopts a broader perspective by considering multiple FP measures, offering a more holistic understanding of the governance-performance relationship.
- **Advanced Analytical Techniques** – While previous research predominantly relied

On panel regression and random effects models, this study employs more sophisticated statistical and econometric techniques (e.g., mediation analysis) to uncover deeper insights into the CG-CSR-FP nexus.

- **Strategic Insights** – The study not only investigates the theoretical relationship between CG, CSR, and FP but also provides actionable insights for corporate managers and policymakers to optimise governance and CSR strategies for improved financial outcomes.
- **Use of AI** - This study introduces an innovative stacking ensemble combining XG-Boost, CATBoost, and Random Forest to enhance predictive modeling in financial distress analysis. Additionally, SHAP analysis is employed to improve interpretability, ensuring both robust performance and deeper insights.

2.9 Development of hypothesis through literature

2.9.1 Corporate Governance and Financial Performance

Corporate governance mechanisms encompass a wide spectrum of internal and external dimensions that are widely theorized to reduce agency costs and thus elevate firm value (Al-Ahdal & Hashim, 2022; Das & Dey, 2016; Prince, 2014). Despite extensive scholarly efforts, a standardized and universally accepted method for measuring corporate governance quality remains elusive, with most researchers resorting to self-constructed indices tailored to specific contexts (Sethi, Sahu & Maity, 2023; Chatterjee & Nag, 2022; Nepal & Deb, 2022). Cross-national studies have frequently probed into the governance–performance link, but the results have lacked consistency, partly due to varying corporate governance systems and institutional environments (Palaniappan, 2017; Baladur, 2016; Bansal & Sharma, 2016). This fragmented evidence base necessitates a critical review of

empirical efforts that seek to quantify governance effectiveness through composite indices and their linkages with firm performance outcomes.

Emerging market evidence suggests that well-governed firms command higher market valuations, as composite Corporate Governance Index (CGI) scores exhibit a positive association with financial outcomes such as Tobin's Q and share price performance (Arora & Bodhanwala, 2018; Black, Jang & Kim, 2015; Varshney et al., 2012). Nevertheless, such relationships are neither universal nor robust across performance dimensions or measurement approaches. For example, while Bhattacharya & Rao (2008) argue that Clause 49 implementation in India improved governance quality, their results paradoxically indicate reduced volatility and returns for larger firms, casting doubt on whether regulatory interventions alone yield sustained firm value enhancement (Chatterjee & Nag, 2022; Nepal & Deb, 2022). The literature reflects considerable heterogeneity in both the dimensions included in CGI construction and the empirical methods employed, suggesting a lack of consensus about the true performance implications of corporate governance reforms.

Much of the extant research emphasizes board and ownership structures as proxies for governance practices, yet the causal linkages with firm performance remain ambiguous and highly context-sensitive (Sethi et al., 2023; Al-Ahdal & Hashim, 2022; Bansal & Sharma, 2016). Arora & Sharma (2016) identified a dualistic pattern: board size negatively correlated with Return on Assets but positively with Tobin's Q, while promoter ownership adversely affected Tobin's Q, yet board meetings positively influenced it—highlighting the nuanced and sometimes contradictory influence of governance mechanisms. Similarly, Vafeas (1999) found that increased board meetings correlated inversely with firm value, possibly due to inefficiency or symbolic compliance, a conclusion echoed in later studies that question the effectiveness of formal board activities as true governance enablers (Chatterjee & Nag, 2022; Palaniappan, 2017).

2.9 Development of hypothesis through literature

Board independence is frequently valorized as a governance best practice, yet its performance effects are mixed. Mishra & Kapil (2018) reported a positive association with Return on Assets, implying that independent oversight can constrain managerial opportunism, though this is not uniformly observed across sectors or markets (Das & Dey, 2016; Prince, 2014). In contrast, Brick and Chidambaran (2010) emphasized board activity over independence as the true driver of firm value, a claim that receives partial validation in the Indian context where board activism often substitutes for institutional weaknesses in enforcement (Arora & Bodhanwala, 2018; Varshney et al., 2012). Ownership structure further complicates the picture: while Ganguli & Agrawal (2009) revealed a negative relationship between non-promoter ownership and Tobin's Q, Mishra et al. (2020) reported a strong positive link between promoter ownership and Return on Assets, reflecting the classical trade-off between control concentration and minority shareholder protection (Al-Ahdal & Hashim, 2022; Neelak, 2022).

Comparative studies adopting composite indices to capture governance breadth also yield divergent outcomes. Shahwan (2015), in the Egyptian context, constructed a CGI incorporating disclosure, board composition, investor relations, and ownership structure, but found only marginal correlation with Tobin's Q, suggesting that governance improvements do not automatically translate into market performance (Das & Dey, 2016; Prince, 2014). Bhatt and Bhatt (2017), using a survey-based weighted scoring system for Malaysian firms, identified significant positive correlations between CGI and both Return on Assets and Return on Invested Capital, yet such findings are difficult to generalize due to their dependence on subjective scoring (Baladur, 2016; Bansal & Sharma, 2016).

Methodological sophistication does not necessarily yield clarity. Akbar et al. (2016), employing a dynamic system GMM model on a UK firm panel, found no significant relationship between CGI and firm performance, a result they attribute to earlier studies' failure to model the dynamic and endogenous nature of firm behavior. Similar skepticism is echoed by da Silva and Leal (2005), who used static panel models for Brazilian firms and reported a strong CGI–ROA correlation but

only a marginal association with Tobin's Q, suggesting that governance effects are more visible in operational performance than in market metrics (Sethi et al., 2023; Neelak, 2022).

In the Indian context, Varshney et al. (2012) constructed a CGI using a weighted aggregation of internal and external governance variables, including promoter and institutional ownership, board size, and market share. Their findings showed a positive link between CGI and Economic Value Added, but little correlation with other performance metrics, raising questions about the appropriateness of CGI as a comprehensive performance predictor (Chatterjee & Nag, 2022; Nepal & Deb, 2022). Arora & Bodhanwala (2018) extended this framework using a random effects panel model and observed a strong positive correlation with Return on Net Worth but statistically insignificant associations with Return on Assets and Earnings Per Share, thus reinforcing the inconsistencies plaguing the governance–performance discourse (Al-Ahdal & Hashim, 2022; Bansal & Sharma, 2016).

In sum, while the effort to capture corporate governance through multidimensional indices is commendable, the empirical literature remains inconclusive due to methodological differences, context-specific governance realities, and varying firm performance metrics. The absence of a universally accepted CGI format and the inconsistent predictive validity of governance indicators across studies call for a more nuanced, theory-driven, and sector-specific approach to evaluating corporate governance quality (Sethi et al., 2023; Chatterjee & Nag, 2022; Neelak, 2022).

Table 2.5: Findings by authors using different CG characteristics

S No	Author	Findings
1	J. B. Prince (2014)	The study examines the impact of non-mandatory CG disclosures on Indian firms' performance, using a sample from BSE100. The authors developed a Corporate Governance Index (CGI) to measure disclosure scores. The results show a weak yet significant relationship between CGI and market value, but no impact on accounting performance.
2	Surya Baladur G. C. (2016)	The study examines the interdependence of CG, corporate capital structure, and CFP in India. Results show that good CG practices positively impact CFP, while larger board sizes, promoter ownership, and financial leverage negatively affect performance. The study also reveals that ownership structure significantly influences CG practices, with ownership concentration negatively impacting governance.

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Table 2.5 – Continued from previous page

S No	Author	Findings
3	Bansal, N., & Sharma, A. K. (2016)	Using fixed-effects panel data analysis, this research evaluates the impact of audit committee dynamics (independence, meeting frequency) and CG factors (duality, promoter ownership, board composition, size) on firm performance in the context of India's 2013 Companies Act. The sample comprises 235 non-financial NSE 500 firms (2004–2013). Outcome highlights a strong positive correlation between board size and the dual role of CEO and chairman with firm performance. However, audit committee characteristics (independence and frequency of meetings) do not significantly influence CFP.
4	Arindam Das & Sourav Dey (2016)	The study assesses the role of CG factors in firm performance in large Indian corporations. Findings suggest that director interlocks positively impact CFP, market valuation, and shareholder returns. Larger boards, the presence of women, and active participation in board meetings also serve as a significant influence.

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Table 2.5 – Continued from previous page

S No	Author	Findings
5	Palaniappan G (2017)	The research explores the effect of board characteristics on CFP in manufacturing firms in India, finding an inverse association between board size and performance indicators, and a significant negative influence of board size on return on equity and assets.
6	Waleed M. Al-Ahdal and Hafiza Aikash Hashim (2022)	The study examines the effect of audit committee characteristics and external audit quality on the performance of non-financial public limited companies listed on the National Stock Exchange 100. Results show no evidence of audit committee characteristics improving Indian firms' performance, but external audit quality positively impacts CFP.
7	Sethi, P., Sahu, T. N., & Maity, S. (2023)	The study examines the relationship between CG parameters like board independence and board meetings, leverage, liquidity, and firm size. It considers data from 76 non-financial firms in India from 2010-2019 and finds no significant impact on firm performance. Board independence has a positive relationship with asset utilization ratio, while board meetings have a negative relationship with CFP.

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S No	Author	Findings
8	Chatterjee C.; Nag T. (2022)	The study reveals that the presence of a woman director on boards doesn't significantly impact CFP. However, women on company boards positively contribute to CFP and economic value creation. Larger boards and independent directors do not necessarily improve performance. Indian companies with largest CEOs and chairpersons outperform those with CEO duality.
9	Neelak, N. G. (2022)	The study found that higher board size and board meetings improve decision-making. However, no significant correlation was found between ROA, EPS, and NPM with board independence. Board meetings positively correlate with To-bin's Q and performance indicators, enhancing CG practices. Conversely, ROE, NPM, and CEO duality negatively correlate. The study suggests that proper CG practices can enhance performance and mitigate agency issues.
10	Nepal, M., & Deb, R. (2022)	The study found an upward trend in relations with board size and CFP, while a negative relationship exists between board independence and CFP. Audit committee characteristics like meeting frequency and external audit quality significantly impact performance.

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S No	Author	Findings
11	Mishra A.K.; Mangena R.L.; Jain S.(2023)	The study examines how CG factors like board size, promoter ownership, or board duality impact CFP. Results indicate that, on one hand, board meetings are negatively influenced by firm performance.

Table 2.6: Findings by authors using comprehensive Corporate Governance Index

Sl no	Author	Findings
1	Pankaj Varshney (2012)	The study assesses the impact of CG on business performance in the Indian market. It constructs a CGI based on internal and external governance mechanisms and uses EVA as the primary performance measure. Using various econometric techniques, the study concludes that there is a positive influence between CG and firm performance when measured in terms of EVA, but not for traditional performance tools like "RONW, ROCE, or Tobin's Q".
2	Supriti Mishra and Pitabas Mohanty (2014)	In order to determine the connection between CG and CFP, the study looks at CG concerns in India. In contrast to the legal compliance indicator, the board and proactive indicators have a substantial impact on the firm's performance. The performance of the firm is well predicted by the composite CG indicator.
3	Akshita Arora, Shernaz Bodhanwala (2018)	The study found a significant positive relationship between CGI and firm performance. The analysis showed that firms with higher CGI scores had better metrics, such as RONW and ROA. However, there was no significant relationship between CGI and ES. The study suggests that maintaining high governance standards can improve firm performance and reduce funding costs.
4	Aswini Kumar Mishra, Shikhar Jain, R. L. Manogna (2021)	CG significantly impacts firm performance in Indian non-financial firms, pos- itively impacting accounting-based measures like ROA and RONW, and negatively impacting market-based measures like Tobin's Q.
5	Farooq, M., Noor, A., & Ali, S. (2022)	Positive impact of CG on accounting return and Tobin's Q; little effect on ROE; larger firms benefit more from better governance than smaller firms.

From the above discussion, the null and alternative hypotheses are developed based on objective 1 : **To study the impact of Corporate Governance on CFP**.

The mixed findings in the literature justify testing the hypothesis on the corporate governance and financial performance link. While studies like Nepal & Deb (2022); Baladur (2016) and Das & Dey (2016), report a positive impact of governance factors such as board size, interlocks, and audit quality on firm performance, others such as Sethi et al. (2023), Al-Ahdal and Hashim (2022) and Prince (2014) find weak or no significant effects. Additionally, conflicting results on board independence and CEO duality (Mishra et al., 2023; Neelak, 2022) further support testing both H_{01} and H_{11}, as CG impacts appear context- and variable-specific.

- **Null Hypothesis (H_{01}):** Corporate Governance has no significant impact on Corporate Financial Performance.
- **Alternative Hypothesis (H_{11}):** Corporate Governance has a significant impact on Corporate Financial Performance.

2.9.2 Corporate social responsibility and financial performance

The impact of mandatory CSR expenditure on the performance of Indian firms remains a complex issue, as existing research presents mixed findings and emphasizes the role of several influencing factors. While studies by Barman & Mukherji (2024), Kesari & Sharma (2023) and Kaur & Dave (2020), report a positive correlation between CSR activities and FP metrics like ROA, ROE, and ROI, others suggest a more nuanced picture. Hayat et al. (2022) and Fahad & Asad (2021) find a negative relationship, especially in smaller firms or those with limited CSR disclosure. Similarly, Sharma & Chakraborty (2024) and Kaur & Singh (2021) report weak or negative correlations, urging a re-

evaluation of CSR strategies in India. Nayan (2023) and Kwek (2022) present mixed findings, where CSR spending improves profitability but shows inconsistency across broader metrics like ROCE or Tobin's Q. Mittal (2023) and Maqbool & Huraiti (2022) further support the idea of non-linear or bi-directional relationships, indicating CSR's impact may evolve over time or be influenced by previous financial success. Overall, the evidence suggests that CSR's effect is not uniform and may depend on industry characteristics, firm size, disclosure quality, and the strategic alignment of CSR initiatives.

Table 2.7: Details of Literature Review of Articles with Indian Sample After the Introduction of Mandatory CSR

S no	Author(s)	Methodology	Type of Relationship	CSR Measurement	CFP Measurement	Findings
1	Babitha Rohit-Prakalpa Pinto (2021)	Correlation and regression analysis	Positive	CSR Expense	NP, ROA, ROE, ROCE, EPS	There is a very high correlation between CSR spending and net profit for Oil and Gas, Chemicals, and Consumer durables sectors. EPS is negatively correlated with CSR expenses for all sectors except Consumer durables.

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S no	Author(s)	Methodology	Type of Relationship	CSR Measurement	CFP Measurement	Findings
2	Bag and Omrane (2022)	Factor analysis and regression analysis; Durbin-Watson Test	Mixed	CSR Expenses	Net Sales (NS), Net Profit (NP), Market Capitalization (MC), Earnings Per Share (EPS), Return on Equity (ROE), Operating Profit (OP) through factor analysis	CSR activities have a significant impact on CFP, leading to improved competitiveness, increased business image, and higher employee and customer loyalty.
3	Garg, A. & Gupta, P. K. (2020)	One-way ANOVA, Levene's Test, Tukey's HSD Test	Negative	CSR Expenses	EVA, cumulative stock returns	Mandatory CSR spending does not enhance firm profitability. Public sector firms have lower performance, and private sector firms do not show significant differences.

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S no	Author(s)	Methodology	Type of Relationship	CSR Measure-ment	CFP Measure-ment	Findings
4	Jha, A. & Desai, V. S. (2020)	Partial Least Squares Structural Equation Modeling (PLS-SEM)	Positive	Institutional pressure, CSR implementation	-	Statistically significant relationship between CSR performance and CFP. CSR improves financial outcomes. CSR efforts enhance a company's reputation and stakeholder relationships.
5	Singhania, S., Arora, A., & Sar-dana, V. (2024)	Content analysis to create a CSR reporting index; panel data analysis using GMM	Mixed The mixed relationship implies that CSR reporting enhances internal profitability (ROA) but may reduce perceived market value (Tobin's Q).	CSR index based on Schedule VII disclosures	ROA, Tobin's Q	Positive impact of CSR reporting on ROA, but negative on Tobin's Q.

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S no	Author(s)	Methodology	Type of Relationship	CSR Measurement	CFP Measurement	Findings
6	Kaur, R. & Dave, T. (2020)	Fixed effect regression analysis	Positive	CSR expenditure from csrhub.com	PAT, ROA, ROE, ROCE	CSR activities improve firm profitability. A higher CSR score is correlated with better performance. CSR compliance significantly enhances financial metrics.
7	Barman, S. & Mukherji, A. (2024)	Dynamic panel data models	Positive	Natural log of actual CSR expenses variable of 1 if disclosed	ROA, ROE, ROCE	CSR-performance sensitivity exists. CSR expenses significantly improve CFP.

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S no	Author(s)	Methodology	Type of Relationship	CSR Measure-ment	CFP Measure-ment	Findings
8	Hayat, N., Naim, M., Yunay, A. (2022)	Ordinary Least Squares Regression with Fixed Effects Model	Negative	CSR % spent, experience, and number of board meetings	Tobin's Q and ROA	CSR spending negatively affects firm performance. Firm size moderates the CSR-performance link.
9	Fahad, P. & Asad, S. A. (2021)	Correlation Analysis	Negative	Voluntary disclosure scores from Bloomberg	ROA, ROE, Divi-dend per share, To-bin's Q	Negative correlation between CSR disclosure and CFP. The reverse effect observed in firms with lower CSR disclosure.

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S no	Author(s)	Methodology	Type of Relationship	CSR Measure-ment	CFP Measure-ment	Findings
10	Biswrat Kesari-Ranjan Sharma (2023)	Regression correlation analysis	Positive	CSR supplements like employee stock ownership, CSR disclosure, stakeholder management	ROA, ROE, ROI, LR	CSR positively influences CFP, particularly through ROA. Other factors also play a crucial role.
11	Deepu Sharma & Suman Chakraborty (2024)	Random effects panel regression	Negative	CSR disclosure from Corporate Responsibility Index and weighted CSR spending on projects	ROA, ROCE, ROE	Negative relationship between CSR and CFP. Suggests rethinking CSR strategies in India.

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S no	Author(s)	Methodology	Type of lationship	CSR Measurement	CFP Measurement	Findings
12	Nayan, N. (2023)	Panel analysis using regression techniques	Mixed The findings imply that while CSR spending can boost profitability, its effects on broader financial metrics like sales and ROCE remain inconsistent.	CSR Expenses	Net sales, Net profit, ROCE	Positive impact of CSR spending on profits but mixed results for other metrics.
13	Kaur, N. & Singh, V. (2021)	Panel mixed regression and ANOVA	Negative	CSR disclosure scores	ROA,	Weak correlation between CSR and CFP.
14	Kwek, K. M. (2022)	Regression panel analysis	Mixed CSR enhances accounting-based performance like ROA and ROE but has limited influence on market-based	CSR disclosure	ROA, ROE, Tobin's Q	Positive impact of CSR on accounting-based performance but weak impact on market-based performance.

			measures such as Tobin's Q.			
15	Maqbool, S. & Huraiti, S. A. (2022)	Regression with fixed effects	Bi-directional The bi-directional relationship suggests that CSR improves financial performance and is also strengthened by prior financial success.	ESG indicators from Bloomberg	ROA	CSR positively impacts current and future CFP.

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S no	Author(s)	Methodology	Type of Relationship	CSR Measurement	CFP Measurement	Findings
16	Kaur, S. & Punieta, G. B. & Bhullar, P. S. (2022)	Pearson correlation tests	Negative	CSR Expenses and CSR disclosure	EPS, ROA, ROE, Tobin's Q	CSR spending has a negative impact on Tobin's Q.
17	Koel Mittal (2023)	Panel data regression with fixed effects	Non-linear The non-linear relationship implies that CSR's financial benefits may emerge gradually over time, with unclear or limited short-term effects.	CSR index based on weighted elements	ROA, ROE, Tobin's Q	Mixed results; CSR positively impacts long-term growth but short-term impact is unclear.
18	V. D. Rao & K. S. (2022)	Regression Discontinuity Design	Negative	CSR expenditure threshold	Long-Term Investor Value (LIV), Tobin's Q	Small CFP improvements for firms exceeding CSR thresholds.

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S no	Author(s)	Methodology	Type of Relationship	CSR Measurement	CFP Measurement	Findings
19	Shafiat Subhan & Abu Bakar (2019)	U-shaped regression model	U-Shaped The U-shaped model implies that initial CSR efforts may reduce performance, but substantial and sustained CSR leads to significant financial gains.	Directors' ESG track record	ROA, ROE, Total Returns (TR)	CSR improves performance only beyond a threshold.
20	Nair, A.K.S. & Bhattacharyya, S. (2019)	Difference-in Differences	Insignificant	CSR index	ROA, ROE, Tobin's Q	Mandatory CSR has no significant impact on CFP.

2.9.3 The Nuances of the Relationship

Although numerous studies suggest that CSR positively affects CFP, some have reported mixed or even negative results. These inconsistencies underscore the complex nature of the CSR–FP relationship and emphasize the role of diverse factors like firm size, industry characteristics, and the specific CSR initiatives undertaken.

Negative relationship

Several studies highlight that mandatory CSR negatively affects FP. Oware (2022) and Iddrisu (2021) find that mandatory reporting reduces stock returns without significantly influencing Tobin's Q. Garg & Gupta (2020) challenge instrumental stakeholder theory, arguing that mandatory CSR offers limited benefits. Hayat et al. (2022) find negative effects for small-cap firms, with positive outcomes only for large-cap firms. Fahad & Busru (2021) report that CSR disclosure lowers profitability and firm value in India, as firms prioritise short-term gains over CSR due to high competition and low consumer awareness. Kaur et al. (2023) describe mandatory CSR as tax-like, lacking strategic value. Some findings also reveal a U-shaped relationship.

In Indian companies, CSR and FP show complex patterns. Maqbool & Bakr (2019) find a U-shaped link, where early CSR investments reduce performance, but later efforts improve ROE and ROCE. Beloskar & Rao (2022) also confirm non-linear effects. Bhatnagar et al. (2023) note an inverted U-shape, where gains decline after a point. Maqbool & Hurrah (2021) find a bi-directional relationship, with CSR boosting present and future FP, while firm success also supports CSR, especially its social aspect. Bag & Omrane (2022) stress the importance of substantive CSR in India for improving image and profitability. Rohith & Pinto (2021) report strong links between CSR and profits in

specific sectors, though EPS is negatively affected except in consumer durables. Oduro et al. (2022) argue CSR's impact varies by sector and initiative. Susilawati et al. (2024) find that environmental CSR significantly increases profits, suggesting firms should emphasise environmental efforts where outcomes are more tangible and financially rewarding.

Both internal and external factors influence the relationship between CSR and FP. These factors include competitive strategy, innovation capability, and firm risk. The effect of CSR on FP varies across organizations depending on their CSR engagement and performance levels. Despite this, research exploring the CSR–FP relationship remains limited, with few studies focusing on contextual or situational variables. Several studies have shown that CSR impacts financial outcomes indirectly through mediating factors, encompassing marketing competence, competitive advantage, innovation, and managerial effectiveness.

Based on the theories discussed above and existing literature, based on objective 2: **To analyze the impact of Corporate Social Responsibility on Corporate Financial Performance**, following null and alternative hypothesis are developed.

Despite extensive literature on the CSR–FP link, existing studies show mixed results due to varied methodologies, metrics, and sectoral focuses (e.g., Barman & Mukherji, 2024; Bag & Gupta, 2022; Garg & Gupta, 2020). This inconsistency highlights the uniqueness of testing H_{02} and H_{12}, which objectively assess the CSR–FP impact without presupposing a directional outcome.

- **H_{02}**: Corporate Social Responsibility (CSR) has no significant impact on Corporate Financial Performance (CFP).
- **H_{12}**: Corporate Social Responsibility (CSR) has a significant impact on Corporate Financial Performance (CFP).

2.9.4 The mediating role of Corporate social responsibility

The relationship between CG, CSR, and CFP has been widely discussed in the literature. Studies indicate that good CG positively influences FP, both directly and through CSR as a mediating factor (Sarwar et al., 2022). Effective CG promotes ethical and responsible behavior, which enhances CSR practices (Ibrahimov & Omarova, 2020; Ida Bagus *et al.*, 2019; Bolourian *et al.*, 2021). Additionally, strong CG fosters better CSR engagement, which in turn contributes to improved FP (Fahad & Rahman, 2020; Tarigan & Stacia, 2019). Engaging in socially and environmentally responsible activities is consistently linked to enhancing competitiveness and FP (Fuadah & Kalsum, 2021; Qureshi *et al.*, 2020; Kartika *et al.*, 2019). Research suggests that CSR plays a mediating role in the relationship between CG and FP. Studies have found that CG positively influences CSR, which in turn enhances FP (Nura & Tasman, 2023; Hossain *et al.*, 2016).

Table 2.8: Findings by authors on mediating role of Corporate Social Responsibility

S. No	Authors	Methodology	Findings
1	Pham V.L.; Ho Y.-H. (2024)	Analyzed panel data from 173 Taiwanese companies (2009-2021). **Data Source:** Utilized the Refinitiv database, known for its extensive ESG indicators and transparent data calculation methods. **Modeling Approach:** Employed a static panel approach model using Stata 14 software, specifically the `xtgls` command, to address variable variance and autocorrelation through FGLS prediction models. **Statistical Analysis:** Conducted Hausman tests to determine the appropriateness of fixed versus random effects models, ultimately favoring fixed effects for more precise estimates.	The outcome depicts a positive correlation between independent directors and CFP, with ESG factors significantly mediating this relationship. Findings reveal that diversity in board composition and ESG commitments enhance governance quality and profitability. External pressures from regulators and markets are identified as primary drivers for embedding ESG into corporate strategies.

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S. No	Authors	Methodology	Findings
2	Anaplu Diana P.K.; Awutlah S.K.; Anaplu I.K.O.; Amayaw F.; Amoopsa E. (2023)	**Research Design:** A cross-sectional and quantitative approach was utilized, focusing on listed banks in the Ghana Stock Exchange from 2008 to 2021. **Sample Selection:** Nine banks were selected using a judgmental sampling technique from a total of thirty-five licensed commercial banks in Ghana. **Data Collection:** The study involved 392 respondents, including- executives, senior managers, And junior staff, and used audited annual reports to compute Value-Based CFP measures (EVA, MVA, CVA).	The outcome revealed that CG, CSR, and Corporate Accountability (CA_{CC}) positively and significantly affect Value-Based CFP (VBFP) (proxied by EVA, MVA, and CVA) of banks in Ghana. The outcome highlights that CSR and CA_{CC} mediate the relationship between CG and VBFP.

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S. No	Authors	Methodology	Findings
3	Akhter W.; Hassan A. (2024)	This study employs a GMM approach to analyse the correlation among CG, CSR, and firm performance.	The results reveal that board attributes, including "size, independence, and gender diversity, positively influence firm performance". All three components of ownership structure, namely "family, foreign, and institutional shareholdings", positively affect firm performance. CSR partially mediates the positive influence of CG and the firm's performance.

The relationship among Corporate Governance, Corporate Social Responsibility, and Financial Performance can be theoretically explained using Stakeholder Theory, Resource-Based View Theory, and Stewardship Theory. According to Stakeholder Theory, as emphasized by Freeman et al. (2021), organizations that practice sound governance consider the interests of all stakeholders and not solely shareholders. Such firms align their operations with ethical values and social and environmental concerns, promoting long-term sustainability and improving overall performance. From the perspective of the Resource-Based View Theory, good governance practices are seen as valuable intangible resources that support and enhance CSR efforts. As McGahan (2021) notes, CSR initiatives embedded within a framework of strong governance can serve as strategic assets that contribute to improved financial outcomes and competitive advantage. Stewardship Theory, on the other hand,

highlights the commitment of corporate leaders to organizational goals over personal gain. Klettner (2021) argues that board members act as stewards whose primary objective is to enhance firm value through responsible decision making, which in turn fosters effective governance and value creation. These theories collectively suggest that robust governance not only strengthens CSR practices but also drives financial performance. In line with this, the study proposes a hypothesis to examine whether CSR acts as a mediator between Corporate Governance and Financial Performance, supporting objective three of the research framework. Based on objective 3: **To assess the mediating effect of CSR between CG and CFP**, the following hypotheses are proposed.

- **Null Hypothesis (H_{03}):** CSR does not mediate the relationship between CG and Corporate Financial Performance.
- **Alternative Hypothesis (H_{13}):** CSR mediates the relationship between CG and Corporate Financial Performance.

Table 2.9 Hypotheses Table

Null Hypothesis (H_{01}): Corporate Governance has no significant impact on Corporate Financial Performance. Alternative Hypothesis (H_{11}): Corporate Governance has a significant impact on Corporate Financial Performance
Null Hypothesis (H_{02}): Corporate Social Responsibility (CSR) has no significant impact on Corporate Financial Performance (CFP). Alternative Hypothesis (H_{12}): Corporate Social Responsibility (CSR) has a significant impact on Corporate Financial Performance (CFP).
Null Hypothesis (H_{03}): CSR does not mediate the relationship between Corporate Governance and Corporate Financial Performance. Alternative Hypothesis (H_{13}):CSR mediates the relationship between Corporate Governance and Corporate Financial Performance.

The reviewed literature highlights a strong interconnection between corporate governance, CSR, and firm financial performance. Empirical evidence generally

supports the notion that well-governed firms with strong CSR practices tend to perform better financially. CSR often serves as a conduit through which governance mechanisms influence performance outcomes. In the Indian context, evolving regulatory requirements and increasing stakeholder pressure are pushing firms toward greater accountability and social responsibility. However, findings remain somewhat context-dependent, with variations across sectors and firm sizes. Overall, the literature suggests that integrating CSR into governance structures enhances long-term financial performance and aligns firms with broader sustainability goals. While the literature establishes significant bilateral relationships among governance, CSR, and performance, relatively limited research integrates these constructs within a unified mediation framework in emerging markets. This gap provides the foundation for the development of the study's hypotheses.

Chapter 3

Research methodology

This chapter depicts how the research is conducted to find out the impact of CG and CSR on FP. The research methodology outlines the systematic approach used to investigate the relationship between CG, CSR, and FP. It includes the research philosophy, research design, hypothesis testing, sample design and selection, data collection details, empirical models developed, and data analysis techniques used. Data processing includes descriptive statistical analysis, data cleaning, and outlier removal. Regression and predictive modeling assess relationships, with accuracy checks ensuring reliability. If accuracy is unsatisfactory, further data refinement is conducted as shown in Figure 3.1. The rationale behind this approach lies in the complexity and multidimensionality of the variables involved, which require both traditional statistical methods and advanced AI/ML (Artificial Intelligence and Machine Learning) tools for robust and predictive insights. Ethical considerations guide the entire analytical process.

3.1 Research Philosophy

Saunders *et al.* (2009), Sekaran (2003), and Cooper & Schindler (2003) all conclude that the systematic plan of inquiry in a study is determined by the philosophical approaches applied, which encompass the research design, data collection, and analysis techniques, as well as the interpretation of the results in response to research questions.

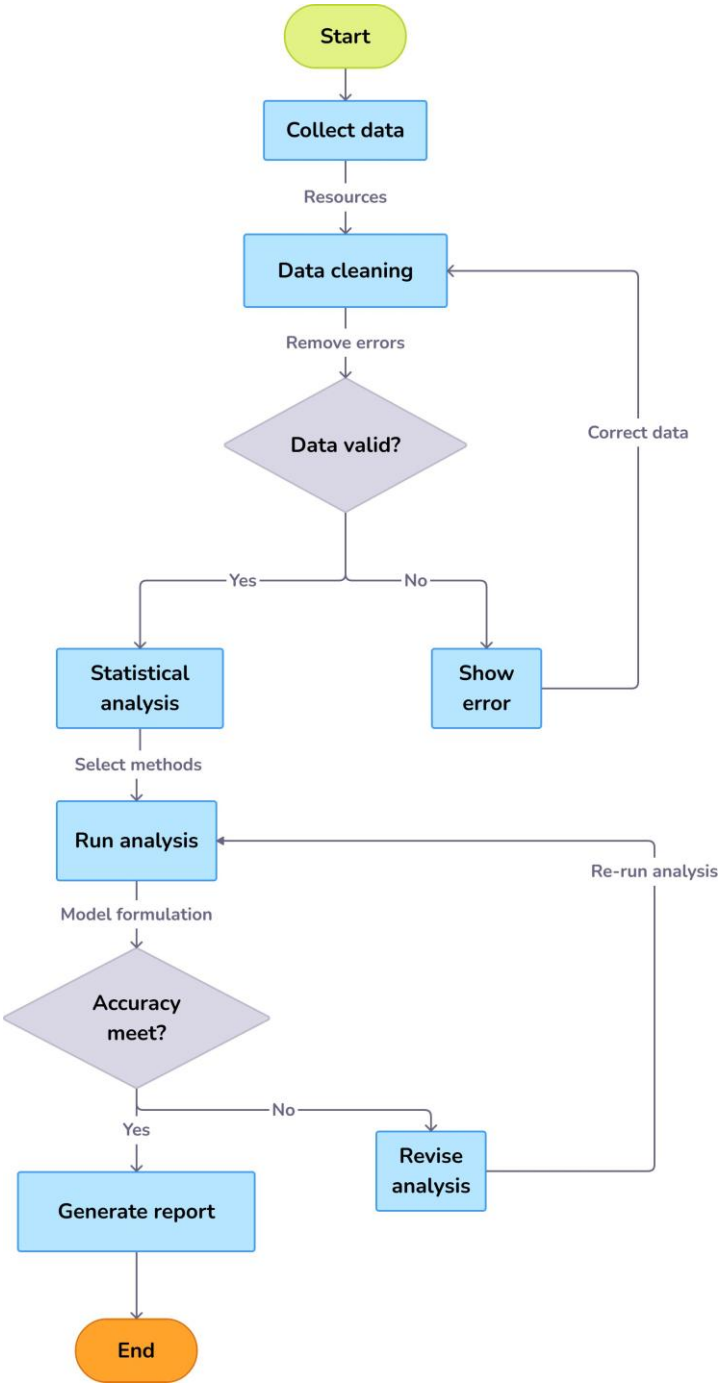


Figure 3.1: Overall proposed research methodology

The study adopts a positivist paradigm as it emphasizes objective analysis of the relationships between CG metrics, CSR expenditures and indices, and financial performance using statistical regression models (Saunders et al., 2009; Sekaran, 2003; Cooper & Schindler, 2003). The use of quantifiable financial indicators and corporate disclosures supports this approach, consistent with prior research applying deductive methods and multi-method data under a postpositivist lens (Mahmood et al., 2021).

3.2 Research Design

The research follows a causal design with a quantitative and deductive approach, aiming to evaluate the influence of CG and CSR on FP. It uses secondary data from annual reports and disclosures, applying a longitudinal time horizon to analyze trends over ten financial years from 2013-14 to 2022-23.

3.3 Research objective-wise Hypotheses

Research objective-wise hypotheses are formulated, ensuring focused analysis, systematic validation, and meaningful research outcomes are illustrated below:

1. To study the impact of Corporate Governance on Corporate Financial Performance.

- **Null Hypothesis (H_0):** Corporate Governance has no significant impact on Corporate Financial Performance.
  - **H_{01a}:** Corporate Governance has no significant impact on Accounting ratios of financial performance.

- **H_{01b}:** Corporate Governance has no significant impact on Market ratios of financial performance.

- **Alternative Hypothesis (H_1):** Corporate Governance has a significant impact on Corporate Financial Performance.
  - **H_{11a}:** Corporate Governance has a significant impact on Accounting ratios of financial performance.
  - **H_{11b}:** Corporate Governance has a significant impact on Market ratios of financial performance.

2. To analyze the impact of Corporate Social Responsibility on Corporate Financial Performance.

- **Null Hypothesis (H_0):**
  - **H_{02}**: Corporate Social Responsibility (CSR) has no significant impact on Corporate Financial Performance (CFP).
  - **H_{02a}**: Corporate Social Responsibility (CSR) has no significant impact on accounting ratios of corporate financial performance.
  - **H_{02b}**: Corporate Social Responsibility (CSR) has no significant impact on market ratios of corporate financial performance.
- **Alternative Hypothesis (H_1):**
  - **H_{12}**: Corporate Social Responsibility (CSR) has a significant impact on Corporate Financial Performance (CFP).
  - **H_{12a}**: Corporate Social Responsibility (CSR) has a significant impact on accounting ratios of corporate financial performance.
  - **H_{12b}**: Corporate Social Responsibility (CSR) has a significant impact on market ratios of corporate financial performance.

3. To assess the mediating effect of CSR between Corporate Governance and Corporate Financial Performance

- **Null Hypothesis (H_{03}):** CSR does not mediate the relationship between Corporate Governance and Corporate Financial Performance.
- **Alternative Hypothesis (H_{13}):**CSR mediates the relationship between Corporate Governance and Corporate Financial Performance.

3.4 Sample Design

3.4.1 India Setting

India's distinctive socio-economic and regulatory landscape facilitates an in-depth analysis of the interaction between CG, CSR, and FP. Indian companies face dual pressures: adherence to CG and CSR standards, alongside the necessity to maintain competitiveness in a hard market (Meher et al., 2021). This dual focus offers a unique chance to examine:

- The extent to which robust governance systems and CSR initiatives, either individually or together, improve FP.
- How companies manage institutional obstacles while reconciling stakeholder demands and profits.
- The enduring impacts of mandatory CSR spending and CG reforms on corporate sustainability and competitiveness.

3.4.2 Sampling Method

The purposive sampling technique is a "non-probability sampling method". It involves selecting a sample from the universe. This selection is the non-random process of a sample from the universe that is of interest to the researcher (Andrade 2021). The sample is finalized through a systematic process.

3.4.3 Sample selection attributes

The company must be listed under BSE, included in the BSE 500 Index, non-financial, and have a financial year ending March 31st as described below:

- **Company is Listed Under BSE and Included in BSE 500 Index:** This is based on the fact that the companies comprising the index are regarded as corporate frontrunners and indicators of India's economic growth, rendering them an equitable representation of all sectors (Maqbool, 2019). As a result of their substantial market capitalization, BSE stocks are indicative of the corporate sector in India (Singh *et al.*., 2022). Fahad and Rahaman (2020) used a BSE 500 sample to find out the impact of CG on CSR Disclosure. To find out the impact of CSR on FP Hayat *et al.*., (2022) also selected the BSE 500 as their sample, recognizing its strong representation of India's corporate landscape. The BSE 500 includes the top 500 companies that collectively account for 93 percent of the total market capitalization and span across 20 diverse industries (Singhania et al., 2024; Raithatha and Haldar, 2021).
- **Company Should Not Be a Banking, or Financial Services or Insurance (BFSI) Company:** These companies are excluded based on the previous literature as these companies are regulated under different Acts in India (Hayat *et al*.,2022), they are subject to particular accounting standards (Gharbi & Jarboui, 2024), and due to their differing financial reporting requirements, which can make comparisons problematic (Shahab *et al.*. 2021; Aktas *et al.*. 2015). The corporate governance framework differs for entities like financial institutions and banks, resulting in their exclusion (Raithatha & Haldar, 2021).

- **Company's Financial Year Should End on March 31st:** Statistical analysis and comparing financial statements ending on different dates can lead to biased or inaccurate conclusions. By excluding companies with differing accounting years, comparison for the same period and control of extraneous factors such as economic and political environment is ensured (Sikand *et al.*, 2013; Bettman & Weitz,1983). The details of the number of companies chosen for the final sample are given in Table 3.1.

Table 3.1: Deduction of number of companies in the sample

Description	Number of Companies
Total number of companies in BSE 500 listed companies	500
Less Banking service, finance, and insurance companies	-91
Less financial year not ending in March	-34
Missing data	-18
Balance in final sample	**357**

3.4.4 Period of study

The study covers a period of ten financial years from 2013-14 through 2022-23. The year 2013 marks a pivotal point in India's economic reforms with the enactment of the Companies Act 2013, which introduced key provisions related to CG and CSR. A decade-long timeframe offers robust data for analysing FP and assessing the progression of CG and CSR practices.

3.4.5 Number of observations in the sample

Based on the above sample selection and the period of study, the number of firm-year observations should have been 3570. However, this is not a balanced sample, wherein for each year, the same number of companies would be included in the sample. Some companies are not listed for some years, and similarly, if information for some years could not be accessed, such companies for those years are removed. The same is explained as imputation in the data analysis section (3.8). Thus, after imputation, in the final sample, there are 2725 observations of 357 companies operating in India in 11 different sectors.

Sample size determination

The Power analysis test is done at the desired power of 0.8, and thus it requires a minimum of 1068 observations. The graphical analysis of the test is shown in figure 3.2. The plot illustrates that in power analysis, achieving higher power to detect an effect typically requires larger samples. Thus, it requires about 1400 observations at 0.9 power. The study uses a larger sample size of 2,725 observations, exceeding the minimum threshold, enhancing reliability, precision, and generalizability, thus providing sufficient statistical power for achieving study objectives.

3.4.6 Industry sector classification

The sample companies are classified into industry sectors based on the "Global Industry Classification Standard (GICS)" as is done in literature "(Beloskar & Rao 2022; Hua Fan & Michalski, 2020; Yu *et al.*, 2020; Daszyńska-Żygadlo *et al.*, 2016)". GICS® is a framework for industry analysis that assists investors in comprehending the primary business operations of companies worldwide. This classification standard was formulated by "MSCI" and "S&P Dow Jones Indices" to ensure that investors have access to comprehensive and consistent industry definitions. GICS® is a hierarchical industrial classification system consisting of four tiers. The four levels are: Sectors, Industry Groups, Industries, and Sub-Industries.

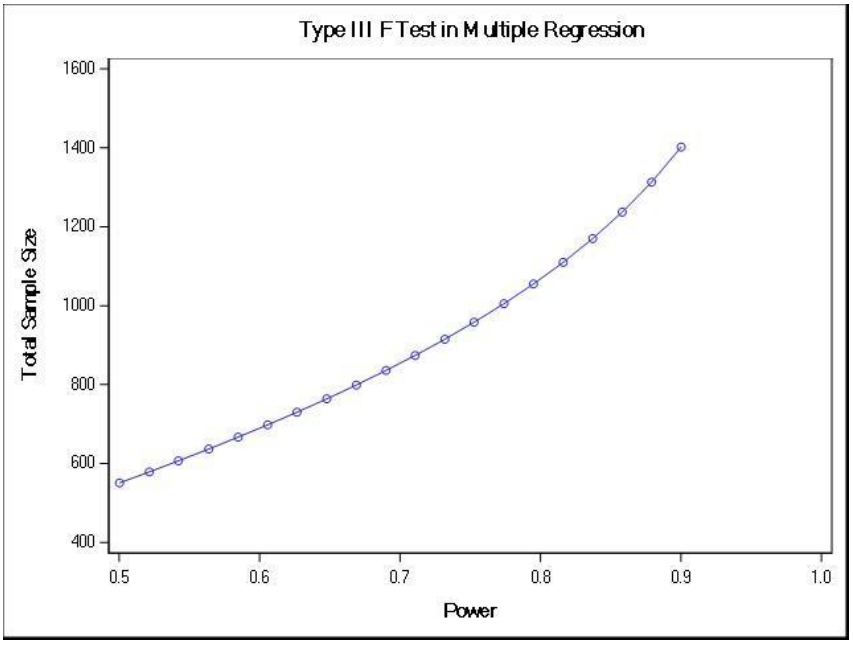


Figure 3.2: Type III F test in multiple regression

However, in this research, only sector-level classification is taken. Sector-level classification is appropriate for this study as it provides a broad yet consistent framework for grouping companies based on primary business activities, enabling meaningful industry-wise comparison while maintaining alignment with established literature and the GICS standard.

3.4.7 Sample data

Figure 3.3 gives an overall picture of a number of companies covered under each industry sector while Figure 3.4 shows the number of companies under large-cap, Midcap and small-cap segments.

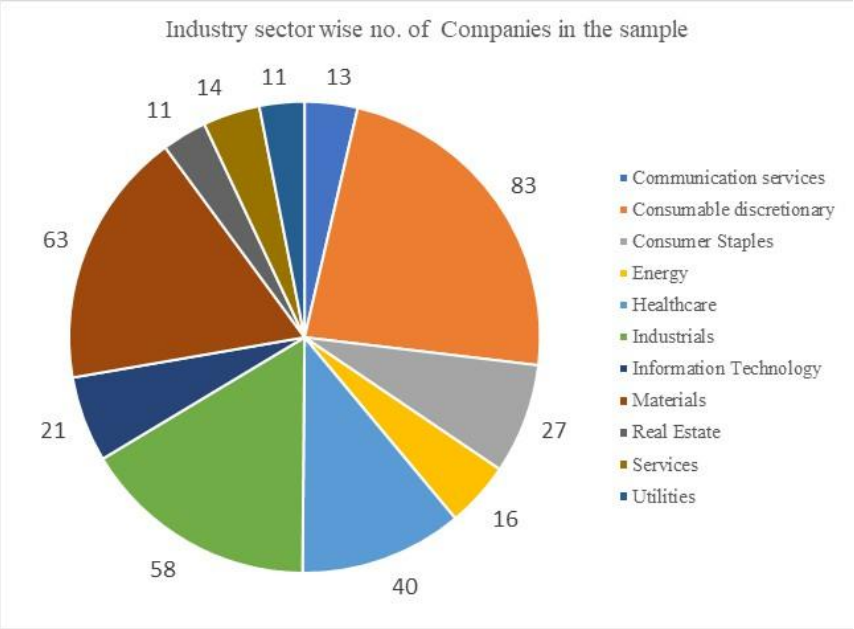


Figure 3.3: Pictorial representation of industrial sector classification.

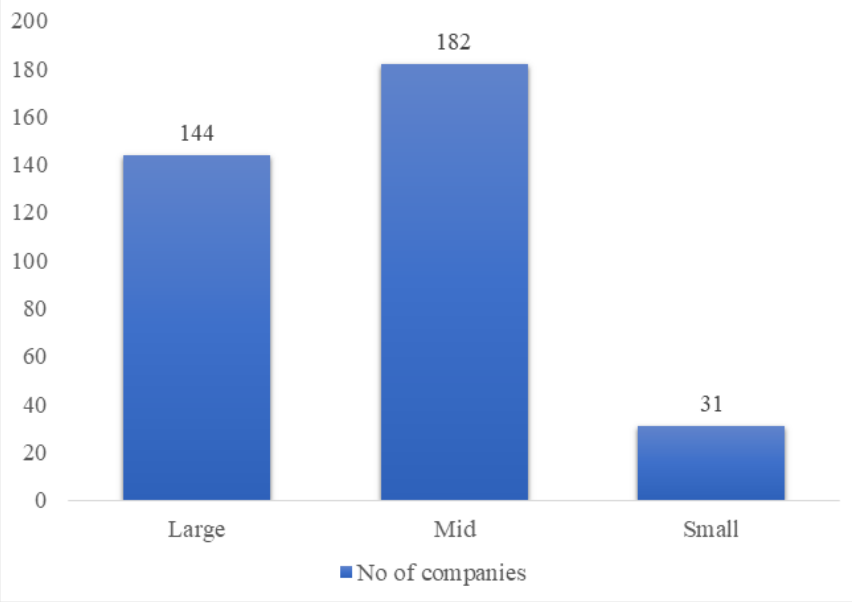


Figure 3.4: Market cap type-wise number of companies in the sample

3.5 Data collection

3.5.1 Data collection method

Data mining or quantitative data extraction methods from the Prowess database for all quantitative data and content analysis from companies' annual reports and CSR and CG compliance reports for preparing the CGI and CSRI are the data collection methods employed. Singhania *et. al.,* (2024) also used content analysis to construct a CSR reporting index.

3.5.2 Data Source

The study examines the CG disclosures and CSR disclosures made by individual companies in their annual reports. Hence, the data is collected through content analysis from the Annual reports, CG, and CSR compliance disclosures. The annual reports are downloaded from the BSE website (www.bseindia.com). Data for dependent variables (FP indicators) is either directly obtained from the PROWESS database maintained by the CMIE or computed (Tobin's Q) based on the basic data downloaded from PROWESS.

It is understood that PROWESS also collects data from among other sources, mainly from the company's annual reports and filings. PROWESS, being a comprehensive database for Indian companies – listed and unlisted, it is very widely used in studies examining Indian firms' data for quite a long time (Barman & Mahakud, 2024; Hayat *et al.*, 2020; Maqbool & Zameer, 2018; Amitava Roy, 2016; Balasubramanian, Black & Khanna, 2010; Sarkar & Sarkar, 2008 ;).

Annual reports of the companies are the source of data. Annual reports are employed due to their ability to be compared to prior research. The reliability and validity of the data collected are guaranteed by the meticulous preparation of these reports by the company, which is subsequently reviewed by independent auditors (Tiwari & Debnath, 2021). The same is filed with statutory authorities for compliance. These reports have the potential to hold companies accountable for

their commitments. Consequently, it is reasonable to presume that the content of the annual reports is reliable and accurate. Additionally, it is the most comprehensive method of communication between a company and its stakeholders, as it provides information about the organization's activities throughout the year. According to Ertugrul *et al.* (2017), annual reports are a crucial source of information for capital market participants, including investors, creditors, and other stakeholders, as they are legally mandated to be published by all listed companies. While all companies in India are required to publish annual reports, the extent of disclosure varies across private companies, unlisted public companies, and listed companies, with listed firms mandated by SEBI to include additional disclosures. Furthermore, numerous studies have utilized annual reports to assess CSR activities (Abbott & Monsen, 1979).

3.6 Conceptual Model

The proposed conceptual framework for the study is shown in Figure 3.5. The conceptual model illustrates the relationship between CG, CSR, and the FP of companies. Its objective is to assess how these factors influence accounting and market performance metrics. This framework is built to explore and explain the interdependencies among governance practices, social responsibility efforts, and their impact on business outcomes. The model commences by outlining key elements of CG, including ownership structure, compliance, board efficiency, and transparency. These factors serve as the foundation of CG practices, underscoring their importance in fostering organisational accountability and op- operational integrity. The model postulates that well-established CG practices contribute directly to better FP and also indirectly influence it through CSR initiatives. The model demonstrates that CSR serves as both a mediator and an independent construct that directly influences FP. The relationship highlights that socially responsible practices, combined with strong governance, can enhance an organization's reputation, stakeholder trust, and operational efficiency, ultimately leading to improved financial outcomes. Accounting ratios and market ratios are the two categories into which FP is divided.

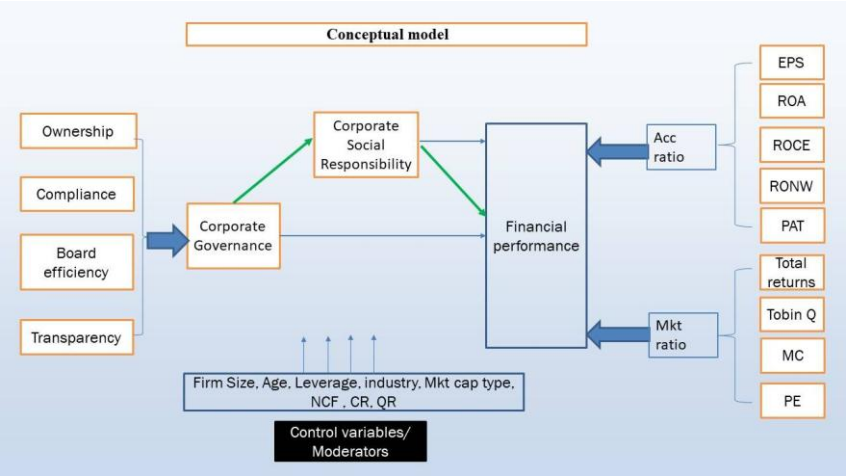


Figure 3.5: Conceptual model

Accounting ratios, such as EPS, ROA, ROCE, RONW, and PAT, reflect operational efficiency and profitability, while market ratios, including total returns, Tobin Q, market capitalisation, and P/E ratio, signify investor confidence and market valuation. Additionally, the model incorporates Control variables such as firm age, size, leverage, market cap type and industry type to account for their potential effects on financial performance. These variables help refine the analysis, ensuring that the relationships examined account for external influences and firm-specific characteristics.

3.7 Variables and their operational independence measurement

Variables are the building blocks of any research. They define what is being studied, provide a means for testing relationships, control for external influences, and guide the data collection and analysis process (Gepp et al., 2024). Without properly defined and managed variables, research would lack clarity, precision, and the ability to produce reliable and valid results.

This quantitative research employs several dependent, independent, and control variables to achieve the study's specified objectives. It is essential to understand their intricacy and examine

their interrelations. The delineation of the diverse variables utilized in the present thesis follows.

This study investigates the impact of CG and CSR on the FP of companies. The dependent variable in this study is FP, measured by indicators such as ROA, Tobin Q, etc. The independent variables are the CG index, and CSR index, which are hypothesized to influence FP. Control variables such as firm age, size, leverage, market cap type, and industry type are included to account for their potential effects on FP. The details of variables such as definition, units, and literature sources of various variables used in the study are given in Table 3.2.

3.7.1 Dependent variables and their measurement

The dependent variable is the outcome or result that is evaluated, observed, or explained. It "depends" on the changes or variations in the independent variables, which are the factors being manipulated in the study (Byzalov, D., & Basu, 2024). FP is chosen as a dependent variable in keeping with prior research (Abilasha & Tyagi, 2019; Maqbool & Zameer, 2018; and Kapoor & Sandhu, 2010;). There is no consensus on the measurement of FP, as there is no unique, concrete measure of FP. FP is defined by various authors using distinct dimensions. Based on research by Bag & Omrane (2022); Maqbool and Zameer (2018), and Stan Chu (2017), , the present study employed both market-based and accounting-based indicators to assess the FP of the organizations, hence enhancing the robustness of the findings. To prevent trade-offs between the numerous FP metrics, a fac- tor analysis is implemented. Accounting ratios and market ratios are the two factors derived from analysis.

3.7 Variables and their operationalization (Measurement)

Table 3.2: Study of the details of variables

Variables	Symbol	Sub Grouping	Units	Data Source	Definition	Literature source
Panel A: Dependent Variables (Finance Performance Measures)						
Profit after Tax	PAT	Accounting Ratios (Acc_Ratio)	%	Prowess	Net income / total sales or revenue	Bag& Omrane (2022); Rohit & Pinto (2021)
Return on Assets	ROA		%	Prowess	Net Income / Total as- sets	Fahad & Busru (2021), Mohammadi and Saeidi (2022), Oware & Mallikarjunappa (2022), Selcuk & Kiymaz (2017), Geetika & Shukla (2017), Liu *et al.* (2012); Singhanai *et al*., (2024)
Return on Net Worth	RONW		%	Prowess	Net Income / Total Eq- uity	Raithatha & Haldar (2021); Bhatnagar *et al.*, (2023); Yang *et al*.,(2019).
Return on Capital Employed	ROCE		%	Prowess	EBIT (Earning before interest and taxes) / capital employed (Equity+Debt)	Rohit & Pinto (2021); Barman & Mahakud (2024).
Earnings Per Share	EPS		Rs/share	Prowess	Net income after pre- ferred dividend / no. of equity shares outstand- ing	Bag & Omrane (2022); Kaur & Dave (2020))
Market Capitalisation	MC	Market Ratios (Mkt Ratio)	INR Million	Prowess	Stock price at the end of the year * no. of equity shares	Bhatnagar *et al.*, (2023)
Tobin Q	Tobin_Q		Times	Balance sheet analysis	(Market value of shares + Debt) / book value of total assets	Fahad & Busru (2021), Oware & Mallikarjunappa (2022) Akisik & Gal (2017). Ahern & Dittmar (2012), Singh *et al.*, (2019b) and Arora (2020); Singhanai *et al*., (2024)
PE Ratio	PE		Times	Prowess	Share price / EPS	
Total Stock Returns	TSR		Times	Prowess	(Ending price - beginning price + dividends) / beginning price	Ming-Hsiang & Chien-Pang (2015); Mohammadi & Saeidi (2022)
Panel B: Independent Variables						
Corporate Governance Index	CGI			Author's compilation	A composite measure of CG attributes	Varshney et al., (2012);Mishra & Mohanty (2014);Raithatha & Haldar (2021)
Corporate Social Responsibility Index	CSRI			Author's compilation	A composite measure of CSR reporting and expenses	Kaur & Singh, 2021, Maqbool & Zameer (2018); Singhanai *et al.*, (2024)
Current Ratio	CR		Times	Prowess	Current assets / Current liabilities	Barman & Mahakud (2024).

3.7 Variables and their operationalization (Measurement)

Quick Ratio	QR	Times	Prowess	Quick assets / Current liabilities	
R&D Expenses	RDE	INR Million	Prowess	Actuals	
Net Cash Flow	NCF	INR Million	Prowess	Net cash earned during the year as per cash flow statement	
Debt Equity Ratio	DE	Times	Prowess	Total debt / Total equity	Mohammadi & Saeidi (2022), Oware & Mallikarjunappa (2022), Nobanee & Ellili (2017), Selcuk & Kiymaz (2017), Han *et al.*, (2016), Mishra & Modi (2013); Singhanai *et al*., (2024)
Firm Size	Size	INR Million	Prowess	Natural log of total assets	Fahad & Busru (2021), Chiu *et al.*, (2020), Selcuk & Kiymaz, (2017), Nobanee & Ellili (2017);Singhanai *et al.*, (2024)
Age	Age	Years	Author's computation	Current Year - Year of incorporation	Mishra *et al.*, (2021); Wahba, H. & Elsayed, K. (2015)

***The information is directly extracted and no computations are made**

Accounting-Based Indicators

Profit After Tax (PAT):

PAT measures the net profitability derived from core business operations relative to revenue or net sales, serving as a key indicator of financial performance (Mulyadi & Sihabudin, 2020).

Return on Assets (ROA):

ROA assesses the efficiency with which a firm utilizes its assets to generate profits. It is a reliable metric unaffected by variations in capital structure or leverage (Prasad, Sivasankaran, & Shukla, 2019).

Return on Capital Employed (ROCE):

ROCE captures how effectively a firm employs its total capital to produce profits. It reflects both operational efficiency and capital management (Mittal, 2019).

Return on Net Worth (RONW):

RONW, equivalent to Return on Equity (ROE) in global usage, measures a company's ability to generate returns for equity shareholders. It is particularly relevant in the Indian reporting context (Salim & Yadav, 2012).

Earnings Per Share (EPS):

EPS indicates the firm's ability to generate net income attributable to each equity share, reflecting both profitability and operational efficiency.

Market-Based Indicators

Market Capitalization (MC):

MC represents the firm's total market value and is often used to categorize

companies into large cap, mid cap, and small cap segments, providing insights into size and investor perception.

Price Earnings (PE) Ratio:

The PE ratio serves as a market sentiment indicator. A high PE implies strong growth expectations, whereas a low PE could signal undervaluation or limited future prospects.

Tobin's Q:

Tobin's Q reflects the ratio of a firm's market value to the replacement cost of its assets, offering a market-based evaluation of firm performance (Singh et al., 2022; Singh et al., 2019a; Jagadeesh, 2021).

In this study, Tobin's Q is computed following the method of Chung and Pruitt (1994), using the sum of market value of equity and book value of debt divided by total assets, as market-based debt values are generally unavailable in the Indian context (Singh et al., 2022; Sarkar & Selarka, 2021).

Total Stock Returns (TSR):

TSR captures the overall return earned by shareholders, reflecting the market's evaluation of the firm's performance and its attractiveness to investors.

3.7.2 Independent variables and their measurement

Independent variables are the factors that might cause or influence changes in the dependent variable. They are manipulated or measured to see if they have an impact on the dependent variable.

Corporate Governance Index (CGI)

Corporate governance encompasses various internal and external mechanisms, with internal mechanisms focusing on the company's ownership structure, board of directors, audit committees, and other committees. External mechanisms involve the market for corporate control and product competition, which can improve governance (Yoshikawa et al., 2021). These mechanisms are influenced by the country's legal and institutional structures. Given the multidimensional nature of governance, assessing overall governance quality through individual variables becomes analytically cumbersome. An overall CG Index can help summarize various aspects of governance with a few numbers. In accordance with studies of Raithatha & Haldar (2021); Mishra *et al.* (2021); and Mishra & Mohanty (2014), , a CGI is constructed based on the internal governance mechanisms that are company-specific and measurable through disclosed data. . External mechanisms are not included in the Corporate Governance Index as they are largely shaped by broader legal and institutional frameworks beyond a firm's direct control (Yoshikawa et al., 2021). Figure 3.6 is the pictorial representation of the attributes of CGI. The measurement methods are given in Table 3.3.

Index construction methodology

The Corporate Governance Index (CGI) is constructed as an unweighted additive index by summing the scores assigned to individual governance attributes. Each attribute is coded using binary (0/1) or ordinal (0/1/2) scoring depending on the degree of compliance or governance intensity. Missing disclosures, if any, are conservatively coded as zero. The maximum possible score is 26.

Higher scores indicate stronger governance quality, greater board independence, improved transparency, and enhanced regulatory adherence.

Equal weighting is applied across indicators to preserve interpretability and theoretical neutrality, avoiding the opacity introduced by statistical weighting techniques such as principal component analysis. The additive method is widely adopted in governance literature and enables straightforward interpretation in regression, mediation, dynamic panel (GMM),

and Structural Equation Modeling (SEM) analyses.

For selected governance attributes (e.g., board meetings, audit committee meetings, attendance, board size), scoring is benchmarked relative to the sample mean rather than statutory minimum requirements. This approach allows governance quality to be evaluated in comparative terms, capturing variations in governance intensity across firms rather than mere legal compliance. Since statutory thresholds represent minimum regulatory requirements, relative benchmarking better reflects governance effectiveness within the observed institutional context.

The index is computed annually for each firm in the sample.

Governance dimensions and coding:

Promoters' Equity Holding

Promoters' equity is calculated as the ratio of equity shares owned by the promoters to the total equity shareholding of the company. Increased promoter holdings are said to result in a concentrated ownership structure, hence conferring monopolistic decision-making authority, as noted by Ganguli and Agrawal (2009). A threshold of 50 percent is used to distinguish between majority-controlled and relatively dispersed ownership structures. Firms with promoter shareholding ≤ 50 percent are assigned a higher score (1), reflecting relatively higher governance due to stronger minority shareholder protection. Firms with more than 50% promoter shareholding are given lower score (0).

Table 3.3: Attributes for construction of Corporate Governance Index and operationalization

Sub-indicators	**Attributes, Measurement**		**Literature Source**
Ownership	Promoters' Equity	If the promoters' equity is less than 50% it is given a value of 1 and if it is more than 50% it is given as 0	Mishra & Mohanty (2014); Varshney et al. (2012)
Transparency and disclosure	Adverse auditor's report	If the auditors have not qualified the audit report, 1 otherwise 0.	Mishra & Mohanty (2014); Raithatha & Haldar (2021)
	Default in payment of taxes	If the company has not defaulted in the payment of the legal dues, 1 otherwise 0	Mishra & Mohanty (2014)
	Dispute in Payment of Taxes	If there are no disputes in tax, 1 otherwise 0	
	Related Party Transactions	If the company disclosed Related Party Transaction Policy, 1 otherwise,0.	Raithatha & Haldar (2021)
Compliance	Audit committee independence	If >80% of AC members are independent value of 2, if it is between 50% to 80% it is 1, and if it is less than 50% it is 0.	Mishra & Mohanty (2014); Raithatha & Haldar (2021)
	Audit committee meetings	If the number of audit committee meetings exceeds the sample average, 2 points are assigned; if equal to the sample average, 1 point and if less than average 0 points	Raithatha & Haldar (2021)

3.7 Variables and their operationalization (Measurement)

Sub-indicators	Attributes	Measurement	Literature Source
	Shareholders Grievance committee	If the company has constituted the shareholder's grievances committee 1, otherwise 0	Raithatha & Haldar (2021)
	Whether CSR committee is constituted	If the company has constituted the CSR committee 1, otherwise 0	
	Whether CSR committee is chaired by an independent director	If chaired by an independent director 1 otherwise 0	
	CEO Duality	If the Chairman of the company and MD or CEO of the company are not the same then 1 otherwise 0	Mishra & Mohanty (2014)
	Whether company has performance-based remuneration to CEO/MD	If yes 1 otherwise 0	Mishra & Mohanty (2014)
	Whether e-voting information is given in AGM notice or annual report	If yes 1 otherwise 0	Raithatha & Haldar (2021)
	Whether company has disclosed policies to prevent sexual harassment	If the company has disclosed 1, otherwise 0	
Board efficiency indicator	Board Size	If this number is more than the mean of the entire sample 2 is given, if it is equal 1 is given and 0 if it is less than the mean of the sample	Mishra & Mohanty (2014); Issa and Fang (2019), Singhanai *et al.*, (2024); Sanan (2016)

3.7 Variables and their operationalization (Measurement)

Sub-indicators	Attributes	Measurement	Literature Source
	Presence of Independent Directors on the board	If more than 1/3 of the director's independent value of 2 is given, if it equals to 1/3rd value 1 is given and if it is less than 1/3rd it is 0.	Mishra & Mohanty (2014); Kyaw *et al.*, (2017), Zhang (2012); Singhanai *et al.*, (2024)
	Woman director on the board	If it has more than one woman director, value 2 is given, if it complies with the Companies Act and has only one woman director , 1 is given, and if it does not comply 0 is given	Issa and Fang (2019)
	Number of board meetings	If the company has conducted board meetings more than the sample average then 2 points, at least equal to the average no of meetings of the sample then 1 and if less than average of the sample 0 is given	Singhanai *et al.*, (2024); Ryou *et al.*, (2022); Mohammadi and Saeidi (2022); Mishra *et al.*, (2021)
	Number of other companies' boards on which the directors are member	1, if no director crosses the threshold fixed by SEBI, otherwise 0	Mishra & Mohanty (2014); Mishra *et al.*, (2021)
	Frequency of attendance in the board meetings	If the average attendance percentage of all the directors in the company has exceeded the average percentage of the sample then 2 if it equals the average of the sample then 1, and if it is less than the sample average 0	Mishra & Mohanty (2014); Mishra *et al.*, (2021)

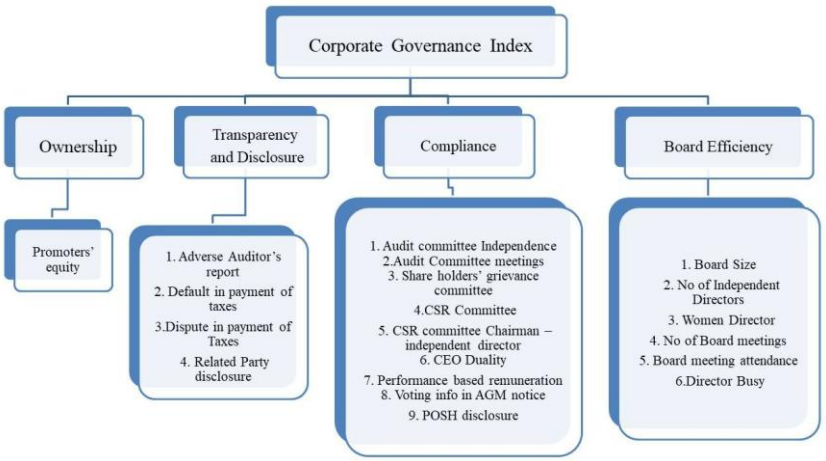


Figure 3.6: Pictorial presentation of attributes in CGI

Board Size

According to section 149 of the Companies Act, public companies are required to have a minimum of three directors. The maximum number of directors is set at 15; however, the company may appoint additional directors upon the passage of a special resolution. In larger boards, responsibility becomes dispersed, leading to weaker oversight of management decisions and risk-taking behavior (Hermalin & Weisbach, 2001). Conversely, large boards benefit from members with diverse backgrounds, contributing knowledge and intellect to the boardroom (Dwivedi & Jain, 2005). The board size significantly and negatively impacts the FP of the company, a phenomenon attributed to coordination and communication issues inherent in larger boards, (Singh *et al.*, 2023). Research, on the contrary, indicates a positive correlation between board size and firm performance (Dalton *et al.*, 1998; Pearce & Zahra, 1992).

Insufficient board membership may hinder the ability to adequately staff essential sub-committees, including the audit committee and remuneration committee. The ideal size of a board is frequently suggested to be between seven and eight members (Jensen, 1993) or ten members (Lipton & Lorsch, 1992).

The size of a board is contingent upon the company's dimensions and specific needs. Hence the scoring for the board size is given relative to the sample mean value. If board size is more than the mean of the entire sample 2 is given, if it is equal, 1 is given and 0 is given if it is less than the mean of the sample.

Number of Independent Directors

Boards comprising independent directors exhibit enhanced efficacy in overseeing management (Bhagat and Black, 2002), demonstrate a greater propensity to dismiss underperforming Chief Executive Officers (Weisbach, 1988), and experience fewer occurrences of fraud (Uzun *et al.*, 2004). In India, a significant proportion of companies are controlled by promoters, who often hold substantial equity stakes—sometimes as high as 50 percent or more. In such a governance structure, the presence of a truly independent board becomes critically important. This independence ensures that the rights and interests of minority shareholders are safeguarded, preventing potential conflicts of interest and promoting fair decision-making in the company's operations. According to SEBI LODR regulations, if the chairman of an Indian firm serves as the executive director, a minimum of 50 percent of the board members must be independent directors. Companies with a non-executive chairperson must maintain a minimum of one-third independent directors on the board. Research indicates a favorable correlation between the ratio of independent non-executive directors and accounting performance metrics (Byrd and Hickman, 1992). The scoring for the index is accordingly given.

Woman Director on the board

Female representation introduces a unique perspective, enhances intuitiveness, and fosters a more collaborative approach to leadership within corporate boardrooms. The Companies Act in India (Section 149(1)) mandated one woman director for specified companies. The findings of the

study indicate that female directors exert a notably greater positive influence in high-performing firms compared to their low-performing counterparts (Conyon & He, 2017). India's context is included, with studies indicating that women directors are positively and statistically significantly associated with firm performance (Jyothi & Mangalagiri, 2019). If firm has more than one woman director, value 2 is given, if it complies with the Companies Act and has only one woman director , 1 is given, and if it does not comply 0 is given.

Number of board meetings

The board must take the lead in steering the CG agenda of the company. The frequency of board meetings serves as an effective indicator of the oversight activities undertaken by directors (Vafeas, 1999). Regular board meetings are viewed as an indicator of improved oversight of senior management (Davila and Penalva, 2005). Increased meeting frequency correlates with a quicker recovery from subpar firm performance (Vafeas, 1999). According to Section 173 of the Indian Companies Act, it is mandated that a board must conduct at least four meetings annually, ensuring that no two consecutive meetings have a gap exceeding 120 days. Here also governance intensity is measured relative to sample mean values to capture firm-level governance effort beyond minimum statutory compliance.

Number of directorships in other companies

The independence of judgment of a board member may be called into question when the individual serves on multiple boards. The interchange of two individuals serving as independent directors and CEOs of separate companies adversely impacts the quality of decision-making (Garg, 2007). Mishra and Kapil (2018) indicate that when directors possess excessive directorships in external firms, they get preoccupied and fail to fulfill their responsibilities effectively within the present organization, thereby resulting in a deterioration of organizational performance.

The cross-board phenomenon is prevalent in India primarily because of a limited pool of qualified and experienced professionals eligible to serve as independent directors. Regulatory requirements, such as independence, expertise, and registration with the independent directors' databank, further narrow the selection. As a result, the same individuals are often appointed across multiple company boards, leading to overlapping directorships.

Therefore, it is essential to analyze its impact on firm performance. Companies Act restricts that an individual can not act as a director on more than 10 public limited companies (Section 165), while

SEBI stipulates that he can not be a director on more than seven listed companies. A score of 1 is given if no director crosses the threshold fixed by SEBI, otherwise 0 is given.

Attendance in board meetings

Brick & Chidambaran (2010) found board activity positively related to firm value. Mishra and Kapil (2018) hypothesized that high director attendance in board meetings could enhance firm valuation. Although not statistically significant in explaining Tobin's Q or ROA, the variable is still considered a good measure of director participation. Mishra and Mohanty (2014) utilized this variable as a sub-indicator in the development of an indicator for board efficiency. Under the Companies Act 2013, section 167 says that if a director doesn't attend any board meetings for 12 months continuously, it will be deemed that he has vacated his office. Attendance in board meetings is also measured relative to the sample mean.

CEO duality

CEO duality occurs when an individual serves simultaneously as both the chairman of the board and the CEO of the company (Rechner and Dalton 1991). The success of CG depends on objective oversight. Separating the roles of Chairperson and CEO is crucial. The Chairperson monitors board activities, while the CEO participates in day-to-day affairs and formulates strategic policies. CG codes recommend that these roles be assumed by different individuals, and in India, the MCA Voluntary Guidelines on CG recommend this separation (section I.A.2). If the Chairman of the company and MD or CEO of the company are not the same then score 1 is given otherwise 0 is given.

Stakeholders' relationship committee

India has made significant improvements in investor grievance redressal due to regulatory pressure

on companies. Complaints can be filed at the Registrar of Companies, SEBI, and the company. Regulation 20 of SEBI LODR regulations mandates the formation of a Stakeholders' relationship Committee with a non-executive director. Auditors must state any pending grievances for over a month. A complying company is given a score of 1; otherwise, it is given a score of 0.

3.7.3 Corporate Social Responsibility Index (CSRI)

The CSR Index serves as another independent variable, providing a dependable method to examine the influence of CSR on the FP of firms (Kapoor & Sandhu, 2010). Diverse CSR measures have been documented in the literature. Research has employed content analysis of annual and sustainability reports (Kapoor & Sandhu, 2010), CSR expenditures (Nair & Bhattacharyya, 2019), and perception-based CSR metrics derived from primary data (Mishra & Suar, 2010). Third-party ESG ratings from many agencies, including MSCI's KLD database (Dupire & M'Zali, 2018), Thomson Reuters (Maqbool & Bakr, 2019), and Bloomberg (Sachin & Rajesh, 2022), have been employed to assess CSR. "Schedule VII of the Companies Act, 2013" enumerates twelve activities of CSR. The CSRI in this study is used to identify the availability of information regarding these 12 activities in the sample firms. Content analysis is utilized for the data acquisition process. A Score of 1 is assigned if the activity is reported, and a Score of 0 if it is not reported (Kaur and Singh, 2021). From PROWESS, CSR expenses "to be incurred" and "incurred" are extracted and compared for each year of each sample company.

Here is the CSR expense coding presented clearly in bullet points:

Code 0: Assigned when the CSR expense incurred is less than the amount required to be incurred.

Code 1: Assigned when the CSR expense incurred is equal to the amount required to be incurred.

Code 2: Assigned when the CSR expense incurred is greater than the amount

required to be incurred.

These scores are transformed into ratings utilizing the specified formula:

CSRI= (Number of CSR activities reported)+ CSR Expense code

Table 3.4: Variables used for constructing CSR index

Variables	Data Source	Definition	Literature source
CSR Expenses	Prowess	If the amount spent is less than mandated 0, spent as mandated 1 and if spent more than mandated 2	Geethika & Shukla (2017); Salehi *et al* (2018); Malik *et al*.,(2019); Oware & Mallikarjunappa, (2019)
CSR Reporting	Annual reports	If Item in the Schedule vii of the companies Actis reported in CSR report 1, otherwise 0	Kaur & Singh, 2021; Maqbool & Zameer (2018); Singhania et al., (2024)

A key characteristic of this unique variable is developed through manual content analysis, allowing a comprehensive evaluation of corporate CSR spending as per the Companies Act's guidelines. The variables used for constructing CSRI are explained in table 3.4.

This variable, CSRI, is distinct from other CSR measurement variables due to its dual-dimensional structure, combining both qualitative disclosure and quantitative compliance aspects. Unlike conventional indices that rely solely on disclosure counts or expenditure amounts, the CSRI integrates:

Manual content analysis of CSR activities reported, reflecting alignment with the CSR schedule of the Companies Act, and

A CSR expense code that captures the firm's actual spending behavior relative to its statutory obligation.

This approach offers a more holistic and nuanced assessment of a firm's CSR commitment, distinguishing it from purely monetary or checklist-based indices.

This is the first Indian study, to the best of our knowledge, to construct a distinctive index for

CSR, which consists of qualitative disclosure and quantified expenses, and to associate it with FP. However, Singhania et al., (2024) developed a comparable index, though it relied solely on qualitative data. Previous studies have primarily used quantitative data from third-party assessments, such as ESG scores (Nadeem et al., 2017) and Sustainalytics ratings (Naciti, 2019), to evaluate both voluntary and mandatory disclosures (Issa and Fang, 2019). The construct validity of CSR ratings was assessed by referencing prior research that adopted similar methodologies for constructing CSR disclosure indices in various economies (Singhania *et al*., 2024; Issa and Fang, 2019).

For the purpose of testing Objective 3, the CSR Reporting Index (CSRI) functions as the dependent variable within the mediation model, as it serves as the mediating variable between CG and FP relationship.

3.7.4 Current Ratio

The current ratio assesses the liquidity of the company – its ability to convert its short-term assets to cash - for meeting day-to-day financial obligations (Douglas, 2014). This variable is also relevant to the study. A higher current ratio may indicate robust short-term financial stability, thereby impacting the FP of a corporation. The current ratio is relevant for this study as it reflects a firm's short-term financial stability, which can be influenced by both corporate governance and CSR practices, and has been empirically linked to improved financial performance (Egbunike & Okerekeoti, 2018; Hantono, 2018). Effective CG procedures can strengthen a firm’s financial management, resulting in improved liquidity and financial stability, hence augmenting FP. Companies engaged in extensive CSR initiatives may exercise greater prudence in financial decision-making to mitigate risks, potentially enhancing liquidity. Egbunike & Okerekeoti (2018) concentrated on consumer goods manufacturing firms in Nigeria, by employing panel regression with random effects as their study methodology and doing the Hausman test, they demonstrated a positive and statistically significant correlation between the current ratio and the economic profitability rate. Hantono (2018), working in the same industry in Indonesia, concluded that the Current ratio has a significant impact on the FP proxied by ROA. In

the current study current ratio is used as one of the independent variables.

3.7.5 Debt Equity Ratio (Leverage)

The debt-equity ratio assesses a company's financial leverage by comparing total debt to shareholder equity. A high ratio indicates significant leverage, which can be perilous, yet could yield greater returns if effectively managed. Thus leverage ratio helps to understand the risk the firm is exposed to (Rahmawati & Hadian, 2022). Robust CG standards often encourage judicious utilization of debt and equity finance. An equitable debt-equity framework mitigates risk while facilitating growth prospects. CSR initiatives centered on sustainable development may promote a conservative financial approach, potentially reducing the debt-equity ratio. Moreover, indebted enterprises are subject to creditor oversight, resulting in more efficient management and observable positive outcomes (Rahmawati & Hadian, 2022). Qurays *et al.* (2017) established that the debt-to-equity ratio influences profitability, as indicated by return on equity. Utami (2016) has shown that the debt-to-equity ratio significantly positively influences the return on assets. In the current study Debt equity ratio is used as one of the independent variables.

3.7.6 Net cash flow

Cash flow refers to the movement of money in and out of a company. Positive cash flow is crucial for business operations, investment, and growth. It's a direct indicator of a company's ability to generate funds from its core activities (Etim et al., 2022). Companies with strong governance structures often make more prudent financial decisions, which can lead to better management of cash flow. CSR initiatives that align with long-term sustainability might also lead to better cash flow by building trust and customer loyalty (Etim et al., 2022). Lin, Yip, Ho, and Sambasivan's study on 465 enterprises found a positive and statistically significant relationship between free cash flow and firm performance in the IT industry, while Abughniem *et al.*'s(2020) panel regression study on 100 Amman Stock Exchange (Jordan) companies found a negative and statistically significant relationship. In the current study, Net cash flow is used as one of the

independent variables.

3.7.7 Size

The firm's size is a significant variable, typically quantified by total assets, sales, or market capitalization. Large enterprises typically possess superior access to finance, more market share, and more consistent revenue sources (Almashhadani et al., 2022). Large corporations generally possess more formal CG frameworks and may exhibit a stronger commitment to CSR due to their increased exposure and heightened public scrutiny. The firm's size may influence its capacity to invest in long-term CSR efforts, which can subsequently improve financial success (Almashhadani et al., 2022). Rahman & Yilun's (2021) study found a positive correlation between firm size and profitability, using data from 40 publicly traded com- panies in China. Yadav *et al.*'s (2021) study, analyzing 250 nonfinancial companies across 12 Asia-Pacific economies, found a negative relationship between company size and FP, suggesting larger companies may lead to inefficiencies. The results differ in China compared to the Asia- Pacific region. In the current study, Size proxied by ln value of total assets is used as one of the independent variables.

3.7.8 Age

The age of a firm can indicate its stability, experience, and ability to adapt to market changes. Older firms might have more established processes, greater brand recognition, and a loyal customer base, all of which contribute to their FP (Abdi et al , 2022). Older firms might be more likely to have formalized governance structures in place, which could enhance their FP. Similarly, older firms may have had more time to develop CSR strategies that positively impact their brand and profitability (Abdi et al , 2022). Cyril & Singla (2021) in India, using quantile regression as research methodology, found that the age of the firm negatively impacts its profitability. While in Croatia, Pervan & Curak (2019) found a positive relationship between firm age and profitability, with older firms operating at higher profitability. In the current study, Age is used

as one of the independent variables. It is represented by the time period from the incorporation date to the year of analysis.

3.8 Analytical Techniques

This study tackles the research problem of elucidating the relationships between diverse CG structures, CSR initiatives, and financial outcomes, aiming to provide comprehensive insights supported by statistical evidence. "A clear understanding of the relationship between CG, CSR, and FP is essential for guiding corporations in strategic decision-making" (Ashan, 2024). The significance of employing quantitative analysis methods stems from their capacity to enhance the rigor of findings, allowing for objective measurement and comparison across different firms and sectors (Shahzad *et al.*, 2024).

3.8.1 Data Processing

Figure 3.7 is a process flowchart related to data processing leading to Hypothesis testing. This flow chart represents a logical progression from raw data collection to hypothesis testing, ensuring that the data is clean, standardized, and well-understood before applying analytical or statistical methods. This structured approach improves the accuracy and reliability of the results obtained from data analysis. Various stages involved are explained below:

Input Data

The analytical process begins with data collected from PROWESS, enhanced by computed variables including firm age and Tobin's Q, alongside aggregated data such as the CGI and CSRI. The raw data are methodically cleaned and processed to ensure reliability and appropriateness for analysis.

Data visualization and Anomaly (Outlier) Detection

Data visualization is employed initially to explore data using graphical tools to understand the distribution, trends, and potential anomalies. Box plots (IQR method) (interquartile range) are used to identify outliers or extreme observations that can lead to normality deviation. Outliers are managed through winsorization at 5 percent on both sides of the distribution. For example, variables such as ROA and market capitalization, which exhibit a high percentage of outliers, are visualized before and after winsorization to illustrate the treatment effects (see Figures 3.8, 3.9, 3.10, and 3.11).

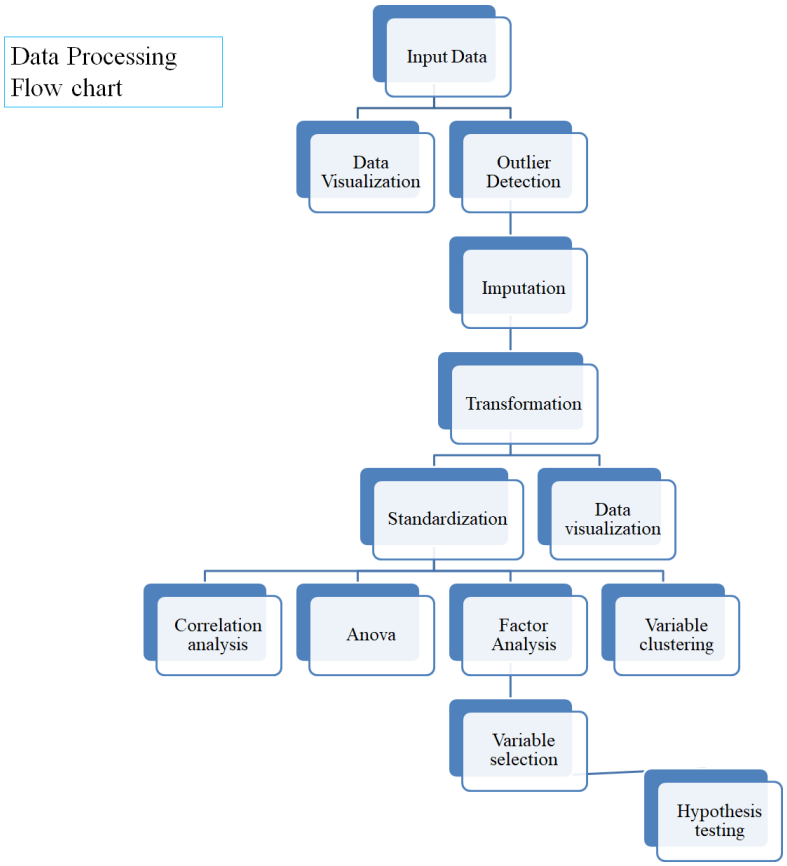


Figure 3.7: Data Processing Flow chart.

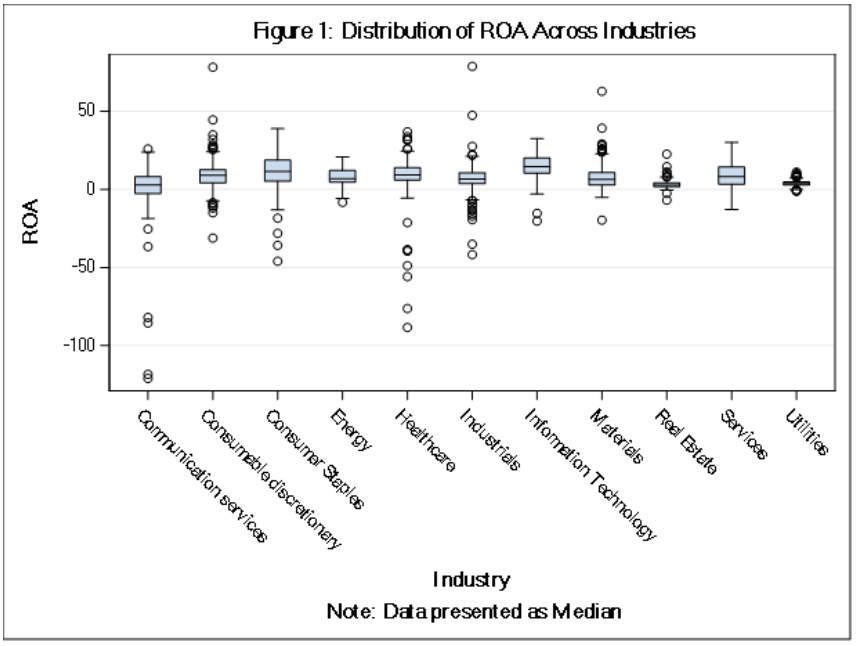


Figure 3.8: Distribution of ROA across industries before winsorisation

Imputation

Data is analyzed for missing values. Observations with genuine missing data are excluded, while missing values generated during outlier treatment are imputed using the sample median. This ensures that all variables are complete for subsequent analysis (Templ 2023).

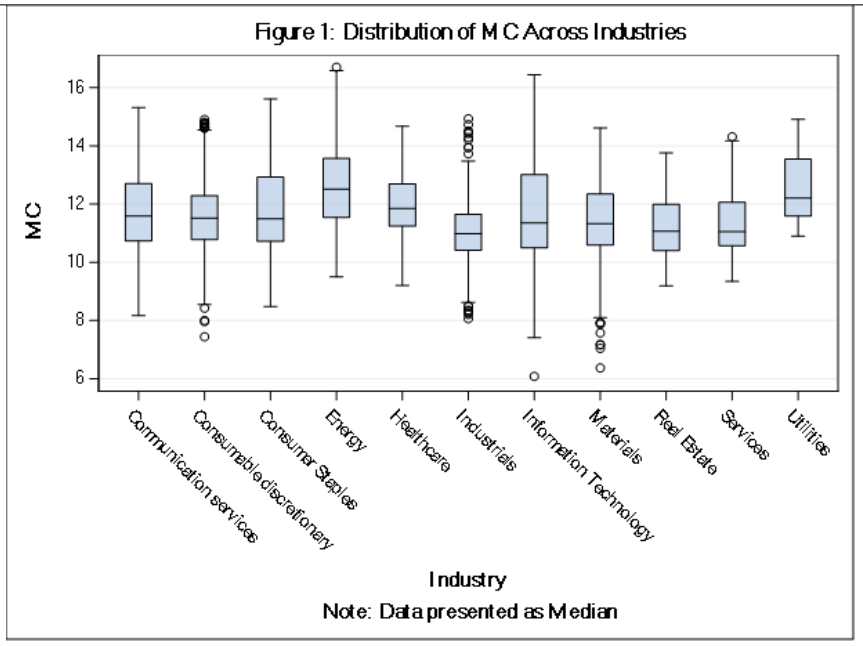


Figure 3.9: Distribution of MC across industries before winsorisation

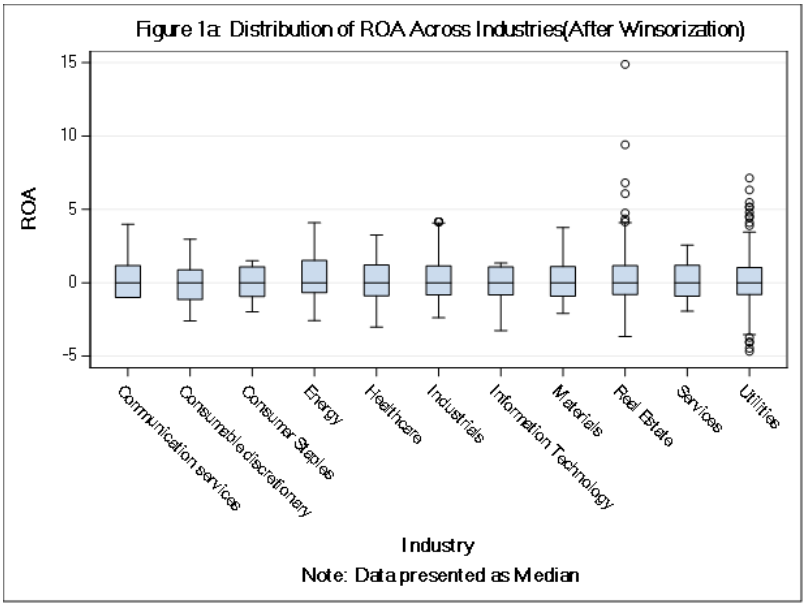


Figure 3.10: Distribution of ROA across industries after winsorisation

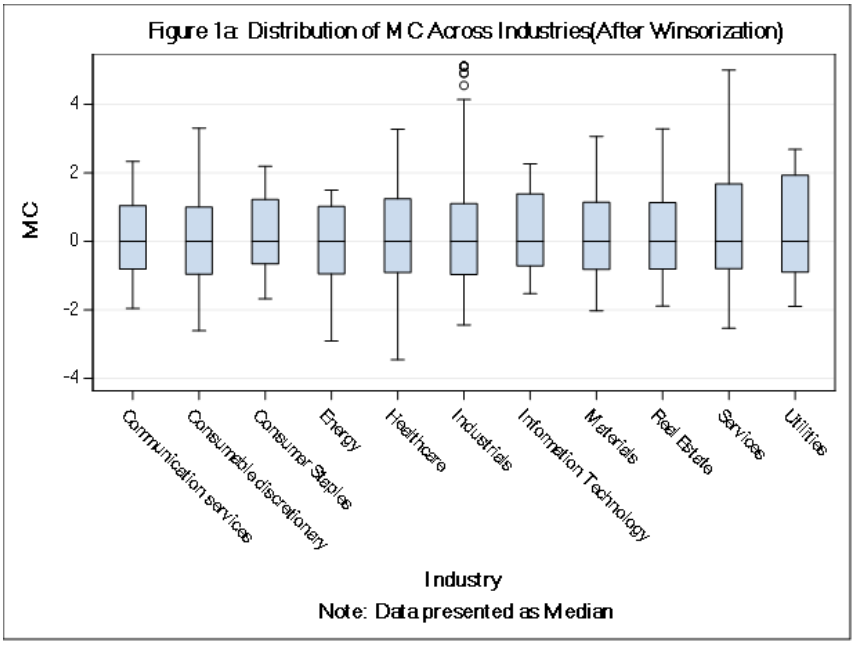


Figure 3.11: Distribution of MC across industries after winsorisation

Data Transformation, Standardization, and Visualization

Based on the variability presented in descriptive statistics, the metrics with high variability and skewed distributions are transformed using appropriate transformations. Metrics having negative values are transformed using inverse transformation. Size, Research and Development expenses, and Market capitalization are transformed through log transformation, and net cash flow is transformed through inverse transformations. The data is standardised to have uniform scaling methods across variables. Continuous variables are standardized using the median average deviation method (MAD). The effect of transformations is visually assessed through histograms before and after the transformation. For illustrative purposes, Figure 3.12 and 3.13 are shown.

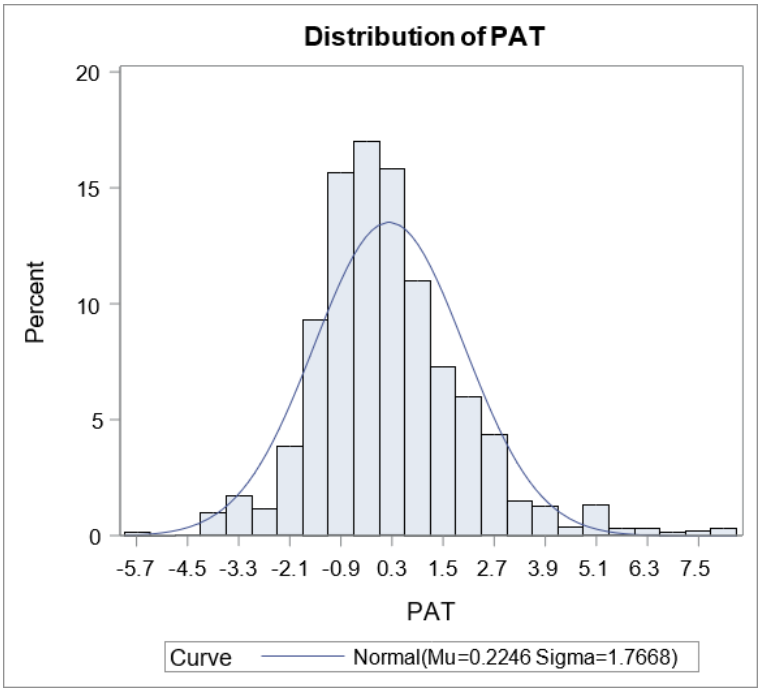


Figure 3.12: Distribution of PAT post transformation

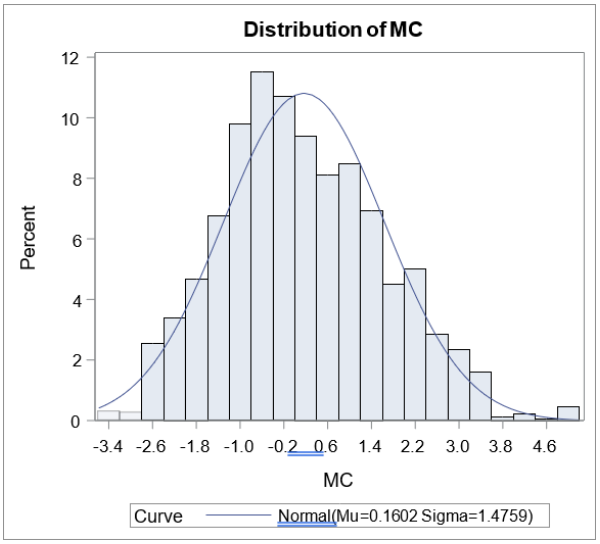


Figure 3.13: Distribution of Market capitalization post transformation

3.9 Statistical analysis

These basic techniques are used to identify the relationships, patterns, and clusters among variables, enabling the selection of the relevant and significant variables and/or those that can be clustered for the study.

3.9.1 Dependent and Independent Variable Identification

- **Descriptive Statistics:** Measures of central tendency and dispersion (mean, median, standard deviation, lower quartile, upper quartile, minimum and maximum) provide insights into the data set's characteristics.

  Correlation Analysis:
  Pearson's correlation coefficients are employed to assess the linear relationships and potential multicollinearity among the continuous dependent and independent variables, including ROA, Tobin's Q, the CGI, and the CSRI. The results are presented through correlation heatmaps, which visually highlight the presence and extent of multicollinearity within the dataset.

- **Anova:**

  - Relationships between categorical independent variables and the continuous dependent variable are evaluated through ANOVA.

  - ANOVA is also used to explore the moderating role of categorical independent variables.

  - Bar charts, box plots, and line plots are used to visualize the relationship between the variables.

- **Dimensionality Reduction:**

  - **Factor Analysis (Dependent Variables):** Exploratory Factor Analysis (EFA) is performed to identify underlying latent constructs among dependent variables, reducing dimensionality while retaining interpretability.

- **Principle Component Analysis (Dependent Variables):** Principal Component Analysis (PCA) is a dimensionality reduction technique used in statistics and machine learning to simplify complex datasets while preserving as much variance as possible. It transforms the original correlated variables into a new set of uncorrelated variables called principal components, which are ranked based on the amount of variance they capture. The first principal component accounts for the highest variance, with each subsequent component capturing progressively less.

- **Variable Clustering (Independent Variables):** Independent variables are grouped into clusters based on similarity, using methods like hierarchical clustering. Dendrograms are used to visualize variable grouping. This helps in the simplification of analysis.

- **Variable Selection:** Based on the results from the above analysis, significant variables are identified for hypothesis testing. These variables are selected based on their ability to explain variations in the dependent variable and their relevance to the study objectives, ensuring the analysis focuses on the most critical factors affecting FP.

- **Hypothesis testing:** The hypothesis testing process is structured using empirical models and statistical techniques as depicted in Figure 3.14. The goal is to validate research hypotheses concerning the relationships between CG, CSR, and FP.

3.9.2 Association models:

Regression models are used to assess the association between independent variables CGI, CSRI) and dependent variables (for example, ROA, Tobin's Q, or accounting ratios and market ratios). The following models are employed:

- **Linear Regression:** It explores linear relationships between a dependent variable and one or more independent variables. In linear regression, it is assumed that independent variables are not correlated with error terms. Linear forward regression is a type of

stepwise

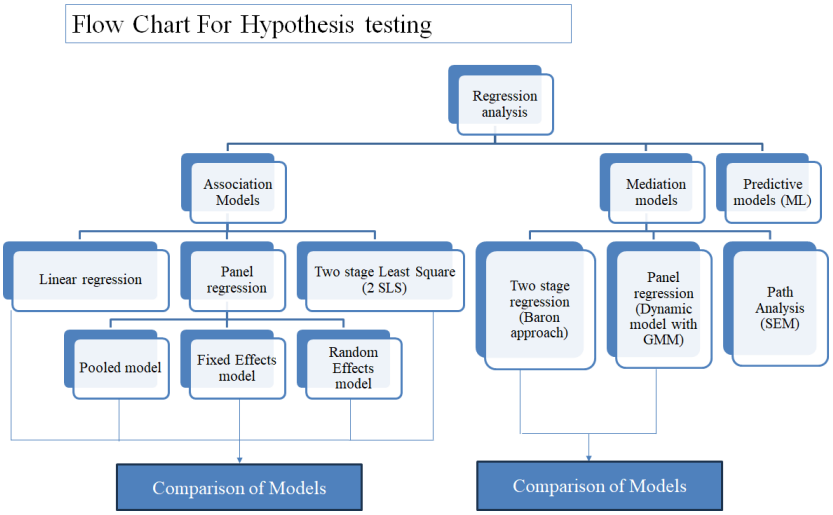


Figure 3.14: Flow chart for Hypotheses testing through statistical analysis

regression where predictors are added one at a time to the model based on their statistical significance, starting with the most significant predictor. The process continues until no additional predictor significantly improves the model. In the current study, linear regression and linear forward regression with interaction terms are performed between FP (accounting ratio and market ratio) as a dependent variable, and CSRI and CGI as independent variables. The other variables chosen are CR, QR, RDE, DE, Size, Age group, Industry, and market cap type. The equations are given hereunder. Model I is linear regression and Model II is Linear regression with forward selection method with interaction terms. Linear regression with interaction terms provides valuable insights into how the relationship between CGI, CSRI, and FP changes depending on contextual factors like industry, market capitalization, and age groups. Interaction terms are included to assess the moderating role of these variables in equation (3.9.2).

For objective 1

Model I:

$$\begin{aligned}\text{Acc\_Ratio}_{it} &= \beta_0 + \beta_1\text{CGI}_{it} + \beta_2\text{CR}_{it} \\ &+ \beta_3\text{QR}_{it} + \beta_4\text{CF}_{it} + \beta_5\text{RDE}_{it} + \beta_6\text{DE}_{it} \\ &+ \beta_7\text{Size}_{it} + \beta_8\text{AgeGr}_{it} + \beta_9\text{Industry}_{it} \\ &+ \beta_{10}\text{MktCapType}_{it} + \varepsilon_{it} \end{aligned} \quad (3.9.1)$$

$$\begin{aligned}\text{Mkt\_Ratio}_{it} &= \beta_0 + \beta_1\text{CGI}_{it} + \beta_2\text{CR}_{it} + \beta_3\text{QR}_{it} + \beta_4\text{CF}_{it} \\ &+ \beta_5\text{RDE}_{it} + \beta_6\text{DE}_{it} + \beta_7\text{Size}_{it} + \beta_8\text{Age\_Gr}_{it} \\ &+ \beta_9\text{Industry}_{it} + \beta_{10}\text{Mkt\_Cap\_type}_{it} + \varepsilon_{it} \end{aligned} \quad (3.9.2)$$

Model II:

$$\begin{aligned}\text{Acc\_Ratio}_{it} &= \beta_0 + \beta_1\text{CGI}_{it} + \beta_2\text{CR}_{it} + \beta_3\text{QR}_{it} + \beta_4\text{CF}_{it} + \beta_5\text{RDE}_{it} \\ &+ \beta_6\text{DE}_{it} + \beta_7\text{Size}_{it} + \beta_8\text{AgeGr}_{it} + \beta_9\text{Industry}_{it} \\ &+ \beta_{10}\text{MktCapType}_{it} + \beta_{11}(\text{CGI} \times \text{Industry}) \\ &+ \beta_{12}(\text{CGI} \times \text{Mkt Cap type}) + \beta_{13}(\text{CGI} \times \text{Age group}) + \varepsilon_{it} \end{aligned} \quad (3.9.3)$$

$$\begin{aligned}\text{Mkt\_Ratio}_{it} &= \beta_0 + \beta_1\text{CGI}_{it} + \beta_2\text{CR}_{it} + \beta_3\text{QR}_{it} + \beta_4\text{CF}_{it} \\ &+ \beta_5\text{RDE}_{it} + \beta_6\text{DE}_{it} + \beta_7\text{Size}_{it} + \beta_8\text{Age\_Gr}_{it} \\ &+ \beta_9\text{Industry}_{it} + \beta_{10}\text{Mkt\_Cap\_type}_{it} \\ &+ \beta_{11}(\text{CGI} \times \text{Industry}) + \beta_{12}(\text{CGI} \times \text{Mkt Cap type}) \\ &+ \beta_{13}(\text{CGI} \times \text{Age group}) + \varepsilon_{it} \end{aligned} \quad (3.9.4)$$

For objective 2

Model I:

$$\begin{aligned}\text{Acc\_Ratio}_{it} &= \beta_0 + \beta_1\text{CSRI}_{it} + \beta_2\text{CR}_{it} \\ &+ \beta_3\text{QR}_{it} + \beta_4\text{CF}_{it} + \beta_5\text{RDE}_{it} + \beta_6\text{DE}_{it} \\ &+ \beta_7\text{Size}_{it} + \beta_8\text{AgeGr}_{it} + \beta_9\text{Industry}_{it} \\ &+ \beta_{10}\text{MktCapType}_{it} + \varepsilon_{it} \qquad (3.9.5)\end{aligned}$$

$$\begin{aligned}\text{Mkt\_Ratio}_{it} &= \beta_0 + \beta_1\text{CSRI}_{it} + \beta_2\text{CR}_{it} + \beta_3\text{QR}_{it} + \beta_4\text{CF}_{it} \\ &+ \beta_5\text{RDE}_{it} + \beta_6\text{DE}_{it} + \beta_7\text{Size}_{it} + \beta_8\text{Age\_Gr}_{it} \\ &+ \beta_9\text{Industry}_{it} + \beta_{10}\text{Mkt\_Cap\_type}_{it} \\ &+ \varepsilon_{it} \qquad (3.9.6)\end{aligned}$$

Model II:

$$\begin{aligned}\text{Acc\_Ratio}_{it} &= \beta_0 + \beta_1\text{CSRI}_{it} + \beta_2\text{CR}_{it} + \beta_3\text{QR}_{it} + \beta_4\text{CF}_{it} + \beta_5\text{RDE}_{it} \\ &+ \beta_6\text{DE}_{it} + \beta_7\text{Size}_{it} + \beta_8\text{AgeGr}_{it} + \beta_9\text{Industry}_{it} \\ &+ \beta_{10}\text{MktCapType}_{it} + \beta_{11}(\text{CSRI} \times \text{Industry}) \\ &+ \beta_{12}(\text{CSRI} \times \text{Mkt Cap type}) + \beta_{13}(\text{CSRI} \times \text{Age group}) + \varepsilon_{it} \qquad (3.9.7)\end{aligned}$$

$$\begin{aligned}\text{Mkt\_Ratio}_{it} &= \beta_0 + \beta_1\text{CSRI}_{it} + \beta_2\text{CR}_{it} + \beta_3\text{QR}_{it} + \beta_4\text{CF}_{it} \\ &+ \beta_5\text{RDE}_{it} + \beta_6\text{DE}_{it} + \beta_7\text{Size}_{it} + \beta_8\text{Age\_Gr}_{it} \\ &+ \beta_9\text{Industry}_{it} + \beta_{10}\text{Mkt\_Cap\_type}_{it} \\ &+ \beta_{11}(\text{CSRI} \times \text{Industry}) + \beta_{12}(\text{CSRI} \times \text{Mkt Cap type}) \\ &+ \beta_{13}(\text{CSRI} \times \text{Age group}) + \varepsilon_{it} \end{aligned} \quad (3.9.8)$$

- **Panel Regression (Model 3):** The Panel regression procedure analyzes a class of linear empirical models that commonly arise when time series and cross-sectional data are combined. Regression models of panel data are characterised by an error structure that can be divided into a cross-sectional component, a time component, and an observation-level component. Fixed-effects, random-effects, and pooled models are used to evaluate the association between dependent and independent variables and the best model is selected through Hausman test and fit statistics.

Main effects model:

$$\begin{aligned}Y_{it} &= \beta_0 + \beta_1 CGI_{it} + \beta_2 Current\_Ratio_{it} + \beta_3 DE\_Ratio_{it} + \beta_4 Size_{it} \\ &+ \beta_5 Age_{it} + \beta_6 Market\_Cap_{it} + \alpha_i + \lambda_t + \varepsilon_{it} \end{aligned} \quad (3.9.9)$$

$$\begin{aligned}Y_{it} &= \beta_0 + \beta_1 CSRI_{it} + \beta_2 Current\_Ratio_{it} + \beta_3 DE\_Ratio_{it} + \beta_4 Size_{it} \\ &+ \beta_5 Age_{it} + \beta_6 Market\_Cap_{it} + \alpha_i + \lambda_t + \varepsilon_{it} \end{aligned} \quad (3.9.10)$$

Y is the dependent variable, Acc ratio or Mkt Ratio Where: β_0 = intercept, $\beta_1 \ldots \beta_6$: coefficients for independent variables α = Firm-specific fixed effects (unobserved heterogeneity) λ = Year fixed effects (time shocks, policies, economic events) ε = error term i = ith firm,

t =tth time period

Fixed one-Time Effects model (Moderation analysis)

$$Y_{it} = \beta_0 + \beta_1 CGI_{it} + \beta_2 Current\_Ratio_{it} + \beta_3 DE\_Ratio_{it} + \beta_4 Size_{it} + \beta_5 Industry_{it} + \beta_6 Market\_Cap_{it} + \beta_7 Age\_Group_{it} + \beta_8 (CGI_{it} \times Industry_{it}) + \beta_9 (CGI_{it} \times Market\_Cap_{it}) + \beta_{10} (CGI_{it} \times Age\_Group_{it}) + \alpha_i + \varepsilon_{it} \quad (3.9.11)$$

$$Y_{it} = \beta_0 + \beta_1 CSRI_{it} + \beta_2 Current\_Ratio_{it} + \beta_3 DE\_Ratio_{it} + \beta_4 Size_{it} + \beta_5 Industry_{it} + \beta_6 Market\_Cap_{it} + \beta_7 Age\_Group_{it} + \beta_8 (CSRI_{it} \times Industry_{it}) + \beta_9 (CSRI_{it} \times Market\_Cap_{it}) + \beta_{10} (CSRI_{it} \times Age\_Group_{it}) + \alpha_i + \varepsilon_{it} \quad (3.9.12)$$

Y is the dependent variable Acc ratio or Mkt Ratio Where: β_0 = intercept, $\beta_1 \ldots \beta_{10}$: coefficients for independent variables α = Firm-specific fixed effects (unobserved heterogeneity) ε = error term i =ith firm, t =tth time period

- **Two-Stage Least Squares (2SLS) (Model 4) :** Two stage least squares regression (2SLS) is used to test for endogeneity and to remove simultaneous equation bias, if any, in the linear case, by replacing the endogenous variables on the right-hand side of the equations with predicted values that are uncorrelated with the error terms. These predicted values are obtained through a preliminary, or "first-stage," instrumental variable regression. Instrumental variables, which are uncorrelated with the error terms, are used as regressors to model the predicted values. The parameter estimates are obtained by a second regression by using the predicted values of the regressors. In the first stage, the endogenous variable X is regressed on the instrument variables (Z)

$$X = \alpha_0 + \alpha_1 + \ldots + \alpha_i Z + v \tag{3.9.13}$$

where,

$$X = \frac{\text{CGI/ CSRI}}{}$$

$$X = \alpha_0 + \alpha_1 Z_1 + \alpha_2 Z_2 + \cdot \cdot \cdot + \alpha_n Z_n + v$$

where, α_0 = intercept; α_1 to α_n is the effect of instruments (Z) on X. Z represents the instrument variables including Transparency, Ownership, Board Efficiency, Compliance, CR, DE, Size, and Age. The residuals (v) are saved for the second stage of regression. In the second stage of regression CGI/ CSRI are regressed on Y (Account ratio and market ratio) by including the residual (v) saved from the first stage of regression.

$$Y = \beta_0 + \beta_1 X + \beta_2 v + \varepsilon \quad (3.9.14)$$

Where Y= dependent variable (accounting and market ratios), β_0 is intercepted, X = CGI; β_1 is the effects of X on Y where $\beta_2$is the effect of residual on Y and ε is the error term. β_2 is tested for significance using a t-test. If $\beta_2 = 0$ then there is no correlation between X and v. If β_2 is not equal to 0, then there is a correlation between X and v. If there is a correlation between X and v, it identifies and confirms endogeneity. Hausman's test (Hausman specification test) is used to analyse the significance of an instrumental variables method (2 SLS) rather than a more efficient OLS estimation. The specific equations for

For objective 1

$CGI = \alpha_0 + \alpha_1 + \ldots + \alpha_i Z + v$

$Acc\_Ratio = \beta_0 + \beta_1 CGI + \beta_2 v + \varepsilon$

$Mkt\_Ratio = \beta_0 + \beta_1 CGI + \beta_2 v + \varepsilon$

For objective 2

$CSRI = \alpha_0 + \alpha_1 + \ldots + \alpha_i Z + v$

$Acc\_Ratio = \beta_0 + \beta_1 CSRI + \beta_2 v + \varepsilon$

$Mkt\_Ratio = \beta_0 + \beta_1 CSRI + \beta_2 v + \varepsilon$

Model Selection:

Regression diagnostics, including residual plots and scatter plots, are used to evaluate the model. All the models are compared and selected based on the fit statistics like R-squared, and MSE (mean square error). The selected model is used for further analysis.

3.9.2.2. Mediation Models:

Mediation analysis investigates whether CSR mediates the relationship between CG and FP. To explore indirect effects and intermediary relationships among variables, mediation analysis is conducted using Baron and Kenny's approach.

- **Mediation Analysis:** This study employed the established methodology of Baron and Kenny to examine the mediating effects of CSR disclosure on the relationship between CG and FP. Accounting ratios and Market ratios are two different proxies for FP. The technique is elucidated as follows:

  In the initial phase, Y, the dependent variable, is regressed against X, the independent variable.

$$Y = \alpha_0 + \alpha_1 X + \varepsilon \tag{3.9.15}$$

  Where α_0 is intercept, α_1 is total effect, and ε is error term. Equation (3.9.15) analyzes the association between CG and FP, with Y representing FP(accounting ratio and Market ratio) and X denoting CG. This total effect (α_1) is the overall effect of X on Y without referring to a particular pathway. In the second stage, M, serving as the mediator variable, is regressed on X, which functions as the independent variable. The direct pathway is represented as :

$$M = \beta_0 + \beta_1 X + \varepsilon \tag{3.9.16}$$

  Where β_0 is the intercept, β_1 is the effect of the X to M path, and ε is the error term. Equation (3.9.16) analyzes the association between CG and CSR, with M representing CSR and X denoting CG. In the last stage, Y, the dependent variable, is regressed on X, the independent variable, and M, the mediator, concurrently.

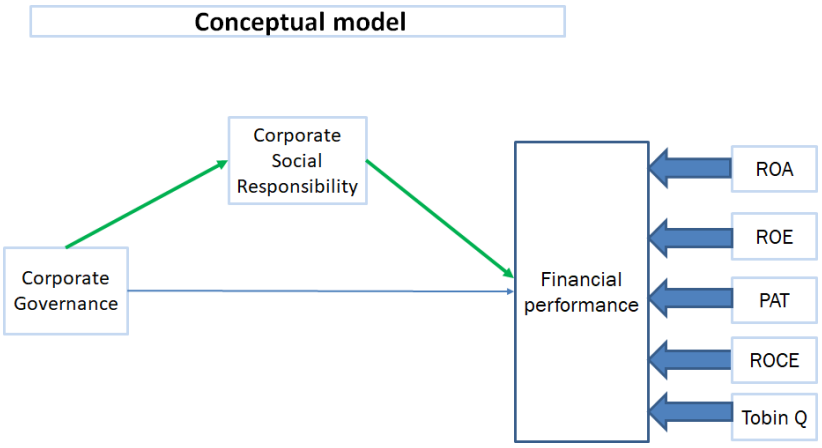


Figure 3.15: Proposed conceptual model for the study of mediation

The direct pathway is represented as :

$$Y = \vartheta_0 + \vartheta_1 X + \vartheta_2 M + \varepsilon \tag{3.9.17}$$

Where ϑ_0 is intercept, ϑ_1 is the effect of the X (CG) to Y(FP) path and ϑ_2 effect of the CSR(M) on FP (Y).

Equation (3.9.17) analyzes the association between CG and CSR in connection to FP, where Y represents FP, M denotes CSR, and X signifies CG.

Equation (3.9.17) illustrates the function of CSR as a mediator in the relationship between CG and FP. This equation represents FP as the dependent variable and regresses it on CSR (M) and CG (X). Bootstrapping with 5,000 resamples was employed to estimate bias-corrected standard errors and confidence intervals for the indirect effect. This resampling procedure generates an empirical sampling distribution of the mediation effect without assuming normality. An indirect effect is considered statistically significant if the bias-corrected confidence interval does not include zero. Although the Baron and Kenny approach provides a structured framework for testing mediation, contemporary methodological literature emphasizes the statistical significance of the indirect effect using bootstrapped confidence intervals, as this approach does not rely on the assumption of normality of the sampling distribution. The analysis was repeated

with relevant covariates to ensure robustness of the mediation results.

$M = \beta_0 + \beta_1 X + \beta_2$ to n (control) $+ \varepsilon$

$Y = \vartheta_0 + \vartheta_1 X + \vartheta_2 M + \vartheta_3$ to n (control) $+ \varepsilon$

Where β_2 to β_n represent the effects of control variables (CR, DE, Size, Age etc) on the mediator CSR , and ϑ_3 to ϑ_n. represent their effects on FP.

Additionally, following Homayoun et al. (2023), robustness tests are conducted to enhance the validity of the results.

Initially, the factored FP metric is replaced with ROCE and Tobin's Q, and a mediation analysis is conducted with and without controls, enabling us to ascertain whether the conclusions persist when utilising direct FP metrics.

Furthermore, a dynamic model with a GMM is used to mitigate potential endogeneity concerns. Instrument variables are included to test for the endogeneity of regressors.

$Y = \alpha_0 + \alpha_1 X + \alpha_2 X_1 + \alpha_3 X_2 + \varepsilon$

Where Y = dependent variable FP, α_0 is the intercept, α_1 is the coefficient of the lagged dependent variable (FP). The lagged dependent variable is instrumented to address endogeneity. X1 = CGI; X2 = CSRI. α_2 and α_3 are the effects of exogenous regressors (CGI, CSRI) on Y. ε is the error term. The lagged values of endogenous variables are used as instruments, while exogenous control variables (CR, DE, Size, Age) enter the model directly.

- **Path Analysis:** Additionally, Path Analysis within a Structural Equation Model (SEM) framework is employed to test hypothesized relationships and causal pathways among variables. Path diagrams with standardized coefficients provide insights into direct, indirect, and total effects, offering a comprehensive understanding of variable interactions.

  SEM is a more comprehensive and robust method for testing mediation. SEM simultaneously assesses both the direct and indirect paths, along with other relationships in the model. SEM provides not only estimates of the indirect effect but also accounts for the relationships between all variables in the model, making it more flexible and accurate for complex models. Bootstrapping, which is often used to assess mediation (sensitivity analysis), has been shown to be more accurate in SEM since it is not predicated on the assumption of a normal distribution of the indirect effects.

Since structural equation modeling estimates relationships simultaneously within a unified framework, coefficient magnitudes may differ from those obtained through stepwise regression approaches. However, consistency in the direction and statistical significance of paths across methods enhances the robustness and reliability of the findings.

3.9.3 Predictive models with Artificial Intelligence

Linear regression is less accurate in making predictions due to statistical constraints like endogeneity and autocorrelation (Risse 2019). Conventional statistical methods predominantly reveal linear associations and may overlook intricacies within extensive data sets Abdullah *et al.* (2024). Conversely, machine learning techniques encapsulate complex, nonlinear processes. Machine learning models proficiently predict time series data by considering trends, seasonality, and autocorrelations. Decision tree regressors, recognized for their interpretability, discern essential traits and interactions, yielding transparent and actionable insights (Chen et al., 2025). Hence, in the current research, more efficient ML models are used, such as random forest, extreme gradient boosting (XGBoost), and categorical boosting (CATBoost). These models do not depend on error correlation or autocorrelation, and they are less outlier-sensitive.

The decision to utilize a combination of statistical analysis and predictive modeling stems from the following additional considerations:

- **Complex Relationships:** CG, CSR, and CFP are influenced by numerous interdependent factors that require advanced techniques to identify patterns and relationships.
- **Dynamic Interactions:** AI/ML models, such as random forest, XGBoost, and CATBoost, can capture nonlinear relationships and interactions often missed by traditional statistical methods.
- **Enhanced Predictive Capability:** Predictive models provide insights not only into current relationships but also forecast potential impacts under varying scenarios.

- **Data Handling Capability:** The use of Python software facilitates the efficient management of large datasets, implementation of both traditional and modern analytical methods, and ensures reproducibility and reliability.

Machine learning models like quantile regression, neural networks, decision trees, and random forest gradient boosting are selected based on their capability to assess non-linear and complex relationships, examine complex patterns by splitting into a number of trees, achieve high accuracy, and model prediction (Yadav et al., 2024). Predictive models are built using machine learning techniques (4 models), and the most suitable is selected by model comparison based on fit statistics. Machine learning models enhance the understanding of non-linear and complex relationships.

Model interpretability using explainable Artificial Intelligence (XAI). XAI, a branch of artificial intelligence, uses machine learning to create highly accurate models. XAI aims to help end users and domain specialists understand how black-box models generate predictions. A large number of XAI techniques have been developed, including Local Interpretable Model-agnostic explanations. LIME and Shapley Additive Explanations (SHAP). LIME employs a local approximation within the model to deliver interpretable and elucidative insights on the aspects that are most pertinent and impactful in the model's predictions. SHAP uses game theory tactics to estimate each feature's contribution to individual predictions. The champion model is interpreted based on global interpretability (PD plots, prediction dependence plots) and ICE plots. LIME and SHap explainers are used for local interpretability.

Random forest

Random Forest is an ensemble learning method used for classification and regression tasks, built upon multiple decision trees. It operates by constructing a collection of decision trees during training and aggregating their outputs to improve predictive accuracy and reduce overfitting. Each tree is trained on a random subset of the data, and feature selection is also randomized to enhance diversity among trees. For regression, it is based on the average output of all trees. Random Forest is highly robust, handles missing data well, and works effectively with both structured and

unstructured data.

Extreme Gradient Boosting

XGBoost (Extreme Gradient Boosting) is a powerful and efficient machine learning algorithm based on gradient boosting, designed for both classification and regression tasks. It improves predictive performance by sequentially building decision trees, where each tree corrects the errors of the previous ones using a gradient descent optimisation approach. XGBoost is known for its speed and scalability due to its optimized implementation, handling missing values, regularization techniques (L1 and L2), and parallel processing. It effectively reduces overfitting while maintaining high accuracy.

Categorical Boosting

CatBoost (Categorical Boosting) is a gradient boosting algorithm designed for high-performance regression and classification tasks, particularly excelling with categorical data. Unlike traditional gradient boosting methods, CatBoost efficiently handles categorical variables without requiring extensive preprocessing, such as one-hot encoding or label encoding. It utilizes an ordered boosting technique to reduce overfitting and a symmetric tree structure for faster training and inference.

3.9.4 Tools for Analysis

This study uses advanced statistical software, SAS 9.4 and Python, for statistical and AI analysis. SAS offers a wide range of statistical data analyses, such as regression, analysis of variance, categorical data analysis, nonparametric analysis, etc. Python offers a rich ecosystem of libraries for statistical data analysis, visualisation, and machine learning, including Random Forest (RF), XGBoost, CatBoost, and Principal Component Analysis (PCA). NumPy and pandas provide essential tools for handling numerical computations and structured data, while SciPy offers advanced statistical functions. For visualization, Matplotlib and Seaborn help create insightful

plots and charts. Scikit- learn is widely used for machine learning tasks, including PCA for dimensionality reduction and Random Forest for classification and regression. XGBoost and CatBoost are specialized libraries optimized for gradient boosting, offering high performance and efficiency. These libraries together enable robust data exploration, feature engineering, predictive modeling, and visualization in various domains.

3.9.5 Ensemble

Stacking ensemble is a powerful machine learning technique that combines multiple base models to improve predictive performance. Unlike bagging and boosting, which typically use the same type of models, stacking involves training diverse models and then using a meta-model (or blender) to learn how to best combine their predictions. The base models make independent predictions, which are then used as input features for the meta-model to generate the final output. This approach reduces bias and variance by leveraging the strengths of different algorithms, leading to more robust and accurate predictions.

3.9.6 SHAP for mediation analysis

SHAP (Shapley Additive Explanations) is a powerful interpretability tool that quantifies the contribution of individual features to a model's predictions. In mediation analysis, SHAP can be used to assess the indirect effects of mediators by decomposing the significations alongside direct predictors. By calculating SHAP values for approachesiator and independent variables, researchers can estimate how much of the total effect on the outcome is mediated through specific pathways. This approach allows for a more granular understanding of causal relationships in complex models, particularly in machine learning-driven mediation frameworks. SHAP-based mediation analysis is valuable in fields like healthcare, social sciences, and economics, where understanding indirect influences is crucial for decision-making.

The study used this cutting-edge statistical software to analyse the impact of CG and CSR on financial performance. These tools provide robust capabilities for regression analysis

and structural equation modeling, validating hypotheses about the interactions between these factors. The aim is to understand how variations in governance practices and CSR efforts correlate with financial success, enabling a comprehensive examination of publicly traded companies. The use of advanced statistical software enhances the quality of analysis and reporting. Statistical significance is set at 5% level (p=0.05).

3.10 Ethical considerations

This study follows ethical guidelines to protect stakeholders' interests and maintain transparency in data collection, analysis, and reporting. It uses publicly accessible secondary data, adheres to intellectual property rights, and acknowledges potential biases. The research maintains academic integrity by citing sources accurately and maintaining originality. The findings aim to contribute to responsible CG and CSR practices, promoting transparency and accountability.

3.11 Summary of the Chapter

This study examines the impact of CG and CSR on the FP of Indian firms, focusing on companies listed in the BSE 500. The research methodology is guided by a positivist philosophy and employs a quantitative approach, utilising secondary data from publicly available corporate disclosures, annual reports, and BRSR filings. The structured research design includes a causal framework. The analytical approach encompasses data preprocessing, sophisticated statistical analysis, variable selection, and hypothesis testing. The methodology also employs machine learning (AI/ML) approaches to provide a thorough and robust analysis of the effects of CG and CSR on FP. The combined approach of statistical and predictive modeling provides a framework for analyzing the effect of CG and CSR on FP. While statistical methods establish foundational relationships, AI/ML techniques enhance the analysis by uncovering deeper patterns, detecting thresholds, and offering actionable insights. This dual methodology ensures that the study not only contributes to academic understanding but also offers practical recommendations for corporate decision-making.

3.12 Summary of the Chapter

This systematic approach aligns with the study's objectives, offering insights into both linear and intricate correlations among variables. Kaur, N., & Singh, V. (2021), who reported a positive correlation between CSR and value-added measures, profitability, and growth and no significant relationship between CSR and market measures, used panel regression and ANOVA in their methodology. A significant but low positive association between CSR and CFP was reported by Bikrant Kesari and Nimisha Rawat (2023) in their analysis using SPSS, who employed linear regression and correlation analysis. The methodology employed by Lachuer & Jabeur (2022) in their research was explainable artificial intelligence (XAI), specifically utilizing machine learning techniques like eXtreme Gradient Boosting (XGBoost) to evaluate the relationship between CSP and CFP. The methodology adopted by Vuppuluri (2024) includes causal mediation analysis using SAS 9.4 with Structural Equation Modeling (SEM) to assess both direct and indirect paths in the model. Alnohoud *et al.* (2022) employed the Barron and Kenny approach to analyse the mediating effect of CSR disclosure on the relationship between CG and CFP. The methodology followed by this study is in line with the methodology followed by these researchers.

Chapter 4

Results and Discussions

In examining the relation between CG, CSR and CFP, it is endeavoured to adhere to a scientific methodology that guarantees a rigorous investigation of the data that is first collected. It involves adhering to a positivist epistemological stance based on a hypothetical-deductive methodology. When evaluating panel data, a specific methodology and a series of econometric tests must be employed to derive the research model necessary for accurate predictions. Initially, when utilizing panel data, it is important to ascertain the requisite parameters that ensure the dependability of the analyzed database. Verifying these conditions enables the identification of the optimal unbiased predictor, facilitating an efficient understanding of the relationships that may exist between the variables. Subsequently, the impact of both the fixed effect and the random effect of the data, which direct the analytical approach, must be examined. The preliminary test findings provide clarity on the appropriate regressor to utilize, so ensuring the elimination of all sources of bias in the outcomes. Among these initial assessments, the homoscedasticity test, the autocorrelation test, and the multicollinearity test are identified. In the research methodology, the validation of these preliminary tests is ensured to facilitate the further investigation of relationships by the implementation of appropriate regression models.

4.1 Overview of sample data

The study sample comprises 2725 firm-year observations from annual reports and ESG reports containing 357 companies over the time from financial year 2013-14 to 2022-23. Companies are grouped into industry sectors based on GIC system. (The Global Industry Classification Standard system categorizes companies into sectors and industries for consistent financial market analysis worldwide.) Table 4.1 shows the data on the number of companies within each industry sector and their corresponding percentage representation in the total data set. It provides an overview of industry distribution, allowing for analysis of sector dominance.

Table 4.1: Frequency Distribution of Industries

Industry	No of Companies	% of Total Frequency
Communication Services	13	3.64
Consumable Discretionary	**83**	**23.2**
Consumer Staples	27	7.56
Energy	16	4.48
Healthcare	40	11.2
Industrials	58	16.2
Information Technology	21	5.88
Materials	**63**	**17.6**
Real Estate	11	3.08
Services	14	3.92
Utilities	11	3.08

The consumable discretionary industry has the highest number of companies, 83, making up 23.2% of the total frequency. This suggests that a significant portion of businesses falls within this sector, which typically includes goods and services that consumers purchase based on discretionary income. The materials sector follows with 63 companies, accounting for 17.6%, indicating a substantial presence in this industry. Similarly, other sectors also contribute to the overall industry distribution.

Industrials sector, comprising 58 companies (16.2%), also holds a strong representation, suggesting the importance of manufacturing and infrastructure-related businesses. Other notable industries include Healthcare (40 companies, 11.2%), Consumer Staples (27 companies, 7.56%), and Information Technology (21 companies, 5.88%), which highlights the diversity within the dataset. The Energy sector comprises 16 companies (4.48%), while Services (14 companies, 3.92%) and Communication Services (13 companies, 3.64%) have relatively lower representations. Finally, Real Estate and Utilities each have 11 companies (3.08%), making them the least represented industries in the dataset. The distribution across sectors implies a diverse industrial landscape with dominance of discretionary consumption, materials, and industrials. This concentration suggests consumer behavior, resource demand, and infrastructure development strongly influence overall performance, while relatively smaller sectors like utilities and real estate indicate limited but specialized economic contributions.

CG and CSR scenarios during the study period, 2014 to 2023, are presented in Table 4.2.

Table 4.2: CG and CSR trend over time (2014-23)

Year	N	Median CSR	Median CG
2013-14	54	6.00	18.00
2014-15	243	5.00	19.00
2015-16	257	5.00	19.00
2016-17	265	5.00	19.00
2017-18	280	5.00	19.00
2018-19	295	6.00	20.00
2019-20	308	6.00	20.00
2020-21	326	6.00	20.00
2021-22	340	5.00	20.00
2022-23	357	5.00	20.00

Median scores are formed by arranging company-level CSR and CG values each year and selecting the middle value, representing the central tendency of the distribution. Table 4.2 gives the CG and CSR trends over time, 2014-23. The data in Table 4.2 highlights the trends of CG and CSR over the period from 2014 to 2023. The median CG score shows a gradual

rise from 18.00 in 2013 to 20.00 by 2018 and remains stable at this level until 2023. This stability suggests that companies have steadily achieved and maintained stronger governance practices over time. In contrast, the median CSR score fluctuates between 5.00 and 6.00, reflecting modest changes and suggesting limited variation in CSR practices. The sample size increases substantially from 54 in 2013 to 357 in 2023, indicating broader coverage and stronger representation of companies across the years. Therefore, the data reflects a pronounced expansion in corporate engagement in governance and social responsibility endeavors over the decade. However, while practices related to CG have shown consistent improvement and stabilisation at an elevated level, CSR commitments seem to have reached a plateau in recent years. This indicates that although businesses are adhering to CSR mandates, there may exist a necessity for a renewed emphasis on amplifying the scale and efficacy of CSR initiatives to foster enduring social and environmental advantages. Looking ahead, corporations should strive to synchronize robust governance structures with more impactful CSR strategies, thereby ensuring a comprehensive approach to corporate sustainability and ethical accountability.

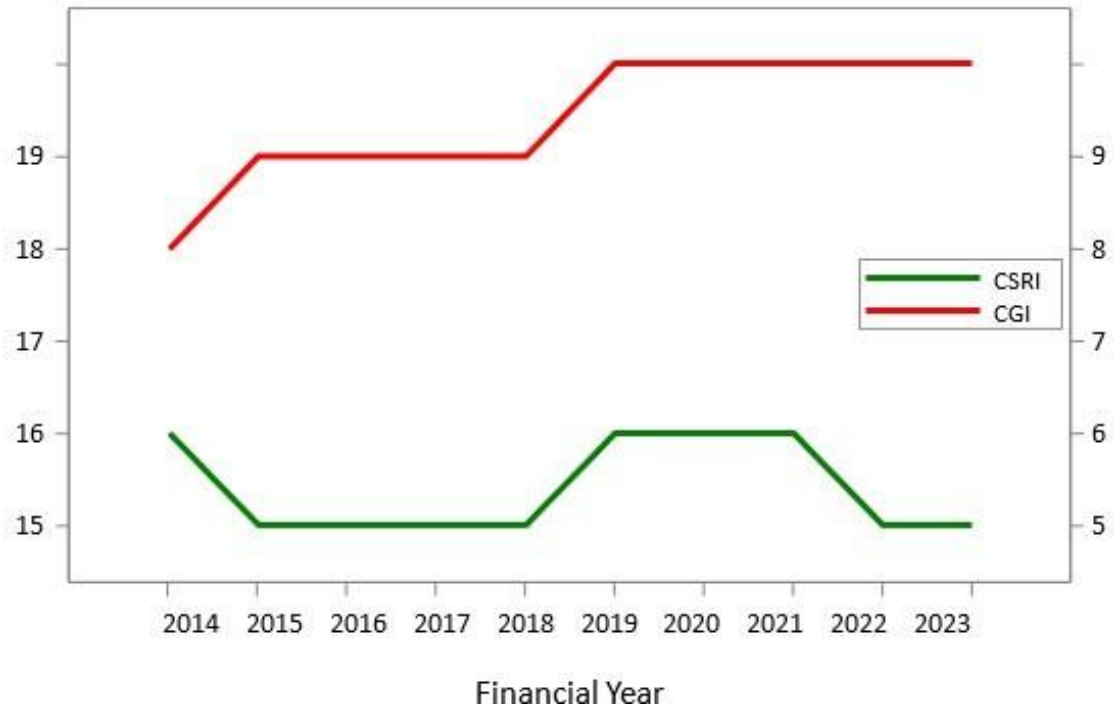


Figure 4.1: Median Distribution of CSRI and CGI During 2014-2023

For CG median, an increasing trend is observed over the period, with a maximum median. (20) from 2018-19. This shows the improved compliance of CG. In contrast, CSR is more volatile and improves from 2014-15 till 2020-21 and thereafter takes a setback (Figure 4.1). This may be because the CSR compliance is based on the average FP of the last three years. During the pandemic, the FP was affected across the country. The divergence between CGI and CSRI in later years (2020–2023) may highlight a gap where governance improvements are not necessarily translating into enhanced CSR activities. The trends suggest governance practices steadily improve, while CSR remains sensitive to financial conditions, indicating governance strength does not always guarantee sustained CSR engagement.

4.2 Overview of industry-wise data

Table 4.3: Industry-Wide CGI Scenario During 2014-2023 (Data presented as Median)

Industry	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Communication services	16.00	18.00	19.00	18.00	18.50	17.00	20.00	18.00	19.50	19.00
Consumable discretionary	18.00	19.00	19.00	19.00	20.00	20.00	20.00	20.00	20.00	20.00
Consumer Staples	18.50	19.00	20.00	20.00	20.00	19.50	20.00	20.00	20.00	20.00
Energy	.	19.00	19.00	19.00	21.00	21.00	20.00	19.50	21.00	20.50
Healthcare	17.00	20.00	20.00	19.00	19.00	19.50	19.50	20.00	20.00	21.00
Industrials	19.00	18.50	19.00	18.00	19.00	20.00	19.00	19.00	19.00	19.00
Information Technology	18.50	20.00	19.00	20.00	19.00	20.00	20.00	20.00	20.00	21.00
Materials	18.00	19.00	19.00	19.00	19.00	20.00	20.00	19.00	20.00	20.00
Real Estate	15.00	18.00	17.50	18.50	18.00	17.00	18.00	17.50	19.50	19.00
Services	16.00	19.00	18.00	18.00	19.00	18.00	20.00	20.00	19.00	20.00
Utilities	17.00	18.00	19.00	20.00	21.50	20.00	20.00	18.00	20.00	20.00

4.2 Overview industry-wise data

Table 4.3 highlights the industry-wise Corporate Governance Index (CGI) scenario from 2014 to 2023, highlighting the governance scores of various sectors over the years. A general observation indicates that most industries have shown an increasing or stable trend in their CG scores, suggesting continuous efforts toward improving governance practices, regulatory compliance, and ethical business conduct.

The Consumer Discretionary and Consumer Staples sectors have consistently maintained high CG scores, reaching 20.00 from 2016-17 onwards. This indicates a strong emphasis on governance standards, possibly driven by regulatory frameworks, stakeholder expectations, and the need for transparency in consumer-driven industries. Similarly, the Information Technology and Healthcare sectors have shown a steady increase in their CG scores, with Healthcare reaching 21.00 in 2022-23, reflecting enhanced governance practices, likely in response to evolving regulations and industry demands. The energy sector has experienced some fluctuations, particularly with a dip in 2020-21 (19.50) before recovering to 21.00 in 2021-22, suggesting a renewed focus on governance. This could be attributed to global shifts towards sustainability and environmental responsibility, which require stricter governance in the energy industry. Likewise, the utility sector peaked at 21.50 in 2017-18, indicating a strong governance framework, but later showed minor variations, stabilizing around 20.00 in recent years. The real Estate and Services sectors have shown relatively lower CG scores throughout the period. Real Estate started at 15.00 in 2013-14 and increased to 19.50 in 2021-22, reflecting gradual improvements, likely due to tightened regulations and increased scrutiny in the sector. The Services sector has demonstrated fluctuations, with scores ranging from 16.00 to 20.00, suggesting periodic governance challenges or industry-specific risks impacting its governance effectiveness.

The given data suggests a positive trend in CG across most industries, with several sectors reaching the 20.00 mark, indicating mature governance frameworks. The improvements in governance scores could be attributed to regulatory developments, investor expectations, and

industry best practices. However, some industries, such as Real Estate and Services, still have room for improvement in governance standards. Moving forward, industries must focus on sustained governance improvements, transparency, and accountability to strengthen stakeholder trust and long-term business sustainability.

Table 4.4: Industry-Wise CSRI Scenario During 2014-2023

Industry	**2013-14**	**2014-15**	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**	**2020-21**	**2021-22**	**2022-23**
Communication services	6.00	5.00	5.00	5.00	4.50	6.00	5.00	6.00	5.50	5.00
Consumable discretionary	6.00	4.00	5.00	5.00	6.00	6.00	6.00	6.00	5.00	5.00
Consumer Staples	6.00	5.00	5.00	5.00	6.00	5.50	6.00	6.00	6.00	5.00
Energy	.	6.00	5.50	5.00	5.50	5.50	7.00	6.00	4.50	4.50
Healthcare	6.00	4.00	4.00	4.00	4.00	5.00	5.00	5.00	4.00	4.00
Industrials	6.00	3.50	4.00	5.00	5.00	6.00	5.00	5.00	5.00	5.00
Information Technology	6.00	5.50	5.00	5.00	5.00	5.50	6.00	5.00	5.00	5.00
Materials	6.00	6.00	7.00	6.00	6.00	7.00	7.00	7.00	6.00	6.00
Real Estate	6.00	6.00	7.00	5.50	6.00	6.00	6.00	6.50	6.00	6.00
Services	6.00	6.00	7.00	6.50	7.00	7.00	7.00	7.00	6.00	6.00
Utilities	6.00	5.00	7.00	7.00	5.50	6.00	7.50	8.00	6.00	7.00

4.2 Overview of Industry wise data

Table 4.4 shows the industry-wise CSRI scores over the period from 2014 to 2023. Analysing the data reveals key trends in CSRI across various industries, indicating fluctuations and consistency in social responsibility priorities.

The Materials, Real Estate, and Services sectors have consistently shown high CSR engagement, often maintaining or exceeding a score of 6.0 in most years. Notably, the Materials sector has exhibited the highest and most stable CSR commitment, reaching scores of 7.0 multiple times, reflecting the industry's continuous focus on sustainability and environmental responsibility. Similarly, the utility sector has shown increasing CSRI, peaking at 8.0 in 2020-21, indicating a significant effort toward infrastructure development and social welfare initiatives. Healthcare and Industrials have demonstrated lower and more fluctuating CSRI. The Healthcare sector, which one might expect to lead in CSR initiatives due to its direct impact on public welfare, has consistently scored around 4.0–5.0, reflecting a more reserved approach compared to other industries. This suggests either strategic prioritisation in CSR activities or budget constraints in social initiatives. The Energy sector displays an interesting trend, with missing data for 2013-14 but showing a decline in CSRI scores in the later years (2021-23). This could indicate shifts in regulatory frameworks, economic downturns, or changes in corporate strategies. Similarly, Communication Services and Information Technology have maintained moderate CSR engagement, often fluctuating between
5.0 and 6.0, highlighting their steady but not leading participation in CSR initiatives.

The data pictures the variation in CSR focus across industries. While some sectors, such as Materials and Services, consistently prioritise CSR, others, like Healthcare and Industrials, exhibit cautious or fluctuating engagement. The trends suggest that industry-specific factors, such as regulatory influences, profitability, and corporate strategies, significantly impact CSR commitments. Going forward, industries with lower CSR scores might need to rethink their social responsibility strategies to align with growing global expectations for corporate contributions to

sustainable and social development.

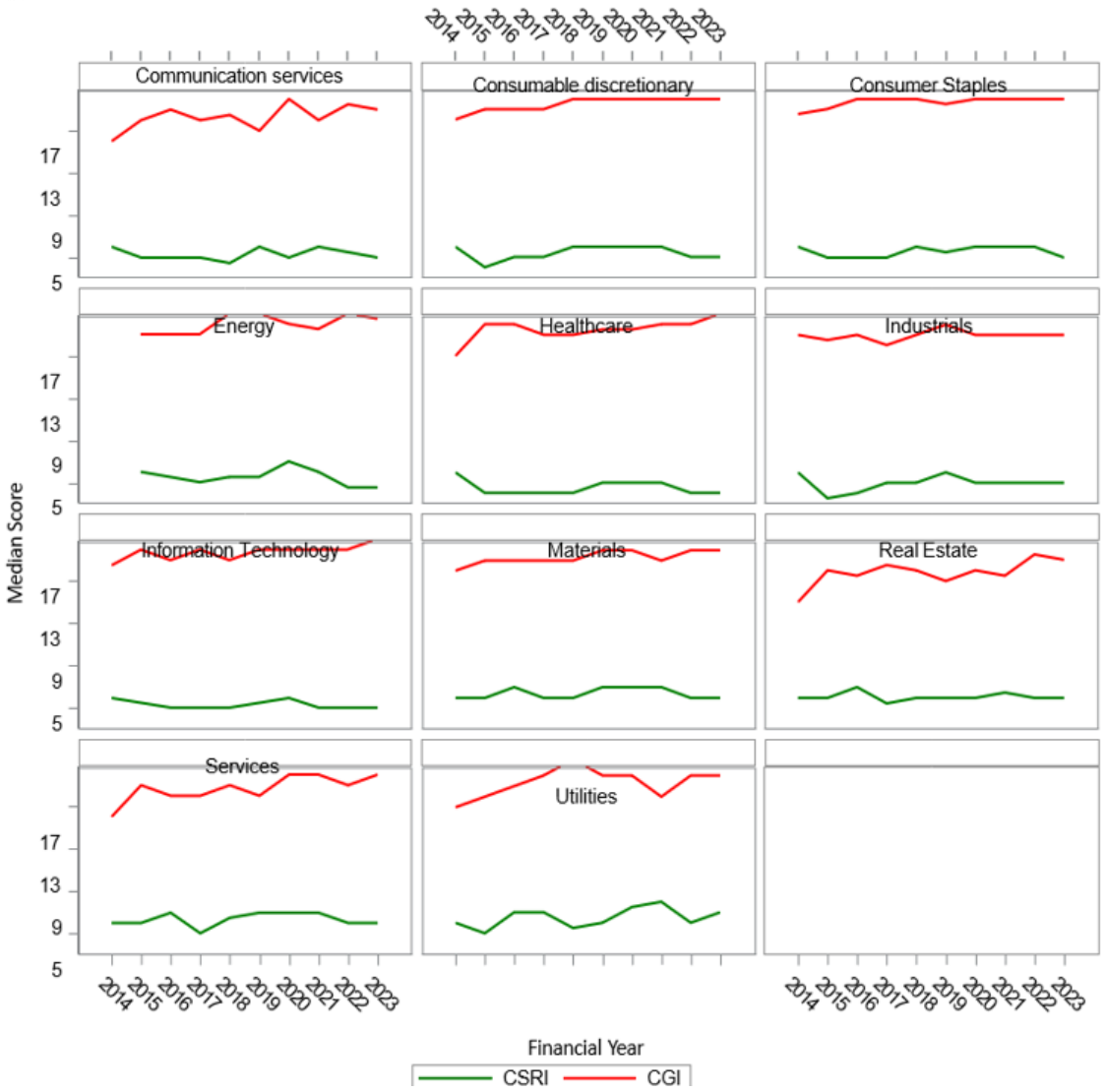


Figure 4.2: Industry-wise median distribution of CSRI and CGI

The CG and CSR trends across industries over the study period are shown in the figure 4.2. The effect of industry on CG and CSR is evident from the figure. Figure 4.2 indicates that industry significantly influences corporate governance and CSR practices, with sector-specific trends reflecting variations in governance quality and sustainability engagement over time.

4.3 Descriptive statistics

This section describes descriptive statistics of the analysis of the variables. From Table 4.5 it is observed that many variables are skewed as can be seen from the values of Mean and Median. Hence, they are transformed and winsorised. The descriptive statistics after transformation are shown in Table 4.6. Transformed data is used for analysis.

Table 4.5: Descriptive Statistics of Analysis Variables

Variable	Label	N	Mean	Median	Std Dev	Lower Quartile	Upper Quartile	Minimum	Maximum
ROA	ROA	2724	8.10	7.77	9.66	3.52	12.63	-121.07	78.88
ROCE	ROCE	2721	10.91	11.33	28.23	5.14	18.02	-867.58	104.90
Return on net worth	Return on net worth	2690	14.29	14.87	23.57	8.19	21.44	-534.17	146.51
Total Returns	Total Returns	2724	0.87	0.52	2.53	-0.68	1.98	-16.06	15.69
PAT	PAT	2725	11481.26	2912.70	43812.77	1135.80	7820.00	-731315.00	442050.00
MC	MC	2725	328000.55	95872.72	925584.87	44063.30	265802.35	438.39	17823996.33
PE Ratio	PE Ratio	2725	36.36	27.15	321.63	14.45	48.66	-7226.50	4479.97
Tobin Q	Tobin Q	2725	3.73	2.55	4.71	1.50	4.60	0.09	70.99
EPS	EPS	2718	28.67	13.93	78.43	5.33	31.91	-356.60	3127.00
CSRI	CSRI	2725	5.37	5.00	2.12	4.00	7.00	1.00	12.00
CGI	CGI	2725	19.10	19.00	3.20	18.00	21.00	2.00	25.00
DE Ratio	DE Ratio	2690	0.69	0.59	9.21	0.02	0.59	0.00	459.26
Quick ratio	Quick ratio	2725	1.41	0.90	2.02	0.55	1.56	0.01	41.83
Current ratio	Current ratio	2725	1.94	1.44	2.07	1.00	2.18	0.01	42.01
R&D Expenses	R&D Expenses	1632	1592.16	232.50	3889.29	67.25	1029.05	0.00	34985.10
Net Cash Flow	Net Cash Flow	2719	179.83	14.60	12395.88	-297.10	508.40	-216530.00	392930.00
SIZE	SIZE	2725	10.94	10.79	1.46	9.96	11.72	6.47	16.09
Age	Age	2725	41.83	35.00	23.76	25.00	56.00	2.00	161.00

Table 4.6: Descriptive Statistics of Analysis Variables after Transformation

Variable	Label	N	Mean	Median	Std Dev	Lower Quar-tile	Upper Quar-tile	Min	Max
ROA	ROA	2724	8.10	7.77	9.66	3.52	12.63	-121.07	78.88
ROCE	ROCE	2721	10.91	11.33	28.23	5.14	18.02	-867.58	104.90
Return on net worth	Return on net worth	2690	14.29	14.87	23.57	8.19	21.44	-534.17	146.51
Total Returns	Total Returns	2724	0.87	0.52	2.53	-0.68	1.98	-16.06	15.69
PAT	PAT%	2725	8.65	9.21	29.38	4.53	15.19	-793.02	80.03
MC	MC	2725	11.60	11.47	1.39	10.69	12.49	6.08	16.70
PE Ratio	PE Ratio	2725	0.02	0.03	0.40	0.02	0.06	-10.55	1.51
Tobin Q	Tobin Q	2725	3.73	2.55	4.11	1.50	4.60	0.09	70.99
EPS	EPS	2718	28.67	13.93	78.43	5.33	31.91	-356.60	3127.00
CSRI	CSRI	2725	5.37	5.00	2.12	4.00	7.00	1.00	12.00
CGI	CGI	2725	19.10	19.00	3.20	18.00	21.00	2.00	25.00
DE Ratio	DE Ratio	2690	0.69	0.18	9.21	0.02	0.59	0.00	459.26
Quick ratio	Quick ratio	2725	1.41	0.90	2.02	0.55	1.56	0.01	41.83
Current ratio	Current ratio	2725	1.94	1.44	2.07	1.00	2.18	0.01	42.01
R&D Expenses	R&D Expenses	1628	5.56	5.56	0.33	4.22	6.94	-1.61	7.01
Net Cash Flow	Net Cash Flow	2713	-0.01	0.00	0.00	-0.00	0.00	-10.00	3.33
SIZE	SIZE	2725	10.94	10.79	1.46	9.96	11.72	6.47	16.09
Age	Age	2725	41.83	35.00	23.76	25.00	56.00	2.00	161.00

Insights from Descriptive Statistics of Analysis Variables

Profitability Performance

- The Return on Assets (ROA) has a mean of 8.1% and a median of 7.77%, with a high standard deviation (9.66), indicating significant variation in profitability. The wide range from -121.07% to 78.88% suggests the presence of firms with extreme losses or gains.
- Return on Capital Employed (ROCE) and Return on Net Worth (RONW) show large standard deviations (28.23 and 23.57, respectively), reflecting varying efficiency levels in capital utilization across firms. Notably, ROCE has a minimum of -867.58%, pointing to firms with severe capital erosion.
- Total Returns have a relatively low median (0.52), with a significant range (-16.06 to 15.69), indicating that while some firms generate high returns, others experience substantial negative returns.

Market Valuation Metrics

- Market Capitalization (MC) exhibits an extremely large spread, ranging from Rs. 438.39 million to Rs. 17.82 trillion, showing vast differences in firm sizes.
- The Price-to-Earnings (PE) ratio has a mean of 36.36, but a high standard deviation (321.63) and wide range (-7226.5 to 4479.97) suggest extreme outliers, possibly due to loss-making firms or speculative valuations.
- Tobin's Q, a measure of firm valuation relative to its assets, has a mean of 3.73 with a high maximum of 70.99, indicating that some firms are valued significantly above their book value.

Corporate Social Responsibility (CSR) and Corporate Governance (CG)

- The CSRI has a median of 5, with most firms falling between 4 and 7, indicating a moderate level of CSR commitment.
- The Corporate Governance Index (CGI) has a median of 19, with most firms clustered between 18 and 21, suggesting a strong adherence to governance practices. However, some firms exhibit significantly lower governance scores (minimum of 2 and maximum of 25). These values signify the existence of two categories of companies: those that prioritize governance and its mechanisms and those that lack them.

Financial Stability and Liquidity

- The Debt-to-Equity (DE) Ratio has a median of 0.18, suggesting that most firms operate with low leverage. However, the maximum value of 459.26 highlights that some firms are heavily debt-financed, posing financial risks.
- Quick Ratio (1.41) and Current Ratio (1.94) suggest that firms, on average, have sufficient liquidity to meet short-term obligations, though high standard deviations indicate variability in liquidity management.
- Net Cash Flow exhibits extreme volatility, ranging from -Rs. 216.53 billion to Rs. 392.93 billion, highlighting differences in cash generation and expenditure across firms.

Firm Characteristics

- Firm size (SIZE) has a mean of 10.94, with most firms clustering between 9.96 and 11.72, indicating a balanced distribution of small and large firms.
- Firm age varies widely, with a median of 35 years but ranging from 2 years to 161 years, showing a mix of both young and well-established firms.

Thus, the summarization suggests that while most firms in the dataset appear financially stable with reasonable governance and CSR commitments, large variations and extreme outliers indicate

the presence of both highly successful and struggling firms. Firms with negative returns, excessive debt, or volatile cash flows may require closer monitoring to mitigate financial risks and enhance long-term sustainability. Presence of outliers and high variability (mean and median difference) leads us to treat outliers using winsorisation, followed by the transformation and standardization of variables to avoid the problem of being influenced by high values.

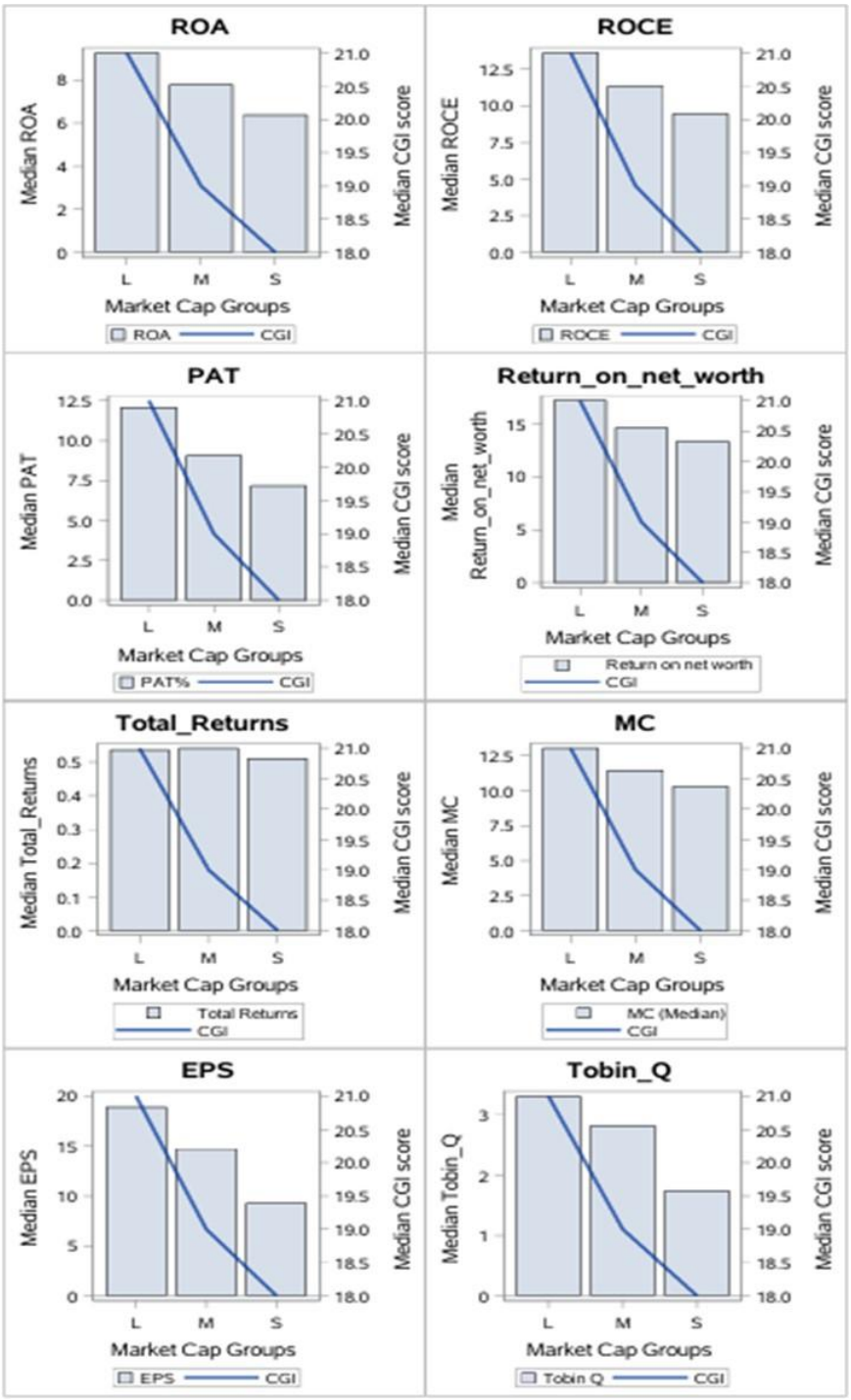


Figure 4.3: Impact of CG on financial metrics across market cap groups (2013-23)

From Figure 4.3, it can be deduced that Larger firms generally perform better financially across profitability, returns, and valuation metrics. CGI remains relatively stable across different market cap groups, indicating that governance quality is not necessarily tied to firm size. Higher governance scores do not show a direct correlation with short-term FP, suggesting that CG may have long-term benefits rather than immediate financial impacts. This analysis implies that CG is a prime factor in maintaining financial discipline across firms of all sizes, but may not always translate to immediate financial gains.

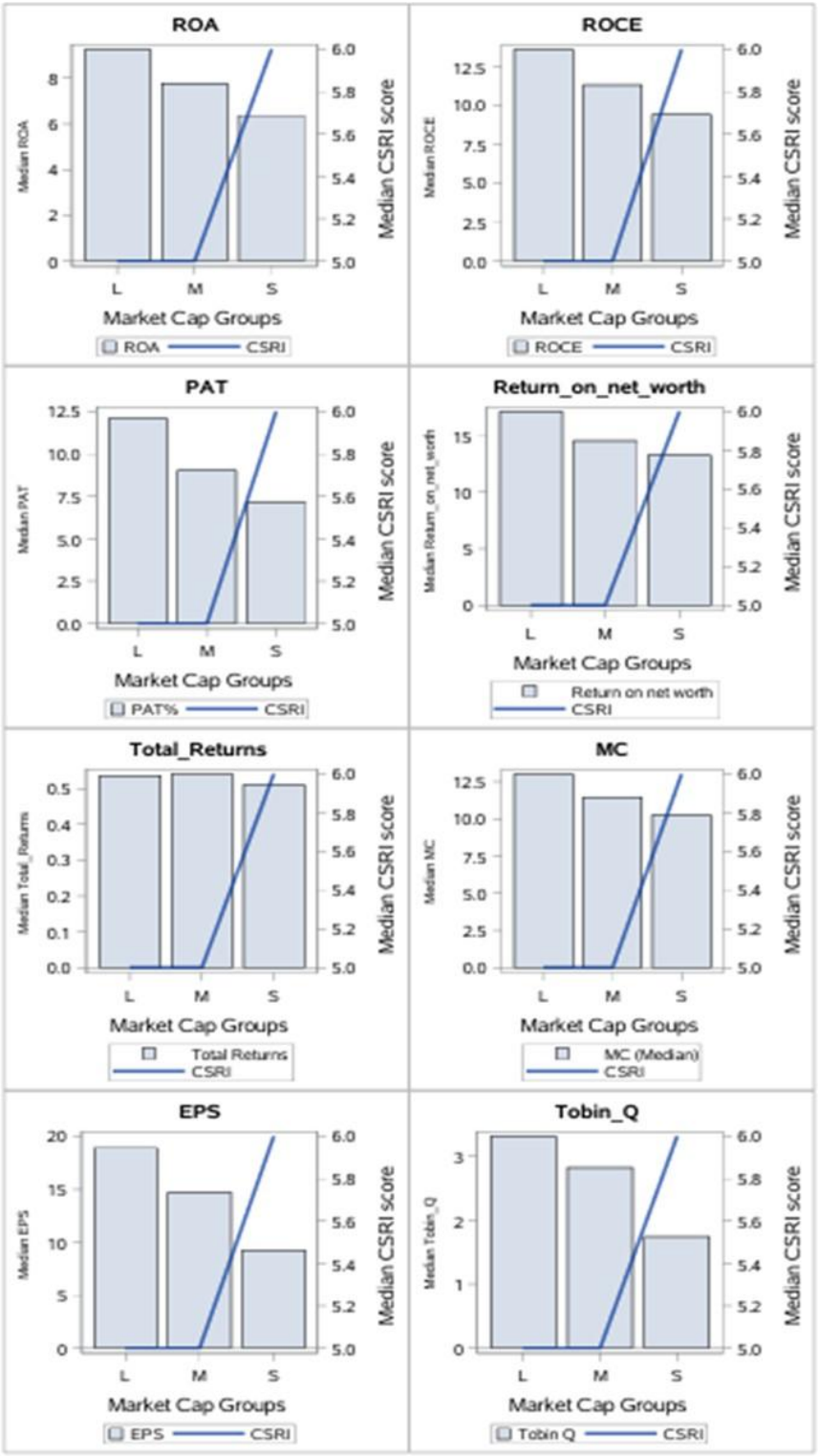


Figure 4.4: Impact of CSR on financial metrics across market cap groups (2013-23)

4.3 Descriptive statistics

Figure 4.4 shows that Large-cap firms tend to perform better financially across almost all profitability metrics (ROA, ROCE, PAT, RONW, Total Returns, EPS). CSRI remains relatively stable across all market cap groups, indicating that CSR initiatives are not significantly different between large, mid, and small firms. Higher CSR scores do not necessarily translate into immediate financial gains, as the financial metrics do not show a strong correlation with CSR. This suggests that while CSR efforts are present across all firm sizes, they do not always directly impact FP in the short term but may contribute to long-term sustainability and corporate reputation.

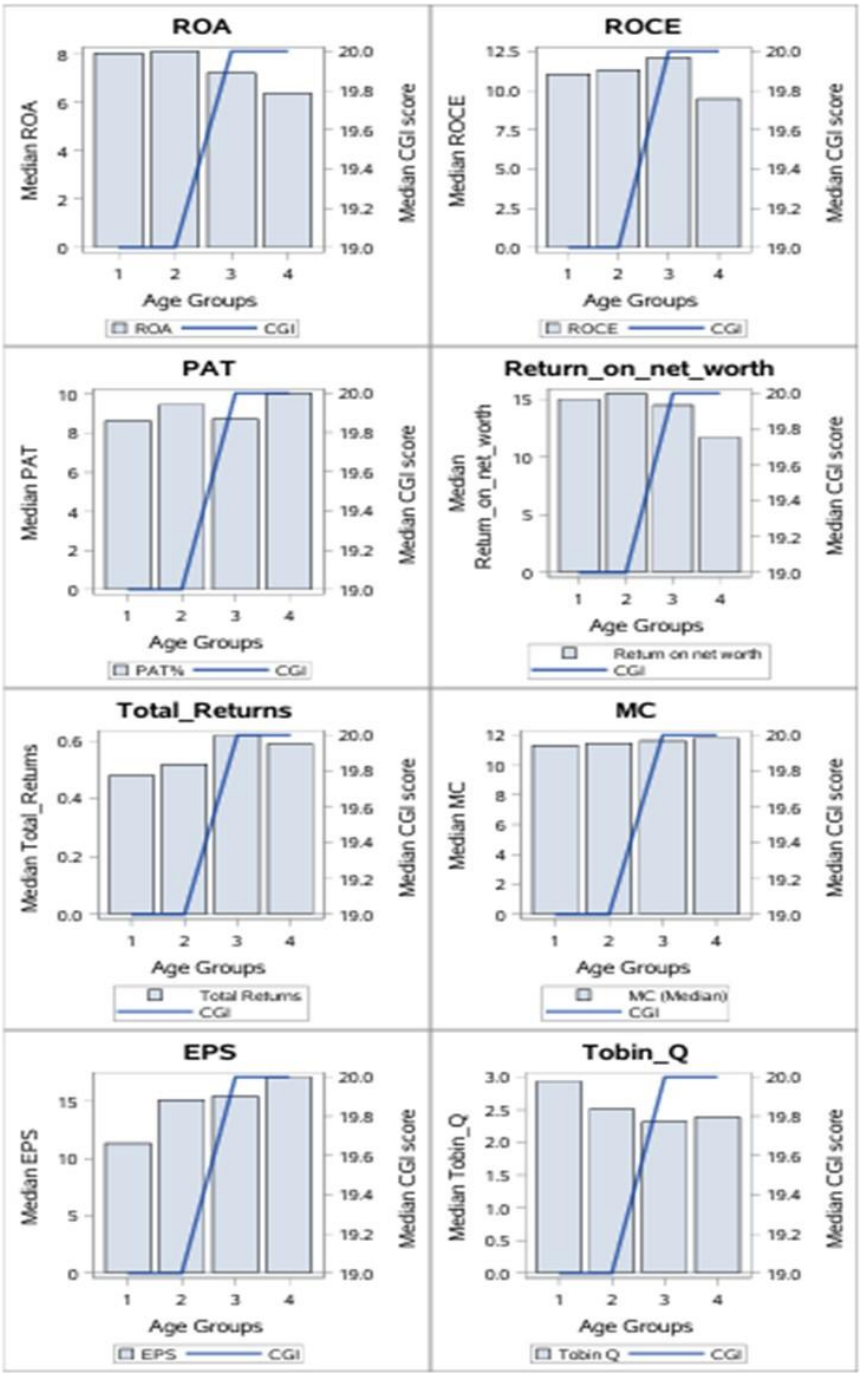


Figure 4.5: Impact of CG on financial metrics across age groups (2013-23)

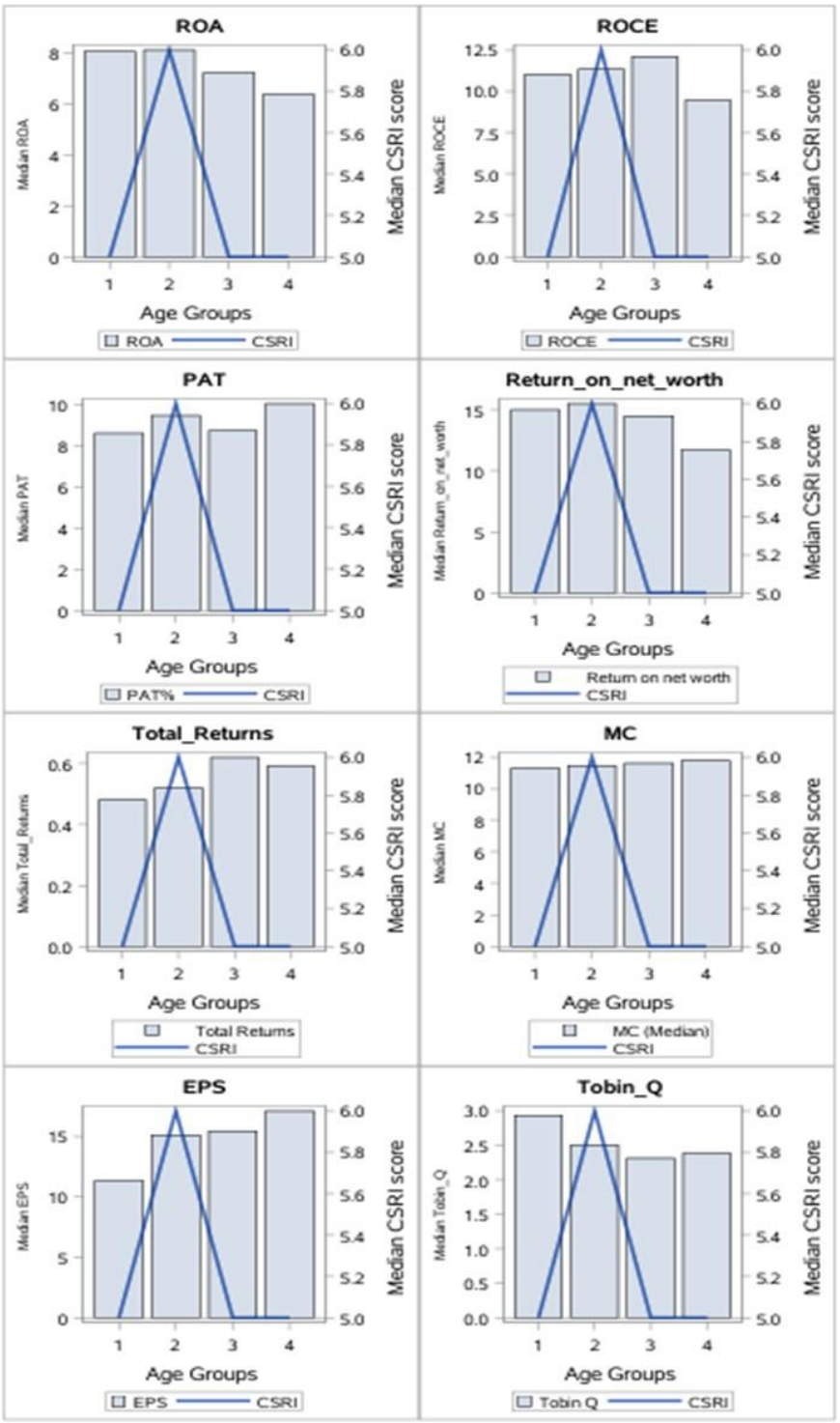


Figure 4.6: Impact of CSR on financial metrics across age groups (2013-23)

The figures 4.5 and 4.6 examine the relationship between CGI and CSRI and various FP metrics across different firm Age Groups (1, 2, 3, 4) over the period 2013-2023. This analysis suggests that while older firms tend to have better FP, CG practices are maintained consistently across firms, regardless of their age.

This consistency supports the study's focus on CG and CSR as structural mechanisms that influence performance outcomes beyond mere firm size or maturity, reinforcing the importance of considering both internal and market-based factors in understanding firm efficiency and strategic sustainability.

4.4 Correlation analysis

The heatmap (Figure 4.7) highlights strong correlations among several dependent variables, justifying dimensionality reduction through factor analysis to consolidate related variables into key factors.

ROA, ROCE, and RONW are strongly correlated with each other, while PAT shows a moderate positive correlation with ROA, ROCE, and RONW. EPS shows moderate correlation with ROA, ROCE, RONW, and PAT. MC exhibited a weak positive correlation with ROA, ROCE, RONW, and PAT, while a negative correlation with the PE ratio. However, this relation is significant at 1% level of significance. These observations emphasize that a multidimensional relationship exists among dependent variables and, hence, there is a need for a reduction in multidimensionality by further analysis.

CGI demonstrates a weak negative correlation with dependent variables in ROA and ROCE and a positive correlation with MC. In contrast, CSRI is positively correlated. ROA, ROCE, RONW, and PE are negatively correlated with Tobin Q. This corroborates the hypotheses of a relationship's existence between CGI and FP, and CSR and FP. The study of the correlation is inadequate to determine such a link. Consequently, an analysis of the regressions required is conducted to elucidate the relationship between these two variables.

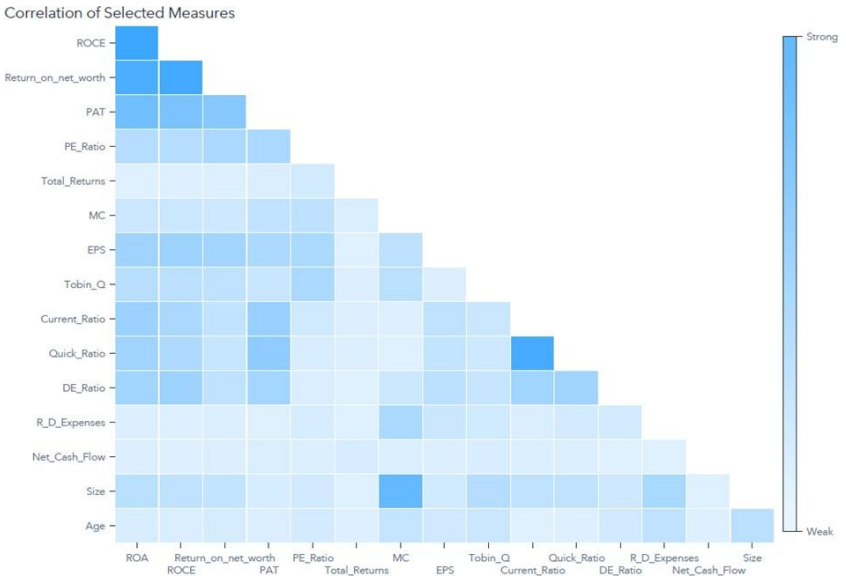


Figure 4.7: Heatmap of correlation matrix

Quick ratio and current ratio exhibit moderate positive correlation at 1% significance with dependent variables while DE ratio and Size show negative correlation. These observations suggest the use of current ratio, DE ratio and size as potential predictors in regression models. Quick ratio and current ratio have strong positive correlation between them while they both show weak but significant negative correlation with other independent variables. RD expenses has positive correlation with CGI and CSRI but negative correlation with DE ratio and size. This demonstrates multicollinearity among independent variables and suggests selection of potential variables through variable selection techniques.

4.5 Dimensionality reduction analysis

4.5.1 Factor analysis

Dependent variables are subjected to sample adequacy tests to know the possibility of dimensionality reduction and decompose them into two factors. KMO's sample adequacy test explains the variance of individual factor with a cut-off of 0.5. The overall variance exhibited by

dependent variables is 0.79 after eliminating the variable total returns which has no contribution (< 0.5).

Table 4.7 shows the partial correlation analysis of dependent variables by controlling for all other variables.

Table 4.8 and 4.9 show the overall MSA as 0.7589 which indicates moderate adequacy, improving to 0.7894 after removing Total Returns. The revised MSA values are all above 0.6, with PAT (0.8975) and EPS (0.9093) showing strong adequacy. In Table 4.10, the significant Chi-Square value (< 0.0001) confirms that factor analysis is appropriate. The results indicate that the sample is adequate for factor analysis, most variables demonstrate strong sampling adequacy, and correlations support meaningful extraction of common factors.

Key Observations from the Rotated Factor Pattern (Varimax Rotation) shown in Table 4.11 and 4.12 are

- **ROA (93), ROCE (93), Return on Net Worth (90), PAT (74), and EPS (54)** load strongly onto one factor – "Accounting Ratios".
- **Market Capitalization (MC, 60)** and **Tobin's Q (77)** load strongly onto Factor 2 which is "Market ratios".
- **Factor 1 Accounting ratios, explains 3.64 units of variance**, indicating it captures the majority of the variation in the dataset **while Factor 2 "Market Ratios" explains 1.50 units**, making it a secondary but relevant factor.

Factors are extracted using principal component method with varimax rotation. It decomposed the variables into two factors and renamed them as the account ratio and Market Ratios. The account ratio explains the variables with 70.76% while the market ratio explains 29.24% variance (Figure 4.8). The factors loading after the rotation are presented in Table 4.11. The factor analysis confirms two distinct dimensions, with accounting

ratios capturing the majority of variance and market ratios representing a secondary but meaningful aspect of performance.

Table 4.7: Partial Correlation Analysis of Dependent Variables

	ROA	ROCE	Return on net worth	PAT	Total Returns	MC	PE Ratio	Tobin Q	EPS
ROA	1.00000								
ROCE	**0.75019**	1.00000							
Return on net worth	-0.01662	**0.57635**	1.00000						
PAT	0.31396	-0.03287	-0.07708	1.00000					
Total Returns	-0.01581	0.02667	-0.01426	-0.05137	1.00000				
MC	-0.05955	0.01136	0.04574	0.17903	-0.00733	1.00000			
PE Ratio	0.00257	-0.09899	0.22834	0.25191	0.08552	-0.26484	1.00000		
Tobin Q	0.09166	-0.05717	0.10008	0.06756	0.02401	0.08851	-0.35365	1.00000	
EPS	0.00700	0.08390	-0.01044	0.01601	-0.01373	0.22353	0.23772	-0.01176	1.00000

The partial correlations show the strength and direction of association between dependent variables after controlling for others. ROA and ROCE have a strong positive correlation of 0.750, indicating a close relationship. Most other correlations are weak or near zero, suggesting minimal multicollinearity among the remaining variables.

Table 4.8: Kaiser's Sample Adequacy Test

Kaiser's Measure of Sampling Adequacy: Overall MSA = 0.7588								
ROA	ROCE	Return on net worth	PAT	Total Returns	MC	PE Ratio	Tobin Q	EPS
0.7719	0.7159	0.8374	0.8573	**0.4072**	0.5377	0.5840	0.6377	0.8442

Table 4.9: Kaiser's Sample Adequacy Test after removing Total Returns

Kaiser's Measure of Sampling Adequacy: Overall MSA = 0.7894						
ROA	ROCE	Return on net worth	PAT	MC	Tobin Q	EPS
0.7633	0.7132	0.8571	0.8975	0.6281	0.7507	0.9093

The overall MSA of 0.759 indicates that the sample is adequate for factor analysis. Individual MSAs range from 0.407 (Total Returns) to 0.857 (PAT), showing most variables are suitable, while Total Returns is relatively weak. Removing Total Returns improves overall MSA to 0.789, enhancing sampling adequacy.

Table 4.10: Bartlett's Test

Significance Tests Based on 2725 Observations			
Test	**DF**	**Chi-Square**	**Pr> ChiSq**
H_0: No common factors **H_A: At least one common factor**	36	14184.0855	<0.0001
H_0: 2 Factors are sufficient **H_A: More factors are needed**	19	663.9529	<0.0001

The test is highly significant (Chi-Square = 14184.086, $p < 0.0001$), rejecting the null hypothesis of no common factors. This confirms that the correlation matrix is suitable for factor analysis. Testing sufficiency of two factors yields Chi-Square = 663.953, $p < 0.0001$, indicating more than two factors are necessary to explain variability.

Table 4.11: Rotated Factor Pattern

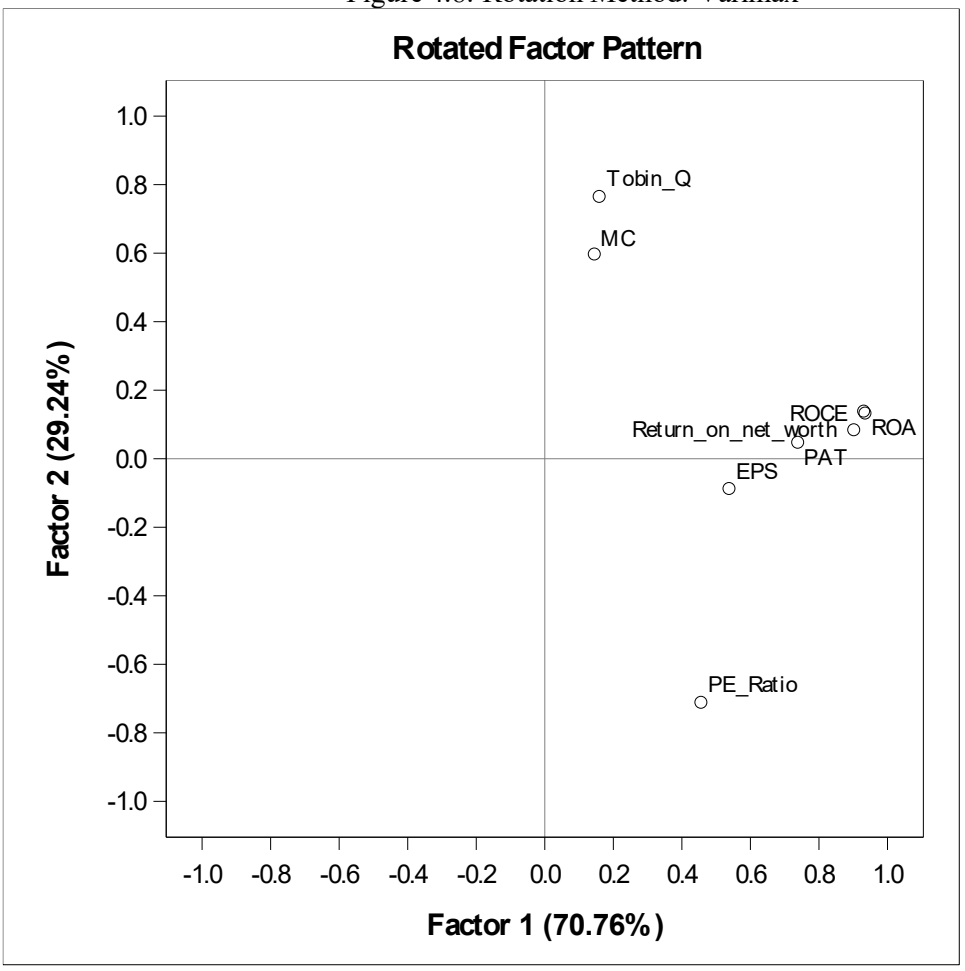
Rotated Factor Pattern		
	Factor1	**Factor2**
ROA	93 *	14
ROCE	93 *	13
Return on net worth	90 *	8
PAT	74 *	5
PE Ratio	46	-71 *
MC	14	60 *
Tobin Q	16	77 *
EPS	54 *	-9

Printed values are multiplied by 100 and rounded to the nearest integer. Absolute values greater than 0.4 are flagged by an '*'.

Table 4.12: Variance Explained by Each Factor

Variance Explained by Each Factor	
Factor1	**Factor2**
3.6375786	1.5028156

Figure 4.8: Rotation Method: Varimax



4.6 Variable selection with cluster analysis

Independent variables are selected based on variable importance using R-squared as the selection criterion. Variable cluster analysis is used to select the potential independent variables. The analysis results presented in Table 4.1show seven variables in five clusters. The current ratio is selected from the first cluster based on a high R-squared value. Similarly size is selected from the second cluster with high R squared. Net cash flow, Age and DE ratio are retained as independent variables.

Table 4.13: Feature selection with cluster analysis

Total variation explained = 6.190897 Proportion = 0.8844

5 Clusters		R-squared with		
Cluster	**Variable**	**Own Cluster**	**Next Closest**	**1-R^2 Ratio**
Cluster 1	Quick Ratio	0.9421	0.1287	0.0665
	Current Ratio	0.9421	0.1256	0.0662
Cluster 2	R D Expenses	0.6534	0.0339	0.3588
	Size	0.6534	0.0436	0.3624
Cluster 3	Net Cash Flow	1.0000	0.0005	0.0000
Cluster 4	Age	1.0000	0.0591	0.0000
Cluster 5	DE Ratio	1.0000	0.1349	0.0000

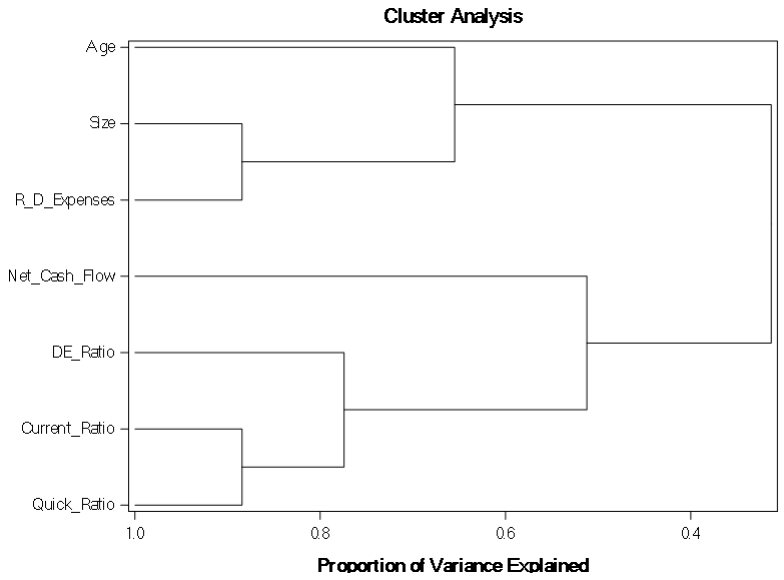


Figure 4.9: Cluster Dendrogram from a Hierarchical Cluster Analysis

4.7 Moderating and control effect of Industry, Market cap, and age group

To explore the conditional influence of CGI and the CSRI on firm performance, this study examined whether industry, market capitalization, and firm age act as moderators or controls in the relationship between CGI, CSRI, and two performance indicators: account ratio and market ratio. Table 4.14 and 4.15 summarize the statistical results for the main effects of CGI and CSRI, both moderation (interaction effects) and control roles of these contextual variables.

Main Effects of Corporate Governance Index(CGI) and Corporate Social Responsibility Index (CSRI):

The analysis reveals consistent and statistically significant main effects of CGI (Table 4.14) and CSRI (Table 4.15) on both types of firm performance measures.

CGI:

CGI demonstrates a significant association ($p < 0.01$, Table 4.14), with account ratio only when market capitalization is included in the model. This indicates that firms with stronger CG frameworks tend to perform better internally, suggesting improved financial efficiency and operational control. In contrast, CGI is consistently significant across all models ($p < 0.01$) with market ratio as a performance indicator. This indicates that investors and the market respond positively to governance quality, likely due to reduced agency costs, enhanced transparency, and lower perceived risk. CGI positively influences internal financial efficiency when accounting for firm size and consistently enhances market valuation, reflecting investor preference for transparent governance and lower perceived risk.

CSRI:

Across all models (Table 4.15), CSRI is found to have a significant association with both account and market ratios ($p < 0.01$). This confirms the central hypothesis that CSR practices contribute to firm performance, aligning with stakeholder theory and the view that socially responsible behaviour enhances corporate value.

4.7 Moderating and control effect of Industry, Market cap and age group

Moderation and Control Effects of Industry, Market Cap and Firm age on CGI and CSRI

The moderation and control effects are assessed to understand how the relationship between CGI and performance varies across firm-specific characteristics and is covered in sections below:.

Industry Effects

CGI: The results (Table 4.14) show a statistically significant interaction between CGI and industry for both account ratio ($p < .0001$) and market ratio ($p = 0.0046$). This suggests that the relationship between CGI and firm performance varies significantly across industries. In other words, the effectiveness of CG is industry-dependent, potentially due to varying regulatory environments, stakeholder expectations, or business models across sectors. When considered as a control variable, industry is significant only for market ratio ($p < .0001$), indicating that industry differences explain a substantial portion of variation in market-based performance measures, but not necessarily in accounting-based outcomes.

CSRI: When examining (Table 4.15) industry as a moderator, the interaction between CSRI and industry is statistically significant in relation to market-based performance ($p < 0.0001$), indicating that the impact of CSR activities on market valuation varies significantly across industries. This implies that certain industries may be more sensitive to or rewarded for CSR efforts by investors and external stakeholders. For the accounting-based performance, the CSRI × Industry interaction is only marginally significant ($p = 0.0962$), suggesting a weaker and less consistent moderating effect. As a control variable, industry is significant in explaining market ratio ($p < 0.0001$), but not account ratio ($p = 0.5717$). This outcome underscores that industry classification plays a more prominent role in shaping market perception of CSR than in influencing internal financial outcomes.

Market Capitalization Effects:

CGI:

While market capitalization is found to be a significant (Table 4.14) control variable for both account ratio ($p < .0001$) and market ratio ($p < .0001$), the interaction terms CGI × Market Cap are not statistically significant ($p > 0.3$). These findings indicate that firm size influences

performance outcomes directly, but does not moderate the relationship between CG and FP. This suggests that CGI impacts firm performance consistently across different firm sizes, though larger or smaller firms may still exhibit different levels of performance due to scale or resource availability.

CSRI:

The results presented in Table 4.15 show that market capitalization significantly moderates the relationship between CSRI and market-based performance ($p < 0.0001$), but not account-based performance ($p = 0.7085$). This finding highlights that the size of a firm, as perceived by the market, affects how CSR initiatives translate into market value. Larger firms might receive greater visibility from their CSR practices, thereby influencing investor sentiment and stock performance. As a control variable, market capitalization is highly significant for both account ratio and market ratio ($p < 0.0001$). This reinforces the role of firm size as a fundamental characteristic influencing performance outcomes, irrespective of CSR engagement.

Firm Age Effects:

CGI:

Firm age group is found to significantly moderate (table 4.14) the relationship between CGI and both account ratio ($p = 0.0074$) and market ratio ($p = 0.0012$). This finding implies an effect of CG on firms of different maturity levels. More established firms may have more formalized governance structures, whereas younger firms may respond differently due to evolving systems or growth dynamics. As a control variable, age group was significant for market ratio ($p < .0001$), but not for account ratio ($p = 0.1452$), suggesting that market perceptions of performance may be more sensitive to firm maturity than internal accounting metrics.

CSRI:

In terms of firm age, the results (Table 4.15) indicate a statistically significant moderating effect on the CSRI–market ratio relationship ($p = 0.0286$), but no significant moderation for account ratio ($p = 0.4787$). This suggests that older firms may derive greater market benefits from CSR practices, possibly due to more established reputations, consistent stakeholder engagement, or accumulated social capital over time. As a control variable, age group is significant for market ratio ($p < 0.0001$), but not for account ratio ($p = 0.1691$). These findings further support the idea that firm maturity affects external perceptions of CSR, more so than internal financial efficiency.

Table 4.14: Effect of Industry Market Cap and Age on the Relation between Financial Performance and CGI as Predictor

Model	Effect	As Moderator	As Control
Acc Ratio=CGI+ Industry	CGI	0.1499	0.1250
	Industry	<.0001	0.3138
	CGI (Industry)	<.0001	.
	CGI	<.0001	<.0001
Acc Ratio=CGI+ Market Cap	Market Cap	0.3280	<.0001
	CGI (Market Cap)	0.3583	.
	CGI	0.1178	0.1089
Acc Ratio=CGI+ Age Group	Age Group	0.0070	0.1452
	CGI (Age Group)	0.0074	.
	CGI	<.0001	<.0001
Mkt Ratio=CGI+ Industry	Industry	0.0035	<.0001
	CGI (Industry)	0.0046	.
	CGI	<.0001	0.0001
Mkt Ratio=CGI+ Market Cap	Market Cap	<.0001	<.0001
	CGI (Market Cap)	0.5485	.
	CGI	<.0001	<.0001
Mkt Ratio=CGI+ Age Group	Age Group	0.0019	<.0001
	CGI (Age Group)	0.0012	.

Table 4.15: Effect of Industry Market Cap and Age on the Relation between Financial Performance and CSRI as Predictor

Model	**Effect**	**As Moderator**	**As Control**
Acc Ratio=CSRI+ Industry	CSRI	0.1617	0.0128
	Industry	0.0220	0.5717
	CSRI(Industry)	0.0962	.
	CSRI	0.0027	0.0016
Acc Ratio=CSRI+ Market Cap	Market cap	0.0863	<.0001
	CSRI(Market cap)	0.7085	.
	CSRI	0.0042	0.0026
Acc Ratio=CSRI+ Age Group	Age group	0.2000	0.1691
	CSRI(Age group)	0.4787	.
	CSRI	<.0001	<.0001
Mkt Ratio=CSRI+ Industry	CSRI	<.0001	<.0001
	Industry	<.0001	<.0001
	CSRI(Industry)	<.0001	.
	CSRI	<.0001	<.0001
Mkt Ratio=CSRI+ Market Cap	Market cap	<.0001	<.0001
	CSRI(Market cap)	<.0001	.
	CSRI	<.0001	<.0001
Mkt Ratio=CSRI+ Age Group	Age group	<.0001	<.0001
	CSRI(Age group)	0.0286	.

These findings underscore the importance of contextualizing CG and CSRI within firm-specific and industry-specific environments.

Table 4.16: Summary of results of moderating and control effects

Variable	Moderator Effect?	Control Effect?
CGI		
Industry	✓ Both Ratios	✓ Market Ratio Only
Market Cap	× No	✓ Both Ratios
Age Group	✓ Both Ratios	✓ Market Ratio Only
CSRI		
Industry	✓ Market Ratio only	✓ Market Ratio only
Market Cap	✓ Market Ratio only	✓ Both Ratios
Age Group	✓ Market Ratio only	✓ Market Ratio only

4.8 Regression analysis

At this stage, it is important to acknowledge that the estimation of panel data can be conducted using three potential estimators, contingent upon the characteristics of the data. In this context, three methods are identified. The Pooled OLS regression, which may necessitate the application of the GLS method to mitigate estimation bias issues. The GLS approach effectively addresses the issues of heteroscedasticity and first-order autocorrelation. The alternative approach is the fixed effects model (or inside model). This model is defined by the presence of a specific feature or behavior within a clearly delineated group of individuals or firms within the sample. The third method is the random effects model. In this final scenario, the subjects under examination may be concurrently affected by both factors (i and t). Panel data estimation requires careful method selection, with pooled OLS, GLS, fixed effects, and random effects offering solutions based on data characteristics and bias considerations. Hausman fixed effects test is conducted, and it confirmed fixed effects in the model ($P<0.01$). Hence, current research focussed on a technique that verifies the fixed effect directly.

Table 4.17: Comparative Analysis of Panel Regression Models

Model	Dependent Variable	Predictor	Statistic	Fixed One	Fixed One (Time)	Fixed Two	Pooled
MODEL3	Accounting Ratio	CGI	MSE	0.4176	0.7779	0.4109	0.7825
			R-Square	0.6405	0.2287	0.6476	0.2216
			Pr > F	0	0.0031	0	—
	Market Ratio	CGI	MSE	0.2429	0.5576	0.2177	0.5792
			R-Square	0.7902	0.4453	0.8127	0.4219
			Pr > F	0	0	0	—
MODEL3	Accounting Ratio	CSRI	MSE	0.4160	0.7752	0.4091	0.7805
			R-Square	0.6420	0.2316	0.6493	0.2238
			Pr > F	0	0.0013	0	—
	Market Ratio	CSRI	MSE	0.2427	0.5549	0.2177	0.5776
			R-Square	0.7904	0.4482	0.8127	0.4237
			Pr > F	0	0	0	—

Pr > F statistic from Hausman fixed effects test (null hypothesis no fixed effects)

Based on the comparative analysis of panel regression models in Table 4.11, the Fixed Two Effects Model (Firm + Time Effects) appears to be the most appropriate choice.

- The Fixed Two Effects Model consistently has the highest R-Square values, indicating the best explanatory power. **Accounting Ratio (CGI)**: 0.6476 (highest) and **Market Ratio (CGI)**: 0.8127 (highest).
- *It has* the lowest MSE in all cases, meaning it provides better accuracy in predictions. **Market Ratio (CSRI)**: 0.2177 (lowest).
- The predictors (**CGI, CSRI**) are statistically significant in all cases under the Fixed Two Effects Model (**Pr > F = 0**).

The Fixed Two Effects Model accounts for both firm-specific and time-specific variations, reducing omitted variable bias.

Table 4.18: Model Evaluation of Regression Models (Predictor = CGI)

Selected Model	Model	Method	Dependent	Predictor	MSE	R-Square
Yes	MODEL3	Panel Regression: 2 Way Fixed Effects	Mkt Ratio	CGI	0.2177	0.8127
Yes	MODEL3	Panel Regression: 2 Way Fixed Effects	Acc Ratio	CGI	0.4109	0.6476
	MODEL2	Linear Regression: FWD Selection	Mkt Ratio	CGI	0.5112	0.4926
	MODEL2	Linear Regression: FWD Selection	Acc Ratio	CGI	0.7783	0.2274
	MODEL1	Linear Regression	Acc Ratio	CGI	0.8220	0.1795
	MODEL1	Linear Regression	Mkt Ratio	CGI	0.9616	0.0402
	MODEL4	2SLS Regression	Acc Ratio	CGI	0.9787	0.0227
	MODEL4	2SLS Regression	Mkt Ratio	CGI	0.9808	0.0174

Table 4.19: Model Evaluation of Regression Models (Predictor = CSRI)

Selected Model	Model	Method	Dependent	Predictor	MSE	R-Square
Yes	MODEL3	Panel Regression:2Way Fixed Effects	Mkt Ratio	CSRI	0.2177	0.8127
Yes	MODEL3	Panel Regression:2Way Fixed Effects	Acc Ratio	CSRI	0.4091	0.6493
	MODEL2	Linear Regression:FWD Selection	Mkt Ratio	CSRI	0.5082	0.4956
	MODEL2	Linear Regression:FWD Selection	Acc Ratio	CSRI	0.7766	0.2291
	MODEL1	Linear Regression	Acc Ratio	CSRI	0.8209	0.1806
	MODEL1	Linear Regression	Mkt Ratio	CSRI	0.9575	0.0442
	MODEL4	2SLS Regression	Mkt Ratio	CSRI	0.9854	0.0128
	MODEL4	2SLS Regression	Acc Ratio	CSRI	0.9950	0.0064

The results derived from the regression models underscore the importance of the indicators utilized in this research. Table 4.18 and Table 4.19 consolidate the regression models appropriate for this research based on the comparative evaluation of different regression models based on their Mean Squared Error (MSE) and R-Square values, categorized by two predictors: CGI, and CSRI. The objective is to determine which model provides the best predictive accuracy and explanatory power.

Comparison for Predictor = CGI

Among all models, the two-way fixed effects panel regression model (MODEL3) demonstrated superior model fit, with significantly lower MSE and higher R-squared values compared to other models. Specifically, the model explained 81.3% of the variance in Market Ratio (MSE = 0.2177) and 64.8% of the variance in Accounting Ratio (MSE = 0.4109), while accounting for firm-level and time-level fixed effects. In contrast, traditional linear regression models (MODEL1 and MODEL2) showed much lower explanatory power, with R-squared values ranging between 4% and 49%. Similarly, the 2SLS model (MODEL4), used to address potential endogeneity, did not yield improved explanatory power and had the lowest R-squared values ($\approx$ 2%), suggesting weak instruments or over-specification. The two-way fixed effects model outperforms other specifications, effectively capturing firm and time variations, while traditional and 2SLS models show lower explanatory power.

Comparison for Predictor = CSRI

For the CSRI predictor, the results follow a similar pattern. The Panel Regression: Two-Way Fixed Effects (MODEL3) again delivers the best performance, with MSE values of 0.2177 for Mkt Ratio and 0.4091 for Acc Ratio, and R-Square values of 0.8127 and 0.6493, respectively. This confirms its superior predictive capability.

Other models, such as Linear Regression (MODEL1) and 2SLS Regression (MODEL4), show significantly higher MSE values and lower R-squared values, indicating weaker predictive accuracy.

Hence, the main outcome is that the Two-Way Fixed Effects Panel Regression (MODEL3) is the

Best-performing model. The two-way fixed effects panel regression consistently provides superior predictive accuracy for CSRI, outperforming linear and 2SLS models in both market and accounting ratio measures. The subsequent section will present discussions regarding the implementation of the selected regression model only.

Model diagnostics

Autocorrelation:

Table 4.20: Dependent Variable: Acc ratio

Durbin–Watson D	0.899
Pr< DW	< 0.0001
Pr> DW	1.0000
Number of Observations	2725
1st Order Autocorrelation	0.550

Note: "Pr<DW is the p-value for testing positive autocorrelation, and Pr>DW is the p-value for testing negative autocorrelation."

Table 4.21: Dependent Variable: Mkt ratio

Durbin–Watson D	0.658
Pr< DW	< 0.0001
Pr> DW	1.0000
Number of Observations	2725
1st Order Autocorrelation	0.671

If the Pr value is less than DW suggests significant '+ve' autocorrelation. Whereas, if the Pr value is more than DW suggests significant '-ve' autocorrelation.

Tables 4.20 and 4.21 report Durbin-Watson statistics for Acc ratio and Market ratio models, respectively. Both tables indicate significant positive first-order autocorrelation with DW values below 2 and p-values less than 0.0001. This suggests that residuals are correlated over time, highlighting the need to account for autocorrelation in the panel regression analysis for accurate estimation.

The Durbin-Watson test is employed to examine the presence of first-order autocorrelation in the residuals. The DW statistic is observed to be 0.899 with the account ratio and 0.658 with the market ratio, which are considerably below the threshold of 2.0, indicating strong positive autocorrelation. This result is statistically significant ($p < 0.0001$), with a first-order autocorrelation coefficient of 0.550 and 0.671, confirming the violation of the independence of residuals assumption. Given the panel structure of the dataset, such autocorrelation is not uncommon and can be addressed through the use of cluster-robust standard errors or panel data estimation techniques (HAC) (Heteroscedasticity Auto Correlation correction) that account for serial correlation.

The results of the Durbin-Watson D tests suggest significant positive autocorrelation in the residuals for either predictor (CGI or CSR) across both dependent variables, as p-values are well above the conventional significance level of 0.05.

Multicollinearity: To assess the presence of multicollinearity among explanatory variables, Variance Inflation Factor (VIF) values are computed. All variables reported VIF scores well below the conventional threshold of 5, with the highest being 1.1755 for the current ratio. These findings confirm that multicollinearity is not a concern, and the regression coefficients are not distorted due to linear dependence among predictors. This confirms that the explanatory variables are not highly linearly correlated, ensuring that the regression coefficients are reliable and interpretations of their individual effects on FP are valid and unbiased.

Table 4.22: Multicollinearity test results – CGI

Variable	VIF
Intercept	0.0000
CGI	1.0733
Current Ratio	1.1755
DE Ratio	1.1570
Size	1.1512
Age	1.0632

Table 4.23: Multicollinearity test results – CSRI

Variable	VIF
Intercept	0.0000
CSRI	1.0171
Current Ratio	1.1755
DE Ratio	1.1691
Size	1.0990
Age	1.0592

Heteroscedasticity and Panel model specification:

Conversely, the Hausman specification tests consistently returned p-values of <0.0001, indicating significant differences between the random effects and fixed effects models. This result confirms that unobserved firm-level heterogeneity is correlated with one or more explanatory variables, most notably the CGI and CSRI. As such, the fixed effects model is preferred, as it provides consistent and unbiased estimates in the presence of such correlation.

Moreover, the same Hausman test results suggest the presence of heteroscedasticity in the residuals, violating the classical assumption of homoscedastic errors. This finding, in combination with the detected autocorrelation, necessitates the application of robust standard errors or alternative estimation techniques, such as fixed effects with clustered standard errors or two-stage least squares (2SLS), to ensure the validity of statistical inference.

To correct for these violations, Newey-West heteroskedasticity- and autocorrelation-consistent (HAC) standard errors are employed to ensure valid inference.

Panel fixed Effects model evaluation:

To further validate the regression estimates, several model specifications are compared across both accounting and market-based performance measures. The models include fixed effects (FixOne), fixed effects with time dummies (FixOneTm), two-way fixed

effects (FixTwo), and pooled OLS. The evaluation focuses on mean squared error (MSE), R-squared, and (Pr > F) using both CGI and CSRI as key predictors.

Model based on Acc ratio:

For models using CGI as the independent variable, the two-way fixed effects model (FixTwo) produced the lowest MSE (0.4109) and the highest R-squared (0.6476), suggesting superior model fit and predictive power relative to the other specifications. Similarly, when CSRI is used as the predictor, the two-way fixed effects model again performed best, with the lowest MSE (0.4091) and the highest R-squared (0.6493). The F test for fixed effects across all models is statistically significant, supporting the overall explanatory power of fixed effects model. Findings suggest that the two-way fixed effects model provides the best fit and predictive accuracy for accounting ratios, demonstrating strong explanatory power of firm and time effects.

Model based on Mkt ratio:

In models predicting the market-based ratio, the FixTwo model consistently outperformed other specifications. For both CGI and CSRI, the FixTwo model achieved the lowest MSE (0.2177) and the highest R-squared values (0.8127). These findings highlight that accounting for both firm-specific and time effects improves model performance substantially in capturing variation in market valuation. Results indicate that including both firm-specific and time effects enhances model accuracy, with FixTwo achieving lower error and higher explanatory power for market-based performance predictions.

Overall, the comparison across models demonstrates that the two-way fixed effects specification offers the most robust and reliable estimation, irrespective of whether CGI or CSRI is used as the main explanatory variable. This consistency across performance measures and predictors reinforces the appropriateness of the two-way fixed effects

approach for analysing the panel data structure of the sample.

Based on these results, MODEL3 (2-way fixed effects panel regression) is selected as the most appropriate model for further interpretation and hypothesis testing, providing both statistical robustness and meaningful insight into the relationship between CGI, CSRI, and firm performance.

Association between CGI and Financial performance:

To investigate the association between CGI and FP, as well as the moderating effects of variables such as industry, market capitalization, and age group, two model specifications are considered: two-way fixed effects and one-way fixed effects with time controls (FIXONETIME).

Limitation of two way fixed effects model:

Two-way fixed effects models control for both entity-specific and time-specific unobserved heterogeneity. However, this model automatically removes time-invariant variables (e.g., industry) and interaction terms involving these variables (e.g., CGI*Industry) due to collinearity with entity dummies. As a result, this approach is not suitable when the research objective involves examining moderating effects of categorical variables that do not vary over time.

Rationale for One-way fixed effects with Time controls (FIXONETIME):

To retain important time-invariant predictors and their interaction terms, a one-way fixed effects model with explicit time controls is adopted. This approach accounts for firm-level heterogeneity while preserving the effects of variables such as industry and their interactions with CGI. It offers the necessary flexibility to test moderation hypotheses while maintaining control over key sources of variation.

To summarize, the two-way fixed effects model is used for analyzing robust main effects

of CGI on firm performance, while one-way fixed effects with time controls (FIXONETIME) is used to test moderation by time-invariant categorical variables like industry.

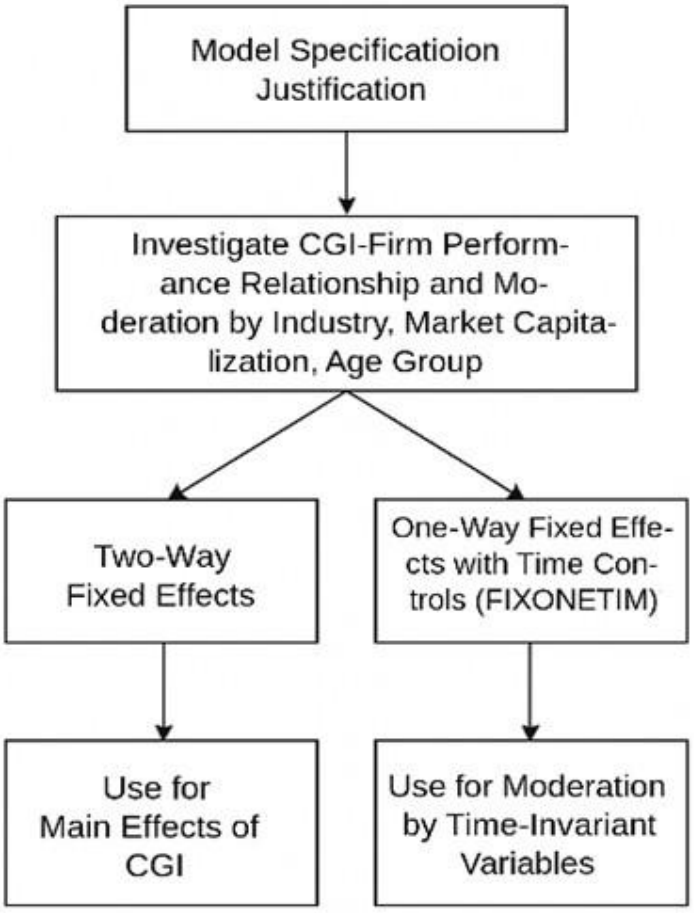


Figure 4.10: Model specification Justification

The subsequent section will present discussions regarding the implementation of the selected regression model only.

4.8.1 Panel regression analysis CGI-Accounting ratios

Table 4.24 and Table 4.25 present the results from the fixed effects regression model using Acc Ratio as the dependent variable, with interactions capturing the moderating roles of industry, market capitalization, and firm age on the relationship between CGI and FP

Main Effects model:

Table 4.24: Results from the 2-way fixed effects regression model using Acc Ratio as the dependent variable

Variable	DF	Estimate	Std. Error	t Value	Pr > |t|	Label
CGI	1	-0.00389	0.00697	-0.56	0.5772	CGI
Current_Ratio	1	0.042169	0.0111	3.79	0.0002	
DE_Ratio	1	-0.04174	0.00934	-4.47	<.0001	
Size	1	-0.37828	0.0689	-5.49	<.0001	
MARKET_CAPM	0	0	.	.	.	MARKET_CAP = M
MARKET_CAPL	1	0.357368	0.0517	6.91	<.0001	MARKET_CAP = L
MARKET_CAPS	1	-0.31213	0.0461	-6.77	<.0001	MARKET_CAP = S
AGE_GROUP2	0	0	.	.	.	AGE_GROUP = 2
AGE_GROUP1	1	0.080289	0.0693	1.16	0.2464	AGE_GROUP = 1
AGE_GROUP3	1	-0.02858	0.1365	-0.21	0.8342	AGE_GROUP = 3
AGE_GROUP4	1	-0.00993	0.1848	-0.05	0.9571	AGE_GROUP = 4

The two-way fixed effects model (Table 4.24) revealed that CGI did not have a statistically significant direct effect on the account ratio ($\beta = -0.00389$, $p = 0.5772$). However, several control variables emerged as strong predictors:

- **Current Ratio** is positively associated with the account ratio ($\beta = 0.0422$, $p = 0.0002$),

- **Debt-to-Equity Ratio** showed a significant negative effect ($\beta = -0.0417$, $p < 0.0001$),
- **Firm Size** also had a significant negative impact ($\beta = -0.3783$, $p < 0.0001$).

Market capitalization also played a significant role. Relative to medium-cap firms, large-cap firms are positively associated with the account ratio ($\beta = 0.3574$, $p < 0.0001$), while small-cap firms showed a negative association ($\beta = -0.3121$, $p < 0.0001$).

Age group variables, however, remained insignificant, suggesting that firm age alone does not drive variations in the account ratio.

The diagnostic plots (Figures 4.11 and 4.12) collectively suggest that the assumptions of homoscedasticity, independence, and approximate normality are reasonably met. The fixed-effects panel model for Account Ratio is thus statistically reliable for inference.

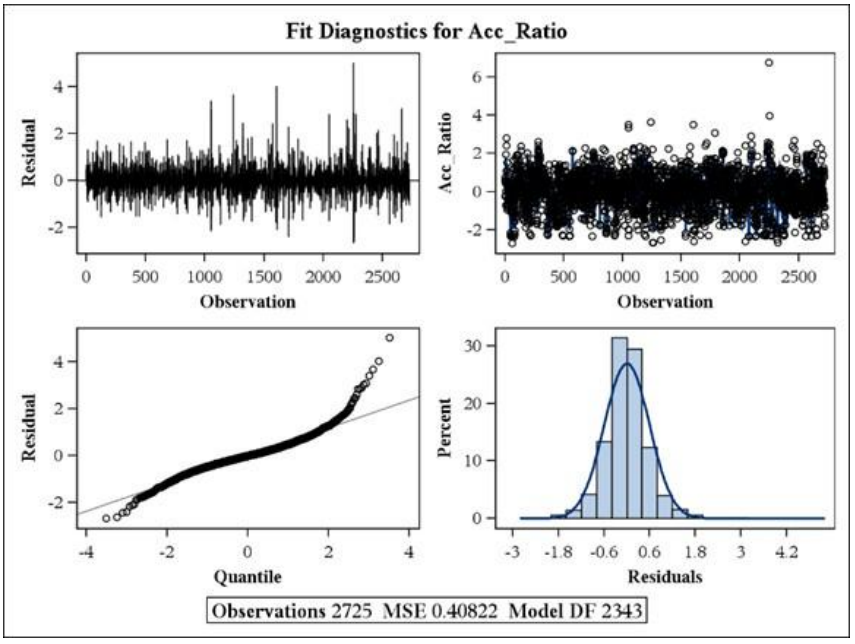


Figure 4.11: Fit Diagnostics CGI Account ratio

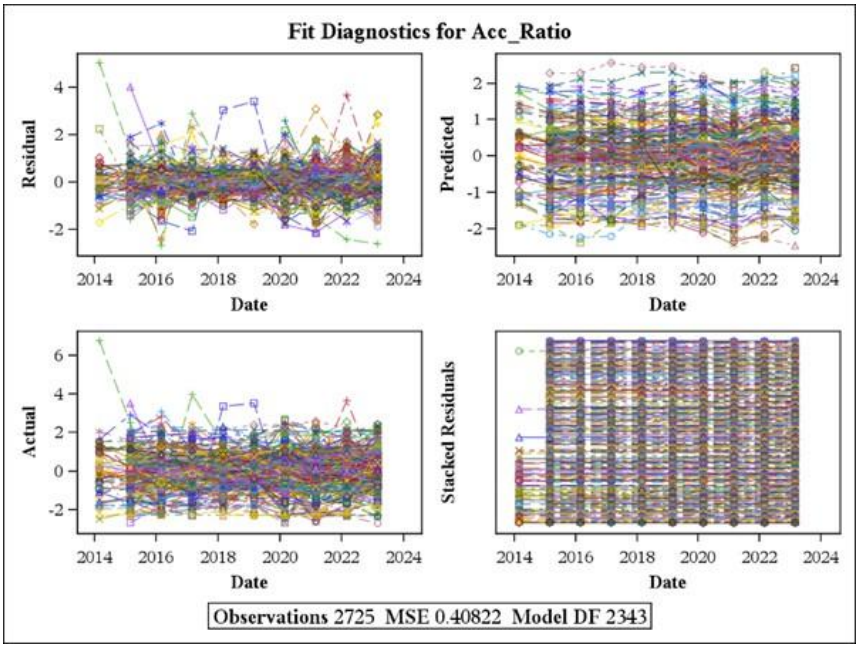


Figure 4.12: Fit diagnostics over time for CGI and Accounting ratio

The diagnostics presented in Figure 4.12 suggest that the two-way fixed effects panel model fits the data well, with:

- no serious issues of autocorrelation or heteroscedasticity,
- consistency across time,
- stable residuals distribution, and
- support for using fixed firm and year effects over alternatives like random effects (as already confirmed by the Hausman test).

The Hausman test confirms that fixed effects are more appropriate than random effects, ensuring consistent and unbiased estimation of firm and year specific influences on performance.

Moderation Analysis:

The one-way time fixed effects model incorporating interaction terms provided new insights. CGI became a significant predictor in the presence of moderators ($\beta = -0.0883$,

$p = 0.0163$), highlighting the contextual nature of governance effects. Several significant moderating relationships are identified (Table 4.25).

Table 4.25: Results from the fixed effects one-time regression model using Acc Ratio as the dependent variable, with interactions capturing the moderating roles of industry, market capitalization, and firm age

Variable	DF	Estimate	Std. Error	t Value	Pr > |t|
Intercept	1	0.297171	0.3469	0.86	0.3917
CGI	1	-0.08827	0.0367	-2.40	0.0163
Current_Ratio	1	0.092881	0.00982	9.46	<.0001
DE_Ratio	1	-0.06419	0.00794	-8.08	<.0001
Size	1	-0.16071	0.0199	-8.08	<.0001
INDUSTRYHealthcare	1	1.251481	0.8008	1.56	0.1182
INDUSTRYIndustrials	1	0.247675	0.3308	0.75	0.4541
INDUSTRYMaterials	1	0.00297	0.4293	0.01	0.9945
INDUSTRYUtilities	1	2.325291	1.2336	1.88	0.0595
INDUSTRYServices	1	0.699626	0.9066	0.77	0.4404
INDUSTRYEnergy	1	-0.46452	0.5491	-0.85	0.3976

Variable	DF	Estimate	Std. Error	t Value	Pr > |t|
INDUSTRYConsumer	1	0.065226	0.6892	0.09	0.9246
INDUSTRYConsumable	0	0	.	.	.
INDUSTRYInformation	1	-2.93158	0.9941	-2.95	0.0032
INDUSTRYCommunication	1	-0.90332	0.6348	-1.42	0.1549
INDUSTRYReal	1	2.405715	1.0740	2.24	0.0252
MARKET_CAPM	0	0	.	.	.
MARKET_CAPL	1	0.359463	0.3208	1.12	0.2626
MARKET_CAPS	1	-0.25612	0.2802	-0.91	0.3607
AGE_GROUP2	0	0	.	.	.
AGE_GROUP1	1	-1.06662	0.3644	-2.93	0.0035
AGE_GROUP3	1	-0.22301	0.3224	-0.69	0.4892
AGE_GROUP4	1	-0.5338	0.3799	-1.40	0.1602
CGIINDUSTRYHealthcare	0	0	.	.	.
CGIINDUSTRYIndustrials	1	0.062714	0.0384	1.63	0.1025
CGIINDUSTRYMaterials	1	0.07112	0.0401	1.78	0.0760
CGIINDUSTRYUtilities	1	-0.05647	0.0695	-0.81	0.4163
CGIINDUSTRYServices	1	0.042117	0.0604	0.70	0.4858
CGIINDUSTRYEnergy	1	0.076065	0.0425	1.79	0.0737
CGIINDUSTRYConsumer	1	0.068393	0.0480	1.43	0.1541
CGIINDUSTRYConsumable	1	0.071201	0.0396	1.80	0.0720
CGIINDUSTRYInformation	1	0.220149	0.0593	3.71	0.0002
CGIINDUSTRYCommunication	1	0.11892	0.0504	2.36	0.0183
CGIINDUSTRYReal	1	-0.04784	0.0654	-0.73	0.4647
CGIMARKET_CAPM	0	0	.	.	.
CGIMARKET_CAPL	1	0.007615	0.0159	0.48	0.6323
CGIMARKET_CAPS	1	-0.0041	0.0148	-0.28	0.7816
CGIAGE_GROUP2	0	0	.	.	.
CGIAGE_GROUP1	1	0.052758	0.0189	2.79	0.0053
CGIAGE_GROUP3	1	0.007004	0.0163	0.43	0.6672
CGIAGE_GROUP4	1	0.019644	0.0188	1.05	0.2954

- **Industry Moderation:** The effect of CGI on account ratio is positively moderated

in the following industries:

- Information Technology ($\beta = 0.2201$, $p = 0.0002$)
- Communication ($\beta = 0.1189$, $p = 0.0183$)

These results suggest that CG practices are more effective in improving accountability in technology-driven and information-intensive industries.

- **Firm Age Moderation:** A significant positive interaction is observed for the youngest firms (Age Group 1) ($\beta = 0.0528$, $p = 0.0053$), indicating that governance mechanisms have a stronger impact in newer or less established companies.
- **Market Cap Moderation:** None of the interaction terms between CGI and market capitalization groups are statistically significant, suggesting that firm size, in terms of market cap, does not moderate the effect of governance on account ratio.

For industries where moderation does not hold, the results indicate that CG practices have limited influence on account ratios, suggesting that accountability improvements are not uniformly experienced across all sectors. This implies that in sectors outside Information Technology and Communication, governance mechanisms may be less effective or face structural and operational constraints that reduce their impact, highlighting the importance of considering industry-specific characteristics when implementing governance policies.

Overall, the findings indicate that the relationship between CG and financial accountability is contingent upon industry and firm maturity. While CGI alone may not directly influence the account ratio, its impact becomes significant when examined through the lens of firm-specific characteristics. These results underscore the importance of designing governance frameworks that are sensitive to contextual factors such as industry structure and firm lifecycle stage.

4.8.2 Panel regression analysis CGI- Market Ratios

This section presents the results (Table 4.26 and Table 4.27) from the fixed effects regression model using *Market Ratio* as the dependent variable, with interactions capturing the moderating roles of industry, market capitalization, and firm age on the relationship between the CGI and FP.

Main Effects Model

The coefficient for CGI is observed to be negative (Table 4.26) and not statistically significant ($\beta = -0.00316$, $p = 0.5386$), suggesting that CGI, by itself, does not have a significant association with market-based performance in this model specification. The analysis suggests that CGI alone does not significantly influence market-based performance, indicating that CG effects may depend on additional factors or contextual variables.

Table 4.26: Results from the fixed effects 2-way regression model using Mkt Ratio as the dependent variable

Variable	DF	Estimate	Std. Error	t Value	Pr > |t|
CGI	1	-0.00316	0.00514	-0.62	0.5386
Current_Ratio	1	-0.00679	0.00796	-0.85	0.3938
DE_Ratio	1	0.00308	0.00584	0.53	0.5983
Size	1	-0.16931	0.0458	-3.70	0.0002
MARKET_CAP = L	1	0.68329	0.0402	17.01	<.0001
MARKET_CAP = S	1	-0.70882	0.0349	-20.30	<.0001
AGE_GROUP = 1	1	0.00232	0.0506	0.05	0.9635
AGE_GROUP = 3	1	0.28265	0.0978	2.89	0.0039
AGE_GROUP = 4	1	0.06770	0.1409	0.48	0.6309

Size is negatively and significantly associated with market ratio ($\beta = -0.1693$, $p = 0.0002$), implying that smaller firms tend to have relatively higher market performance

compared to larger firms. Market Cap has a strong and significant impact: Firms in the Large-cap category have significantly higher market ratios compared to the Medium-cap reference group ($\beta = 0.6833$, $p < 0.0001$). In contrast, Firms in the Small-cap category have significantly lower market ratios ($\beta = -0.7088$, $p < 0.0001$). Only Age Group 3 (possibly older firms) show a statistically significant positive relationship with market ratio ($\beta = 0.2826$, $p = 0.0039$).

Despite the expectation of a positive governance-performance linkage, CGI did not significantly predict market performance in this model. This could suggest that the market may not fully factor in governance quality in pricing firm value or that other factors may mediate or moderate this relationship. Market capitalization remains a strong determinant of market performance, emphasizing investor preference toward larger, established firms.

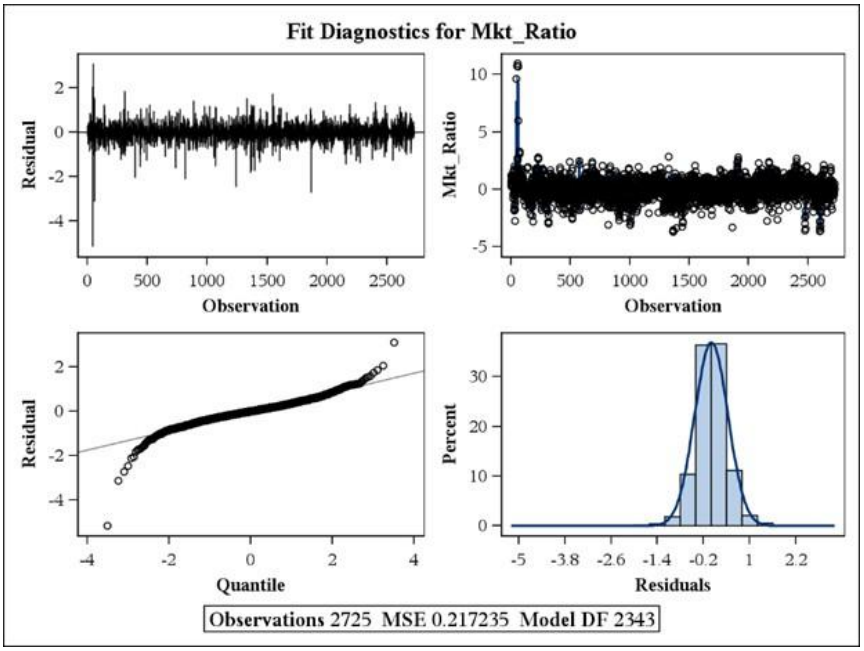


Figure 4.13: Fit diagnostics CGI Market Ratio

The overall diagnostics suggest that the model assumptions (linearity, homoscedasticity, and normality of residuals) are reasonably satisfied. While some minor outliers and skewness are present, they do not substantially distort the model's validity. The low MSE and tight residual distribution reinforce the robustness of the fixed effects panel regression model used for market ratio prediction.

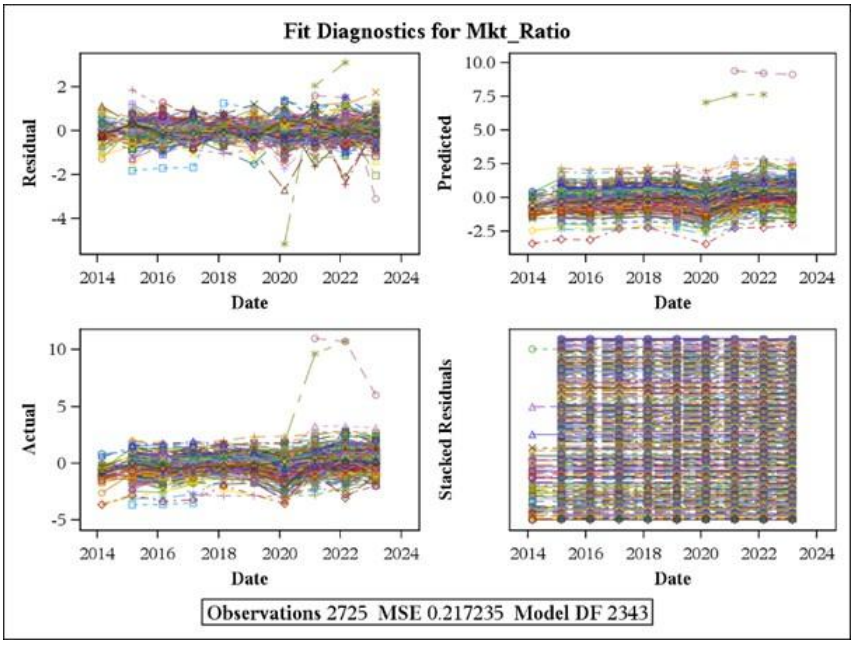


Figure 4.14: Fit diagnostics over time CGI Market Ratio

The time-based diagnostics support the suitability of the two-way fixed effects panel model for Market Ratio. While minor deviations are observed around 2020–2022, the model is robust across the 10-year panel, with low error variance and stable prediction trajectories. The deviations observed from 2020 to 2022 likely reflect market disruptions and economic uncertainties caused by global events such as the COVID-19 pandemic, affecting firm valuations.

Moderation analysis:

The direct effect of CGI on Market Ratio is marginally significant ($\beta = -0.0394$, $p = 0.0500$, Table 4.27), indicating a negative association. This suggests that higher CG, when isolated, may not significantly enhance market valuation. Findings indicate that CGI alone has a marginal negative effect on Market Ratio, suggesting that CG may not consistently improve market valuation across firms.

Table 4.27: Results from the fixed effects one-time regression model using Mkt Ratio as the dependent variable, with interactions capturing the moderating roles of industry, market capitalization, and firm age

Variable	DF	Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	-0.25668	0.2317	-1.11	0.2680
CGI	1	-0.03944	0.0201	-1.96	0.0500
Current_Ratio	1	-0.02557	0.00735	-3.48	0.0005
DE_Ratio	1	0.005238	0.00577	0.91	0.3637
Size	1	-0.32389	0.0205	-15.77	<.0001
INDUSTRYHealthcare	1	0.712281	0.4039	1.76	0.0779
INDUSTRYIndustrials	1	0.514102	0.2374	2.17	0.0304
INDUSTRYMaterials	1	0.636114	0.2856	2.23	0.0260
INDUSTRYUtilities	1	0.119407	1.3789	0.09	0.9310
INDUSTRYServices	1	0.03376	0.4653	0.07	0.9422
INDUSTRYEnergy	1	-0.54317	0.5134	-1.06	0.2901
INDUSTRYConsumer	1	-0.22227	0.7095	-0.31	0.7541
INDUSTRYConsumable	0	0	.	.	.
INDUSTRYInformation	1	-0.50733	0.4937	-1.03	0.3043
INDUSTRYCommunication	1	0.006991	0.5455	0.01	0.9898
INDUSTRYReal	1	0.604783	0.4234	1.43	0.1532
MARKET_CAPM	0	0	.	.	.
MARKET_CAPL	1	1.230493	0.2846	4.32	<.0001

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Table 4.27 continued from previous page

Variable	DF	Estimate	Standard Error	t Value	Pr > |t|
MARKET_CAPS	1	-1.0575	0.1951	-5.42	<.0001
AGE_GROUP2	0	0	.	.	.
AGE_GROUP1	1	0.188438	0.2586	0.73	0.4663
AGE_GROUP3	1	0.262237	0.2287	1.15	0.2515
AGE_GROUP4	1	-0.19672	0.2676	-0.74	0.4623
CGIINDUSTRYHealthcare	0	0	.	.	.
CGIINDUSTRYIndustrials	1	0.03861	0.0217	1.78	0.0747
CGIINDUSTRYMaterials	1	0.024479	0.0222	1.10	0.2694
CGIINDUSTRYUtilities	1	0.054601	0.0724	0.75	0.4510
CGIINDUSTRYServices	1	0.063227	0.0302	2.10	0.0362
CGIINDUSTRYEnergy	1	0.04038	0.0290	1.39	0.1644
CGIINDUSTRYConsumer	1	0.044074	0.0380	1.16	0.2464
CGIINDUSTRYConsumable	1	0.042818	0.0204	2.10	0.0355
CGIINDUSTRYInformation	1	0.085198	0.0303	2.82	0.0049
CGIINDUSTRYCommunication	1	0.061135	0.0332	1.84	0.0658
CGIINDUSTRYReal	1	0.031072	0.0285	1.09	0.2756
CGIMARKET_CAPM	0	0	.	.	.
CGIMARKET_CAPL	1	0.001762	0.0138	0.13	0.8985
CGIMARKET_CAPS	1	0.002463	0.0104	0.24	0.8127

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Table 4.27 continued from previous page

Variable	DF	Estimate	Standard Error	t Value	Pr > |t|
CGIAGE_GROUP2	0	0	.	.	.
CGIAGE_GROUP1	1	0.004858	0.0137	0.36	0.7225
CGIAGE_GROUP3	1	-0.01098	0.0116	-0.95	0.3439
CGIAGE_GROUP4	1	0.016575	0.0140	1.19	0.2358

Regression Interpretation and Moderation Effects

Current Ratio is significantly negative ($\beta = -0.0256$, $p = 0.0005$), implying that firms with higher short-term liquidity had lower market valuation, potentially signalling inefficiency or underutilization of capital. Leverage (DE Ratio) remained statistically insignificant ($\beta = 0.0052$, $p = 0.3637$). Meanwhile, Firm Size continued to demonstrate a strong negative effect ($\beta = -0.3239$, $p < 0.0001$), consistent with prior findings and possibly indicating that smaller firms have higher growth expectations baked into market valuations. Findings suggest higher short-term liquidity may reduce market valuation while firm size strongly affects performance, indicating smaller firms receive higher growth expectations in market assessments.

Industry Moderation:

Several industry classifications showed significant main effects (Table 4.27). Firms in Industrials ($\beta = 0.5141$, $p = 0.0304$) and Materials ($\beta = 0.6361$, $p = 0.0260$) sectors had significantly higher market ratios compared to the reference industry. Additionally, interaction terms revealed that the effect of CGI on Market Ratio varied significantly across industries:

- Services ($\beta = 0.0632$, $p = 0.0362$), Consumables ($\beta = 0.0428$, $p = 0.0355$), and Information ($\beta = 0.0852$, $p = 0.0049$) showed positive and significant moderation effects, suggesting that in these sectors, higher CGI contributes more positively to market valuation.

- Other industries, such as Communication and Industrials, displayed marginally significant interaction effects ($p = 0.0658$ and $p = 0.0747$, respectively), indicating some sector-specific sensitivity to governance practices.

The analysis indicates that industry significantly moderates the relationship between CGI and market ratios. Services, Consumables, and Information sectors benefit more from strong governance, while other sectors like Communication and Industrials show marginal sensitivity, highlighting that governance effectiveness varies across industry contexts.

Market Cap Moderation:

Market cap has strong main effects:

- Large-cap firms have significantly higher market ratios ($\beta = 1.2305$, $p < 0.0001$),
- While small-cap firms are negatively associated ($\beta = -1.0575$, $p < 0.0001$).

However, the interactions between CGI and market cap categories are not statistically significant, suggesting that the effect of CG on market valuation does not meaningfully vary by market cap classification.

Firm Age Moderation:

Firm age groups did not exhibit significant moderation effects. All interaction terms between CGI and age groups are non-significant, indicating that the governance-performance linkage is not strongly contingent on firm age.

In brief, this model demonstrates that while CGI does not exert a uniformly strong

direct effect on market ratio, its effectiveness is conditional on industry context, especially within service-oriented and information-rich sectors. Moreover, while firm size and market cap influence valuation, CGI's impact is more pronounced when considered in sector-specific contexts, particularly where investor perception might be more sensitive to governance signals.

Summary of findings for objective 1:

The two-way fixed effects model indicated that CGI did not have a statistically significant impact on either accounting-based or market-based performance metrics, as the coefficients were negative in both instances. These results indicate that governance by itself does not directly influence financial results.

The one-way time effects moderation analysis shows a more detailed picture. For accounting ratios, the CGI–FP relationship was considerably influenced by industry and firm age. CGI enhanced outcomes for nascent enterprises, underscoring the context-specific significance of governance in particular industries such as information and communication and in developmental phases of firms.

The moderating results were not as strong for market ratios. Market capitalization was a major predictor of market-based success. CGI connections with industry, size, and market capitalization were mostly not significant, which means that governance methods had little effect on market-based measures.

In summary, our data shows that CGI alone is not a good predictor of FP, rather its effects depend on other factors. The impact of CG is predominantly evident in particular industries and organizational contexts, especially on accounting-based metrics, while market-based performance seems to be more influenced by firm size and industry traits rather than CG itself.

The positive relationship between CG and FP suggests that stronger governance mechanisms enhance managerial discipline and reduce agency conflicts. This finding is consistent with stakeholder and agency theory, which emphasise the role of board effectiveness and transparency in value creation. Similar results have been reported in prior studies in emerging markets, though some studies report weaker effects. Table 4.28 gives the details of various authors and their measures of CGI and the relationship they found between CGI and FP.

Table 4.28: Results obtained by other researchers in case of CGI and financial performance

Author's Name	CGI Measurement	Findings	In Relation to Current Research
CG INDEX			
Aswini Kumar Mishra, Shikhar Jain, R. L. Manogna (2021)	Comprehensive CGI developed	Significant positive relationship with ROA and RONW. Significant negative relationship with Tobin's Q	Current study **contrasts** with their positive results for accounting ratios, as no significant direct CGI effect is found. However, like their mixed accounting vs. market findings, variation depending on performance measures and contexts is also observed.
Farooq, M., Noor, A., & Ali, S. (2022)	29 governance provisions (audit committee, board committee, ownership, compensation)	Positive impact on ROA and Tobin's Q, but little impact on ROE	**Similar** to current study findings, the evidence was mixed. No direct CGI effect is found, but moderation analysis shows conditional effects, consistent with their view that governance impacts may vary by metric.
Affes, W., & Jarboui, A. (2023)	CG score from DataStream	Governance largely enhances CFP in English firms	Current study findings **differ**, as CGI alone did not improve performance. However, moderation analysis suggests governance can enhance performance in specific industries/contexts, meaning its impact is less universal than suggested here.
CG INDIVIDUAL ATTRIBUTES			
Akshita Arora and Chandan Sharma (2016)	Individual attributes (Board size, independence, CEO duality, institutional ownership)	ROA, ROE, TQ not related to most CG indicators. BS improved performance; CEO duality has no impact	**Closely aligned** with current results: like theirs, no significant direct CGI-performance link overall is found. Current study extends this by showing that governance effects appear only conditionally (e.g., by industry, age).

Palaniappan, G. (2017)	Individual attributes (Board size, independence, duality, meetings)	Board composition had significant adverse relation with both accounting and market-based metrics	**Partially aligned**. Current study also finds negative coefficients for CGI, but not statistically significant. The analysis shows that such effects are not universal but depend on firm-specific and contextual moderators.

While the prior studies on the CGI-FP relationship report mixed outcomes, the current study contributes to the literature by showing that CGI by itself does not exert a statistically significant direct effect on either accounting ratios or market ratios. It shows that the governance effects are contingent on industry characteristics and firm age rather than absolute.

4.8.3 Panel regression analysis CSRI- Accounting ratios

The results from the fixed effects panel regression model (Table 4.29) reveal several significant findings regarding the influence of CSRI and control variables on firm account ratio.

Table 4.29: Panel regression analysis results - CSRI Accounting Ratio

Variable	DF	*B*	Standard Error	t Value	Pr > |*t*|	Label
CSRI	1	0.032093	0.00948	3.38	0.0007	CSRI
Current_Ratio	1	0.043337	0.0123	3.54	0.0004	
DE_Ratio	1	-0.03815	0.0106	-3.60	0.0003	
Size	1	-0.39594	0.0739	-5.35	<0.0001	
Age	1	-0.32563	0.1423	-2.29	0.0222	
MARKET_CAPM	0	0	.	.	.	MARKET_CAP = M
MARKET_CAPL	1	0.348581	0.0533	6.54	<0.0001	MARKET_CAP = L
MARKET_CAPS	1	-0.30683	0.0491	-6.25	<0.0001	MARKET_CAP = S

The coefficient for CSRI is positive and statistically significant ($\beta = 0.0321$, $p = 0.0007$), suggesting that firms with higher levels of CSR disclosure tend to exhibit higher account ratios.

Regarding control variables, the current ratio has a positive and significant impact on the account ratio ($\beta = 0.0433$, $p = 0.0004$). This indicates that firms with better short-term liquidity management tend to maintain healthier account structures. Conversely, the debt-to-equity (DE) ratio is negatively associated with the account ratio ($\beta = -0.0382$, $p = 0.0003$), highlighting the potential burden that excessive leverage places on internal accounting mechanisms.

Firm size also plays a crucial role; it shows a significant negative effect ($\beta = -0.3959$, $p < 0.0001$), implying that larger firms may face complexities that reduce their account ratio, potentially due to more diversified operations or increased agency problems. Similarly, firm age is negatively related to account ratio ($\beta = -0.3256$, $p = 0.0222$), which may suggest that older firms are either more conservative in accounting practices or have systems that emphasize stability over dynamic efficiency.

Market capitalization exhibits significant group-level effects. Compared to medium-sized firms (reference group), large firms (MARKET_CAP = L) show a significantly higher account ratio ($\beta = 0.3486$, $p < 0.0001$), while small firms (MARKET_CAP
= S) show a significantly lower ratio ($\beta = -0.3068$, $p < 0.0001$). These findings support the notion that market cap sizes can provide advantages or limitations depending on how resources are managed and how sustainability is embedded within organizational processes.

Mid-sized firms were chosen as the reference group because they provide a balanced benchmark between the extremes of large and small firms. Large firms often have more resources but face complexities and agency challenges, while small firms may have

limited resources and lower account ratios. Using mid-sized firms as the reference allows for clearer interpretation of the relative effects of market capitalization on accounting ratios, capturing how both advantages and limitations manifest in large and small firms compared to a moderate baseline.

This finding is consistent with the stakeholder and legitimacy theories, which propose that transparent sustainability practices enhance stakeholders' trust and consequently improve a firm's financial reporting quality and reliability. These results imply that the integration of sustainability principles into corporate strategies is not only socially beneficial but also aligned with improved internal accounting performance.

In conclusion, the results support the hypothesis that corporate sustainability reporting contributes positively to internal accounting measures, reinforcing the value of sustainability practices in enhancing firm efficiency. The significant effects of control variables underscore the multifaceted nature of accounting health, influenced by liquidity, leverage, size, and market context. These insights are crucial for policymakers and corporate leaders seeking to align FP with broader sustainability goals.

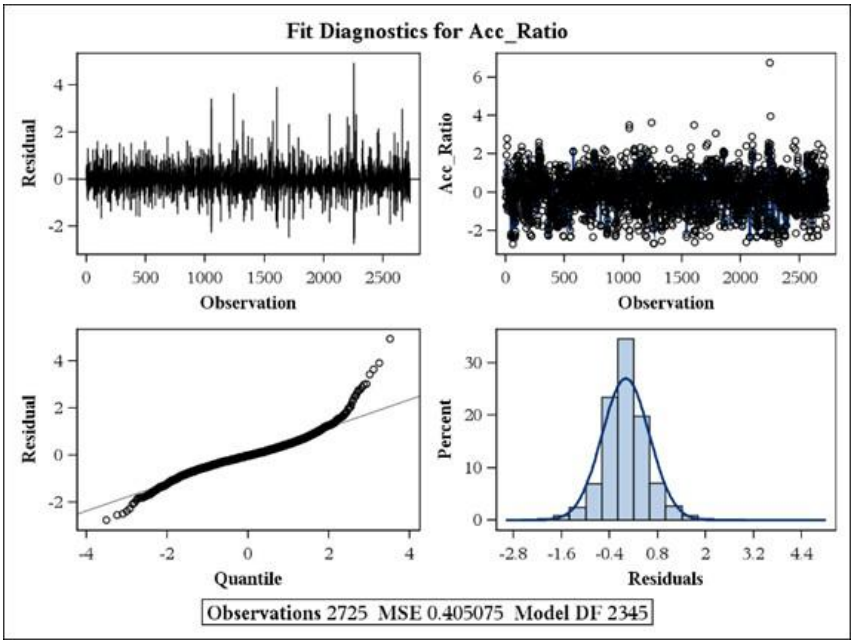

Figure 4.15: Fit diagnostics CSRI Accounting ratio

The diagnostic evaluation of the fixed effects panel regression model for Account Ratio (Figure 4.15) indicates that the model assumptions are reasonably met. The residual plot shows a random scatter around zero, suggesting no serious autocorrelation or heteroscedasticity issues. The Q-Q plot and histogram of residuals confirm an approximate normal distribution, although minor deviations are observed in the tails. The fitted vs. observed values plot displays a dense cluster of data points, implying a generally good model fit with some dispersion. The model demonstrates acceptable explanatory power and robustness, supporting the reliability of the estimates derived. Model diagnostics indicate the fixed effects panel regression for Acc_Ratio meets assumptions with random residuals and approximate normality, supporting reliable and robust estimation of predictor effects.

The extended diagnostic plots over time (Figure 4.16) provide further evidence regarding the model's adequacy. The residual-by-date plot shows no clear time-dependent structure, indicating the absence of strong autocorrelation across the years 2014–2024.

Predicted values are fairly stable over time, though some inter-firm variability is evident, which is expected in a panel dataset with diverse firms. The actual vs. date plot shows dispersion but within reasonable bounds, supporting the model's consistency across time. The stacked residuals plot, although visually dense, reflects that residuals are generally centred around zero for most firms and years, reinforcing the assumption of random errors. The model demonstrates stable predictive performance over the study period without major violations of linear regression assumptions. Diagnostic plots indicate the model is stable over time with minimal autocorrelation and random residuals, supporting reliable predictive performance and validity for longitudinal firm data.

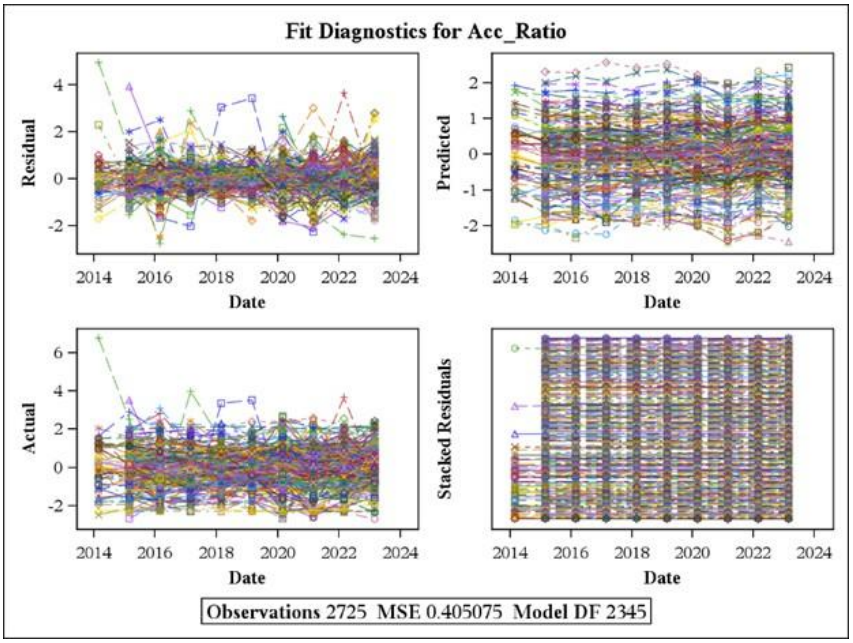

Figure 4.16: Fit diagnostics over time CSRI Accounting ratio

Moderation Analysis: Table 4.30 results from the fixed effects regression model using CSRI - Acc Ratio as the dependent variable, with interactions capturing the moderating roles of industry, market capitalization, and firm age.

Table 4.30: Results from the fixed effects one-time regression model using CSRI - Acc Ratio as the dependent variable, with interactions capturing the moderating roles of industry, market capitalization, and firm age

Variable	**DF**	*β*	**Standard Error**	**t Value**	**Pr > |t|**
Intercept	1	-0.15624	0.1693	-0.92	0.3563

Variable	DF	*B*	Standard Error	t Value	Pr > |t|
CSRI	0	0	.	.	.
Current_Ratio	1	0.095861	0.0121	7.92	<0.0001
DE_Ratio	1	-0.06299	0.00947	-6.65	<0.0001
Size	1	-0.16495	0.0248	-6.64	<0.0001
INDUSTRYHealthcare	1	-0.25236	0.2484	-1.02	0.3097
INDUSTRYIndustrials	1	0.133164	0.2071	0.64	0.5203
INDUSTRYMaterials	1	0.106856	0.2101	0.51	0.6110
INDUSTRYUtilities	1	-0.21002	0.5953	-0.35	0.7243
INDUSTRYServices	1	0.152016	0.3946	0.39	0.7001
INDUSTRYEnergy	1	0.225594	0.2561	0.88	0.3785
INDUSTRYConsumer	1	0.014148	0.2618	0.05	0.9569
INDUSTRYConsumable	0	0	.	.	.
INDUSTRYInformation	1	0.04062	0.3073	0.13	0.8948
INDUSTRYCommunication	1	0.528389	0.2825	1.87	0.0615
INDUSTRYReal	1	0.324888	0.4771	0.68	0.4960
MARKET_CAPM	0	0	.	.	.
MARKET_CAPL	1	0.33469	0.1530	2.19	0.0288
MARKET_CAPS	1	-0.22312	0.1411	-1.58	0.1138
AGE_GROUP2	0	0	.	.	.
AGE_GROUP1	1	-0.20925	0.1702	-1.23	0.2189
AGE_GROUP3	1	-0.21644	0.1622	-1.33	0.1821

Variable	DF	*B*	Standard Error	t Value	Pr > |t|
AGE_GROUP4	1	-0.069	0.1994	-0.35	0.7293
CSRI*INDUSTRYHealthcare	1	0.087148	0.0444	1.96	0.0497
CSRI*INDUSTRYIndustrials	1	0.054432	0.0397	1.37	0.1703
CSRI*INDUSTRYMaterials	1	0.035945	0.0326	1.10	0.2702
CSRI*INDUSTRYUtilities	1	0.057474	0.0835	0.69	0.4913
CSRI*INDUSTRYServices	1	0.05518	0.0624	0.88	0.3768
CSRI*INDUSTRYEnergy	1	-0.05015	0.0391	-1.28	0.1992
CSRI*INDUSTRYConsumer	1	0.057163	0.0440	1.30	0.1937
CSRI*INDUSTRYConsumable	1	0.059231	0.0341	1.74	0.0823
CSRI*INDUSTRYInformation	1	0.05179	0.0510	1.02	0.3096
CSRI*INDUSTRYCommunication	1	-0.04515	0.0560	-0.81	0.4203
CSRI*INDUSTRYReal	1	0.039935	0.0676	0.59	0.5545
CSRI*MARKET_CAPM	1	-0.03405	0.0266	-1.28	0.2006
CSRI*MARKET_CAPL	0	0	.	.	.
CSRI*MARKET_CAPS	1	-0.05268	0.0315	-1.67	0.0946
CSRI*AGE_GROUP2	0	0	.	.	.
CSRI*AGE_GROUP1	1	0.023892	0.0287	0.83	0.4050
CSRI*AGE_GROUP3	1	0.022899	0.0278	0.82	0.4107
CSRI*AGE_GROUP4	1	-0.0138	0.0367	-0.38	0.7068

To examine whether the relationship between the CSRI and account ratio varies across firm-specific characteristics, a moderation analysis was conducted using interaction terms between CSRI and three categorical moderators: industry, market capitalization, and age group. The

fixed-effects panel regression model (Table 4.30) did not retain CSRI as a main effect in the presence of interaction terms, suggesting that its variance was largely absorbed by the interaction terms or was rendered statistically redundant in the saturated model. Moderation analysis indicates that CSRI's direct effect on accounting ratios becomes statistically redundant when accounting for interactions, highlighting potential context dependence across industry, market capitalization, and firm age.

Among the interaction terms, only the CSRI × Healthcare industry interaction was statistically significant ($\beta = 0.087$, $p = 0.0497$), indicating a marginally positive moderation effect. However, no other CSRI interactions with industry sectors, market capitalization groups, or age groups reached statistical significance ($p > 0.05$). Furthermore, ANOVA tests confirmed that the inclusion of moderator terms did not significantly improve the model's explanatory power for account ratio.

These findings suggest that the effect of CSRI on account ratio is largely consistent across different organizational contexts, with limited evidence of sector-specific variations. The slight interaction observed in the healthcare sector may reflect the unique stakeholder expectations and regulatory scrutiny faced by firms in this industry, where socially responsible behavior could be more closely linked to financial reporting practices. Nonetheless, the lack of broader significance across moderators implies that CSRI's influence on account ratio remains relatively stable and non-contingent on firm characteristics such as size, age, or sector.

4.8.4 Panel Regression Analysis: CSRI and Market Ratios

This section presents the results (Table 4.31 and Table 4.32) from the fixed effects regression model using *Market Ratio* as the dependent variable. The model incorporates

interactions to assess the moderating roles of *industry*, *market capitalization*, and *firm age* on the relationship between the CSRI and market-based performance.

Main Effects Model:

Table 4.31: Two-way fixed effects regression analysis results - CSRI Mkt Ratio

Variable	DF	Estimate	Standard Error	t Value	Pr > |t|
CSRI	1	-0.00571	0.00713	-0.80	0.4236
Current_Ratio	1	-0.00686	0.00912	-0.75	0.4524
DE_Ratio	1	0.00276	0.00620	0.44	0.6566
Size	1	-0.16866	0.0513	-3.29	0.0010
MARKET_CAP = M	0	0	.	.	.
MARKET_CAP = L	1	0.68235	0.0440	15.53	<.0001
MARKET_CAP = S	1	-0.70846	0.0377	-18.80	<.0001
AGE_GROUP = 2	0	0	.	.	.
AGE_GROUP = 1	1	0.00453	0.0529	0.09	0.9318
AGE_GROUP = 3	1	0.28068	0.1038	2.70	0.0069
AGE_GROUP = 4	1	0.05749	0.1485	0.39	0.6988

The results presented in Table 4.31 showed that the CSRI has a negative but statistically insignificant effect on the market ratio ($\beta = -0.00571$, $p = 0.4236$), suggesting no direct impact of CSR engagement on firm performance in the overall sample.

Among the control variables:

- **Firm size** had a significant negative effect ($\beta = -0.16866$, $p = 0.0010$), indicating that larger firms tend to have lower market ratios.

- **Market capitalization** showed strong and opposing effects:
  - Large-cap firms had a significantly higher market ratio ($\beta = 0.6823$, $p < 0.0001$).
  - Small-cap firms had a significantly lower market ratio ($\beta = -0.7085$, $p < 0.0001$), relative to medium-cap firms (reference group).
- **Age group 3** (firms aged between 21 and 30 years) also showed a positive significant effect ($\beta = 0.2807$, $p = 0.0069$).

The findings from the main effects model suggest that CSRI does not have a uniform, significant, direct impact on market-based performance across all firms in the sample. This implies that the benefits of CSR are context-dependent and may not be immediately reflected in financial indicators such as the market ratio.

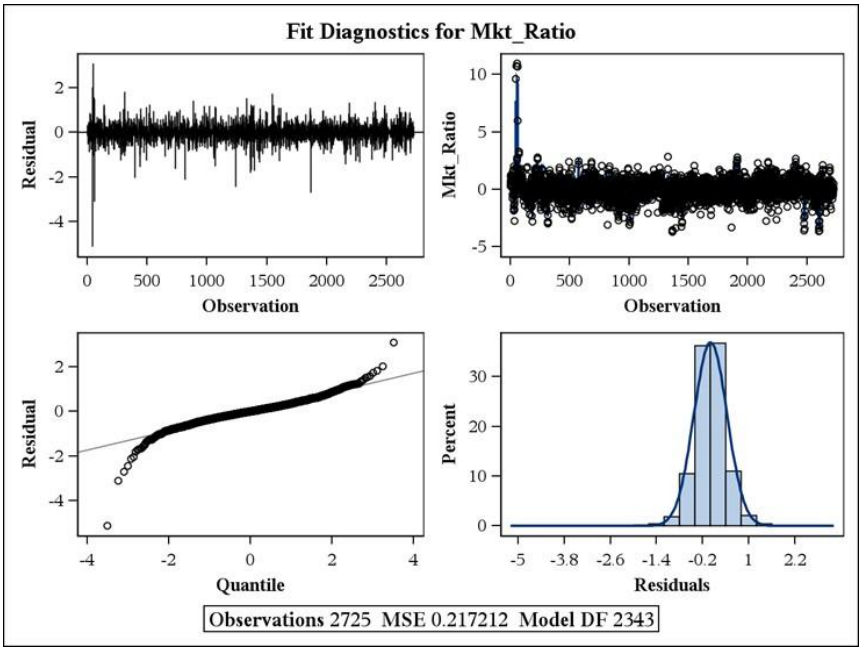

Figure 4.17: Fit diagnostics – CSRI mkt ratios

The model diagnostics for the Market Ratio regression (Figure 4.17) indicate a reasonably good model fit, with a Mean Squared Error (MSE) of 0.2172. This value is comparatively lower than that of the Account Ratio model, suggesting better predictive accuracy in capturing market-based firm performance.

Overall, the diagnostic plots support the robustness of the model. There are no strong violations of the underlying regression assumptions, including linearity, homoscedasticity, and normality of residuals. Therefore, the model is deemed appropriate for interpreting the relationship between the predictors and market-based firm performance.

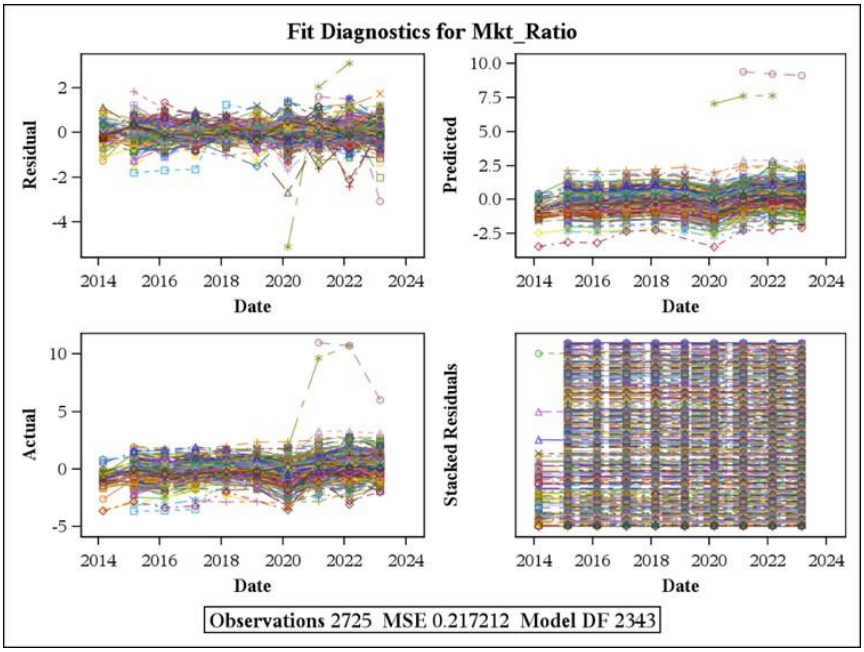

Figure 4.18: Fit diagnostics over time – CSRI mkt ratios

The model diagnostics over time for Mkt Ratio (figure 4.18) also suggest a good overall model fit. The residuals are well-behaved both temporally and across observations. The slight deviations at the distributional tails are acceptable and do not materially affect the reliability of inferences. The model is well-suited for analyzing the effects of CSR and related firm-level predictors on market-based performance.

Moderation analysis:

Table 4.32: Results from the fixed effects one-time regression model using CSRI - Mkt Ratio as the dependent variable, with interactions capturing the moderating roles of industry, market capitalization, and firm age

Variable	DF	Estimate	Standard Error	t Value	Pr > |t|	Label
Intercept	1	-0.11688	0.1216	-0.96	0.3367	Intercept

Variable	DF	Estimate	Standard Error	t Value	Pr > |t|	Label
CSRI	0	0	.	.	.	CSRI
Current_Ratio	1	-0.02264	0.00812	-2.79	0.0053	
DE_Ratio	1	0.005137	0.00695	0.74	0.4596	
Size	1	-0.31116	0.0223	-13.94	<.0001	
INDUSTRY Healthcare	1	-0.30227	0.124	-2.44	0.0149	INDUSTRY= Healthcare
INDUSTRY Industrials	1	0.447906	0.1356	3.3	0.001	INDUSTRY= Industrials
INDUSTRY Materials	1	0.162343	0.1422	1.14	0.2538	INDUSTRY= Materials
INDUSTRY Utilities	1	1.902341	1.2947	1.47	0.1419	INDUSTRY= Utilities
INDUSTRY Services	1	0.214796	0.1978	1.09	0.2777	INDUSTRY= Services
INDUSTRY Energy	1	-0.49064	0.192	-2.55	0.0107	INDUSTRY= Energy
INDUSTRY Consumer	1	-0.59258	0.2197	-2.7	0.007	INDUSTRY= Consumer
INDUSTRY Consumable	0	0	.	.	.	INDUSTRY= Consumable

Variable	DF	Estimate	Standard Error	t Value	Pr > |t|	Label
INDUSTRYInforma1tion		0.042936	0.1772	0.24	0.8086	INDUSTRY= Information
INDUSTRY Communication	1	0.318524	0.2014	1.58	0.1139	INDUSTRY= Communication
INDUSTRY Real	1	0.470723	0.2267	2.08	0.0379	INDUSTRY= Real
MARKET_CAPM	0	0	.	.	.	MARKET_CAP= M
MARKET_CAPL	1	1.409058	0.1405	10.03	<.0001	MARKET_CAP= L
MARKET_CAPS	1	-1.1826	0.1089	-10.86	<.0001	MARKET_CAP= S
AGE_GROUP2	0	0	.	.	.	AGE_GROUP= 2
AGE_GROUP1	1	0.389406	0.1509	2.58	0.0099	AGE_GROUP= 1
AGE_GROUP3	1	0.262621	0.1148	2.29	0.0222	AGE_GROUP= 3
AGE_GROUP4	1	0.292326	0.1484	1.97	0.049	AGE_GROUP= 4

To investigate whether the effect of CSRI differs across industries, interaction terms are included between CSRI and industry categories, market capitalization groups, and firm age groups. In this model, the main effect of CSRI is not retained (Table 4.32), likely due to multicollinearity and absorption by the interaction terms. However, the *Current Ratio* ($\beta = -0.0226,\ p = 0.0053$) and *Size* ($\beta = -0.3112,\ p < 0.0001$) continued to demonstrate strong negative effects consistent with prior findings.

Industry Moderation

Several industry sectors showed significant main effects (Table 4.32). Firms in industries such as *Healthcare*, *Energy*, and *Consumable Discretionary* demonstrated a significant negative impact on market-based performance ($p < 0.01$), while *Industrials* ($p = 0.001$) and *Real Estate* ($p = 0.0379$) showed a significant positive impact.

Several CSRI–Industry interaction terms are significant, supporting the role of industry as a moderator. Specifically:

- Industrials: $\beta = -0.0506$, $p = 0.0400$
- Energy: $\beta = -0.05376$, $p = 0.0440$
- Consumable Discretionary: $\beta = -0.04454$, $p = 0.0182$

These negative and significant moderation effects suggest that in these sectors, CSR initiatives may either incur higher implementation costs or face weaker stakeholder endorsement. This could be attributed to the nature of these industries—often resource-intensive or tightly regulated—where CSR activities are viewed more as compliance obligations than as strategic performance-enhancing tools. In such cases, higher CSR activity

is associated with reduced market valuation, indicating sector-specific sensitivity to CSR practices. These findings suggest that in specific industries CSR initiatives may involve higher implementation costs or encounter weaker stakeholder support, reducing their effectiveness in enhancing market performance.

Market Capitalization Moderation

Market capitalization showed strong main effects:

- Large-cap firms exhibited significantly higher market valuations ($\beta = 1.4091$, $p < 0.0001$),
- Small-cap firms were negatively associated with market performance ($\beta = -1.1826$, $p < 0.0001$).

In contrast, the interaction between CSRI and small-cap firms indicated a significant positive association ($\beta = 0.0625$, $p = 0.0039$), suggesting that the impact of CSR practices on market valuation meaningfully varies across market cap classifications. A limitation of the moderation analysis is that mid cap firms do not exhibit significant interaction effects with CSRI. This restricts understanding of whether CSR influences mid cap valuations differently from large or small firms thereby leaving a gap in generalizability and limiting nuanced insights across the full market capitalization spectrum.

Firm Age Moderation

Age groups showed significant main effects on market-based performance ($p < 0.05$). However, only Age Group 3 displayed a significant interaction with CSRI ($\beta = -0.04137$, $p = 0.0240$), suggesting that the CSR-performance relationship is also moderated by firm

age.

The significant interactions with market capitalisation and firm age further highlight the heterogeneous impact of CSR across different firm characteristics. For example, small-cap firms may experience distinct stakeholder pressures or resource limitations that influence the effectiveness of CSR initiatives. Similarly, mid-aged firms (Age Group 3) may have more mature operations and stakeholder networks, which can cause CSR to yield better or worse returns depending on strategic alignment.

Overall, these findings reinforce theoretical arguments from stakeholder theory and contingency theory, emphasizing that the value of CSR is not universal but contingent on firm-specific and contextual factors.

Summary of findings for objective 2:

The examination of CSR (assessed using CSRI) and FP indicates divergent dynamics between accounting-oriented and market-oriented results. The two-way fixed effects model shows that CSRI has a statistically significant positive effect on accounting ratios ($\beta = 0.0321$, $p = 0.0007$). Thus, the increased CSR participation is linked to better operational accounting performance. This is consistent with stakeholder theory. This effect continues to exist even when business size, leverage, liquidity, age, and market capitalization are taken into account. This means that companies who actively participate in CSR programs see real accounting benefits, such as better operational efficiency and greater connections with stakeholders. These findings align with the slack resources theory, which posits that companies that can invest in CSR are rewarded with enhanced operational efficiency.

On the other hand, CSRI exhibits no significant direct effect on market ratios ($\beta = -0.0057$, $p = 0.424$), indicating that equity market valuations do not regularly include CSR initiatives in the short run. This finding is consistent with legitimacy theory, which posits that although CSR may improve societal acceptance, its impact on market valuations is contingent upon external views and legitimacy assessments. The lack of an immediate impact on the capital market aligns with signaling theory, indicating that CSR signals may not be equally assessed by investors, especially

in environments where short-term financial indicators prevail in decision-making.

The one-way fixed effects moderation analysis shows the effect of CSR on accounting ratios varies with industry. Healthcare and to a lesser extent, information technology sectors show perceivable benefits. Interactions between market capitalization and company age are mostly not significant, which means that CSR benefits are quite constant across different sizes and ages of companies when it comes to accounting performance.

For market ratios, the moderation results similarly indicate no universal effect of CSR. But, strong interactions with specific contextual variables, such as market capitalization and industry dummies, underscore that CSR's valuation effects are conditional rather than direct. Specifically, large-cap companies regularly have a better market-based reputation for CSR than small-cap companies.

The results underscore the importance for firms and policymakers to consider industry and organizational context when designing or assessing CSR strategies.

This differential impact suggests that CSR contributes primarily to internal operational efficiency rather than immediate market valuation. While accounting measures capture improvements in productivity, stakeholder relations, and risk management, market-based measures reflect short-term investor sentiment, where CSR may be perceived as a cost. Similar mixed evidence has been reported by various authors and the same are given in the Table 4.33.

Table 4.33: Results obtained by other researchers for CSR and financial performance

Authors	**Measure of CSR**	**Relationship found**	**In relation to Current research**
Waris & Din, (2024)	Datastream	Negative relationship between CSR and ROA	**Contrary** -Present findings show a positive and significant CSR–ROA link

Singhania, S., Arora, A., & Sardana, V. (2024)	CSR expenditure	Mixed (Positive-CSR and ROA, negative CSR, and Tobin's Q)	**Aligned-**Present study also finds CSR strengthens accounting performance but does not directly enhance market-based performance**.**
Ahamed, & Tripathi (2023)	CSR expenditure	Mixed (Positive-CSR and ROA, negative CSR, and Tobin's Q)	**Aligned-** consistent with the evidence that CSR supports accounting outcomes but shows weak or no direct effect on market valuation.
Bhatnagar, C. S., Bhatnagar, D., & Bhullar, P. S. (2023)	Content analysis of firms' reports	Negative - CSR and ROA	**Contrary-** Current results point to CSR improving accounting-based measures rather than weakening them.
Kaimal & Uzma, (2023)	CSR expenditure	Positive - CSR with ROA and Tobin's Q	**Partially aligned -** The study confirms the positive CSR–ROA effect but do not observe a direct significant link with market ratios such as Tobin's Q.

Table 4.33 gives the details of various authors and their measures of CSR and the relationship they found between CSR and FP.

The affirmative results of CSR reporting and financial performance are substantiated by stakeholder theory, resource dependency theory, legitimacy theory, and institutional theory. Companies that strive to meet the economic, social, and financial demands of their stakeholders while adhering to legitimate practices, such as CSR reporting, enjoy enhanced access to advantages provided by stakeholders. Companies that comply with CSR reporting standards benefit from increased customer demand and investment capital.

4.8 Regression analysis

The study elucidates that CSR reporting activities may influence firms' FP; however, it is imperative to cultivate awareness among investors and market participants regarding the significance of CSR reporting, which could enhance other facets of FP as well.

4.9 Analysis of CSRI Mediation Effect

4.9.1 Two stage causal relationship – mediation- bootstrapping approach results

CSRI mediation- Accounting ratio results

Table 4.34: Summary of Estimation of Causal Mediation Effects of Corporate Social Responsibility Between Corporate Governance and Financial Performance (Accounting Ratio)

Acc Ratio as a Measure of CFP		Without Controls		With Controls	
S.No	**Causal Effect**	**Estimate**	**Pr > Z**	**Estimate**	**Pr > Z**
1	Total Effect	-0.0095	0.1127	-0.0090	0.1114
2	Controlled Direct Effect (CDE)	-0.0113	0.0590	-0.0106	0.0614
3	Natural Direct Effect (NDE)	-0.0113	0.0590	-0.0106	0.0614
4	Natural Indirect Effect (NIE)	0.0018	0.0067	0.0016	0.0098
5	Percentage Mediated	-19.3881	0.1773	-17.8291	0.1813

The total effect (-0.0095) of CG/CSR on Accounting Ratio is found to be negative but statistically (CSR) insignificant, indicating that governance and sustainability initiatives, when considered holistically, do not have a direct and strong impact on financial outcomes – Accounting Ratios. However, the controlled direct effect (CDE) (-0.0113) and natural direct effect (NDE) (-0.0113) are found to be slightly more negative and marginally significant ($p \approx 0.06$). Despite the negative direct effect, the natural indirect effect (NIE) (0.0018) is found to be positive and statistically significant ($p < 0.01$). This shows that CSRI mediates. Thus, CSRI has partial mediation on the Accounting ratio, though direct effect is negative, but the indirect effect via CSR is positive. Because the total effect is not significant and the direct effect is marginally significant, the mediation is not strong enough to claim. The percentage mediated (-

19.39% without controls and -17.83% with controls) suggests a suppression effect, meaning that the indirect (positive) mediation effect is counteracting the direct (negative) effect. This indicates that the benefits of CG/CSR are realized through mediating factors rather than immediate FP improvements. However, the direct negative effect implies that firms may need time to recover from the initial costs of CG/CSR implementation before experiencing financial gains.

When an independent variable's direct and mediated effects on a dependent variable have opposing signs, there is a suppression effect within a mediation model (Cliff & Earlyywine, 1994; Tzelgov & Henik, 1991). These kinds of models are referred to as inconsistent mediation models (Davis, 1985), in contrast to models of consistent mediation where the sign of the mediated and direct effects is the same.

Findings suggest CSR partially mediates accounting ratios with suppression effects indicating benefits emerge indirectly while direct impacts remain negative reflecting initial adjustment costs.

Table 4.35: Summary of Outcome Model Estimates

Acc Ratio as a Measure of FP		Without Controls			With Controls	
S.No	**Parameter**	**Level1**	**Estimate**	**Pr>Chi**	**Estimate**	**Pr>Chi**
1	Intercept	-	0.0595	0.6252	-0.5326	0.0012
2	CGI	-	-0.0113	0.0590	-0.0106	0.0614
3	CSRI	-	0.0293	0.0012	0.0255	0.0023
4	Current Ratio	-	.	.	0.0954	<0.0001
5	DE Ratio	-	.	.	-0.0614	<0.0001
6	Size	-	.	.	-0.1548	<0.0001
7	Industry	Industrials	.	.	0.2636	0.0192
8	Market Cap	L	.	.	0.7832	<0.0001
9	Market Cap	M	.	.	0.2769	<0.0001
10	Age Group	2	.	.	0.1543	0.0166

Table 4.36: Summary of Mediator Model Estimates

Acc Ratio as a Measure of FP		Without Controls			With Controls	
S.No	**Parameter**	**Level1**	**Estimate**	**Pr>Chi**	**Estimate**	**Pr>Chi**
1	Intercept	-	4.1694	<0.0001	5.1606	<0.0001
2	CGI	-	0.0630	<0.0001	0.0628	<0.0001
3	Current Ratio	-	.	.	0.0044	0.8027
4	DE Ratio	-	.	.	-0.0667	<0.0001
5	Size	-	.	.	0.2056	<0.0001
6	Industry	Communication Services	.	.	-1.2562	<0.0001
7	Industry	Consumer Discretionary	.	.	-1.1090	<0.0001
8	Industry	Industrials	.	.	-1.3560	<0.0001
9	Market Cap	L	.	.	-0.7810	<0.0001
10	Market Cap	M	.	.	-0.4982	<0.0001
11	Age Group	2	.	.	0.4802	0.0011

Interestingly, the results remain consistent across models with and without control variables (firm size, age, leverage, and industry), suggesting that these factors do not drastically alter the mediation effects. This highlights the robustness of the findings and indicates that the influence of CG/CSR on Accounting ratios is primarily driven by internal CG mechanisms rather than external firm characteristics. The mediation effect is observed only in Industrials under industry, Large cap and Mid cap under market cap-wise, and under age group only under Age group 2.

CSRI mediation- Market ratio results

Table 4.37: Summary of Estimation of Causal Mediation Effects of Corporate Social Responsibility Between Corporate Governance and Financial Performance (Market Ratio)

Mkt Ratio as a Measure of FP		Without Controls		With Controls	
S.No	**Causal Effect**	**Estimate**	**Pr>Z**	**Estimate**	**Pr>Z**
1	Total Effect	0.0300	<0.0001	0.0019	0.6773
2	Controlled Direct Effect (CDE)	0.0327	<0.0001	0.0036	0.4278
3	Natural Direct Effect (NDE)	0.0327	<0.0001	0.0036	0.4278
4	Natural Indirect Effect (NIE)	-0.0027	0.0006	-0.0017	0.0018
5	Percentage Mediated	-8.9638	0.0059	-90.8055	0.6819

Total Effect of CGI on Market Ratios without controls is Significant (0.0300, $p < 0.0001$) and with controls is Not significant (0.0019, $p = 0.6773$). Unlike in Accounting ratios, in this case, there is a lot of difference in the impact of controls, and hence, the estimates with controls are widely different. CDE is 0.0327 and is Significant without control, whereas it is not significant with controls (0.0036). The Natural Indirect Effect (NIE) is significant both with and without controls, but Negative effect. Hence, the conclusion is that CSRI partially mediates the CGI market ratios relationship without controls, but in a negative direction (suppressing)

and with controls mediation effect is statistically significant, but the mediation effect is negative.

Percentage Mediated without controls is -8.9% (p = 0.0059). A small but negative mediation. Whereas with controls, the percentage Mediated is -90.8% (p = 0.6819), though the p-value here suggests non-significance. This indicates, in the case of no controls, a partial suppression effect, meaning that CSR is playing a minor role in reducing the effect of corporate governance (CGI) on CFP (Market ratios). Since the percentage mediated is relatively small (-8.9%), the direct effect of CGI on market ratios is still stronger than the indirect (mediated) effect through CSR. In the case of controls, the study indicates a strong suppression effect of CGI on market ratios (CFP), with CSR mediating the effect negatively (-90.8%), but the mediation effect is not statistically significant, indicating high variability with the introduction of controls.

Findings suggest CSR exerts a minor yet significant negative mediation without controls while controls introduce a strong but statistically insignificant suppression effect indicating variability and instability. This highlights that CSR's influence on the governance performance linkage is inconsistent and highly sensitive to contextual factors.

Table 4.38: Summary of Outcome Model Estimates

Mkt Ratio as a Measure of CFP		Without Controls			With Controls	
S.No	**Parameter**	**Level1**	**Estimate**	**Pr>chi**	**Estimate**	**Pr>chi**
1	Intercept	-	-0.3946	0.0011	-0.8077	<0.0001
2	CGI	-	0.0327	<0.0001	0.0036	0.4278
3	CSRI	-	-0.0427	<0.0001	-0.0275	<0.0001
4	Current Ratio	-	.	.	-0.0239	0.0001
5	DE Ratio	-	.	.	0.0021	0.6646
6	Size	-	.	.	-0.3227	<0.0001
7	Industry	Consumer Discretionary	.	.	-0.3478	<0.0001
8	Industry	Consumer Staples	.	.	-0.5477	<0.0001
9	Industry	Energy	.	.	-0.9491	<0.0001
10	Industry	Healthcare	.	.	-0.5156	<0.0001
11	Market Cap	L	.	.	2.3786	<0.0001
12	Market Cap	M	.	.	1.1007	<0.0001
13	Age Group	1	.	.	0.1431	0.0107
14	Age Group	2	.	.	-0.1160	0.0263
15	Age Group	3	.	.	-0.0994	0.0808
16	Age Group	4	.	.	0.0000	.

Outcome Model: CFP = CGI + CSRI (Without and With Controls)

Note: Only significant industries are presented.

Table 4.39: Summary of Mediator Model Estimates

Mkt Ratio as a Measure of CFP		Without Controls			With Controls	
S.No	**Parameter**	**Level1**	**Estimate**	**Pr>chi**	**Estimate**	**Pr>chi**
1	Intercept	-	4.1694	<0.0001	5.1606	<0.0001
2	CGI	-	0.0630	<0.0001	0.0628	<0.0001
3	Current Ratio	-	.	.	0.0044	0.8027
4	DE Ratio	-	.	.	-0.0667	<0.0001
5	Size	-	.	.	0.2056	<0.0001
6	Industry	Consumer Discretionary	.	.	-1.1090	<0.0001
7	Industry	Consumer Staples	.	.	-0.7633	0.0028
8	Industry	Healthcare	.	.	-1.7783	<0.0001
9	Market Cap	L	.	.	-0.7810	<0.0001
10	Market Cap	M	.	.	-0.4982	<0.0001
11	Age Group	1	.	.	0.5458	0.0006
12	Age Group	2	.	.	0.4802	0.0111
13	Age Group	3	.	.	0.3099	0.0539
14	Age Group	4	.	.	0.0000	.

Mediator Model: CSRI = CGI (Without and With Controls)

Note: Only significant industries are presented.

Thus, in the case of market ratios, external firm characteristics do influence the mediation. Consumable discretionary, Consumable staples, and Health care show the mediation effect under the industry category, while large cap and mid cap under the market cap category, and finally, under age, group age group 1 and 2 show the mediation effect in case market ratios.

4.9.2 Additional Tests

In accordance with the recommendations of Armstrong et al., (2022); Leuz (2022); and Homayun et al., (2023), regarding the need of triangulation to strengthen result reliability, two further tests are performed: "Alternative Measures of the Dependent Variable" and the "Alternative Estimation Method". Thus, by applying different measurement of dependent variable and using different estimation method ensured the reliability of the results.

Alternative measures of the dependent variable

In order to arrive at alternative measures of dependent variables, Cluster analyses of FP measures are done, and the results are tabulated in the 4.40.

Table 4.40: Cluster Analysis of Financial Metrics (Measures of FP)

Cluster	Variable	Own Cluster	Next Closest	R Square Ratio
Cluster 1	ROA	0.9060	0.0013	0.0941
	ROCE	**0.9148**	**0.0010**	**0.0852**
	Return on net worth	0.8319	0.0001	0.1681
	PAT	0.5351	0.0001	0.4649
	EPS	0.2616	0.0031	0.7407
Cluster 2	MC	0.3904	0.0263	0.6261
	Tobin Q	**0.5459**	**0.0402**	**0.4731**
	PE Ratio	0.5363	0.1089	0.5204

The highest R-squared values from the own cluster, which are made bold in clusters 1 and 2, are selected. Thus, alternative measures for FP are taken as ROCE and Tobin's Q, and mediation analysis is done, and the results are given in Tables 4.41 and 4.42. Excluding other variables implies they show weaker clustering strength and higher cross associations, which may reduce robustness and clarity in capturing FP.

Table 4.41: Summary of Estimation of Causal Mediation Effects of Corporate Social Responsibility Between Corporate Governance and Financial Performance (ROCE)

ROCE as a Measure of FP		Without Controls		With Controls	
S.No	**Causal Effect**	**Estimate**	**Pr > Z**	**Estimate**	**Pr > Z**
1	Total Effect	-0.0186	0.0473	-0.0143	0.0951
2	Controlled Direct Effect (CDE)	-0.0209	0.0263	-0.0161	0.0615
3	Natural Direct Effect (NDE)	-0.0209	0.0263	-0.0161	0.0615
4	Natural Indirect Effect (NIE)	0.0023	0.0222	0.0018	0.0429
5	Percentage Mediated	-12.3551	0.1383	-12.4449	0.2017

Table 4.42: Summary of Estimation of Causal Mediation Effects of Corporate Social Responsibility Between Corporate Governance and Financial Performance (TOBIN's Q)

Tobin Q as a Measure of FP		Without Controls		With Controls	
S.No	**Causal Effect**	**Estimate**	**Pr > Z**	**Estimate**	**Pr > Z**
1	Total Effect	-0.0052	0.7947	0.0131	0.4570
2	Controlled Direct Effect (CDE)	0.0027	0.8955	0.0191	0.2812
3	Natural Direct Effect (NDE)	0.0027	0.8955	0.0191	0.2812
4	Natural Indirect Effect (NIE)	-0.0079	0.0015	-0.0059	0.0037
5	Percentage Mediated	150.5486	0.7946	-45.1685	0.4755

Total Effect (-0.0186, Pr = 0.0473 without controls; -0.0143, Pr = 0.0951 with controls). This represents the overall impact of the independent variable (CG/CSR) on ROCE as a measure of FP. The significance level suggests the effect is significant without controls and becomes insignificant with controls. Controlled Direct Effect & Natural Direct Effect (-0.0209, Pr = 0.0263) without controls; and with controls is -0.0161, Pr = 0.0615. Since these remain statistically significant (though not significant with controls), it suggests that the independent variable still has a direct impact on ROCE, meaning there is no full mediation but only Partial Mediation. Natural Indirect Effect (0.0023, Pr = 0.0222)

without controls; and with controls is 0.0018, Pr = 0.0429. This represents the mediated effect. It is positive and significant in both cases, suggesting that the mediator contributes significantly to the relationship. Percentage Mediated suggests that only about 12% of the total effect is mediated, and the negative value could indicate that the mediated effect opposes the direct effect. However, the p-values for percentage mediated (0.1383 & 0.2017) indicate that this mediation effect is not statistically significant. Results indicate partial mediation where CSR contributes positively but modestly to ROCE, though effects weaken with controls, highlighting limited and statistically fragile mediation significance. Conclusion is CSRI partially mediates ROCE positive and explains 12%.

When the FP measure is Tobin' Q, the mediation is a full negative mediation without controls. And with controls, it is the same, but mediation weakens. The percentage mediated is highly unstable (150.55% without controls, -45.16% with controls), which suggests inconsistencies in how CSR mediates the relationship across different model specifications. Findings indicate unstable mediation effects suggesting CSR's mediating role in the Tobin Q relationship is inconsistent and sensitive to model specification choices.

4.9.3 Alternative estimation method: Path analysis

The results of path analysis are given in Table 4.43, and the path diagram is given in Figure 4.19.

Table 4.43: Path Analysis for Mediating Effect of CSRI

Path		Estimate	Standard Error	t Value	Pr > |t|
Acc Ratio	==⇒ ROCE	0.93450	0.00249	375.9	< .0001
Acc Ratio	==⇒ Return on net worth	0.90140	0.00359	250.9	< .0001
Acc Ratio	==⇒ PAT	0.73784	0.00873	84.5261	< .0001
Acc Ratio	==⇒ EPS	0.53741	0.01363	39.4383	< .0001
Mkt Ratio	==⇒ Tobin Q	0.77245	0.00802	96.3069	< .0001
Mkt Ratio	==⇒ MC	0.59758	0.01232	48.5127	< .0001
CGI	==⇒ ROCE	-0.00879	0.00686	-1.2807	0.2003
CGI	==⇒ Tobin Q	-0.07812	0.01237	-6.3155	< .0001
CSRI	==⇒ ROCE	-0.00853	0.00687	-1.2416	0.2144
CSRI	==⇒ Tobin Q	-0.00917	0.01234	-0.7432	0.4574
CGI	==⇒ CSRI	0.09488	0.01899	4.9971	< .0001
CGI	==⇒ Acc Ratio	-0.03626	0.01919	-1.8894	0.0588
CGI	==⇒ Mkt Ratio	0.10439	0.01898	5.5009	< .0001
CGI	⇐== Transparency	0.49207	0.01480	33.2582	< .0001
CGI	⇐== Ownership	0.12504	0.01680	7.4447	< .0001
CSRI	==⇒ Acc Ratio	0.06205	0.01916	3.2379	0.0012
CSRI	==⇒ Mkt Ratio	-0.09051	0.01900	-4.7629	< .0001

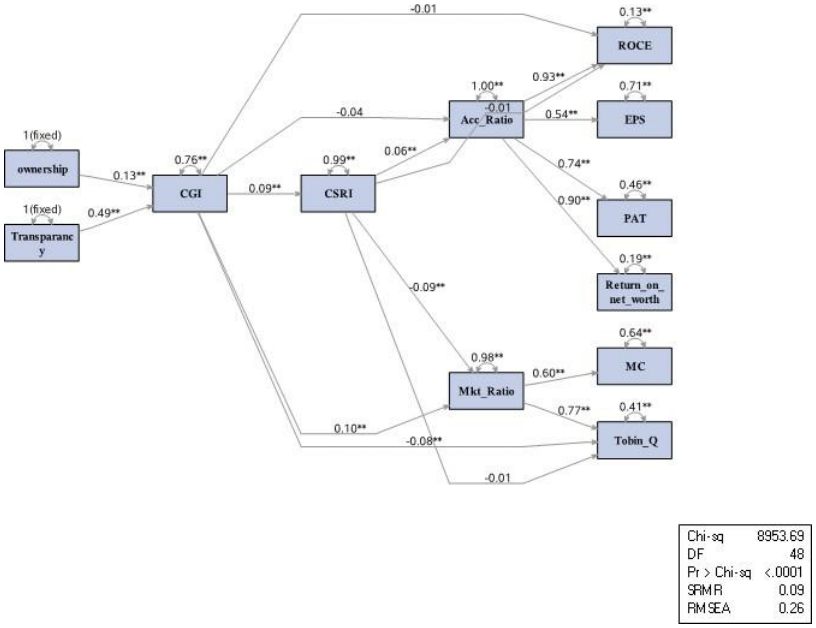

Figure 4.19: Path Diagram showing Mediation Role of CSRI between CG and Financial Performance

Table 4.43 provides a comprehensive path analysis examining the mediating effect of the CSRI on the relationship between CGI and various FP metrics, specifically the accounting ratio and market ratio and Figure 4.19 pictorially presents the path analysis.

The results show that CGI has a significant positive effect on CSRI (Estimate = 0.09488, $p < .0001$), suggesting that better CG practices are associated with higher levels of CSR. However, the direct effects of CGI on FP metrics are mixed. While CGI has a significant positive effect on the market ratio (Estimate = 0.10439, $p < .0001$), its effect on the accounting ratio is marginally significant and negative (Estimate = -0.03626, $p = 0.0588$). This implies that while strong governance practices may enhance market perceptions, their impact on accounting-based performance metrics is less clear. CSRI, on the

On the other hand, it has a significant positive effect on the accounting ratio (Estimate = 0.06205, p = 0.0012) but a significant negative effect on the market ratio (Estimate = -0.09051, p <.0001). This suggests that while CSR initiatives may improve financial health and operational efficiency, they might not always translate into higher market valuations, possibly due to the costs associated with implementing CSR activities.

The path analysis confirms a suppression pattern. For accounting ratios, CGI has a marginally negative direct effect while CSR exerts a significant positive effect, indicating that CSR offsets the weak governance effect rather than fully mediating it. For market ratios, CSR introduces a significant negative path, thereby dampening CGI's otherwise positive association. Thus, CSR strengthens internal accounting performance but suppresses market-based outcomes, consistent with inconsistent (suppression) mediation models. Vup- puluri & Pandey (2024) have also found in their research on CSR mediation on the relationship between CG and FP in banks in India, full mediation with PAT, ROA and ROE and partial mediation with Tobin's Q.

Summary of findings for objective 3:

Accounting ratios: CSR exhibits some beneficial mediation. CGI has a modestly negative direct effect, while CSR has a strong positive indirect effect that makes up for this. This causes a suppression effect, which means that the real advantages of governance come via CSR in an indirect way.

Market ratios: CSR has negative mediation effects (suppression), which means that CGI's favorable effect on market performance is lessened. This effect is tiny but important without controls; with controls, it becomes unstable and statistically weak.

Other measurements (ROCE, Tobin's Q): CSR has a small, positive effect on ROCE (partial mediation), while it has an inconsistent, negative effect on Tobin's Q.

Path analysis: Confirms the pattern — CSR makes accounting-based results better but

market-based results worse. So, CSR has a different effect: it makes things work better inside the company, but it doesn't always lead to higher market values.

The results substantiate the mediating hypothesis (H3) that CSR mediates the relationship between CG and FP. The results are in line with earlier research by Akther & Hassan (2024), who suggested that CSR partially mediates the positive relationship between CG and FP in BRICS countries by using the GMM methodology. Alnohoud *et al.* (2022) and Apreku-Djan *et. al.*, (2023) have also reported CSR mediating FP and value-based FP, respectively, in the case of banks.

According to Xu et al. (2022)'s empirical findings, CSR partially mediates the association between CG and FP in both the Family Business and the entire sample; however, the Non Family Business sample does not experience this mediation effect.

4.10 Results of AI and ML Analysis

This section illustrates the analysis of results obtained from machine learning algorithms. The statistical analysis presented in the study, while rigorous in its application of panel data techniques, fixed-effects models, and mediation analysis, reveals certain limitations that machine learning (ML) methods can effectively address. Traditional statistical approaches, such as regression and factor analysis, often assume linear relationships and struggle to capture complex, non-linear interactions between variables like CG, CSR, and FP. Additionally, these methods may not fully account for multicollinearity, heteroscedasticity, or outliers, which can skew results. For instance, the study notes the presence of extreme values and high variability in financial metrics, which were addressed through winsorization and transformation, but such adjustments may not fully resolve underlying data complexities.

ML techniques, such as Random Forest, XGBoost, and CatBoost, excel in handling non-linear relationships, high-dimensional data, and outlier robustness without relying on strict assumptions. The study's integration of ML, particularly through SHAP (Shapley Additive exPlanations), provides deeper insights into feature importance and interaction effects, revealing how CSR mediates the CG-FP relationship in ways traditional statistics might overlook. For example, SHAP analysis highlights that CSR's impact on FP varies significantly across contexts, a nuance that linear models could miss. Furthermore, ensemble methods like stacking improve predictive accuracy by combining multiple models, mitigating biases inherent in single-model approaches.

Thus, ML analysis complements statistical methods by uncovering hidden patterns, enhancing predictive power, and offering interpretable results, thereby filling gaps left by conventional techniques and providing a more holistic understanding of the CG-CSR-FP nexus.

Figure 4.20 shows the process and the flow chart of the methods applied specifically

for AI analysis. It starts with data preprocessing steps, including data cleaning, outlier removal, and applying Principal Component Analysis (PCA) to reduce dimensionality.

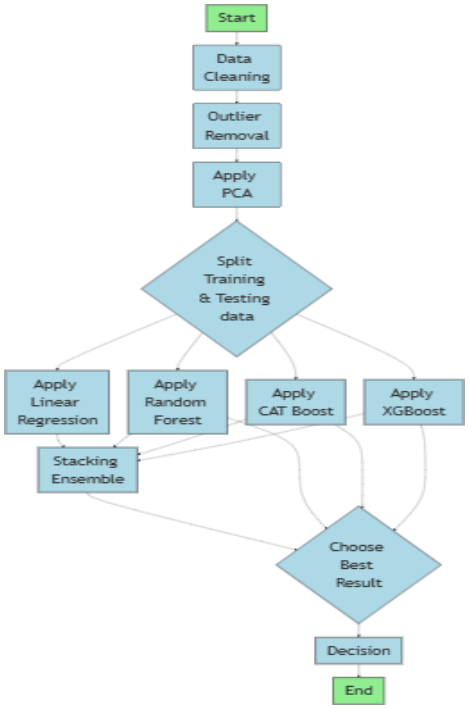

Figure 4.20: AI analysis flowchart

Next, the dataset is split into training and testing sets. Four different machine learning models—Linear Regression, Random Forest, CAT Boost, and XGBoost—are trained on the dataset. Their predictions are then combined using a stacking ensemble technique, which aggregates outputs from multiple models to improve accuracy. Finally, the best-performing model or ensemble is selected, leading to a final decision, marking the end of the pipeline. This workflow optimizes predictive performance by leveraging multiple algorithms in a structured way. The chosen machine learning models, including regression and ensemble techniques, capture both linear and complex nonlinear relationships. Their integration through stacking enhances predictive accuracy, enabling the study to better analyze governance, responsibility, and financial performance linkages with reliable, data driven insights.

4.10.1 Outliers removal and histogram analysis

The figure 4.21 presents histograms of independent variables used in a study after removing the outliers, illustrating their distributions after outlier removal. Outliers affect machine learning models differently based on their structure and training approach. Linear Regression (LR) is highly sensitive to outliers since it minimizes squared errors, causing extreme values to skew predictions significantly (Dumre et al., 2024). Random Forest (RF) is more robust because it averages multiple decision trees, reducing the influence of outliers, though frequent extreme values may still impact split selection. XGBoost is moderately sensitive, as outliers can influence gradient updates and lead to overfitting, though its built-in regularization helps control this effect. CATBoost is the least sensitive among these models due to its ordered boosting approach and categorical feature handling, making it more stable against extreme values. Outliers can distort study results by skewing predictions, reducing model accuracy, and creating misleading relationships between governance, responsibility, and financial performance variables.

Each subplot represents a different variable, including Market Cap, Age Group, DE Ratio, SIZE (Total Assets), CSR Index (CSRI), Corporate Governance Index (CGI), Ownership, Board Directors, Compliance, Transparency, Quick Ratio, Current Ratio, R&D Expenses, and Net Cash Flow. The histograms show how the data points are distributed across different values, revealing patterns such as skewness, concentration, or gaps in the dataset. Some variables, like Ownership and Quick Ratio, display right-skewed distributions, while others, such as Transparency and Compliance, exhibit more balanced distributions. The removal of outliers ensures a more representative and reliable dataset for subsequent analysis.

The figure 4.22 presents histograms of dependent variables for the market ratio after

outlier removal, showing the distribution of Total Returns, Market Capitalization (MC), Price-to-Earnings (PE) Ratio, and Tobin's Q. The Total Returns histogram appears approximately normal, indicating a balanced spread of values around the mean. MC exhibits a right-skewed distribution, suggesting that most companies have lower market capitalization, with a few high-value firms. The PE Ratio is also right-skewed, with a concentration of values around a lower range, but some extreme values extending higher.

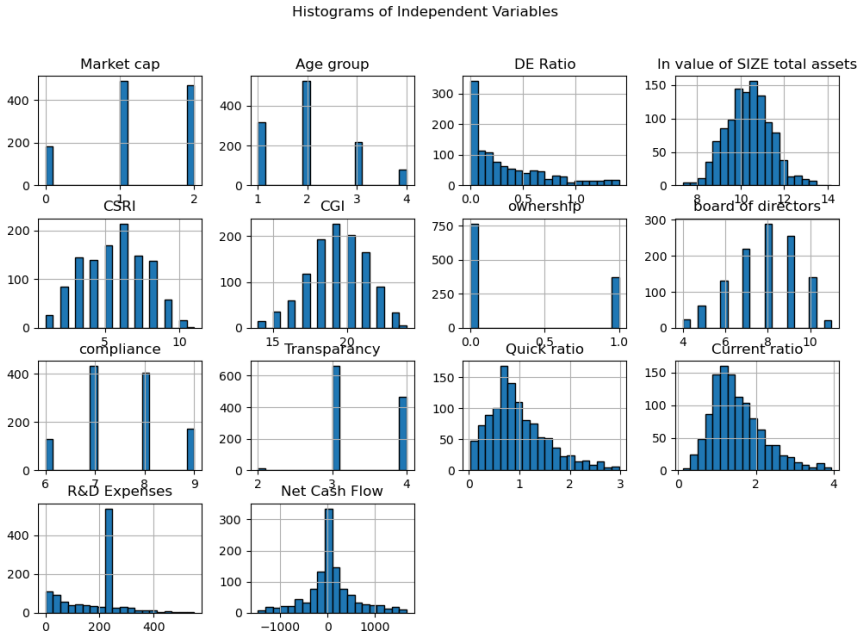

Figure 4.21: Histograms of independent variables after removing outliers

Similarly, Tobin's Q follows a right-skewed pattern, indicating that most firms have lower Tobin's Q values, with fewer having significantly higher values. These distributions suggest that financial ratios and market performance metrics tend to be asymmetric, with a small number of firms exhibiting extreme values. The figure 4.23 displays histograms of dependent variables related to account ratios after outlier removal, illustrating the distributions of PAT per cent, Return on Net Worth, ROA, and EPS. The PAT percent and Return on Net Worth histograms exhibit approximately normal distributions, with most values concentrated around a central range and some right-skewness. ROA also follows

a similar pattern, with a fairly symmetric shape, indicating balanced profitability across firms. In contrast, EPS is right-skewed, showing a higher concentration of values in the lower range, with a few extreme values extending towards higher earnings. These distributions suggest that while profitability ratios tend to be more symmetric, earnings per share are more variable across companies.

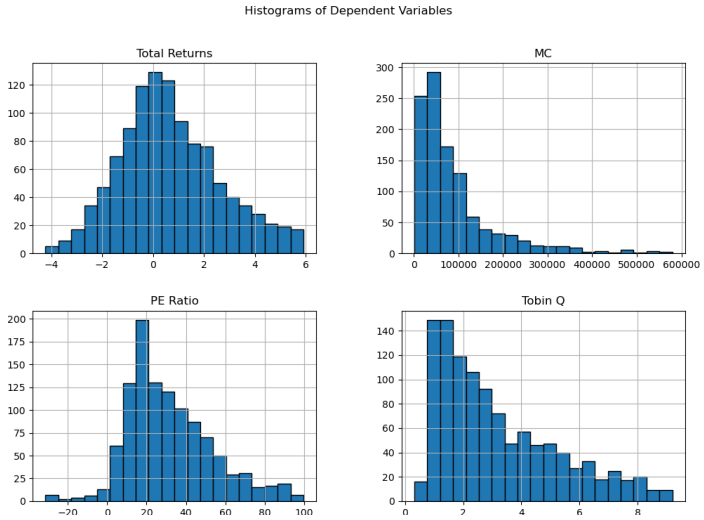

Figure 4.22: Histograms after removing outliers((Market Ratio)

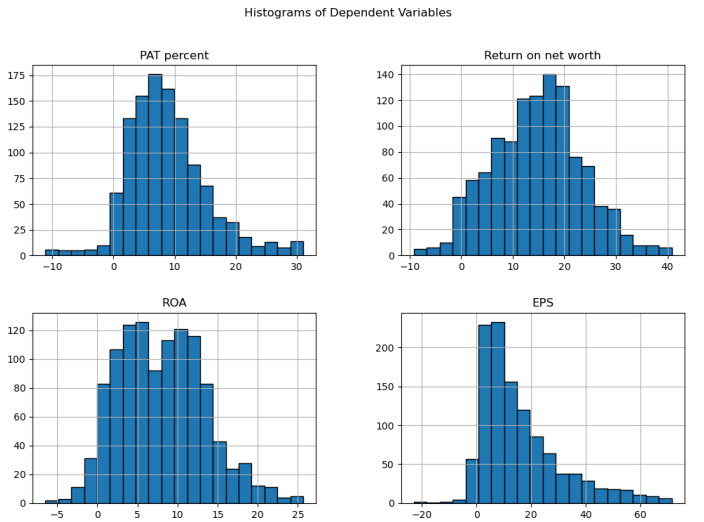

Figure 4.23: Histograms after removing outliers (Account ratio)

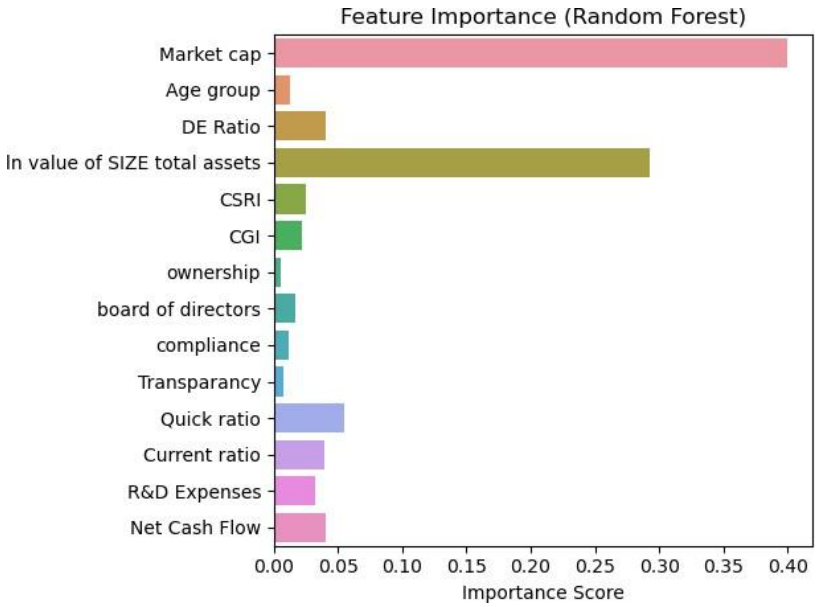

Figure 4.24: Feature importance (Market ratio)

4.10.2 Analysis financial performance based on market ratios

The figure 4.24 illustrates the feature importance scores derived from a Random Forest model in predicting market ratio-related variables. The bar chart ranks the independent variables based on their contribution to the model's predictions, with Market Cap and In Value of Size Total Assets being the most influential features. **Market Cap has the highest importance score, indicating its strong predictive power in determining market ratios. Similarly, the size of total assets plays a significant role, suggesting that company size is a crucial factor in market-related financial metrics**.

Other features, such as DE Ratio, Quick Ratio, and Net Cash Flow, exhibit moderate importance, indicating their relevance in explaining variations in market ratios, but to a lesser extent than Market Cap and total assets. Variables like Age Group, Ownership, Board of Directors, Compliance, and Transparency have minimal impact on the model's predictions, implying they do not significantly influence market ratio-related outcomes.

Table 4.44: Market Ratio

Algorithm	MAE	MSE	RMSE
Linear Regression	0.63	0.65	0.81
Random Forest	0.61	0.70	0.84
XGBoost	0.67	0.82	0.90
CatBoost	0.64	0.67	0.82
Ensemble (Stacking ensemble model using Random Forest, XGBoost, and CatBoost as base learners, with Linear Regression as the final estimator)	0.62	0.66	0.81

This distribution of feature importance underscores the dominance of company size and capital-related metrics in market performance assessments, aligning with financial theories (Resource-Based View (RBV), Signaling Theory, Stakeholder Theory, Agency Theory) that emphasize firm valuation and asset base in determining market behavior. **A higher market cap and total assets indicate financial stability and investor confidence, which directly impact stock valuation and profitability. Understanding these key drivers helps businesses and investors make informed decisions about market positioning and FP optimization**. Applying these theories explains why capital strength and firm size dominate market outcomes. They highlight how resources, investor signals, and governance mechanisms shape valuation, thereby reinforcing the study's findings and guiding businesses and investors toward strategies that improve financial stability and market performance.

4.10.3 Model selection over financial performance: market ratio

Table 4.44 illustrates the performance metrics: Mean Absolute Error (MAE), Mean Squared Error (MSE), Root Mean Squared Error (RMSE) for different machine learning models used to predict the market ratio. Lower values for these metrics indicate better predictive performance. Linear Regression exhibits relatively low errors, but Random Forest achieves the lowest MAE (0.61), though with a slightly higher MSE and RMSE.

XGBoost has the highest error values, suggesting it may not be the best choice for this task. The stacking ensemble model, which combines Random Forest, XGBoost, and CatBoost with Linear Regression as the final estimator, achieves competitive performance

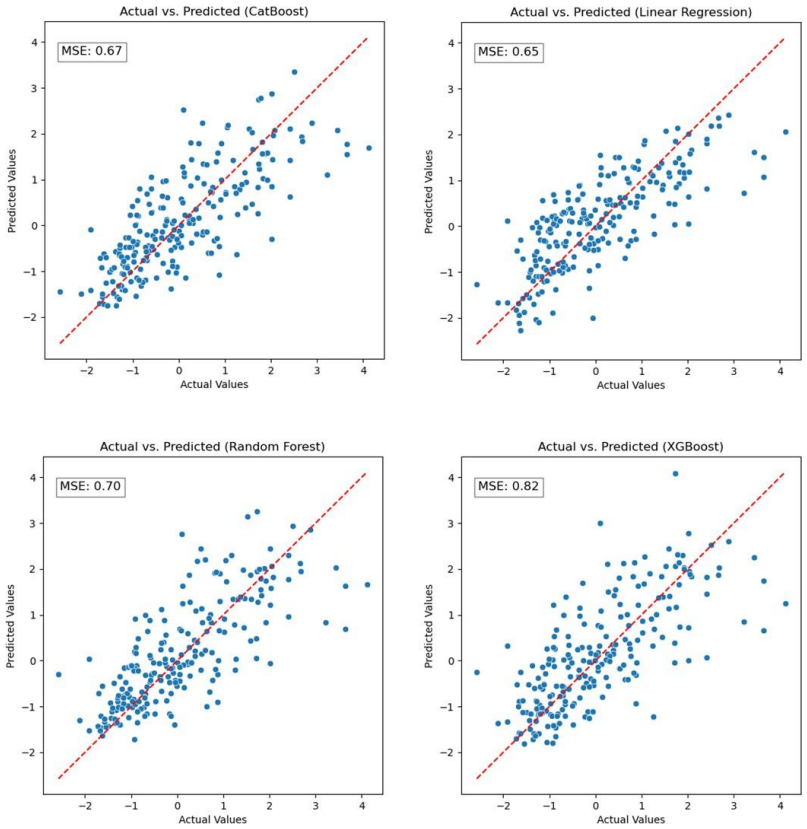

Figure 4.25: Actual vs predicted (Market ratio)

with an MAE of 0.62 and RMSE of 0.81, suggesting it leverages the strengths of individual models effectively. **In choosing the best model for predicting FP, Random Forest or the ensemble model appears to be the most reliable, balancing accuracy and generalization capability hence this model is selected.**

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Figure 4.25 presents scatter plots comparing actual versus predicted values for the market ratio using four different machine learning models: CatBoost, Linear Regression, Random Forest, and XGBoost. Each subplot includes a red dashed line representing the

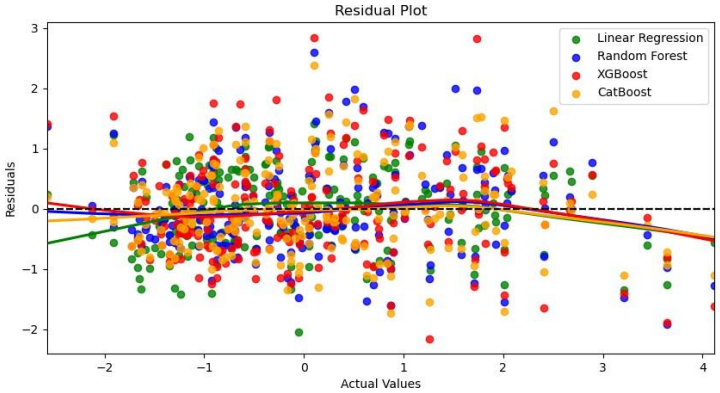

Figure 4.26: Residual plot (Market Ratio)

ideal 1:1 correlation, where perfect predictions would align. The Mean Squared Error (MSE) is displayed in each plot as an indicator of model performance, with lower values indicating better predictive accuracy. Linear Regression achieves the lowest MSE (0.65), followed by CatBoost (0.67), Random Forest (0.70), and XGBoost, which performs the worst with an MSE of 0.82. The scatter distributions show that predictions from Linear Regression and CatBoost are more closely aligned with actual values, suggesting these models provide more reliable estimations for market ratio prediction. However, all models exhibit some dispersion, indicating room for improvement in capturing market dynamics effectively. XGBoost performs poorly, likely due to sensitivity to noise and overfitting, making it less effective in capturing market ratio dynamics.

Figure 4.26 presents the residual plot for the market ratio, comparing the performance of four machine learning models. Residuals, represent the difference between actual and predicted values, are plotted against the actual values to assess accuracy and bias of model. Ideally, residuals should be randomly scattered around zero without any discernible pattern, indicating that the model captures the data well without

systematic errors. In this plot, the Linear Regression model (green) shows a relatively stable distribution of residuals around the zero line, suggesting minimal bias. The Random Forest (red), XGBoost (blue), and CatBoost (orange) models exhibit slight

Table 4.45: Account Ratio

Algorithm	MAE	MSE	RMSE
Linear Regression	1.05	1.7	1.33
Random Forest	0.94	1.48	1.21
XGBoost	0.97	1.57	1.25
CatBoost	0.98	1.60	1.26
Ensemble (Stacking ensemble model using Random Forest, XGBoost, and CatBoost as base learners, with Linear Regression as the final estimator)	0.94	1.48	1.21

curvature, which shows a potential non-linearity in the data that these models attempt to capture. However, none of the models display severe heteroskedasticity or significant patterns, suggesting reasonable performance in predicting the market ratio. The residual analysis implies models reasonably capture market ratios, with Linear Regression showing least bias and others addressing mild nonlinearity.

4.10.4 Analysis of financial performance based on accounting ratio

In the similar manner as market ratio, Figure 4.27 illustrates the importance of the characteristics of the account ratio, determined using the Random Forest. The most influential features in predicting the account ratio include the Debt-to-Equity (DE) Ratio, the value of total assets (SIZE), and the Current Ratio, which have the highest importance scores. These variables are likely vital in assessing financial stability and liquidity. Other notable contributors include Quick Ratio, R&D Expenses, and CSRI, indicating that financial leverage, operational efficiency, and governance factors impact account ratios. Less

significant variables, such as ownership structure, compliance, and transparency, show lower importance scores, suggesting a relatively smaller effect on account ratio prediction. This analysis highlights the importance of liquidity and financial structure in determining a firm's account ratio, aiding better financial decision-making.

Linear regression from Table 4.45 shows the highest error rates in all metrics (MAE =

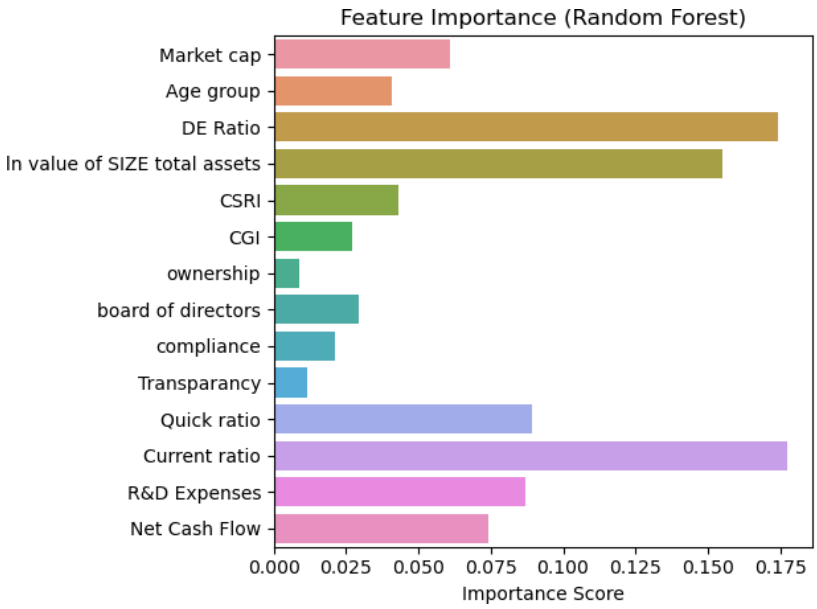

Figure 4.27: Feature importance (Account ratio)

1.05, MSE = 1.7, RMSE = 1.33), indicating that it is the least effective model to predict the account ratio. Among individual ML models, Random Forest achieves the lowest error values (MAE = 0.94, MSE = 1.48, RMSE = 1.21), suggesting its superior capacity for capturing non-linear relationships in the data compared to XGBoost and CatBoost, which have slightly higher error values.

The ensemble model, which combines the strengths of Random Forest, XGBoost, and CatBoost with Linear Regression as the final estimator, matches Random Forest in MAE and MSE while achieving the lowest RMSE (1.21). This suggests that the ensemble approach improves prediction stability and reduces variance in the model's estimates. In general, findings indicate that Random Forest and the ensemble model are the best choices

for predicting the account ratio because of their superior performance in minimising prediction errors. These findings suggest that the use of multiple models in an ensemble framework can enhance the precision and robustness of the financial ratio

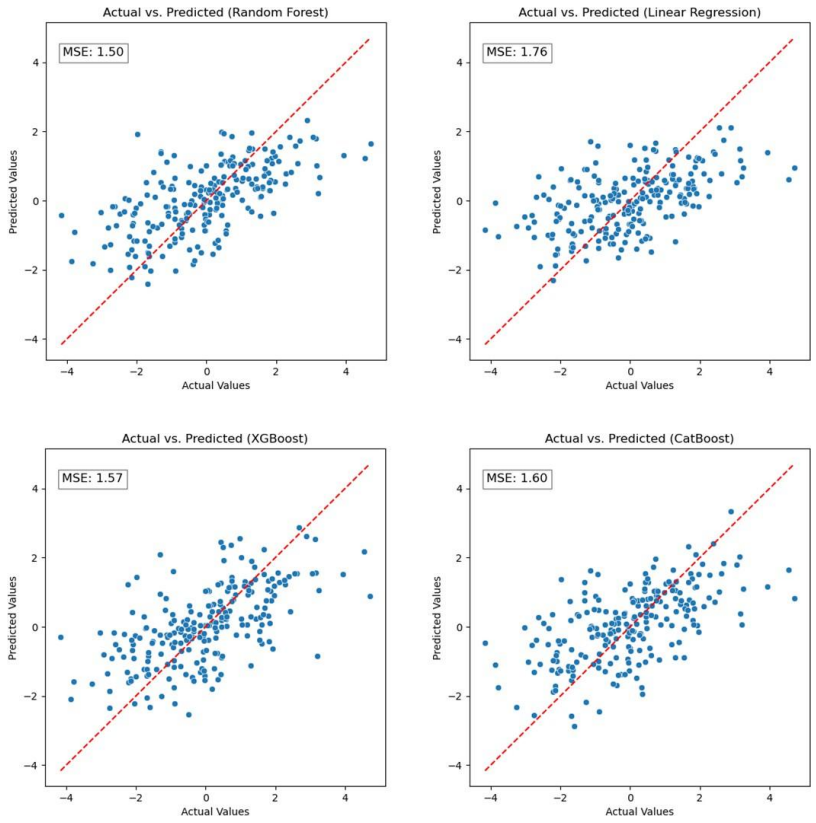

Figure 4.28: Actual vs predicted (Account ratio)

predictions. The ensemble model enhances prediction stability and robustness, making it highly effective for accurate financial ratio forecasting.

From Figure 4.28, the scatter plots reveal that all models follow the expected trend but with varying degrees of dispersion around the ideal prediction line (red dashed line). This suggests that ensemble approaches may further improve prediction accuracy. However, the residuals (4.29) are scattered around zero, indicating that models do not exhibit strong systematic bias. However, some deviation is observed, particularly at the

extremes, suggesting that the models struggle with very high or low values. The distribution of residuals appears relatively uniform, implying that the models capture the underlying pattern well but still have room for improvement in reducing prediction error.

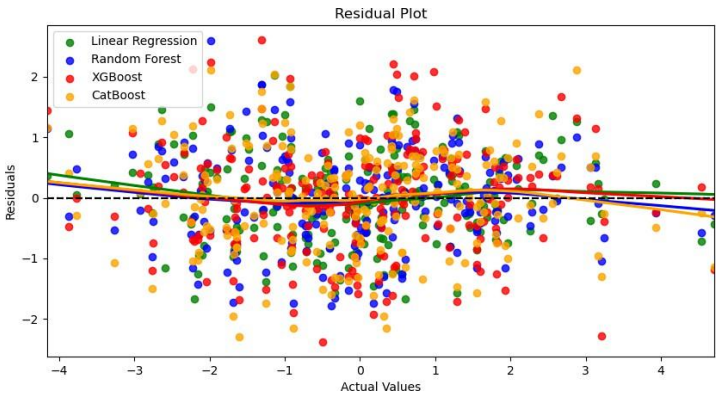

Figure 4.29: Residual Plot (Account Ratio)

The residual curves for the models remain close to the zero line, reinforcing their moderate predictive reliability. Residual analysis shows no major bias, but models struggle with extreme values, highlighting limits in capturing extremes.

4.10.5 Predictive modeling of market ratio based on corporate governance

Table 4.46 presents the performance-metrics analysis of different machine learning algorithms for predicting the market ratio based on CG features. The evaluation metrics used include MAE, MSE, and RMSE. The following points are obtained.

- **Linear Regression** performs reasonably well, with a MAE (0.67), MSE (0.71), a RMSE (0.84), making it a competitive baseline model.
- **Random Forest** shows a slightly lower MAE of 0.66 but a slightly higher MSE of 0.76 and the same RMSE of 0.87, indicating similar predictive capability with

minor differences.

Table 4.46: Analysis of market ratio based on CG features

Algorithm	MAE	MSE	RMSE
Linear Regression	0.67	0.71	0.84
Random Forest	0.66	0.76	0.87
XGBoost	0.69	0.87	0.94
CatBoost	0.67	0.75	0.87
Ensemble (Stacking ensemble model using Random Forest, XGBoost, and CatBoost as base learners, with Linear Regression as the final estimator)	0.66	0.73	0.85

- **XGBoost** has the highest error rates, with an MAE of 0.69, an MSE of 0.87, and an RMSE of 0.94, making it the least effective model in this comparison.
- **CatBoost** exhibits performance similar to Linear Regression, achieving an MAE of 0.67, MSE (0.75), RMSE (0.87).
- **Stacking Ensemble Model**, which combines multiple models (Random Forest, XGBoost, and CatBoost) with Linear Regression as the final estimator, achieves the best overall performance with an MAE of 0.66, an MSE of 0.72, and an RMSE of 0.85. This suggests that stacking multiple models improves accuracy and reduces error compared to individual models.

  The results suggest ensemble modeling improves prediction accuracy and reduces error, confirming that combining algorithms outperforms individual models in capturing complex relationships between governance features and market ratios.

The Stacking Ensemble Model provides the best trade-off between bias and variance, making it a more robust predictive approach compared to single models.

The residual plot in Figure 4.31 shows that all models exhibit a relatively centred distribution, with the residuals slightly increasing in spread for higher actual values, suggesting some heteroscedasticity. The Stacking Ensemble model has the most balanced

residual distribution, implying that it may generalize better than individual models. However, minor deviations from the zero line indicate room for improvement in capturing complex patterns within the data.

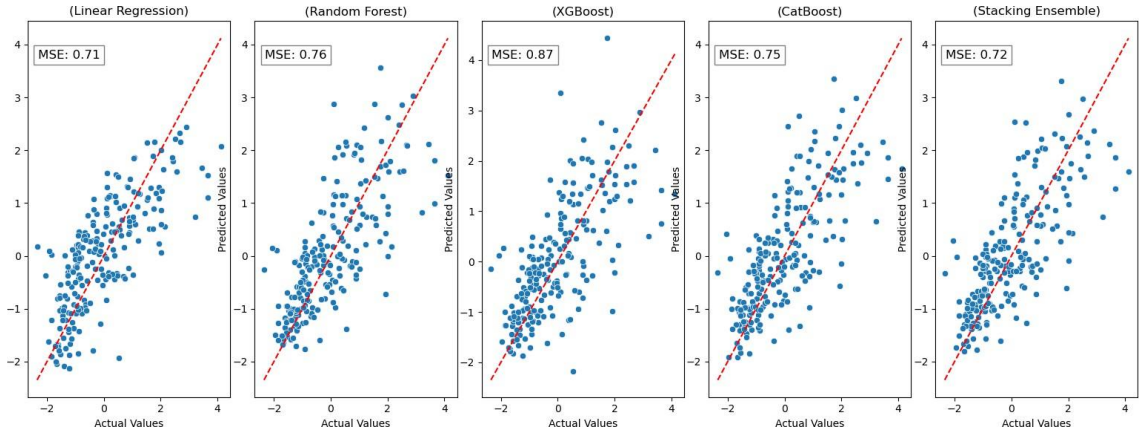

Figure 4.30: Original vs Predicted (with CG and market ratio)

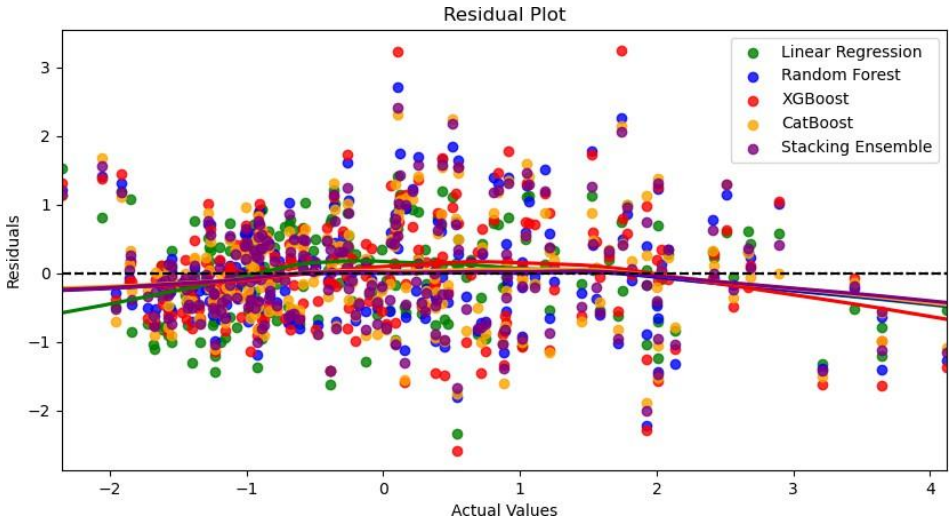

Figure 4.31: Residual plot (with CG and market ratio)

4.10.6 Predictive modelling of accounting ratios based on corporate governance

Table 4.47 presents an analysis of different ML models for predicting accounting ratio based on CG features, comparing their performance using MAE, MSE, and RMSE. Among all models, Linear Regression exhibits the highest error values (MAE: 1.06, MSE: 1.86, RMSE: 1.36), indicating that it is the least effective model for this dataset.

Random Forest and CatBoost perform comparatively well, both achieving a lower MAE of 0.95, with CatBoost having the lowest RMSE (1.23) among individual models, signifying better predictive accuracy. XGBoost, on the other hand, shows slightly higher error rates (MAE: 1.01, MSE: 1.70, RMSE: 1.30), making it a less optimal choice compared to Random Forest and CatBoost. The findings indicate CatBoost and Random Forest provide more accurate predictions of accounting ratios, while Linear Regression and XGBoost underperform, emphasizing the value of advanced ensemble techniques.

The Stacking Ensemble model, which integrates Random Forest, XGBoost, and CatBoost with Linear Regression as the final estimator, yields the best overall performance. It has the lowest MAE (0.94), MSE (1.48), and RMSE (1.22), suggesting that the ensemble approach enhances predictive accuracy by leveraging the strengths of multiple models.

Figure 4.32 reflects that among the models, Linear Regression performs the worst (MSE: 1.86), likely due to its inability to capture complex relationships in the data. Tree-based models, such as Random Forest (MSE: 1.54), XGBoost (MSE: 1.70), and CatBoost (MSE: 1.51), show improved accuracy by learning nonlinear patterns. The Stacking Ensemble model achieves the lowest MSE (1.49), indicating that combining multiple models enhances predictive performance. Moreover, residuals are plotted against actual

values, where a well-performing model should exhibit a random spread of points centered around zero. The plot confirms that all models maintain a fairly balanced error

Table 4.47: Analysis of accounting ratio based on CG features

Algorithm	**MAE**	**MSE**	**RMSE**
Linear Regression	1.06	1.86	1.36
Random Forest	0.94	1.52	1.23
XGBoost	1.01	1.70	1.30
CatBoost	0.95	1.51	1.23
Ensemble (Stacking ensemble model using Random Forest, XGBoost, and CatBoost as base learners, with Linear Regression as the final estimator)	0.94	1.48	1.22

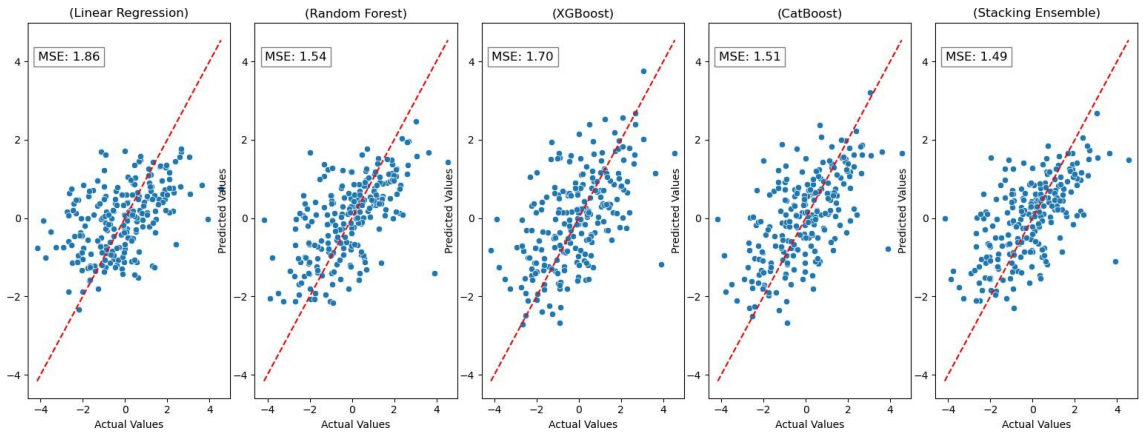

Figure 4.32: Original vs Predicted (with CG and accounting ratio)

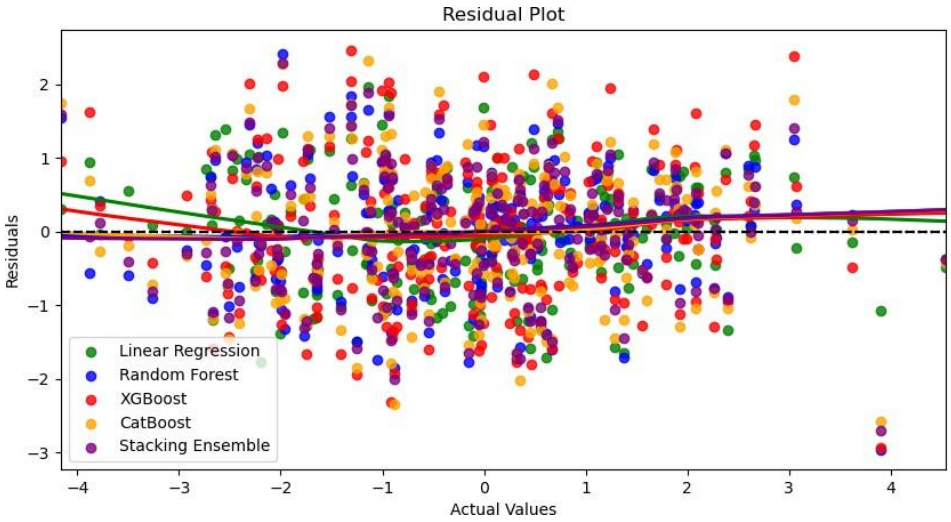

Figure 4.33: Residual plot (with CG and accounting ratio)

distribution, suggesting minimal bias. However, Linear Regression (green dots) shows some structure in its residuals, indicating that it may not fully capture the complexities in the data. On the other hand, tree-based models and the Stacking Ensemble produce more evenly distributed residuals, reinforcing their ability to model nonlinear relationships effectively.

The two figures provide strong evidence that ensemble and tree-based models significantly outperform Linear Regression in predicting financial outcomes using CG and accounting ratio features. Lower MSE values and more uniform residual distributions indicate that these models generalize better, making them more suitable for real-world predictive tasks. Among them, the Stacking Ensemble model emerges as the most accurate, suggesting that leveraging multiple models together yields the best predictive performance.

Table 4.48: Analysis of market ratio based on CSR features

Algorithm	MAE	MSE	RMSE
Linear Regression	0.67	0.75	0.86
Random Forest	0.60	0.67	0.82
XGBoost	0.67	0.79	0.89
CatBoost	0.62	0.67	0.82
Ensemble (Stacking ensemble model using Random Forest, XGBoost, and CatBoost as base learners, with Linear Regression as the final estimator)	0.60	0.65	0.80

The results of Table 4.48 show the ensemble model achieves the best performance with lowest errors, while Random Forest and CatBoost also perform strongly, whereas Linear Regression and XGBoost provide comparatively weaker predictions.

4.10.7 Predictive modeling of market ratio based on corporate social responsibility

Table 4.49 presents an analysis of different machine learning algorithms in predicting the market ratio based on CSR features. Linear Regression, a simple statistical model, exhibits the highest MSE (0.75) and RMSE (0.86), suggesting it struggles to capture complex relationships within CSR-related financial data. Random Forest and CatBoost perform better, each achieving lower MSE (0.67) and RMSE (0.82), indicating their ability to model non-linear dependencies more effectively. XGBoost, although a powerful gradient boosting algorithm, shows slightly worse performance with the highest MSE (0.79) among the tree-based models. The analysis indicates Random Forest and CatBoost effectively capture CSR-related financial patterns, while Linear Regression and XGBoost show weaker predictive power, highlighting the advantage of advanced ensemble models.

The best-performing model has been the Stacking Ensemble, which integrates XGBoost, Random Forest, and CatBoost as base learners and uses Linear Regression as the final

estimator. This model achieves the lowest MSE (0.65) and MAE (0.60), demonstrating that combining multiple models enhances predictive accuracy by leveraging the strengths of each. However, the RMSE value is missing, likely due to a formatting issue.

Both figures 4.34 and 4.35 collectively highlight the advantages of ensemble learning techniques over traditional regression and single tree-based models when predicting

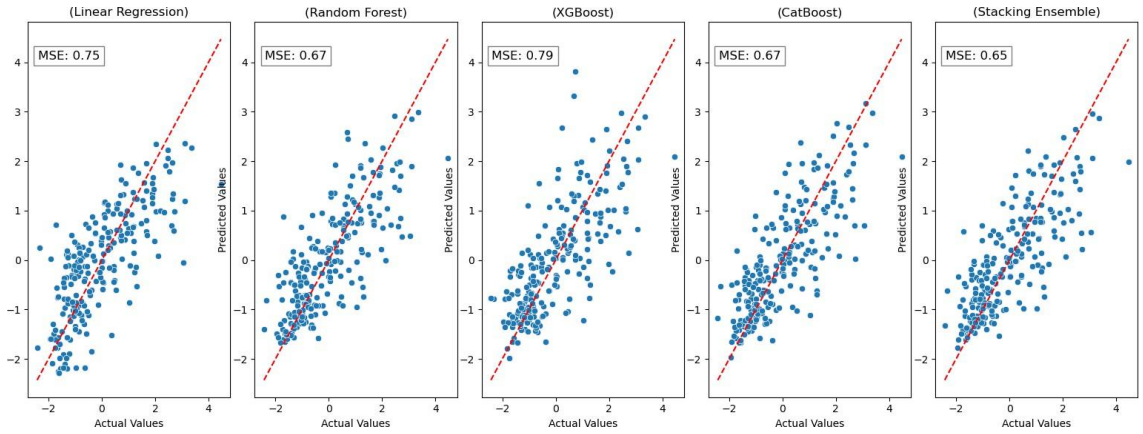

Figure 4.34: Original vs Predicted (with CSR and market ratio)

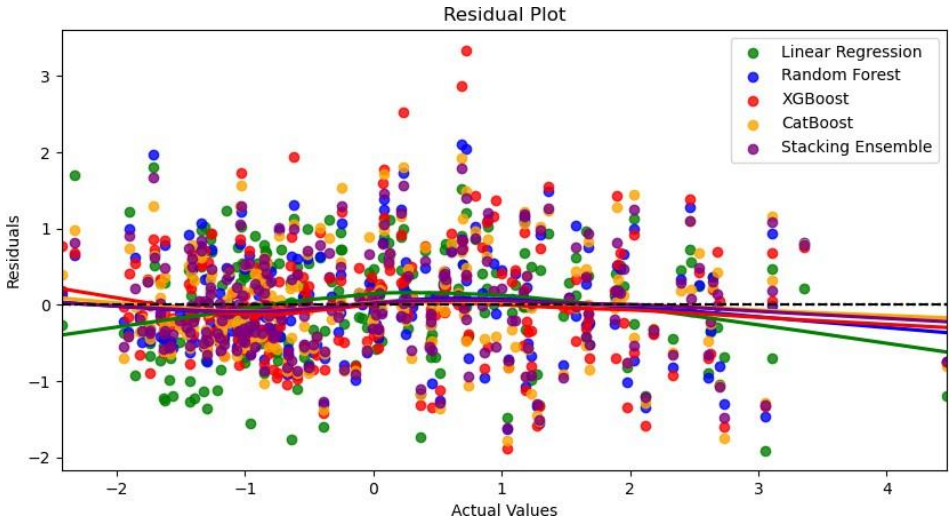

Figure 4.35: Residual plot (with CSR and market ratio)

financial outcomes using CSR and market ratio features. The lower MSE values and more evenly distributed residuals in the Stacking Ensemble model confirm its superior performance, demonstrating that combining multiple models enhances accuracy and robustness. These findings suggest that ensemble approaches are more suitable for financial prediction tasks where relationships between variables are complex and non-linear. The findings confirm that stacking ensemble delivers superior predictive accuracy and robustness, outperforming individual models, and proving highly effective for capturing complex CSR-driven financial relationships and market ratio outcomes.

4.10.8 Predictive modeling of accounting ratio based on corporate social responsibility

It is observed from Table 4.49 Linear Regression, which assumes a simple linear relationship between input features and the target variable, has the highest MSE (1.79) and RMSE (1.34), indicating relatively poor performance in capturing complex patterns within the data. Among the individual tree-based models, Random Forest achieves an MSE of 1.62 and an RMSE of 1.27, performing slightly better than XGBoost (MSE: 1.70, RMSE: 1.30) and CatBoost (MSE: 1.63, RMSE: 1.28). These models are capable of modelling nonlinear relationships, leading to improved predictive accuracy over Linear Regression. The best-performing model is the Stacking Ensemble, which combines the strengths of multiple tree-based models (Random Forest, XGBoost, and CatBoost) with Linear Regression as the final estimator. It achieves the lowest MSE (1.57) and RMSE (1.25), indicating that ensemble learning improves overall prediction accuracy. When analysing both figures 4.36 and 4.37 together, it is evident that ensemble learning methods, particularly the Stacking Ensemble, enhance predictive accuracy by leveraging the strengths of multiple models. The residual analysis further supports this conclusion, as the ensemble model exhibits less bias and variance, suggesting that it is a more reliable

approach for predicting accounting ratios based on CSR features. This reinforces the advantage of using ensemble techniques in financial modeling, as they mitigate the limitations of individual models

Table 4.49: Analysis of accounting ratio based on CSR features

Algorithm	**MAE**	**MSE**	**RMSE**
Linear Regression	1.05	1.79	1.34
Random Forest	0.98	1.62	1.27
XGBoost	1.03	1.70	1.30
CatBoost	1.00	1.63	1.28
Ensemble (Stacking ensemble model using Random Forest, XGBoost, and CatBoost as base learners, with Linear Regression as the final estimator)	0.98	1.57	1.25

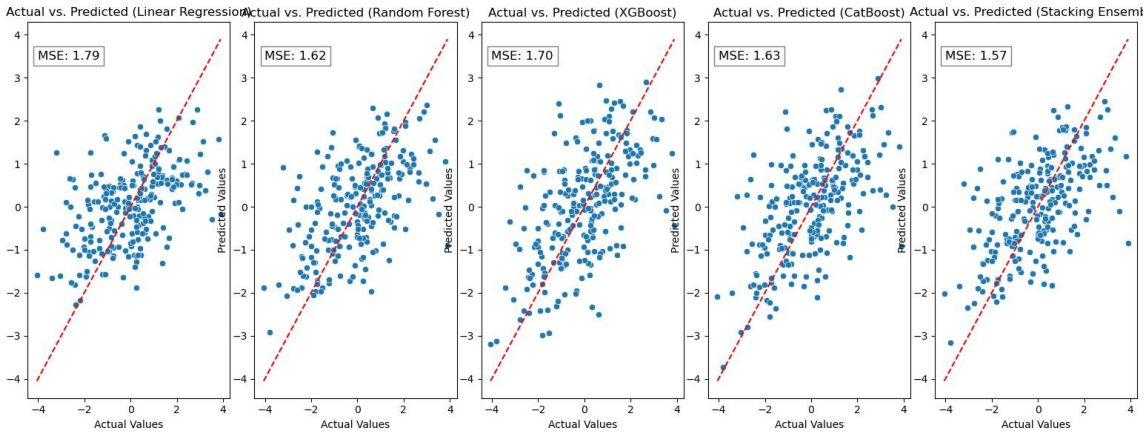

Figure 4.36: Original vs Predicted (with CSR and accounting ratio)

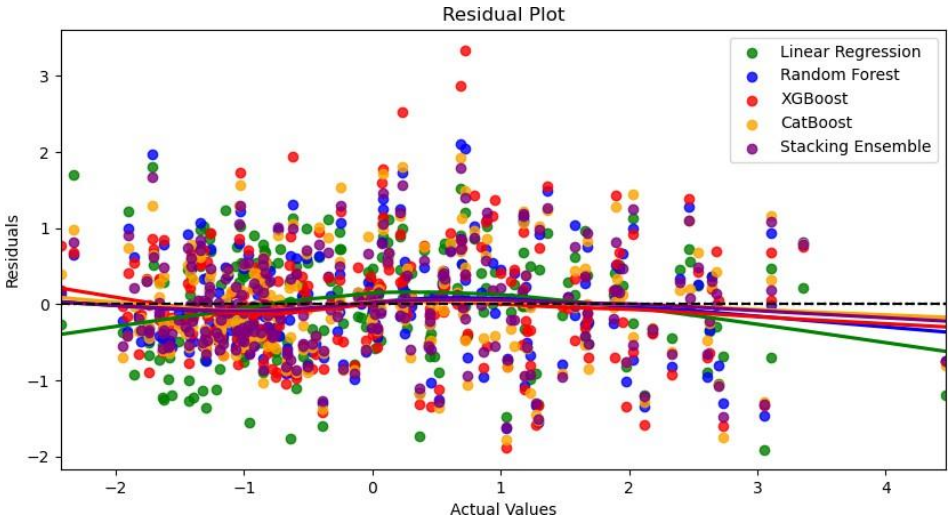

Figure 4.37: Residual plot (with CSR and accounting ratio)

and provide more stable and accurate predictions. The results highlight that stacking ensemble outperforms individual models, reducing bias and variance, and offering more stable and accurate predictions for accounting ratios using CSR features.

4.10.9 SHAP analysis

SHAP (SHapley Additive exPlanations) (SHAP is an interpretability method that explains machine learning predictions by assigning contribution values to each feature, showing their influence on model outputs.) helps analyze the effect of CG, CSR on FP by quantifying feature importance, understanding nonlinear relationships, and identifying interaction effects. It provides insights into how CG and CSR variables contribute to FP variations. SHAP interaction values reveal whether strong governance amplifies or moderates CSR's impact on FP.

Effect of CG and CSR on FP

The SHAP dependence plot illustrates the relationship between CGI and its impact on the model's predictions for FP. From the plot, it can be observed that as CGI increases, the

SHAP values generally rise, indicating a positive correlation between CG strength and FP. It suggests that companies with better governance structures contribute positively to financial outcomes. However, there are some scattered points where lower CGI values show a wide range of SHAP values, indicating variability in the impact. Additionally, a few extreme negative SHAP values at low CGI levels suggest that weak governance might significantly hurt FP in some cases. However, a mixed impact of CSRI on FP is observed. There are both positive and negative SHAP values across different CSRI levels, indicating variability in CSR's contribution to FP. In some cases, higher CSRI values have a positive SHAP impact, meaning CSR initiatives can enhance financial outcomes. However, there are also instances where higher CSRI values result in negative SHAP values, suggesting that in certain conditions, CSR activities might impose financial burdens or inefficiencies. The scattered distribution and outliers suggest that other factors might moderate the connection between CSRI & FP, highlighting the need for further interaction analysis with governance or industry-specific variables.

CSR role in mediation

The SHAP summary plots (Figures 4.38 and 4.43) demonstrate that when CSR-related features are included, they significantly impact model predictions. The CSRI is among the top contributors when CSR is considered, while its absence results in a stronger influence of governance-related features such as the board of directors and the CGI. This implies that CSR moderates the direct impact of CG on FP by acting as an intermediary factor.

Additionally, the SHAP decision plots (Figures 4.39 and 4.44) show that CSR-related factors introduce a more structured pattern in model decision-making. Without CSR, decision paths appear more erratic and concentrated around a few CG-related factors. With CSR, there is a more balanced contribution from multiple governance and responsibility-related factors, reinforcing the idea that CSR mediates the governance-FP

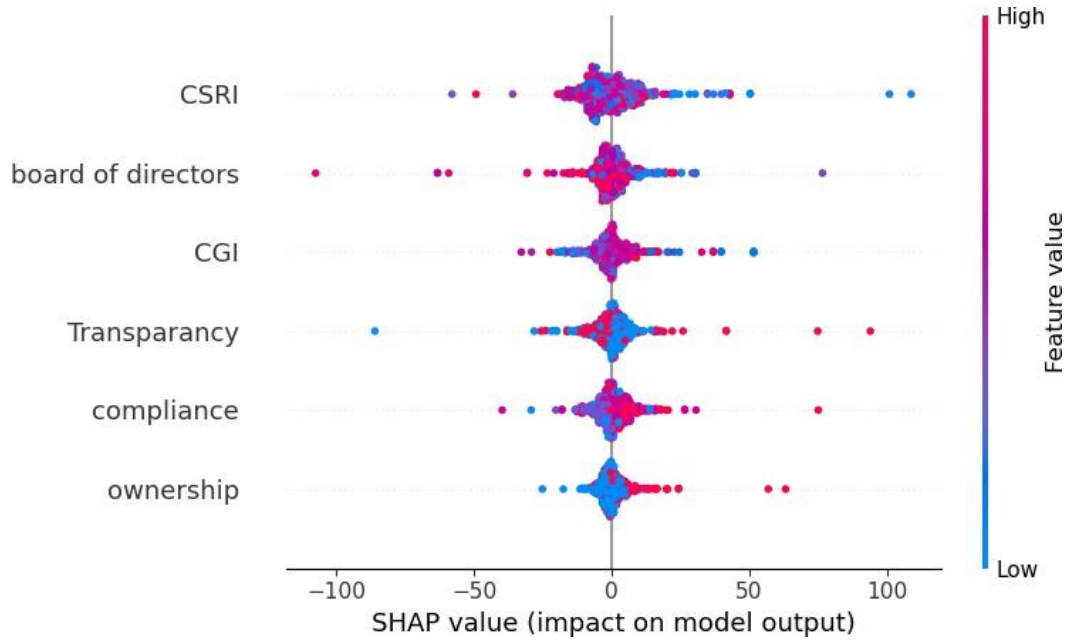

Figure 4.38: SHAP with CSRI

link. The results suggest that stronger CG mechanisms (such as board effectiveness, compliance, and transparency) alone may not fully explain FP. Instead, firms with robust CSR strategies tend to see an amplified impact of good governance on financial success. This aligns with stakeholder theory, which argues that responsible business practices enhance brand reputation, customer loyalty, and risk management—factors that aid in long-term financial stability. Findings imply CSR strengthens the influence of governance on financial performance, highlighting its role as a mediator that enhances stability, reputation, and long-term growth.

The predictive models and SHAP interpretability analysis indicate that CSRI is an important predictive feature and that its inclusion changes the relative contribution of CGI in explaining financial outcomes. These findings are consistent with the possibility that CSR interacts with governance in shaping performance, but they do not by themselves establish a causal mediation pathway. SHAP provides evidence of predictive importance and heterogeneous effects, not formal

proof of mediation in the statistical sense.

However, in general terms, it may be concluded that CSR acts as a bridge that enhances the effectiveness of governance structures, leading to better FP. This means that companies focusing on both governance and CSR are likely to experience superior financial outcomes compared to those that prioritize governance alone.

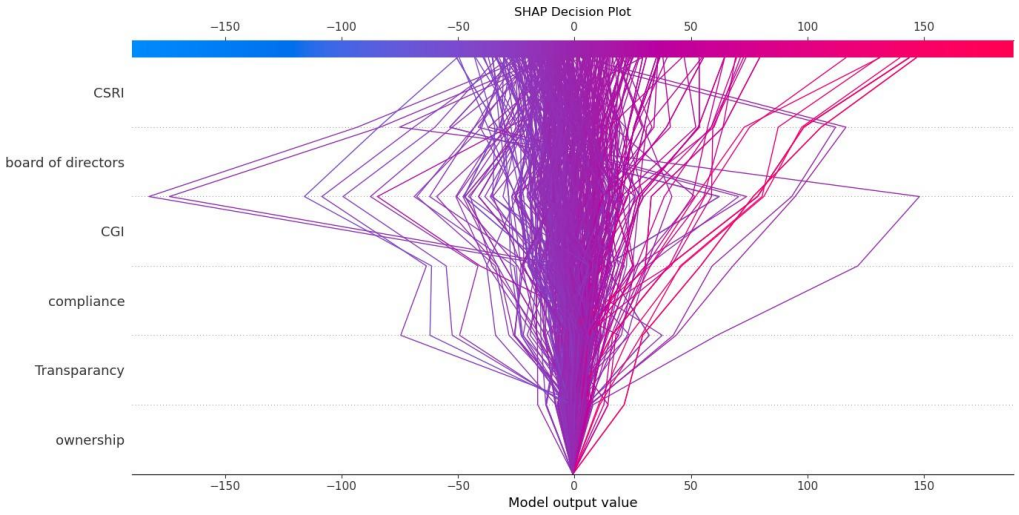

Figure 4.39: SHAP decision plot with CSRI

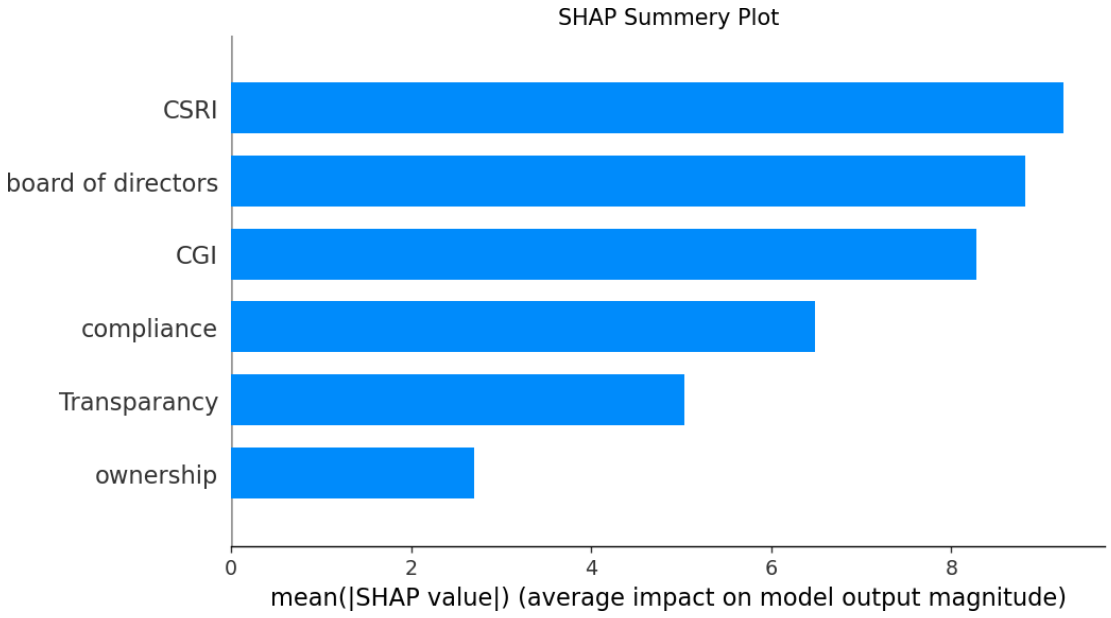

Figure 4.40: Mean SHAP value

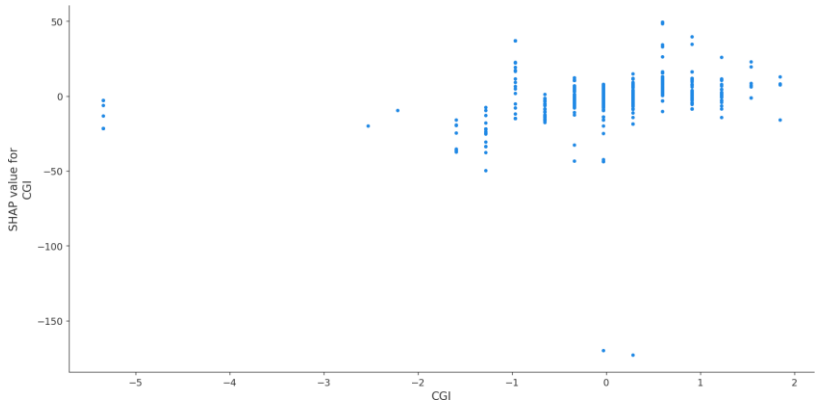

Figure 4.41: SHAP dependence plot for CGI

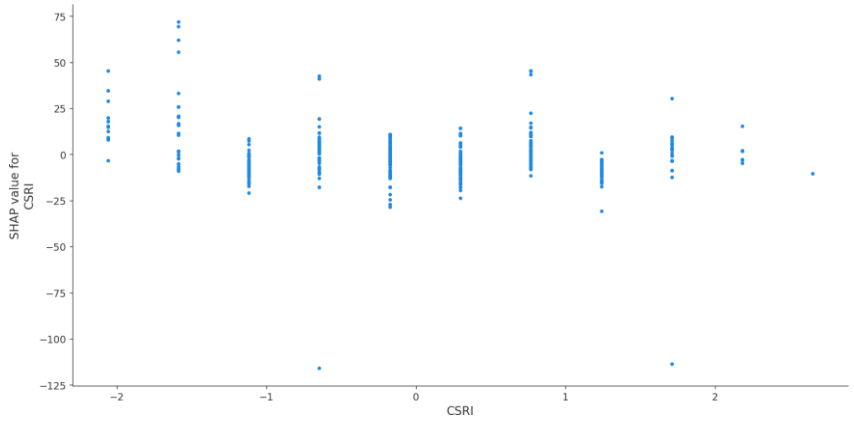

Figure 4.42: SHAP dependence plot for CSRI

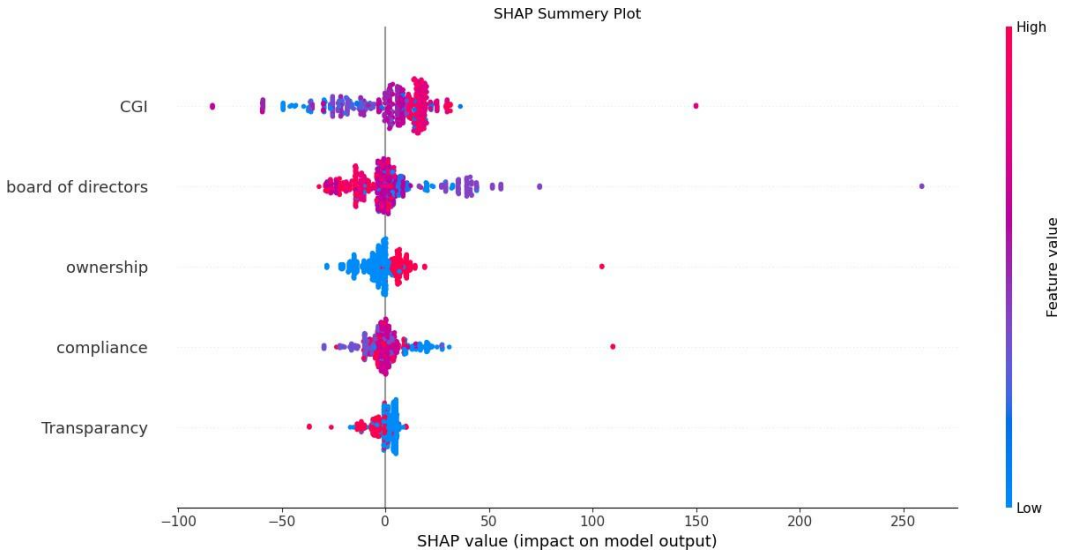

Figure 4.43: SHAP without CSRI

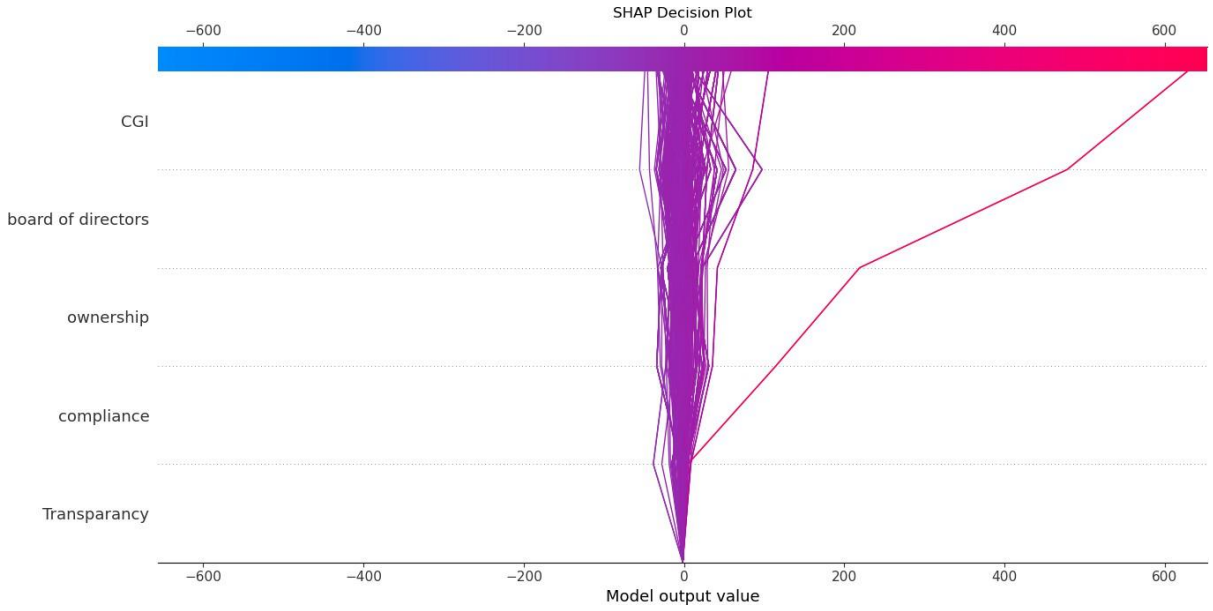

Figure 4.44: SHAP decision plot without CSRI

Table 4.50: Summarised comparative results

Objective	Statistical (Regression & Mediation Models)	AI/ML (Ensemble Models & SHAP Analysis)
Obj. 1: CGI → CFP	• No significant direct effect of CGI on accounting- or market-based ratios.• Some moderation effects (ownership, size) shaped outcomes.• Governance upward trend observed over study period.• Overall: **weak direct effect**, stronger context-dependent influences.	• CGI consistently ranked as an important predictor in ML models.• SHAP showed **positive contributions for market-based outcomes (e.g., Tobin's Q)** but weak/mixed effects for accounting ratios.• Effects were **non-linear and heterogeneous**.• Overall: **CGI matters for prediction, especially for markets**, though not uniformly.
Obj. 2: CSR → CFP	• CSR (CSRI) positively and significantly associated with **accounting ratios** (ROA, ROCE).• Effect on **market ratios** weak or insignificant.• Findings aligned with stakeholder and legitimacy theories.• Overall: **CSR strengthens operations, limited market effect.**	• CSR consistently identified as a **top predictive feature**.• SHAP showed **heterogeneous effects** — mostly positive for accounting ratios, mixed (sometimes negative) for market ratios.• Overall: **CSR improves operational performance, but market valuation impact is conditional and inconsistent.**
Obj. 3: CSR as Mediator	• **Accounting ratios:** Suppression effect — CGI direct effect weakly negative; CSR indirect effect positive and significant.• **Market ratios:** Suppression effect — CSR indirect effect negative, reducing CGI's positive influence; mediation unstable once controls added.• Overall: **CSR enhances operations but dampens market outcomes.**	• SHAP showed that including CSR **reshaped CGI's predictive importance**.• CSR had **mixed contributions** (positive in some firms, negative in others).• This pattern is **consistent with a mediating/moderating role** but does not prove causal mediation.• Overall: **CSR interacts with CGI in shaping predictions**, but mediation cannot be confirmed in the statistical sense.

4.11 A comparative analysis on methodological superior over other studies

This thesis demonstrates significant methodological superiority over existing studies in

several key areas. First, it stands out as one of the few works to incorporate machine learning (ML) techniques, including logistic regression (LR), polynomial regression (PR), random forests (RF), XGBoost (XGB), CatBoost (CB), and SHAP explainability (SE). While most prior research relies on traditional statistical methods like OLS, fixed-effects models, or basic regression, only one other study (Lachuer & Jabeur, 2022) employs ML—specifically, Explainable AI (XAI). However, this thesis goes further by integrating multiple ML models alongside structural equation modeling (SEM), ensuring both predictive power and interpretability. The use of SHAP values provides transparency, addressing a common critique of ML as a "black box."

Beyond ML adoption, this thesis offers a more comprehensive analytical framework. Most prior studies examine either the influence of CG on FP or CSR on FP, but rarely both. This work systematically tests both relationships, along with CSR's mediating role, using SEM—a robust approach for causal inference. In contrast, only a handful of studies (e.g., Alnohoud et al., 2022) explore mediation, typically with simpler methods like the Sobel Test. Additionally, the dataset (2,725 observations from 357 firms over 10 years) is larger and more recent than most peers, which often analyze fewer than 500 firms over shorter periods.

The thesis also addresses critical limitations of prior work. Many studies suffer from static methodologies (e.g., cross-sectional regressions) or inadequate handling of endogeneity. By combining ML for pattern detection and SEM for causal pathways, this

research mitigates bias and strengthens validity. Furthermore, it evaluates FP using accounting(ROA, ROCE) as well as market-based(Tobin's Q) metrics, whereas others often focus narrowly on one category.

Unique Contributions and Future Directions :This study's integration of ML with SEM is unprecedented in the CG/CSR-FP literature, offering a replicable framework for future research. Its emphasis on explainability (via SHAP) sets a new standard for transparency in ML applications, while the hybrid methodology balances predictive accuracy with theoretical rigor. Future studies should adopt similar approaches to overcome the limitations of conventional statistical techniques and better capture complex, non-linear relationships in corporate performance analysis.

Chapter 5

Conclusions, Limitations, Future Scope, Managerial implication, and Applications to Society

The conclusion and summary of the thesis's objective-wise findings are the topics of the current chapter. This chapter answers research questions and evaluates study hypotheses. In addition to the observations collected throughout the investigation, it specifies and incorporates new information. The next section of the present chapter will offer a succinct summary of the main ideas discussed in the study, suggest future research options, and highlight the limitations of the current investigation and how they might have affected the findings. Furthermore, this chapter outlines managerial implications and suggests directions for future investigation or action as per the thesis's findings. The recommendations made in this section are aimed at legislators, policymakers, and practitioners and are founded on the evidence provided by the study's conclusions. These ramifications will suitably enable them to update or modify the current governance frameworks, allocate funds to assist in the adoption of new governance and CSR guidelines, and enable them to efficiently collaborate with one another to raise the degree of adherence to governance and CSR protocols.

5.1 Conclusions

The relationship between CG, CSR, and FP has garnered significant attention from researchers, businesses, and policymakers (Fahad & Busru, 2021; Paniagua et al., 2018; Han et al., 2016).

While prior studies have explored this association from multiple perspectives, findings vary due to differences in macroeconomic conditions and industry-specific factors. This study adds valuable insights from the previous literature by examining the effect of CG and CSR on CFP in Indian context, particularly following the regulatory reforms introduced by the Companies Act 2013.

To ensure a comprehensive analysis, this research employed a dual approach—qualitative content analysis to construct CG and CSR indices (CGI and CSRI) and advanced statistical and predictive modeling techniques. The integration of AI/ML tools, including regression trees, neural networks, and random forests, enabled the identification of complex, nonlinear relationships that traditional methods may overlook (Paniagua et al., 2018). Additionally, the use of SAS and Python enhanced data processing efficiency, ensuring accuracy and reproducibility (Fahad & Busru, 2021).

Current investigation results offer valuable visions for businesses and regulators, highlighting how CG and CSR practices influence financial outcomes (Han et al., 2016). By combining traditional statistical methods with predictive analytics, this research provides both explanatory and forward-looking perspectives, aiding strategic decision-making. Future studies could expand on these findings by incorporating longitudinal data, cross-country comparisons, and sector-specific analyses to further refine the understanding of these dynamic relationships. Ultimately, current research demonstrates the significance of robust governance and responsible business practices in driving sustainable FP.

5.1.1 **Objective 1 :** To study the impact of Corporate Governance on Corporate Financial Performance.

It is important to note that while regression-based models do not establish a strong direct causal effect of CGI on FP, machine learning analyses reveal that CG remains a key predictive factor—particularly for market-based outcomes—highlighting non-linear, heterogeneous, and context-specific effects that are not fully captured by traditional econometric models. The Corporate Governance Index (CGI) demonstrated a consistent upward trend over the study period, reflecting improved governance practices. These practices were found to have a positive effect on FP metrics, particularly market-based indicators, notably Tobin's Q, suggesting that strong governance enhances investor confidence and market valuations. While CGI exhibited a positive effect on market-based performance, its influence on accounting-based metrics like ROA and ROCE was less pronounced. This indicates that governance improvements might not immediately translate into operational efficiency or profitability. Nevertheless, mechanisms such as ownership structure were found to contribute significantly to better financial outcomes, including ROA and ROE.

Results underscore that robust CG frameworks not only promote compliance and risk mitigation but also drive long-term value creation. They improve strategic decision-making and bolster market perceptions, even if the impact on short-term operational metrics is more modest. This highlights the importance of distinguishing between immediate operational outcomes and long-term market performance when evaluating the effects of CG on FP.

Prior studies report mixed evidence on the corporate governance–performance relationship, with some documenting positive effects of composite governance indices (Mishra et al., 2021; Farooq et al., 2022), while others find weak, negative, or insignificant

links when governance is examined through individual attributes (Arora & Sharma, 2016; Palaniappan, 2017). The present study does not observe a significant direct effect of CGI on firm performance, suggesting that governance mechanisms do not uniformly reduce agency costs or translate into immediate financial gains, as posited by agency theory. Instead, consistent with a stakeholder-oriented view, governance effects appear conditional and context-specific, becoming value-enhancing only when aligned with firm characteristics such as industry structure and organizational maturity (Affes & Jarboui, 2023).

5.1.2 **Objective 2 :** To analyze the impact of Corporate Social Responsibility on Corporate Financial Performance.

'Corporate Social Responsibility (CSR)' exhibits a more direct and positive association with accounting-based FP metrics, notably ROA and ROCE. This suggests that CSR initiatives contribute to internal operational efficiency and profitability, aligning with stakeholder theory. Unlike CG, CSR exhibits greater convergence between statistical inference and machine learning predictions, particularly in relation to accounting-based performance. However, CSR's impact on market-based metrics is weaker or insignificant, implying that investors may not immediately recognize or reward CSR efforts in market valuations. The inconsistent findings are largely explained by the relative infancy of CSR and limited investor awareness of its activities. The variability in CSR scores over time, specifically during the COVID-19 pandemic, further emphasises the sensitivity of CSR commitments to external economic and regulatory pressures. Despite this, the overall findings support the notion that CSR is essential for improving FP, particularly in industries with high social and environmental stakes.

The study supports stakeholder, resource dependency, legitimacy, and institutional theories, indicating that companies that fulfil their stakeholders' social, economic, and financial necessities, along with following legitimate practices, namely CSR reporting, gain better access to capital from investors and achieve higher customer demand, etc.

However, increasing awareness among market players and investors is crucial for improving FP.

The present study provides clear evidence that CSR positively and significantly enhances accounting-based performance (ROA), diverging from studies that report a negative CSR–ROA relationship (Waris & Din, 2024; Bhatnagar et al., 2023). At the same time, consistent with the mixed findings reported by Singhania et al. (2024), Ahamed and Tripathi (2023), and Kaimal and Uzma (2023), CSR does not translate into a robust improvement in market-based performance as measured by Tobin's Q. This pattern underscores that while CSR strengthens internal operational and accounting outcomes, its valuation by capital markets remains conditional and context dependent.

5.1.3 **Objective 3 :** To assess the mediating effect of CSR between Corporate governance and corporate financial performance.

The mediating role of CSR between CG and FP is complex and context-dependent. Two-stage causal relationship – mediation – bootstrapping approach analysis is done. The study identifies partial positive mediation of CSR in link between CG and accounting-based performance, indicating that CSR activities amplify the financial benefits of strong governance. In fact, here, it is suppressing effect because the indirect (positive) mediation is counteracting the direct (negative) effect. CSR exhibits a heterogeneous and, on average, negative partial mediation for market-based performance suggesting that the costs or strategic trade-offs of CSR may dilute governance's positive market impact. These findings emphasize the necessity for firms to align governance and CSR strategies with their financial goals, ensuring that CSR initiatives complement governance frameworks to maximise both operational and market outcomes. The mediating effects also underscore the significance of industry-specific and firm-specific factors, reinforcing the idea that a one-size-fits-all method to governance and CSR might not be effective.

The findings support the mediating hypothesis (H3), indicating that CSR partially mediates the relationship between corporate governance and financial performance. This is consistent with prior evidence from Akther and Hassan (2024), who report partial mediation of CSR in the CG–FP link in BRICS countries using GMM. Similar mediation effects have been documented in banking contexts by Alnohoud et al. (2022) and Apreku-Djan et al. (2023), while Xu et al. (2022) show partial mediation in family firms and the overall sample but not in non-family firms, highlighting context-specific conditions for CSR mediation.

5.2 Implications of Research

Current research has various theoretical implications. First, by examining a three-way link between the three variables CG, CSR, and FP, this research contributes to existing literature exploring the relationships among CG and FP, CSR and FP, as well as CG and CSR. Furthermore, it reveals that CSR serves as a mediating factor between CG and FP. Second, by integrating the perspectives of agency theory and stakeholder theory, this study highlights their contrasting viewpoints while providing empirical support for a complementary understanding.

Business owners, investors, legislators, and regulators can all benefit from the practical consequences of this study. Present research highlights the significance of using CG to genuinely include the company in CSR for enhancing FP over the long run for business owners. By demonstrating that mediating effect of CSR varies for several industries, the study provides investors with insightful information on how to improve investment efficiency as well as prevent over- or under-investment.

CSR's mediating function enables policymakers to see that, rather than being viewed as an extra expense, CSR may be seen as an additive instrument for improving businesses' FP.

5.3 Limitations of Research

However, for academic transparency, it is essential to discuss certain limitations of this research. This study acknowledges certain limitations that should be considered when interpreting its findings.

- The primary source of data in the study is the annual reports, which may involve subjectivity in measuring the governance and CSR indices.
- Sample excludes financial firms, small and private companies, thereby narrowing the scope of applicability. This research is based solely on the Indian context. Institutional settings and mandatory norms differ from country to country, and hence, generalization may be limited.
- This study did not consider more rigorous ML analysis like LSTM (Long Short-Term Memory) to capture temporal dependencies and patterns over time in time-series data.

These limitations are inherent to the nature of the study and do not detract from its overall attempts to comprehend the connection between FP, CSR, & CG.

5.4 Managerial Implications

The results of current research hold important implications for business leaders and organizational decision-makers.

It becomes clear that CG and CSR should not be approached as mere regulatory obligations but as strategic levers for sustainable growth. Managers should integrate CSR

initiatives within their governance structures, aligning them with financial objectives to harness the identified mediating effects. This strategic integration can not only improve accountability and transparency but also enhance financial outcomes, particularly in operational performance. Additionally, recognizing that the impacts of CG and CSR vary across industries and firm characteristics, managers are encouraged to adopt a context-specific approach rather than a one-size-fits-all model. The utilisation of advanced data analytics and machine learning techniques, as applied in this study, further offers managerial value by enabling predictive insights, better risk management, and more informed decision-making in corporate strategy formulation.

5.5 Scope for Future Research

- The study suggests that future research should incorporate variables such as directors' shareholding, remuneration, audit, and qualitative factors (e.g., directors' qualification, age)when constructing the CGI. Also suggests to include value addition Financial performance indices such as Market Value Addition (MVA), Economic Value Addition (EVA) and Cash Value Addition (CVA) as dependent variables. (Not adopted in this study due to limited data availability and scope, but future studies should incorporate it for comprehensive analysis.)
- This study aims to stimulate debate and encourage further research, particularly in developing countries, on how internal governance systems align with external governance mechanisms.
- Investigation focuses exclusively on publicly traded companies listed on the Bombay Stock Exchange. In addition to using other sophisticated econometric techniques that evaluate the relationship between CSR and FP, such as continuous wavelet transformation (CWT) method,

future researchers can examine both public and private companies, which may provide more conclusive information related to CSR and enhance the external validity of the study's findings. (Not included here due to methodological and sample constraints, but future studies should broaden scope for stronger validity)

Analysing how external factors such as stakeholder demands or legal frameworks affect the interaction between CG, CSR, and FP would provide a clearer insight into the dynamics at play. By overcoming these limitations and investigating fresh research directions, scholars may enhance the field's understanding of the relationships among CG, CSR, and FP. Better decision-making and the real-world implementation of CG and CSR will be made possible by this.

5.6 Societal Implications

This study also underscores the broader societal relevance of effective CG and CSR practices. By establishing a positive connection between CSR and accounting-based CFP, research suggests that socially responsible actions contribute not only to business success but also to societal advancement. When companies invest in ethical labor practices, environmental sustainability, and community development, the resulting improvements in operational performance reaffirm that doing good aligns with doing well. This provides a strong incentive for businesses to go beyond minimum compliance and genuinely embrace social responsibility. On a larger scale, the findings offer guidance for policymakers and advocacy groups, reinforcing the need to promote governance frameworks and CSR regulations that incentivize responsible corporate behavior. Over time, such initiatives can build public trust in business institutions, drive inclusive growth, and foster a more equitable and resilient society.

Appendix A

Appendix

A.1 Corporate Governance in India: A Chronology of Recent Developments

A.1 Corporate Governance in India: A Chronology of Recent Developments

Corporate Governance in India: A Chronology of Recent Developments till 2024

Year	Document
1996	Corporate Governance – A Desirable Code, Confederation of Indian Industry, New Delhi
1999	Report on Excellence in Corporate Governance (1999). Report of the Task Force constituted by the Department of Company Affairs, Ministry of Law, Justice and Company Affairs, Government of India, New Delhi; November http://dca.nic.in/corp-exc.htm
1999	Report of the SEBI (Kumar Mangalam Birla) Com- mittee on Corporate Governance, Securities and Exchange Board of India, Mumbai; December. http://web.sebi.gov.in/commreport/corpgov.html
2001	Report of the Advisory Group on Corporate Governance (2001), Dr. R H Patil, Reserve Bank of India, Mumbai; March. http://www.rbi.org.in
2002	Report of the Consultative (Dr A S Ganguly) Group of Directors of Banks / Financial Institutions (2002), Reserve Bank of India; April; http://www.rbi.org.in
2003	Report of the SEBI (N R Narayana Murthy) Committee on Corpo- rate Governance, Securities and Exchange Board of India, Mum- bai; February http://web.sebi.gov.in/commreport/corpgov.pdf
2004	Report of the (Naresh Chandra) Committee on Corporate Audit and Governance, Department of Affairs, Government of India, New Delhi; http://dca.nic.in/naresh/index.htm
2004	Concept Paper – Note on the Approach [to Companies Legisla- tion], Ministry of Corporate Affairs, Government of India, New Delhi
2005	Report of the (Dr. Jamshed J Irani) Expert Committee on Company Law, Ministry of Company Affairs, Government of India, New Delhi; http://dca.nic.in/report_expertcomt.htm
2009	Corporate Governance Voluntary Guidelines, Ministry of Corporate Affairs, Government of India
2009	Corporate Social Responsibility Voluntary Guidelines, Ministry of Corporate Affairs, Government of India, New Delhi

A.1 Corporate Governance in India: A Chronology of Recent Developments

Year	Document
2009	Report of the CII (Naresh Chandra) Task Force on Corporate Governance, Confederation of Indian Industry New Delhi
2010	Standing Committee on Finance (Twenty-First) Report on Companies Bill, 2010, Lok Sabha Secretariat, Government of India, New Delhi
2012	Standing Committee on Finance (Fifty Seventh) Report on The Companies Bill, 2011, Lok Sabha Secretariat, Government of India, New Delhi
2013	Consultative Paper on Review of Corporate Governance Norms in India, Securities and Exchange Board of India, Mumbai. March 2013. www.sebi.gov.in
2013	The Companies Act 2013, (No.18 of 2013), The Gazette of India, Extraordinary, Part II, Section 1, No. 27, 30 August 2013, New Delhi. [Effective (Notification) date: 29 August 2013]
2014	Corporate Governance in Listed Entities – Amendments to Clauses 35B and 49 of the Equity Listing Agree- ment, SEBI Circular CIR/CFD/POLICY Cell/2/2014 dated 17 April 2014 to all Recognised Stock Exchanges, www.sebi.gov.in/cms/sebi_data/attachdocs/1397734478112pdf
2014	Corporate Governance in Listed Entities – Amendments to Clauses 35B and 49 of the Equity Listing Agreement, SEBI Cir- cular CIR/CFD/POLICY Cell/2/2014 dated 17 April 2014.
2015	SEBI (Listing Obligations and Disclosure Requirements) Regulations, 2015 – Consolidation of listing requirements for better corporate governance.
2016	The Insolvency and Bankruptcy Code, 2016 – Strengthening corporate governance by establishing a clear insolvency resolution framework.
2017	Kotak Committee Report on Corporate Governance – SEBI's recommendations on board independence, disclosures, and related-party transactions.
2018	SEBI's Amendments to LODR Regulations based on Kotak Committee recommendations – Enhancing corporate governance norms for listed entities.
2019	National Guidelines on Responsible Business Conduct (NGRBC) by MCA – Expanding corporate responsibility and governance.
2020	Business Responsibility and Sustainability Reporting (BRSR) framework introduced by SEBI, replacing Business Responsibility Reporting (BRR).

Year	Document
2021	SEBI mandates top 1000 listed companies to follow BRSR from FY 2022-23 onwards to improve ESG disclosures.
2022	Amendments to SEBI LODR Regulations – Strengthening governance of related-party transactions and independent directors' appointment process.
2023	SEBI's tightening of disclosure norms for listed companies to enhance corporate transparency and governance.
2024	Proposed amendments in corporate governance norms under Companies Act and SEBI regulations, focusing on ESG and board accountability.

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