

The Impact of Corruption on Stock Market Performance: Evidence from BRICS

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DECLARATION

I, Siphe Kapase, solemnly affirm that this thesis represents my original work, except where explicitly referenced, and includes the guidance provided by my supervisors. This dissertation has not been previously submitted to any other academic institution for evaluation or degree purposes.

Signed by: *S. Kapase*

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ABSTRACT

This thesis examines the impact of corruption perception on stock market performance across BRICS nations from 2010 to 2022 using a primarily quantitative approach. Grounded in theoretical frameworks such as Corruption as Grease, Corruption as Sand, and New Institutional Economics, the study employs the Panel Autoregressive Distributed Lag (ARDL) model. It explores how corruption perceptions influence stock market capitalization (MCAP) over various time horizons. It utilizes empirical data and advanced techniques like unit root testing and cointegration tests to provide insights into short-term fluctuations and long-term trends in financial markets.

The findings reveal significant long-term negative effects of the corruption perception index (CPI) on MCAP. Higher levels of perceived corruption correlate with lower stock market capitalization over extended periods, underscoring the persistent impact of institutional weaknesses on market stability. Short-term analyses show varying adjustment speeds towards equilibrium among BRICS nations, reflecting different economic contexts and policy responses to corruption.

The findings suggest that investors should focus on markets with lower corruption perceptions for better stock market performance and advise policymakers to enhance transparency to build more resilient financial markets. Future research should continue to explore the impact of corruption on BRICS nations.

Table of Contents

CHAPTER ONE	1
INTRODUCTION	1
1.1. BACKGROUND OF THE STUDY	1
1.2. PROBLEM STATEMENT	4
1.3. GOALS OF THE RESEARCH	5
1.4. METHODS, PROCEDURES AND TECHNIQUES	6
1.5. CONTRIBUTION OF THE STUDY	7
1.6. OVERVIEW OF THE DISSERTATION	8
CHAPTER TWO	9
AN OVERVIEW AND COMPARATIVE ANALYSIS OF CORRUPTION AND BRICS STOCK MARKETS	9
2.1. INTRODUCTION	9
2.2. AN ANALYSIS OF CORRUPTION IN THE BRICS NATIONS	10
2.3. STRUCTURE AND REGULATION OF THE BRICS FINANCIAL MARKETS	11
2.4. TRENDS AND STATISTICS	18
2.5. CORRUPTION IN BRICS	25
2.6. CHAPTER SUMMARY	30
CHAPTER THREE	32
LITERATURE REVIEW	32
3.1 INTRODUCTION	32
3.2. THEORETICAL LITERATURE	32
3.2.1 <i>The corruption as sand theory</i>	32
3.2.2 <i>The New Institutional Theory of Corruption</i>	34
3.2.3 <i>The corruption as grease theory</i>	35
3.3 EMPIRICAL LITERATURE	37
3.4. CHAPTER SUMMARY	40
DATA AND METHODOLOGY	41
4.1. INTRODUCTION	41
4.3 RESEARCH DESIGN	43
4.3.1 <i>Justification of theoretical framework</i>	44
4.3.2 <i>Content Analysis</i>	45
4.3.3 ESTIMATION TECHNIQUES	46
4.4.1 <i>Model specification</i>	54
4.3.3 <i>Definition of variables</i>	55
4.3.4 <i>Diagnostics test</i>	57
4.4 CHAPTER SUMMARY	58
ESTIMATION AND INTERPRETATION OF RESULTS	59
5.1. INTRODUCTION	59
5.2. STYLISED FACTS	59
5.2.1 <i>Descriptive statistics</i>	59
5.2.2 CORRELATION ANALYSIS MATRIX	61
5.2.3 <i>Stationary testing</i>	62
5.2.4 UNIT ROOT	65
5.3. PANEL COINTEGRATION TEST	67
5.3.1 <i>Panel Cointegration Test Results</i>	68
5.3.2 <i>Panel ARDL model</i>	69
5.4. CAUSALITY TESTS	73
5.5. DIAGNOSTICS TESTS	75
5.6. CHAPTER SUMMARY	76
SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS	78
6.1. SUMMARY	78

6.2. KEY FINDINGS	78
6.3 POLICY RECOMMENDATIONS	79
6.4 RECOMMENDATION FOR FUTURE RESEARCH	80
6.6 CONCLUSION	81
7. REFERENCE LIST	82
8. APPENDICES	101

LIST OF TABLES

Table 5.1 Descriptive Statistics of Key Variable.....	55
Table 5.2 Correlation Analysis.....	56
Table 5.3 Panel unit root test at the level and first difference (LLC).....	60
Table 5.4 Panel Unit root test at the level and first difference (IMP&S)	61
Table 5.5 Pedroni Panel Cointegration Test Results.....	62
Table 5.6 Hausman Test Results.....	63
Table 5.7 Pooled Mean Group ARDL Estimations For BRICS.....	63
Table 5.8 Cross-sectional short-run results from the PGM Model.....	65
Table 5.9 Granger Causality Test.....	67
Table 5.10 Panel Heteroskedasticity Test Results.....	68

List of Figures

Figure 2.1 BRI(C)S Stock Market Capitalisation in USD.....	19
Figure 2.2 China’s Stock Market Capitalisation in USD.....	19
Figure 2.3 BRICS stock market capitalization in % of GDP.....	21
Figure 2.4 BRICS Stock Market Turnover % of GDP.....	22
Figure 2.5 BRI(C)S Stock market traded value in USD.....	23
Figure 2.6 China’s Stock Market traded value in USD.....	24
Figure 2.7 BRICS CPI scores.....	25
Figure 5.1 Stock Market Capitalisation at level.....	57
Figure 5.2 Corruption Perception Index Scores at level.....	57
Figure 5.3 Inflation at the level.....	58
Figure 5.4 Stock Market Capitalisation at First Difference.....	58
Figure 5.5 Corruption Perception Index Scores at First Difference.....	59

Figure 5.6 Inflation at first difference.....59

List of Acronyms and Abbreviations

ASTS	Advanced Storage and Trading System
ARDL	Autoregressive Distributed Lag
BM&FBOVESPA	Bolsa de Valores, Mercadorias & Futuros de São Paulo, Commodities and Futures Exchange
BSE	Bombay Stock Exchange
CBR	Central Bank of Russia
CDSL	Central Depository Services Limited
CFFEX	China Financial Futures Exchange
CSDC	China Securities Depository and Clearing Corporation
CPI	Corruption Perception Index
DCE	Dalian Commodity Exchange
ETF	Electronic Funds Transfer
ECT	Error Correction Term
FIU	Financial Intelligence Unit
FX	Foreign Exchange
GDP	Gross Domestic Product
HFT	High-Frequency Trading
INFLTN	Inflation
CCL	Indian Clearing Corporation Limited
IRDA	Insurance Regulatory and Development Authority of India
IFRS	International Financial Reporting Standards
JSE	Johannesburg Stock Exchange
LLC	Levin, Lin & Chu
MCAP	Market Capitalisation
MG	Mean Group
MOEX	Moscow Exchange
MCX	Multi Commodity Exchange of India Limited
MNE	Multinational Enterprise
NCDEX	National Commodity & Derivatives Exchange Limited

NSCCL	National Securities Clearing Corporation Limited
NSDL	National Securities Depository Limited
NSE	National Stock Exchange of India
NIE	New Institutional Economics
PBOC	People's Bank of China
PFRDA	Pension Fund Regulatory and Development Authority
PUMA	Plataforma Unificada Multiativos/ Unified Multi-Asset Platform
PMG	Pooled Mean Group
RBI	Reserve Bank of India
RUB	Russian Rubel
RTS	Russian Trading System
SEBI	Securities and Exchange Board of India
SSE	Shanghai Stock Exchange
SZSE	Shenzhen Stock Exchange
SAFEX	South African Futures Exchange
SOE	State-Owned Enterprises
SMP	Stock Market Performance
SDG	Sustainable Development Goal
USD/BRL	United States Dollar/ Brazilian Real
WGI	World Governance Index

Chapter One

Introduction

1.1. Background of the study

Corruption is a widespread, enduring phenomenon that affects societies globally (Pyman et al., 2014). It involves the misuse of entrusted power for personal gain and takes various forms such as bribery, embezzlement, fraud, nepotism, and illicit activities (Mouselli et al., 2016; Pasculli & Ryder, 2019; Bhandari, 2023). This pervasive issue undermines institutional integrity, hinders economic development, and erodes public trust in governance (Transparency International, 2022).

Bribery entails offering, giving, receiving, or soliciting something valuable to influence an official or person in authority (OECD, 2013). For instance, a company might offer money to a government official to secure a lucrative contract (OECD, 2013). Embezzlement refers to the misappropriation of entrusted funds or property for personal gain, such as diverting company funds into a personal account (Bhandari, 2023). Fraud involves deceptive practices, like falsifying financial statements to obtain unlawful gains (Akers & Gissel, 2006), while nepotism favors relatives or friends in employment and opportunities, often disregarding qualifications (Jacobs, 2014). Illicit activities exploit legal or institutional weaknesses, such as insider trading using confidential information (Myint, 2000; Reed & Fontana, 2011), further eroding institutional fairness and public trust, and impeding economic and social development (Myint, 2000; Reed & Fontana, 2011).

Measuring corruption requires tailored methods for each form. Bribery is often assessed through surveys or indices like Transparency International's Corruption Perceptions Index (Transparency International, 2022). Embezzlement is tracked through financial audits and investigation of discrepancies (Latshaw & Elifoglu, 2003), while fraud detection employs forensic accounting (Latshaw & Elifoglu, 2003). Nepotism measurement analyses hiring and promotion patterns (Kokunda & Sun, 2024), and tracking financial transactions identifies illicit activities like money laundering. Combining quantitative data, qualitative assessments,

surveys, audits, investigations, and specialized indices helps gauge corruption's prevalence and impact.

Corruption uniquely impacts developing countries, notably the BRICS nations (Brazil, Russia, India, China, and South Africa), influencing financial and corporate sectors (Dos Santos, 2016). Financial corruption encompasses bribery, embezzlement, money laundering, and insider trading within financial systems, undermining market integrity and regulatory fairness (Laundering, 2001). These activities ultimately affect global economic stability and investor confidence (Laundering, 2001). Corporate corruption involves unethical behaviors within corporations, including bribery, accounting fraud, kickbacks, and conflicts of interest (Castro et al, 2020). Such actions lead to financial mismanagement, governance challenges, and reputational damage, impacting stakeholders and shaping market perceptions (Castro et al, 2020). Both forms of corruption present significant challenges to economic governance, requiring robust regulatory frameworks to mitigate their harmful effects (Laundering, 2001; Castro et al., 2020).

Within the BRICS corporate sectors, corruption involves bribery for contracts, regulatory evasion, and embezzlement, facilitated by weak regulatory frameworks (Transparency International, 2022; Bhandari, 2023). Such institutional corruption undermines market efficiency, fosters unfair competition, misallocates resources, reduces investor confidence, and hampers economic growth (Bhandari, 2023). For example, Brazil's Petrobras scandal underscores how pervasive corruption in BRICS nations impacts market stability and investor trust, illustrating the crucial link between institutional integrity and stock market performance (Simo-Kengne & Bitterhout, 2023).

Understanding corruption's impact on financial and corporate structures is essential, shaped by systemic issues, weak governance, cultural norms, and socioeconomic conditions (Lewis, 2017; Transparency International, 2022). The literature identifies three primary channels through which corruption affects stock markets: investment decisions (Lakshmi et al., 2021), corporate risk-taking behavior (Tran, 2022; Mouselli et al., 2016), and economic uncertainty (Hanousek et al., 2021). Integrating Corruption as grease and sand theories with New Institutional Economics (NIE) provides insights into corruption's influence on governance, economic development, and investor confidence in developing economies like the BRICS.

The sand theory depicts corruption silently undermining national economies and impeding development across sectors globally (Chapra, 2016). Corruption increases costs, reduces profitability, and introduces uncertainties for multinational enterprises (MNEs) operating in emerging economies like BRICS, thereby deterring investment and undermining stock market attractiveness (Yi et al., 2019). Addressing corruption is crucial for fostering a healthier stock market environment, encouraging corporate risk-taking, and enhancing investor trust, ultimately boosting stock market performance in these economies.

Conversely, the grease theory suggests that despite its drawbacks, some firms view corruption as an opportunity to navigate inefficient institutional environments (Dreher & Gassebner, 2013). Corruption allows firms to circumvent regulations and expedite processes, potentially offsetting associated costs and uncertainties (Dreher & Gassebner, 2013, Yi et al; 2019). Incumbent investors familiar with corruption may benefit from it and increase their investments. However, not all firms engage in corruption, and its impact on investment hinges on the balance between benefits and costs (Yi et al., 2019). In BRICS nations, corruption can act as a "grease" for certain firms, influencing stock market performance and investment decisions.

Understanding institutional dynamics is crucial for comprehending wealth disparities among countries (Achioyamen & Johansson, 2020). New Institutional Economics (NIE) elucidates financial development dynamics and the shaping of societies by institutions (Greif, 2006). Unlike institutional theory, NIE explores why institutions develop in specific ways rather than why they do not (Arrow, 1978; Williamson, 2000). Yet, NIE's focus on institutional elements overlooks culture's influence on institutional characteristics and evolution (Arrow, 1978; Williamson, 2000). NIE's consideration of transaction costs in identifying and enforcing property rights is vital for investors and aligns with analyzing corruption's impact on stock market performance in BRICS countries (North, 1990; Ankarloo, 2002).

Transparency International's Corruption Perceptions Index (CPI) is pivotal for assessing corruption levels globally. Initially on a scale of 0 to 10 from 2010 to 2011, the CPI transitioned to a scale of 0 to 100 in 2012 for more nuanced evaluations (Mouselli et al., 2016). This adjustment enhances alignment with global indices and clarity in conveying results to policymakers, researchers, and the public. The CPI quantifies corruption perceptions through surveys and expert assessments, offering insights into global corruption management (Mouselli

et al., 2016). For instance, South Africa's CPI score of 43 in 2022 reflects ongoing challenges in enhancing trust and transparency within its public institutions (Transparency International, 2022). The CPI's methodology ensures transparency and consistency, facilitating informed decision-making and global discourse on corruption prevention and governance improvement.

The World Governance Index (WGI), developed by the World Bank, evaluates governance quality across six dimensions which are voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption, but is less used than the CPI in corruption-focused stock market studies (Transparency International, 2022). While the WGI offers a broad governance overview, the CPI's focus on corruption perceptions is critical for analysing its specific financial market impacts. Thus, while the WGI provides a comprehensive governance assessment, its application in corruption-related stock market analyses remains limited.

BRICS countries play pivotal roles in the global economy due to their significant population and GDP shares (Hess et al., 2019). Their diverse market conditions make them ideal for studying corruption's effects on stock market performance in rapidly developing nations (Armijo, 2007; Hess et al., 2019). Despite extensive global research on corruption and stock markets from studies by Ayaydın & Baltacı (2013), Goto & Ogunnubi (2014), Lau et al. (2013), Ekşi & Doğan (2020), Mai (2020), and Ming et al. (2018), studies specifically focused on BRICS countries are relatively sparse compared to broader analyses of emerging economies. The existing literature varies widely in terms of the countries studied, methodologies employed, timeframes considered, and economic contexts analyzed, resulting in diverse conclusions. Researchers utilize various data types, including panel data, cross-sectional data, time series data, surveys, and market data, each offering distinct strengths and limitations that influence their findings. Therefore, this study aims to contribute to the literature by understanding how corruption uniquely shapes BRICS stock market dynamics.

1.2. Problem statement

The impact of corruption on stock market performance and economic development varies globally due to institutional frameworks, regulatory environments, cultural norms, and economic conditions. While corruption is known for undermining market efficiency and

investor confidence, its effects are significantly shaped by these factors (Chowdhury et al., 2023). Despite extensive research on corruption's broader economic consequences, studies specifically focusing on its impact within emerging economies like the BRICS nations (Brazil, Russia, India, China, and South Africa), such as those by Simo-Kengne & Bitterhout (2020, 2023), are scarce. Although, these studies focus on corruption's effect on economic growth rather than stock markets in BRICS, understanding how corruption uniquely shapes stock market dynamics in these contexts is crucial for academic inquiry and policy development (Dos Santos, 2016; Kurakin & Sukhareenko, 2018; Chowdhury et al, 2023). This study aims to fill this gap by exploring the nuanced relationship between corruption and stock market performance across the BRICS countries, offering insights to enhance regulatory and governance strategies effectively.

Current research on corruption and stock market performance mainly focuses on larger emerging markets outside the BRICS nations such as (Rose-Ackerman, 1999; Jain, 2001; Méon & Weill, 2010; Méon & Sekkat, 2005; Wei, 2000; Li & Zhou, 2005; Ades & Di Tella, 1999; Fisman & Svensson, 2007). Studies including BRICS countries often use broad methodologies, overlooking the unique institutional and governance dynamics of each nation. This results in a limited understanding of how corruption, involving regulatory evasion, bribery, and institutional inefficiencies, impacts stock market dynamics in these rapidly developing economies. This study aims to fill these gaps by examining corruption's effects on stock market performance across the BRICS countries. Using rigorous empirical methods such as comparative analysis and econometric modeling, the research seeks to uncover how corruption influences market efficiency, investor behavior, and economic growth in each BRICS nation. Additionally, the study provides empirical evidence to guide targeted policy interventions that enhance transparency, strengthen regulatory frameworks, and foster a more resilient and investor-friendly environment in BRICS financial markets.

1.3. Goals of the Research

The study aims to investigate the impact of corruption on stock market performance in BRICS countries (Brazil, Russia, India, China, and South Africa). This study explores the complex interplay between corruption and stock market performance in the BRICS. The empirical

analysis covers the period from 2010 to 2022. The main research questions the study aims to tackle are: Does corruption impact the performance of stock markets? If yes, how?

This research question was achieved through the following sub-objectives:

- To estimate the short-run dynamics between corruption and the stock market in BRICS.
- To determine the long-run influence of corruption on stock market performance in BRICS during the study period.
- Formulate conclusions and recommendations for policymakers.

1.4. Methods, Procedures and Techniques

The study employs a post-positivist approach to investigate how corruption impacts BRICS stock market performance using annual data spanning 2010 to 2022. It utilizes secondary data and quantitative methods, specifically employing the panel ARDL technique and Granger causality analysis to explore these relationships. Data on stock market performance and control variables are sourced from the official World Bank website, with Corruption Perception Index scores obtained from Transparency International, ranging from 0 to 100.

Inflation, measured by the annual percentage change in consumer prices using the Consumer Price Index (CPI), is a key control variable in the analysis. The panel ARDL method is selected for its capability to concurrently estimate short- and long-run dynamics, considering different integration orders and variable lags (Pesaran, Shin, & Smith, 1999; 2001). Additionally, the Granger causality method, introduced by Granger (2003), is instrumental in examining causal relationships between variables, enhancing the depth of the study's analysis.

To validate the estimators used, the study conducted a Hausman test to assess the homogeneity of Mean Group (MG) and Pooled Mean Group (PMG) estimators. Furthermore, the Pedroni seven test was employed to examine long-term relationships, accommodating heterogeneous short-term dynamics and fixed effects across panel members. These tests aim to ensure robustness and accuracy in the findings related to corruption's impact on BRICS stock market performance.

1.5. Contribution of the study

The study enriches the literature on corruption's influence on stock market performance, with a particular focus on BRICS countries, an area that has been relatively neglected in comparison to other emerging markets. By investigating this specific nexus, encompassing Brazil, Russia, India, China, and South Africa, the research addresses the gap in understanding how corruption uniquely shapes financial markets in these rapidly developing economies.

Achieving the main objective of the study involves determining whether corruption impacts stock market performance and elucidating the mechanisms of this impact. This contribution aligns with Sustainable Development Goal (SDG) 16: Peace, Justice, and Strong Institutions (United Nations; 2016, Ahmed & Anifowose, 2024). SDG 16 targets the reduction of corruption in all its forms and aims to build effective, accountable, and transparent institutions (United Nations; 2016, Ahmed & Anifowose, 2024). By providing empirical evidence on the detrimental effects of corruption on stock markets in BRICS countries, the study supports efforts to combat corruption, strengthen governance frameworks, and promote economic stability. These efforts are essential for fostering investor confidence, promoting fair and transparent markets, and ultimately contributing to sustainable economic development and the rule of law.

By achieving the first sub-objective of the study, which is estimating the short-run dynamics between corruption and the stock market in BRICS countries, valuable insights are gained into how immediate fluctuations in corruption levels affect stock market performance. This analysis enhances understanding of the real-time impact of corruption on market efficiency, investor sentiment, and economic stability within these emerging economies. These findings are crucial for policymakers and investors aiming to mitigate short-term risks and optimize market conditions in response to varying levels of corruption.

Examining the second sub-objective, which involves determining the long-run influence of corruption on stock market performance in BRICS countries during the study period, provides comprehensive insights into how sustained corruption levels have shaped overall stock market dynamics over time. This analysis aids in understanding the enduring impacts of corruption on market efficiency, investor behavior, and economic growth within these diverse economies.

Such findings are essential for developing robust policies and strategies aimed at fostering long-term stability, transparency, and investor confidence in BRICS financial markets.

By formulating conclusions and recommendations for policymakers, the study contributes practical insights derived from its findings on corruption's impact on stock market performance in BRICS countries. These conclusions and recommendations aim to inform policy decisions that can enhance transparency, strengthen regulatory frameworks, and foster a more resilient and investor-friendly environment within the BRICS financial markets. This contribution is crucial for guiding policymakers toward effective strategies that mitigate the negative effects of corruption and promote sustainable economic growth.

1.6. Overview of the dissertation

Chapter 1 outlines the study's purpose by presenting its background, elaborating on the problem statement, and highlighting its goals. It also details the methods and techniques employed to achieve the study's objectives and emphasizes its contributions. Chapter 2 provides an in-depth analysis of the key variables and concepts related to corruption in BRICS stock markets emphasizing regulatory frameworks and institutional integrity.

Chapter 3 synthesizes theoretical and empirical literature to establish a framework for understanding corruption's impact on stock markets. The theoretical section explores key concepts such as Corruption as Sand and Corruption as Grease theories. Empirical studies highlight varying impacts of corruption on financial markets and economic growth across different contexts, emphasizing these relationships' complexity and regional nuances.

Chapter 4 conveys the research paradigm and design where an elaborate discussion is provided for a clear indication as to how the research is conducted to achieve the set-out objectives of the research. Chapter 5 reports the empirical results obtained by employing the methodology discussed in Chapter 4, which essentially provides the research findings. Chapter 6 provides a summary of the study along with conclusions, limitations, recommendations, and areas of further research.

Chapter Two

An Overview and Comparative Analysis of Corruption and BRICS Stock Markets

2.1. Introduction

Understanding corruption within stock markets is crucial as it directly impacts economic stability, market integrity, and investor confidence (Menocal, 2015). Corruption distorts fair competition, undermines regulatory frameworks, and leads to the misallocation of resources (Menocal, 2015). It increases transaction costs, reduces efficiency, and deters domestic and foreign investment (Menocal, 2015). Comprehending its dynamics and implementing effective anti-corruption measures are essential for fostering transparent, resilient, and sustainable financial markets (Menocal, 2015).

Emerging markets have become pivotal in international finance, and among them, the BRICS nations—Brazil, Russia, India, China, and South Africa—stand out as drivers of global economic growth (Bishop, 2022). Their influence is underscored by the robust and complex performance of their stock markets, which are crucial indicators of economic health and potential growth (Bishop, 2022). Understanding these dynamics is essential for grasping broader global financial stability and investment strategies implications. The BRICS countries' diverse economic structures and policy frameworks highlight their pivotal role in shaping the future of international trade and finance (Bishop, 2022).

Building on the foundational knowledge from Chapter 1, this chapter delves into a comprehensive analysis of corruption within BRICS stock markets. The first part of the chapter expands on the definitions and dimensions of corruption, contextualizing them within the BRICS stock markets and exploring the prevalence of various types of corruption across these countries. The second part analyses the organizational structures of the stock markets in Brazil, Russia, India, China, and South Africa, focusing on the regulatory and institutional frameworks governing these markets. The third section provides a comparative analysis of corruption trends in BRICS nations, examining contributing factors and the strategies implemented to combat corruption. This analysis highlights regional differences in corruption dynamics and their

impact on financial market performance, investor behaviour, and overall economic development.

2.2. An analysis of corruption in the BRICS nations

Understanding corruption within BRICS nations is crucial for comprehending its profound impact on societies, institutions, and financial markets (Simo-Kengne & Bitterhout, 2023). This section delves into the types of corruption prevalent in these countries, traces their historical evolution, and examines their effects on financial markets and economic development.

In BRICS nations, rapid economic growth often outpaces regulatory development, creating stock market vulnerabilities and opportunities for corruption such as bribery, insider trading, and financial fraud, which undermine market integrity and investor confidence (Na et al., 2018; Bitterhout & Simo-Kengne, 2020; Simo-Kengne & Bitterhout, 2023). Bureaucratic inefficiencies and inconsistent transparency contribute to regulatory capture, allowing insiders to influence policies for their benefit, thereby affecting corporate governance and market functioning (Vyas-Doorgapersad, 2022). Political patronage, weak anti-corruption enforcement, and accountability gaps exacerbate corporate corruption, distorting market competition and investor perceptions (Na et al., 2018). Addressing these issues requires comprehensive reforms to improve regulatory frameworks, transparency, and accountability (Kurakin & Sukharenko, 2018).

The evolution of corruption in BRICS countries reflects their economic and political transitions. For instance, Brazil's Petrobras scandal exposed deep-rooted corruption in state enterprises, impacting market stability (Bechara & Goldschmidt, 2020). In Russia, the transition from state socialism led to oligarchic control and crony capitalism marked by embezzlement (Vasileva, 2013). India's post-liberalization growth revealed vulnerabilities in banking and infrastructure due to corruption scandals (Panagariya, 2005). China's financial reforms introduced corruption through opaque practices and state control (Morrison, 2019). South Africa has faced rent-seeking behaviors and governance failures post-apartheid, compromising market integrity and development efforts (Kalombo, 2005).

Despite various anti-corruption measures, effectiveness varies due to political will, institutional capacity, and societal pressures (Renno, 2013). Weak regulatory frameworks and ineffective enforcement allow corruption to persist, with political interference and lack of transparency worsening the problem (Renno, 2013). Corruption significantly impacts BRICS financial sectors and economic development by distorting competition, reducing investor confidence, and increasing transaction costs, which deters foreign investment, impedes growth, and perpetuates income inequality, while eroding public trust in institutions vital for sustainable development.

2.3. Structure and Regulation of the BRICS Financial Markets

The BRICS nations represent a diverse and dynamic group of emerging economies with unique financial market structures and regulatory frameworks. This section explores the organizational frameworks, trading systems, and regulatory environments of these countries, highlighting their evolution, current practices, and the role of key institutions in maintaining market integrity and promoting investor confidence.

Brazil

Brazil's financial landscape, shaped significantly by B3 (formerly BM&FBOVESPA), has evolved with a robust regulatory framework and advanced trading systems since its 2008 merger of BM&F and Bovespa (Rogers et al., 2008; McKenzie, 2024). This consolidation positioned B3 as one of the world's largest exchanges, enhancing market efficiency and attracting international capital (Rogers et al., 2008; McKenzie, 2024). Regulatory oversight by the Brazilian Securities and Exchange Commission (CVM) since 1965 ensures stringent measures for market integrity and investor protection, crucial for stability and confidence (McKenzie, 2024).

B3 utilizes the PUMA (Plataforma Unificada Multiativos/Unified Multi-Asset Platform) Trading System for real-time trading in equities, derivatives, and fixed-income securities, supporting high-speed transactions and market data dissemination (B3, 2024). High-frequency trading (HFT) and algorithmic trading are prevalent, enhancing trade execution efficiency. The Bond and Debentures System (STVM) facilitates fixed-income trading, including government

and corporate bonds (B3, 2024). Commodity trading is robust on B3, covering agricultural products, metals, and energy via electronic platforms. The FX market operates electronically, enabling major currency pairs like USD/BRL trading (B3, 2024).

B3 offers a diverse range of financial products including equities, bonds, derivatives, and ETFs, fostering market depth and portfolio diversification (Nyasha & Odhiambo, 2013). Transparent financial reporting aligns with international standards, bolstering accountability and investor trust (Nyasha & Odhiambo, 2013). Strong corporate governance practices further reinforce market integrity (Nyasha & Odhiambo, 2013). Foreign investment and cross-listed companies enhance liquidity and global visibility, promoting economic integration (Nyasha & Odhiambo, 2013). Continuous technological advancements maintain B3's advanced trading infrastructure, improving efficiency and reducing costs (Nyasha & Odhiambo, 2013).

Brazil's financial markets are shaped by key institutional indicators that define the regulatory environment, market operations, and investor participation (CVM, 2024). Oversight is provided by regulatory bodies including the Central Bank of Brazil (BCB) for monetary policy and banking operations, the Brazilian Securities and Exchange Commission (CVM) for securities markets, and the Superintendence of Private Insurance (SUSEP) for insurance markets (CVM, 2024). These institutions ensure B3, Brazil's primary stock exchange, facilitates trading in equities, derivatives, and other financial instruments with advanced systems and robust clearing mechanisms, attracting both domestic and international investors (CVM, 2024).

Transparency and comparability in financial disclosures are ensured through adherence to International Financial Reporting Standards (IFRS). Institutional investors significantly influence trading volumes and liquidity (Hoti & Krasniqi, 2022). Government policies and regulations impact market stability and growth, while corporate governance practices ensure transparency and protect shareholder interests (Hoti & Krasniqi, 2022). These indicators collectively bolster Brazil's position in the global financial arena, appealing to investors seeking robust regulatory frameworks and diverse investment opportunities.

Russia

Russia's financial markets have transformed significantly since the dissolution of the Soviet Union, highlighted by the 2011 merger of the Russian Trade System and Moscow Interbank Currency Exchange into the Moscow Exchange (MOEX) (Hoti & Krasniqi, 2022). This institution plays a pivotal role, offering benchmarks like the USD-denominated RTS index and the ruble-denominated MOEX Russia Index (formerly MICEX) (Hoti & Krasniqi, 2022). Challenges, including the 2008 financial crisis driven by oil price fluctuations and capital outflows, were followed by recovery in 2009-2010, yet subsequent downturns in 2011 and 2014 underscored volatility amid currency devaluation and geopolitical tensions (Bakker & Klingen, 2012).

Russia's financial markets employ diverse trading systems to ensure efficiency and liquidity across asset classes (Moscow Exchange, 2024). MOEX utilizes order-driven trading, transparently matching buy and sell orders based on price and time priority. The Advanced Storage and Trading System (ASTS) supports high-speed trading in equities, bonds, derivatives, and foreign exchange, including high-frequency trading (HFT) and algorithmic trading (Moscow Exchange, 2024). Fixed-income trading for government and corporate bonds and commodities trading for oil, gas, and metals are conducted electronically on platforms like SPIMEX, while the FX market operates electronically for major pairs like USD/RUB (Moscow Exchange, 2024).

Institutional oversight is robust, led by entities such as the Central Bank of Russia (CBR), Federal Financial Markets Service (FFMS), Ministry of Finance, and Federal Insurance Supervision Service (FIU) (Central Bank of Russia, 2023). These bodies enforce stringent regulations to maintain market integrity and protect investor interests. Modernized trading systems at MOEX, coupled with efficient clearing and settlement mechanisms, enhance market efficiency and liquidity (Central Bank of Russia, 2023). The adoption of international financial reporting standards (IFRS) improves transparency and comparability of financial information, while cross-border listings support increased participation of foreign institutional investors, integrating Russia more deeply into global markets (Central Bank of Russia, 2023).

Russia's financial markets have evolved significantly, transitioning from volatility to a structured ecosystem over recent decades (OECD, 2021). Regulatory advancements, robust

market infrastructure, and a diverse range of financial instruments have bolstered Russia's global financial standing (OECD, 2021). Compliance with international standards enhances transparency and investor confidence, with ongoing reforms crucial for sustaining growth in Russia's dynamic financial sector (OECD, 2021).

India

India's financial markets have a rich history dating back 200 years, initially evolving under the East India Company. By the 1830s, corporate stock trading in Bombay laid the foundation for the formal establishment of "The Stock Exchange" in 1860 (Roy, 2011). The Bombay Stock Exchange (BSE), founded in 1875, and the National Stock Exchange of India (NSE), established in 1992, introduced modern automated trading systems to mobilize resources, ensure liquidity, and enforce robust corporate governance. Investors actively trade equities, debt, and equity funds on both exchanges, responding to investor sentiment, economic policies, and global crises impacting market volatility (Roy, 2011).

Institutional oversight is provided by bodies such as the Securities and Exchange Board of India (SEBI), ensuring transparency, protecting investor interests, and maintaining market integrity (Bank of India, 2005). The Reserve Bank of India (RBI) manages monetary policy and banking stability, complemented by the Insurance Regulatory and Development Authority of India (IRDAI) for policyholder protection, and the Pension Fund Regulatory and Development Authority (PFRDA) overseeing pension funds (Bank of India, 2005). Market infrastructure is supported by electronic trading platforms at BSE and NSE, alongside clearing corporations like the National Securities Clearing Corporation Limited (NSCCL) and Indian Clearing Corporation Limited (ICCL), ensuring seamless settlement (Bank of India, 2005). Depositories such as the National Securities Depository Limited (NSDL) and Central Depository Services Limited (CDSL) facilitate secure electronic transfers, enhancing market resilience and accessibility (Bank of India, 2005).

India's financial markets operate with advanced trading mechanisms, including transparent order-driven systems, high-speed electronic platforms (e.g., BSE's BOLT and NSE's NEAT), and prevalent algorithmic trading among institutional investors (National Stock Exchange of India, 2023). Derivatives trading encompasses futures and options across various assets, supported by commodity trading platforms like MCX and NCDEX (National Stock Exchange

of India, 2023). Mobile and internet trading are increasingly popular, offering convenient access to market opportunities (National Stock Exchange of India, 2023). Financial instruments span equities, debt instruments, derivatives, mutual funds, and Exchange-Traded Funds (ETFs), all regulated under SEBI's oversight and adhering to rigorous Indian Accounting Standards aligned with International Financial Reporting Standards (IFRS) (National Stock Exchange of India, 2023). Investor engagement ranges from retail investors employing diverse investment strategies to institutional investors, facilitated by government initiatives promoting financial inclusion, digital payments, and entrepreneurial growth (National Stock Exchange of India, 2023).

India's financial markets are characterized by robust institutional indicators: stringent regulatory frameworks, advanced market infrastructure, diverse financial instruments, and supportive government policies. These elements collectively enhance market efficiency, transparency, and global integration, solidifying India's stature in the international financial arena.

China

China's financial markets, established in 1986, have undergone substantial evolution, particularly since 2002 when foreign investors gained access to A-shares and controlling stakes in listed companies (Hansakul et al., 2009; Hu & Wang, 2022). Despite significant growth, the market's size remains relatively modest compared to China's economy and other regional markets (Hansakul et al., 2009; Hu & Wang, 2022). IPOs are overshadowed by bank financing, and barriers to entry constrain the market's impact on capital allocation efficiency (Hansakul et al., 2009; Hu & Wang, 2022). Efforts to list state-owned enterprises (SOEs) face governance challenges, compounded by influential unregistered institutional investors (Hansakul et al., 2009; Hu & Wang, 2022). The maturation of China's stock market hinges on improving share tradability and governance structures, with privatization potentially enhancing regulatory quality (Hansakul et al., 2009).

Since its inception in 1991, the Shanghai and Shenzhen stock markets have become critical for enterprise financing. By the end of 2014, China boasted the world's second-largest stock market by trading volume and market capitalization, reaching \$6 trillion (Hu et al., 2018; Carpenter et al., 2021). These markets operate on a pure order-driven, centralized system without dark pools

and maintain a 10% daily price change limit (Hu et al., 2018; Carpenter et al., 2021). The dual-share system aligns with the US in terms of information aggregation and return patterns (Hu et al., 2018; Carpenter et al., 2021). China's financial markets have transitioned from state control to a market-oriented approach, supported by robust regulatory bodies, financial institutions, and infrastructure (Hu et al., 2018; Carpenter et al., 2021).

China's major exchanges, including the Shanghai Stock Exchange (SSE) and Shenzhen Stock Exchange (SZSE), employ order-driven systems to ensure transparent and equitable trading (China Financial Futures Exchange, 2024). The China Financial Futures Exchange (CFFEX) focuses on derivatives, while the Shanghai Futures Exchange (SHFE) and Dalian Commodity Exchange (DCE) manage commodity trading (China Financial Futures Exchange, 2024). The China Foreign Exchange Trade System (CFETS) oversees the interbank foreign exchange market. Cross-border initiatives such as Bond Connect and Stock Connect expand trading opportunities for international investors (China Financial Futures Exchange, 2024).

Key regulatory bodies include the People's Bank of China (PBOC), China Securities Regulatory Commission (CSRC), China Banking and Insurance Regulatory Commission (CBIRC), and State Administration of Foreign Exchange (SAFE) (People's Bank of China, 2021). The China Securities Depository and Clearing Corporation (CSDC) supports major stock exchanges (People's Bank of China, 2021). State-owned giants like the Industrial and Commercial Bank of China (ICBC) and China Construction Bank (CCB) dominate the banking sector, while major insurers include the People's Insurance Company of China (PICC) and China Life Insurance (People's Bank of China, 2021). Investment funds focus on technology and innovation, with a growing presence in private equity and venture capital sectors (People's Bank of China, 2021).

Government initiatives promote digital payments, financial inclusion, and green finance through platforms like Alipay and WeChat Pay (Ministry of Finance of the People's Republic of China, 2020; Hasan et al., 2022). The Belt and Road Initiative (BRI) enhances international financial cooperation (Ministry of Finance of the People's Republic of China, 2020; Hasan et al., 2022). Market liberalization efforts, including Stock Connect and Bond Connect programs, relaxed foreign ownership limits in financial firms, and move towards market-driven exchange and interest rates (Ministry of Finance of the People's Republic of China, 2020; Hasan et al., 2022). China's financial markets benefit from advanced infrastructure, ongoing reforms, robust

regulatory frameworks, diverse financial institutions, and proactive policies, solidifying China's role in the global financial system (Dai, 2010).

South Africa

South Africa's Johannesburg Stock Exchange (JSE), founded in 1887 initially for the mining sector, has evolved into Africa's largest exchange. It lists over 400 firms with a market capitalization exceeding \$900 billion, surpassing economies like Mexico, Indonesia, and Turkey (Hassan, 2013). The 2001 merger with the South African Futures Exchange (SAFEX) strengthened its leadership in equities and futures trading, aligning with global standards and solidifying its position as Africa's largest exchange by 2004 (De Beer, 2015).

The JSE facilitates trading in equities, bonds, derivatives, and ETFs, with major banks like Standard Bank, FirstRand, ABSA Group, and Nedbank dominating the banking sector, and insurers such as Old Mutual, Sanlam, and Liberty Holdings prominent in insurance (Johannesburg Stock Exchange, 2023). Investment funds, including mutual funds, pension funds, hedge funds, and private equity, enhance liquidity and diversification (Financial Sector Conduct Authority, 2022). Regulatory oversight by institutions like the South African Reserve Bank (SARB), Financial Sector Conduct Authority (FSCA), and Prudential Authority (PA) ensures stability and consumer protection, with the JSE acting as a self-regulatory body (Financial Sector Conduct Authority, 2022). Challenges include income inequality and regulatory compliance, influenced by economic conditions and political stability, impacting market dynamics and confidence (Financial Sector Conduct Authority, 2022).

The JSE employs advanced trading systems like the Millennium Exchange platform by MillenniumIT, renowned for high performance, low latency, and scalability in managing large trade volumes (Johannesburg Stock Exchange, 2023; Exactpro, 2024). Its equity market operates on an order-driven system, transparently matching buy and sell orders through opening and closing auctions (FA News, 2012). The bond market offers electronic trading for government and corporate bonds, promoting liquidity and price discovery (FA News, 2012). Integrated with the main system, the derivatives market (formerly SAFEX) provides futures and options on various assets (FA News, 2012; Johannesburg Stock Exchange, 2023). Currency trading includes spot and forward transactions, with JSE's futures and options facilitating hedging strategies (FA News, 2012; Johannesburg Stock Exchange, 2023). Trading hours are

from 9:00 AM to 5:00 PM SAST for equities, adjusted for bonds and derivatives. Strate, the Central Securities Depository, ensures secure clearing and settlement, monitored for regulatory compliance by the FSCA (FA News, 2012; Johannesburg Stock Exchange, 2023). The JSE supports high-frequency and algorithmic trading for rapid order execution and strategic market participation (FA News, 2012; Johannesburg Stock Exchange, 2023).

Through sophisticated trading systems and robust regulatory oversight, South Africa and the JSE uphold market integrity, transparency, and efficiency, reinforcing the country's commitment to financial sector growth, stability, and inclusivity in the global economic landscape.

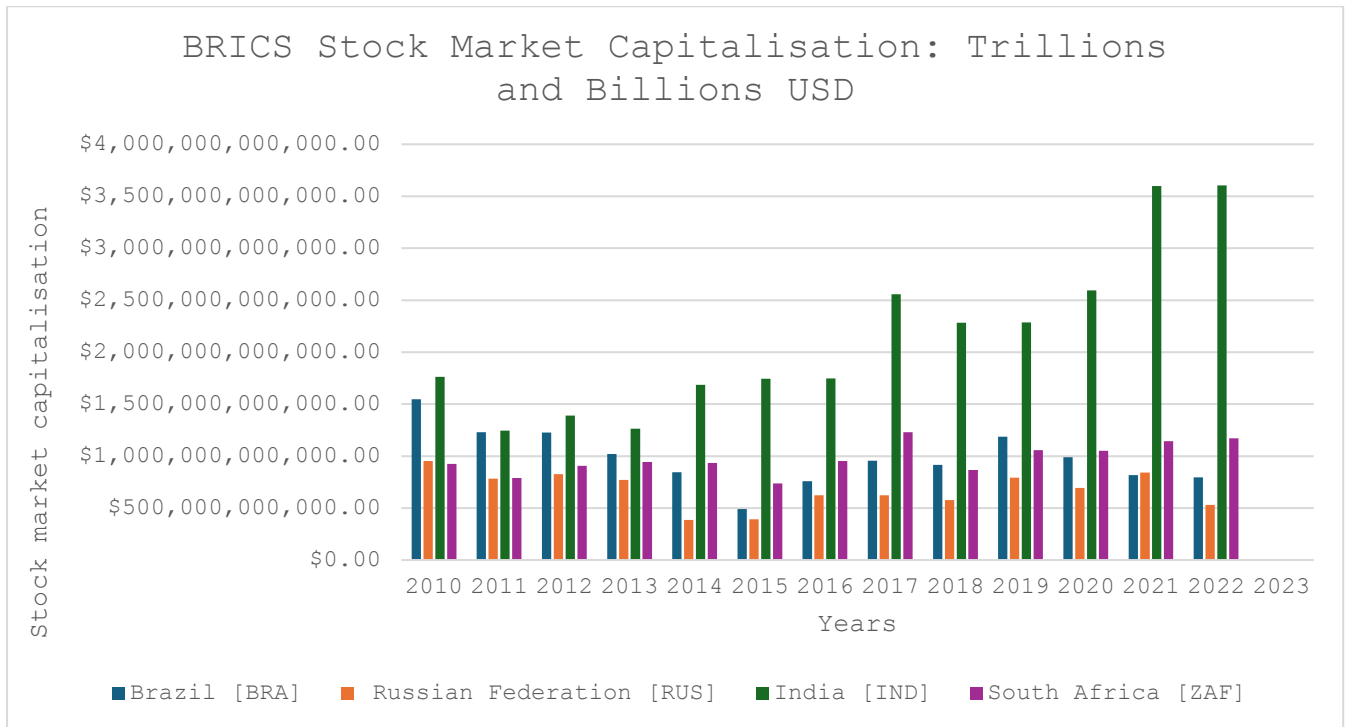
2.4. Trends and Statistics

In examining the stock markets of the BRICS nations from 2010 to 2022, several key trends and statistical patterns emerged, offering valuable insights into the diverse economic landscapes and external influences that have shaped these countries' financial markets. Over this period, each BRICS nation exhibited unique characteristics in market capitalization, turnover ratios, and traded market values, reflecting their varying responses to global economic conditions, internal policy shifts, and geopolitical events.

Stock Market Capitalization

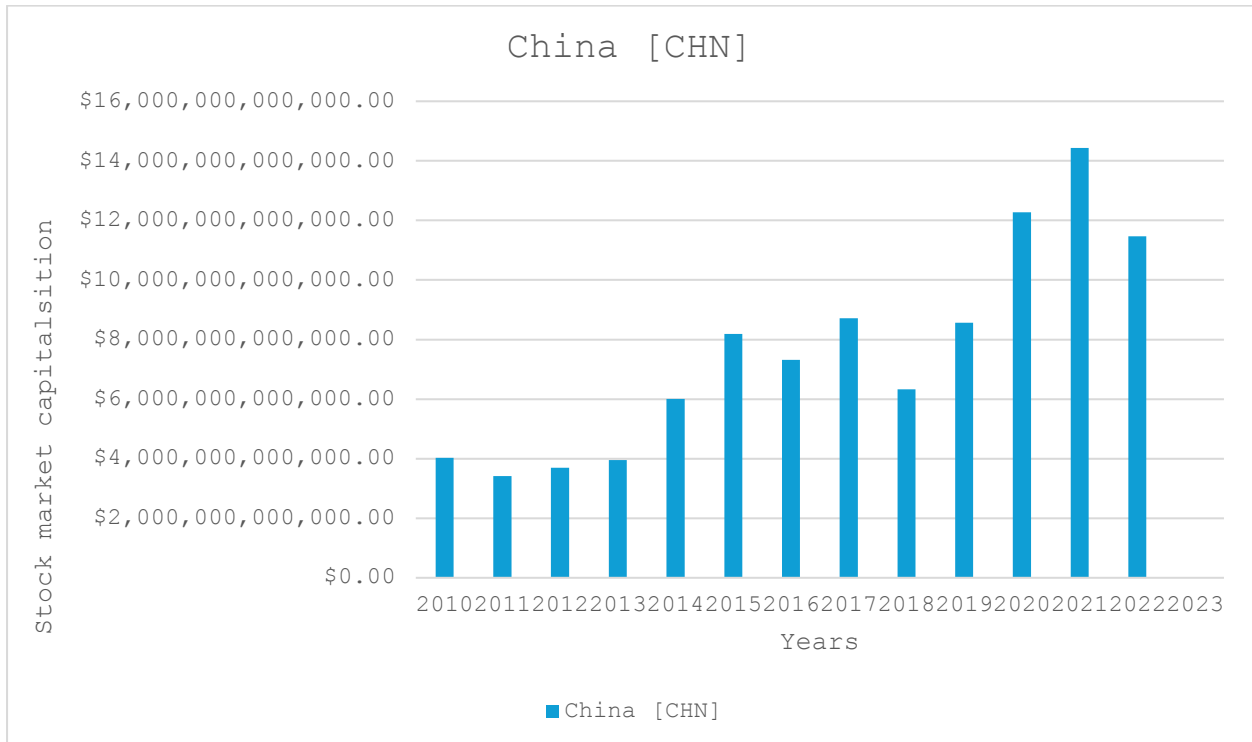
In analysing BRICS countries' stock market capitalizations in USD, China's exclusion was essential due to its outsized economic impact, driven by extensive listings on major exchanges like Shanghai and Shenzhen, robust government policies, and substantial investments as well as being the world's second-largest economy (East Asia Forum, 2024).

Figure 2.1: Bar graph showcasing BRI(C)S Stock Market Capitalisation as USD.



Source: Author's composition using data from the World Bank Databank (2023)

Figure 2.2: Bar graph showcasing China's Stock Market Capitalisation as USD.



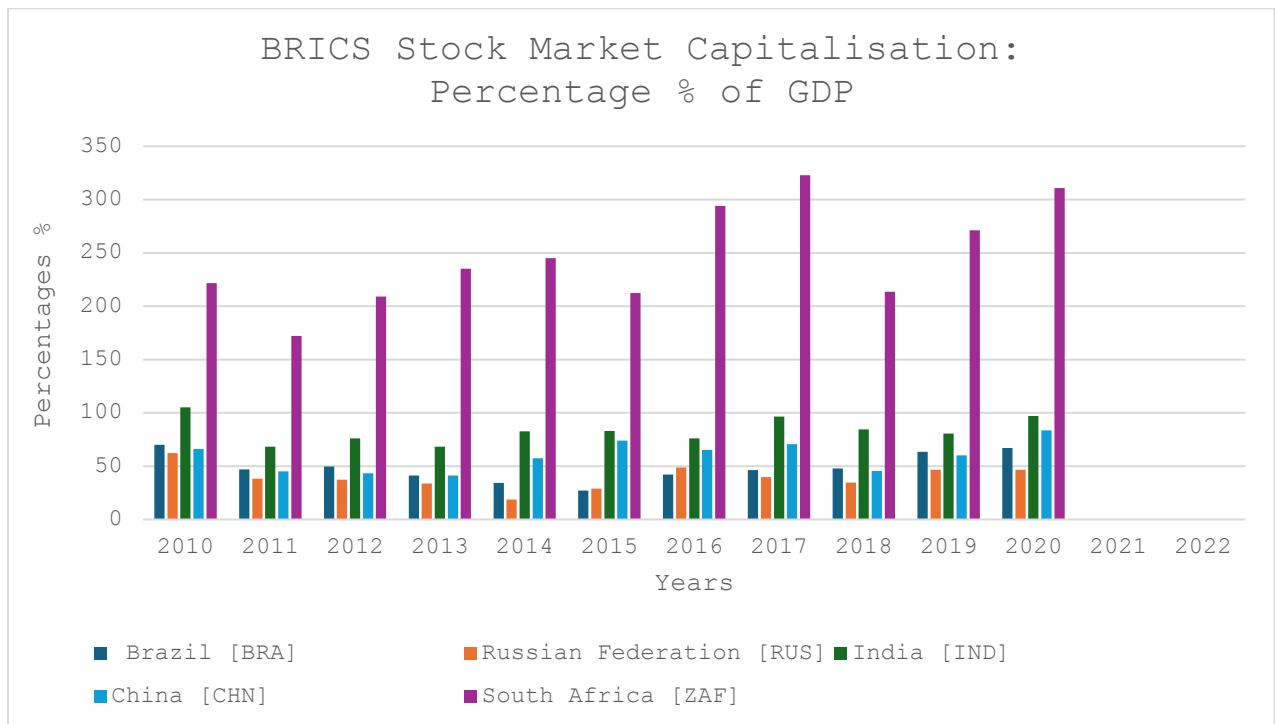
Source: Author's composition using data from the World Bank Databank (2023)

From 2010 to 2022, the stock market capitalization trends among the BRICS nations exhibited both similarities and distinct differences reflective of their unique economic landscapes. China and India demonstrated robust growth trajectories in their market capitalization, driven by their large economies and significant advancements in technology sectors (World Bank and Development Research Center of the State Council; 2013, Anand; 2014). China's market surged from approximately \$4.03 trillion in 2010 to around \$11.47 trillion by 2022, solidifying its position as a global economic powerhouse. India, starting at about \$1.76 trillion, grew steadily to approximately \$3.60 trillion, benefiting from economic reforms and a burgeoning IT industry.

On the other hand, Brazil and Russia experienced more volatile patterns in market capitalization. Brazil's market peaked at over \$1.69 trillion in 2014 but faced significant downturns during economic crises, dropping to around \$0.49 trillion in 2015 before recovering to about \$0.79 trillion by 2022. Similarly, Russia's market fluctuated due to geopolitical tensions and commodity price volatility, reaching highs near \$1.23 trillion in 2017 but declining to approximately \$0.53 trillion by 2022. South Africa showed steady growth in its market capitalization, starting at approximately \$0.93 trillion and reaching around \$1.17 trillion by 2022. Despite economic challenges, South Africa's financial sector resilience and strategic investments supported its upward trajectory in market size.

China stood out for its consistent and substantial growth, maintaining a high market capitalization relative to the other BRICS nations throughout the period. India followed with steady growth, albeit at a slower pace compared to China. Brazil and Russia exhibited greater volatility, influenced by domestic economic uncertainties and external factors like commodity prices and geopolitical tensions. South Africa, while also facing challenges, demonstrated resilience in its market expansion, driven by its status as a financial hub in Africa. These trends highlight the varying economic dynamics and market conditions within the BRICS countries, emphasizing the importance of context-specific analyses when evaluating their stock market performances over time.

Figure 2.3: Bar graph showcasing BRICS stock market capitalization % of GDP



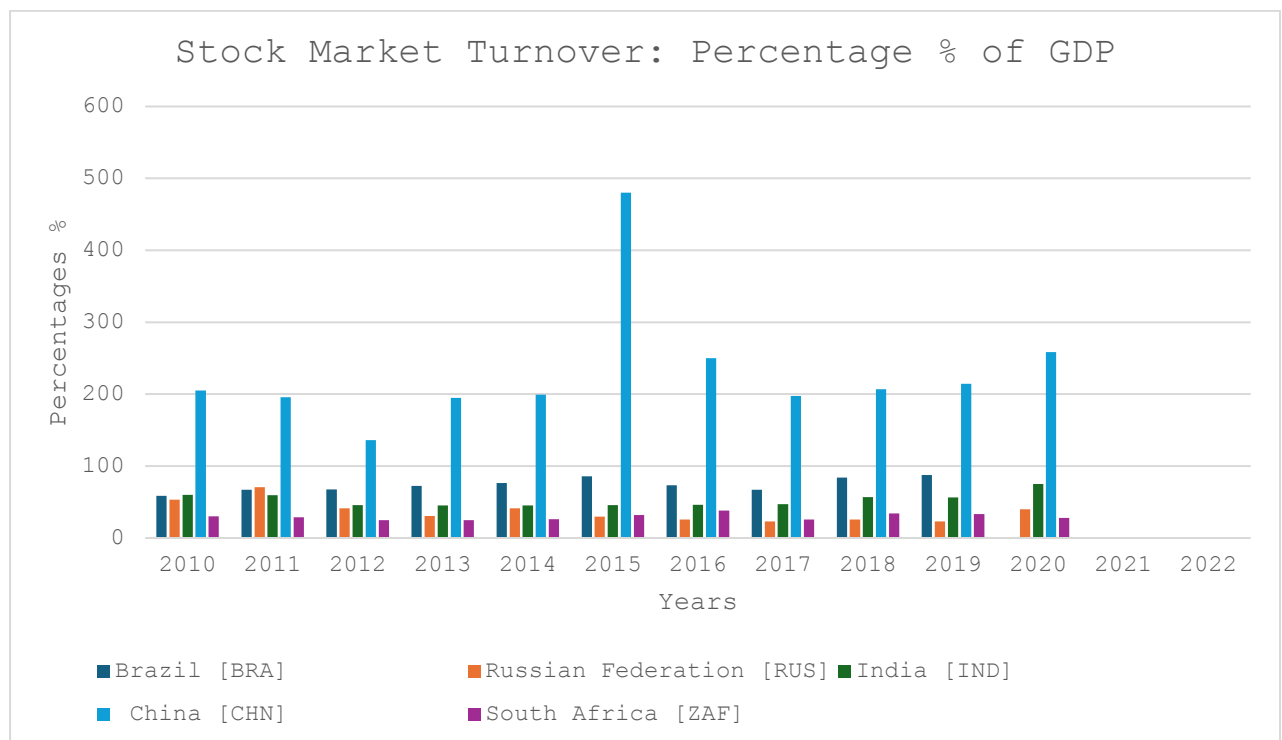
Source: Author's composition using data for World Bank Databank (2023)

From 2010 to 2022, the BRICS nations showed distinctive patterns in their stock market capitalization relative to GDP, reflecting diverse economic landscapes. China stood out with its large and relatively stable market, maintaining a consistently high capitalization ratio despite minor fluctuations. India and Brazil both experienced periods of volatility, with significant recoveries following economic downturns, although Brazil's market exhibited more pronounced swings. Russia, on the other hand, faced a stark decline in market capitalization driven by geopolitical tensions and economic sanctions, contrasting sharply with South Africa's steady growth trajectory in financial market size.

China's market stability and high capitalization relative to GDP underscored its economic resilience and substantial market reforms, setting it apart from the other BRICS countries. India and Brazil showcased resilience amid economic challenges, rebounding strongly after downturns, albeit with Brazil's market being more susceptible to external economic shocks. Russia's market experienced the most pronounced decline, heavily influenced by geopolitical factors and reduced investor confidence. In contrast, South Africa demonstrated consistent growth in financial market size, supported by steady increases in financial institution assets despite broader economic pressures.

These trends highlight the nuanced economic dynamics within the BRICS nations, from China's robust market reforms and stability to Russia's vulnerability to geopolitical fluctuations. India and Brazil's recovery paths from economic downturns reflect their resilience, albeit with varying degrees of volatility. South Africa's steady financial market growth amidst economic challenges illustrates its relative stability compared to its BRICS counterparts.

Figure 2.4: Bar graph showcasing BRICS Stock Market Turnover % of GDP.



Source: Authors composition using data from the World Bank Databank (2023)

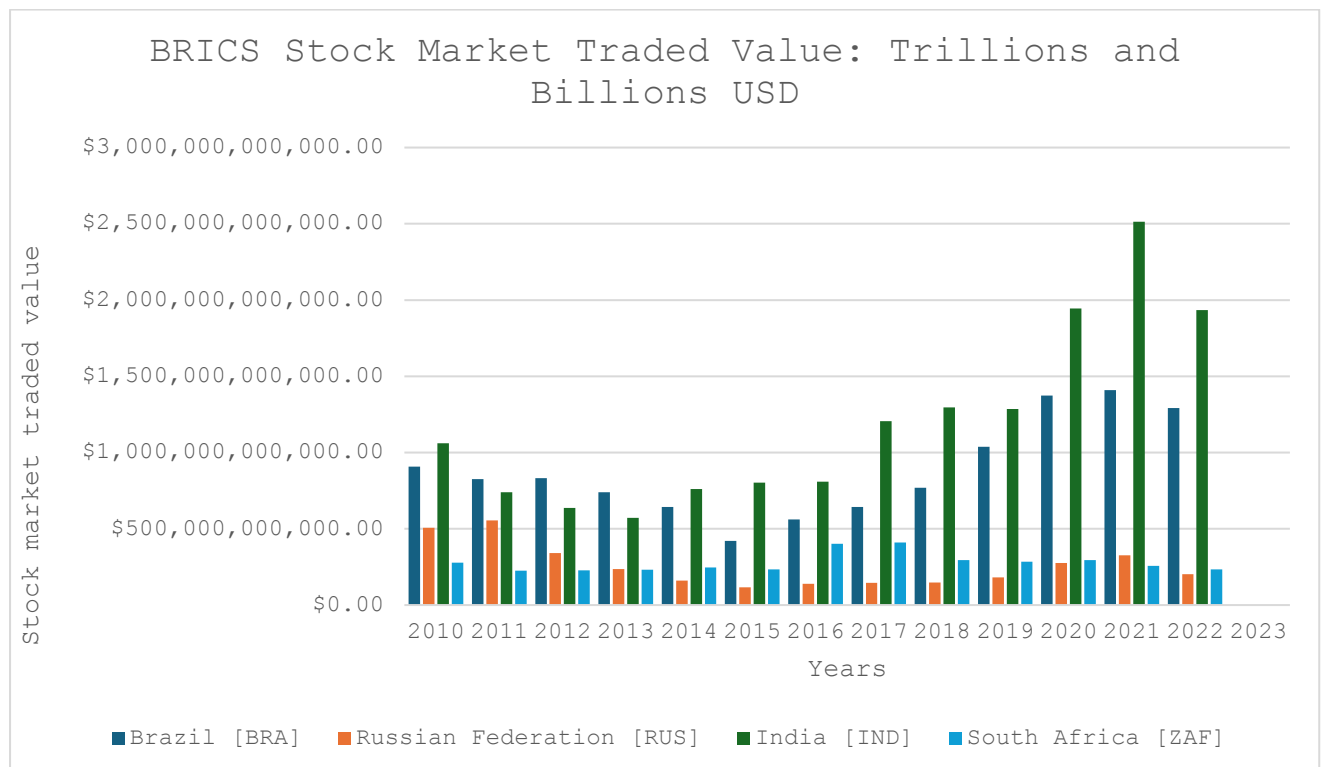
From 2010 to 2022, the stock market turnover ratios of Brazil, Russia, China, India, and South Africa illustrate diverse trends and responses to economic conditions. Brazil and South Africa initially displayed similar patterns with stable ratios around 30% to 35% in the early years, reflecting economic stability and investor confidence. Both countries experienced sharp declines during economic downturns—Brazil in 2015 due to recession and South Africa in 2016 and 2017 amidst political changes and global uncertainties. Russia, on the other hand, maintained a higher initial ratio of 40% to 45%, reflecting economic stability and geopolitical influences, but saw significant drops during economic sanctions and the COVID-19 pandemic, stabilizing around 28% to 30% by 2022.

China exhibited high turnover ratios around 75% to 85% initially, driven by rapid economic growth and regulatory changes, with fluctuations due to market reforms and global economic conditions, stabilizing around 82% by 2022. India started with more moderate ratios of 20% to 30%, influenced by economic reforms and policy changes, experiencing volatility during the COVID-19 pandemic but stabilizing around 20% in recent years. Overall, while all BRICS countries responded to global economic shifts, China's market showed higher initial volatility and resilience, whereas India and South Africa demonstrated more gradual recovery paths amid domestic challenges and external pressures. Each country's turnover ratio reflects not only economic performance but also the impact of policy decisions, global events, and market reforms, highlighting their unique trajectories within the broader BRICS context.

Stock Market Traded Value

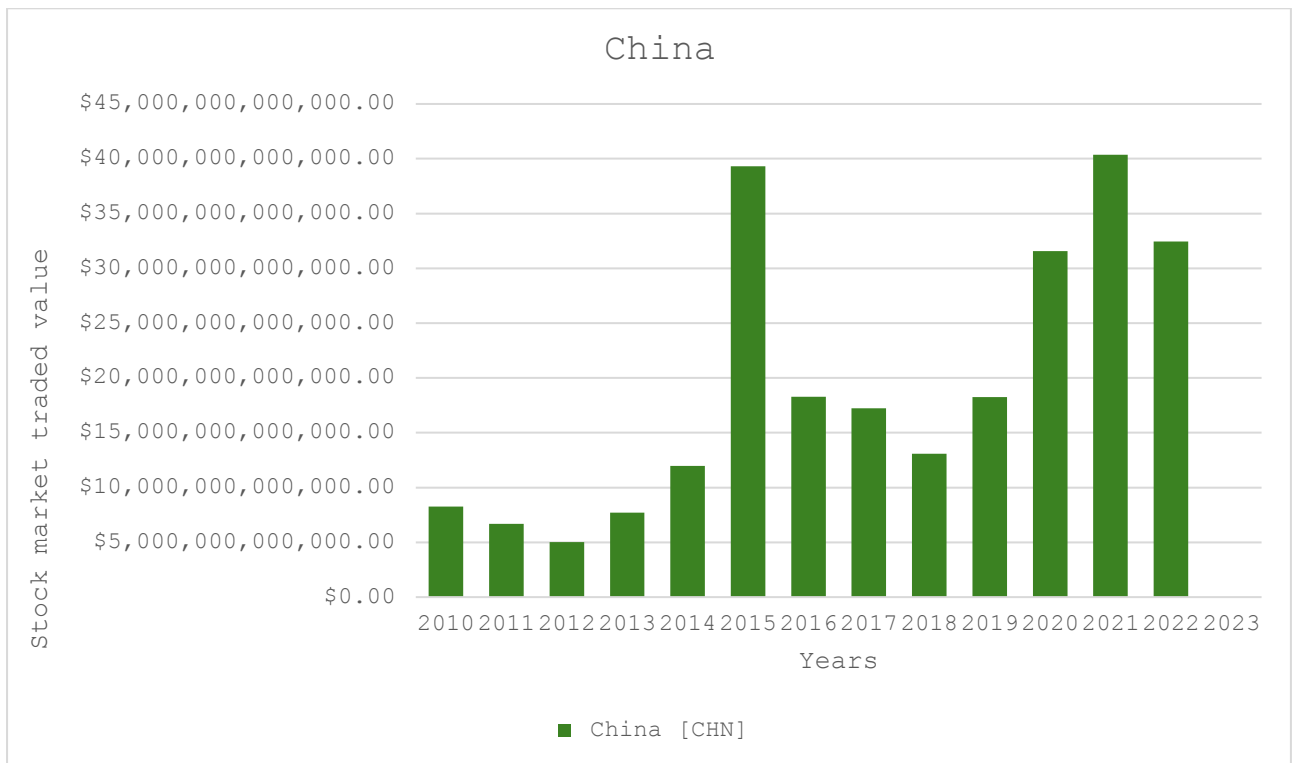
Analysing BRICS market traded values in USD requires separating China's data due to its large economic size and extensive stock market activities, ensuring an accurate evaluation of each country's economic and market characteristics without distortion in comparative analyses.

Figure 2.5: Bar graph showcasing BRI(C)S Stock market traded value as USD.



Source: Author's composition using data from the World Bank Databank (2023)

Figure 2.6: Bar graph showcasing China's Stock Market traded value as USD.



Source: Author's composition using data from the World Bank DataBank (2023)

Across the BRICS nations from 2010 to 2022, the trends in stock market traded values illustrate diverse economic trajectories and responses to global dynamics. China and India emerged as standout performers with significant growth in market size. China, starting from a formidable base of approximately \$8.26 trillion in 2010, saw its market value surge to around \$40.36 trillion by 2021, demonstrating resilience amid regulatory changes and economic reforms. India, although beginning from a lower base, steadily expanded its market value, reaching highs of about \$2.51 trillion in 2021, driven by progressive economic policies and advancements in technology sectors.

Conversely, Brazil and Russia displayed more volatile patterns in their stock market performances. Brazil's market value fluctuated from approximately \$908 billion in 2010 to peaks around \$1.37 trillion in 2020, before declining to about \$1.29 trillion by 2022. This volatility reflects Brazil's susceptibility to political instability and external economic pressures. Russia, starting around \$507 billion in 2010, similarly experienced fluctuations influenced by geopolitical tensions and economic sanctions, ranging from lows of about \$180 billion in 2019 to highs of around \$326 billion in 2021, before decreasing to approximately \$202 billion in

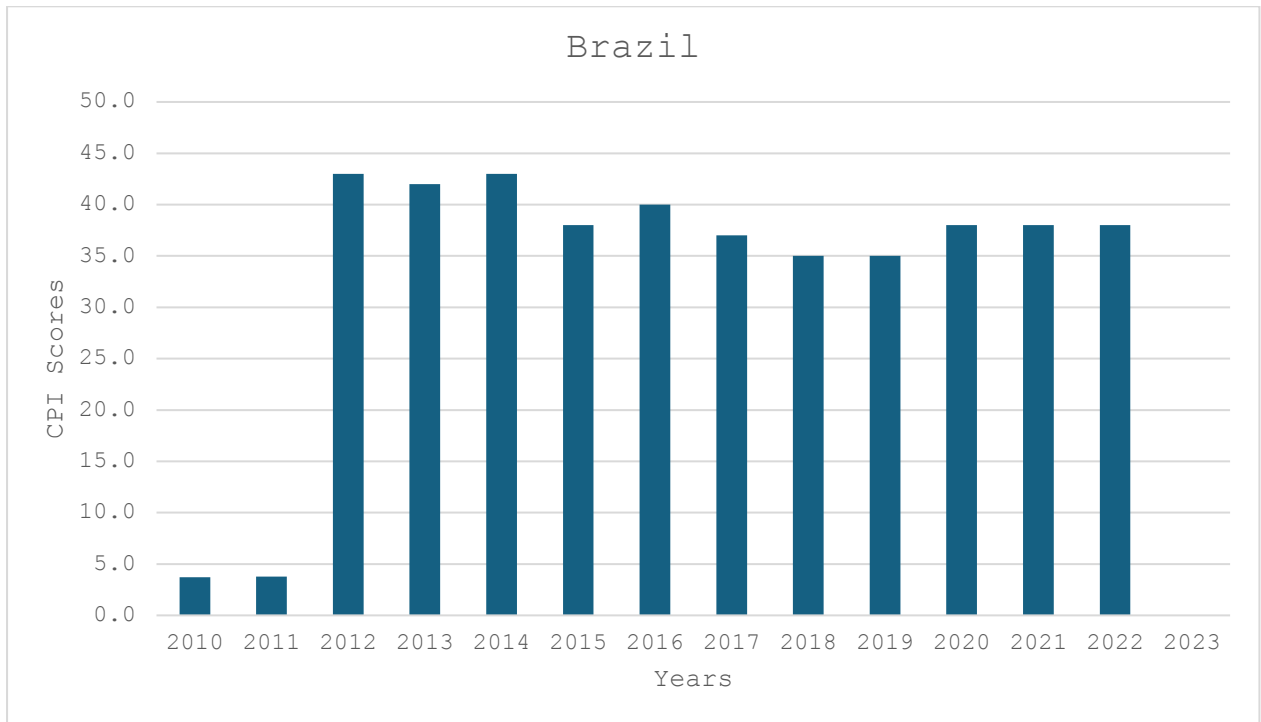
2022. South Africa, with a more stable yet modest growth trajectory, started at roughly \$277 billion in 2010 and peaked at around \$293 billion in 2020, reflecting its role as a regional economic hub influenced by commodity prices and domestic financial conditions.

In summary, while China and India demonstrated robust and consistent growth in stock market traded values, Brazil and Russia exhibited greater volatility. South Africa's market performance, though more stable, reflected its regional economic leadership amidst varying global economic landscapes. These trends underscore the diverse economic dynamics within the BRICS nations, shaped by internal policies, global economic shifts, and sector-specific influences on investor confidence and market resilience over the past decade.

2.5. Corruption in BRICS.

Transparency International's Corruption Perceptions Index (CPI) is a key measure of public sector corruption worldwide. From 2010 to 2011, the CPI used a 0 to 10 scale, with 0 representing high corruption and 10 indicating no corruption. In later years, the index transitioned to a more detailed 0 to 100 scale, where 0 indicates severe corruption and 100 represents a corruption-free environment. This change improved the precision of assessments, especially for countries with moderate corruption levels, and helped track progress over time. The CPI combines expert evaluations and business surveys to provide a comprehensive score, offering insights into global corruption trends and areas needing reform (Transparency International, 2022).

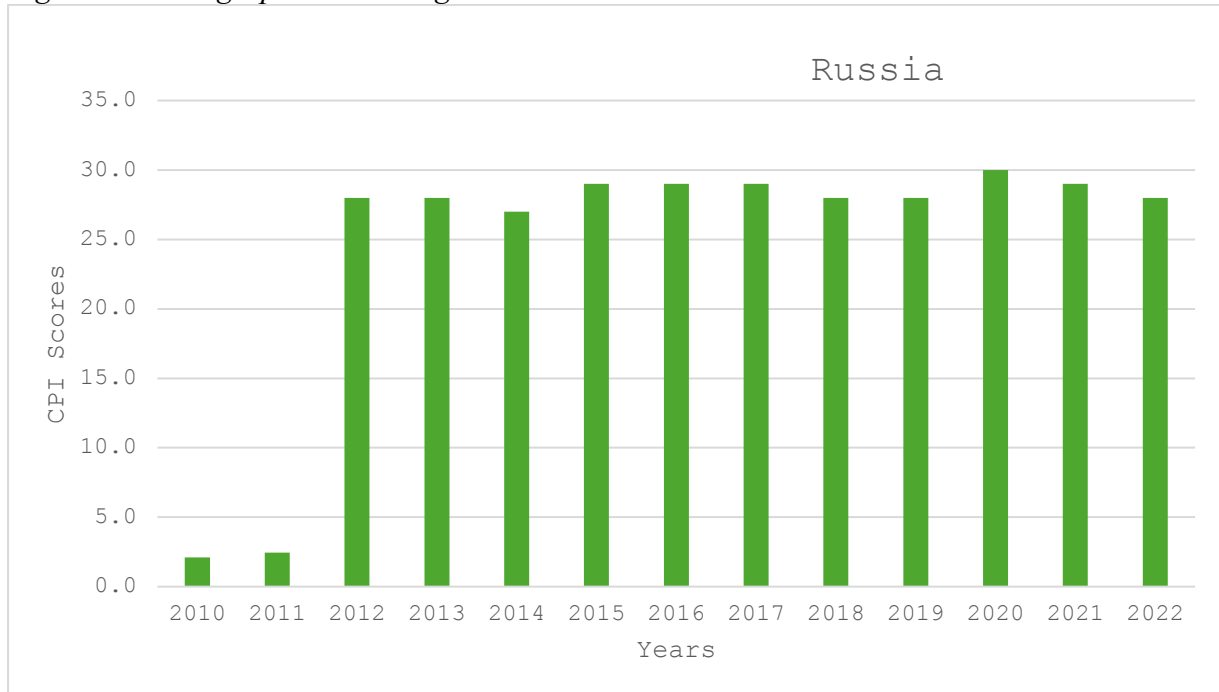
Figure 2.7: Bar graph showcasing Brazil's CPI scores.



Source: Authors composition using data from the Transparency International Index (2022)

From 2010 to 2011, Brazil's CPI scores ranged between 3.7 and 3.8 (Transparency International, 2022), reflecting significant corruption challenges rooted in inequality and a complex tax system. Corruption was pervasive across various sectors, particularly in public infrastructure and state-owned enterprises. In response, Brazil launched several anti-corruption initiatives, the most notable being Operation Carwash (Operação Lava Jato), which uncovered widespread bribery within Petrobras, implicating politicians and business leaders. Legislative reforms also aimed to enhance transparency and the judicial process. However, despite these efforts, Brazil's CPI scores from 2012 to 2022 remained in the mid-30s, indicating ongoing issues with political corruption (World Bank, 2020).

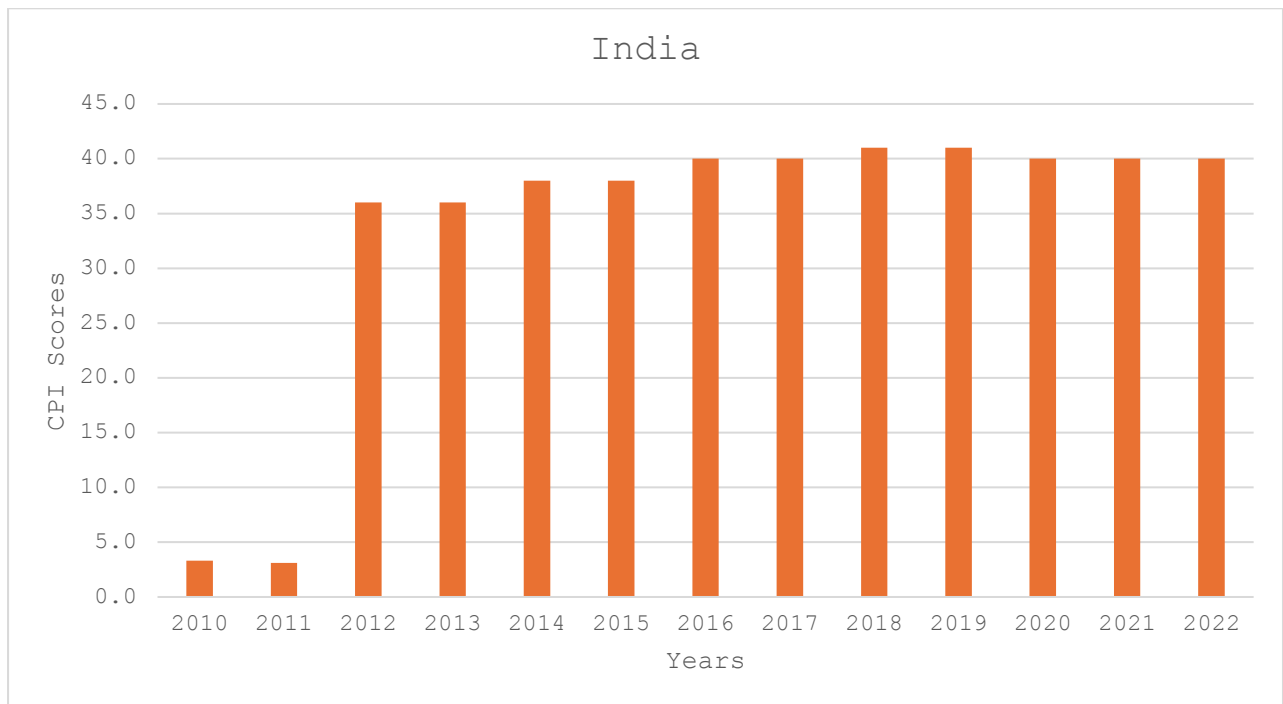
Figure 2.8: Bar graph showcasing Russia's CPI Scores



Source: Authors composition using data from the Transparency International Index (2022)

In 2010 and 2011, Russia's CPI scores were among the lowest in the BRICS group, ranging from 2.1 to 2.4 (Transparency International, 2022). These scores highlighted deep-rooted corruption within the bureaucratic and political systems, with cronyism and bribery permeating public procurement and law enforcement. To counter this, Russia focused on strengthening anti-corruption institutions and improving transparency in public procurement. However, the effectiveness of these efforts has been limited, with selective enforcement and a lack of political will. Between 2012 and 2022, Russia's CPI scores showed little improvement, hovering between the late 20s and early 30s, reflecting ongoing systemic corruption (World Bank, 2020).

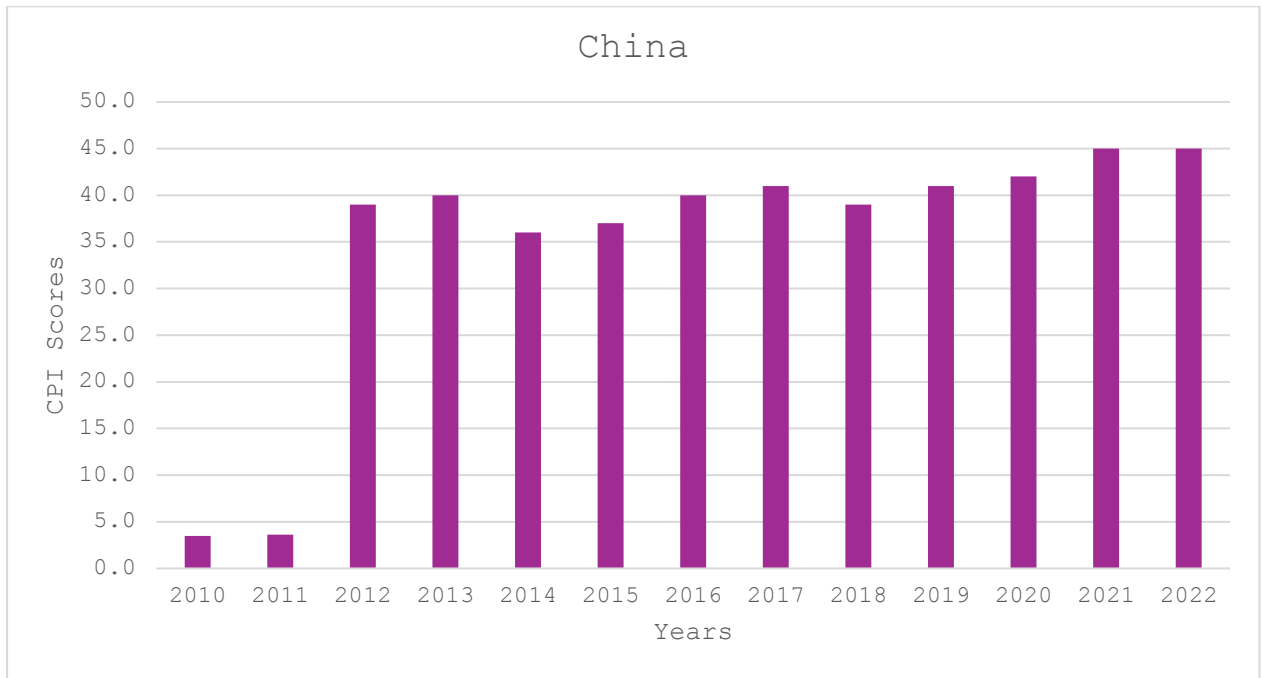
Figure 2.9: Bar graph showcasing India's CPI scores.



Source: Authors composition using data from the Transparency International Index (2022)

India's CPI scores from 2010 to 2011 ranged between 3.1 and 3.3 (Transparency International, 2022), largely driven by regulatory complexity and political factors. Corruption was a persistent issue, especially in infrastructure, real estate, and telecommunications. The Indian government responded by implementing digital governance initiatives like the Aadhaar biometric ID system, aimed at reducing fraud and corruption in welfare programs. Additionally, the Right to Information (RTI) Act empowered citizens to hold public officials accountable. Despite these efforts, corruption persisted, particularly in election financing. By 2022, India's CPI scores had improved to the low 40s, though bureaucratic inefficiencies remained a challenge (World Bank, 2020).

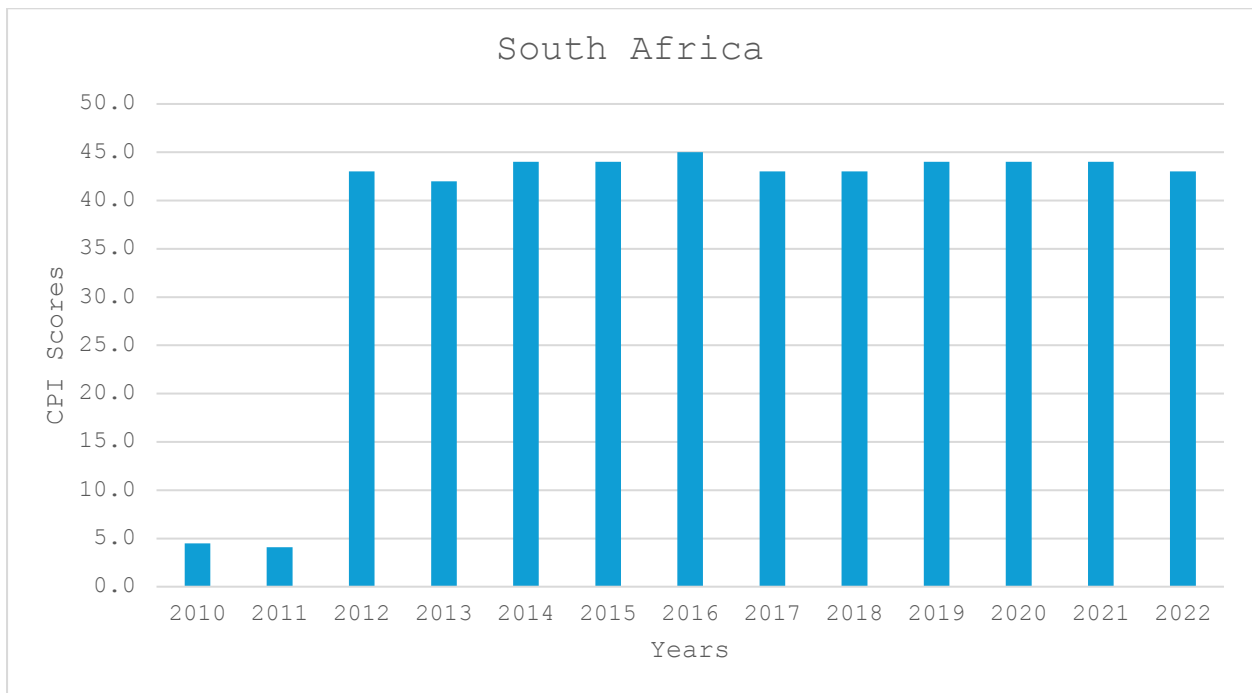
Figure 2.10: Bar graph showcasing China's CPI scores.



Source: Authors composition using data from the Transparency International Index (2022)

China's CPI scores in 2010 and 2011 were between 3.5 and 3.6 (Transparency International, 2022), reflecting corruption challenges associated with rapid economic growth and centralized political power. Corruption was rampant, especially at the provincial level. President Xi Jinping's anti-corruption campaign, launched in 2012, targeted officials across all levels of government, including high-ranking Communist Party members. This crackdown led to thousands of investigations, but some critics viewed it as a tool for consolidating power. By 2022, China's CPI scores improved slightly, reaching the mid-30s to early 40s, reflecting progress in anti-corruption efforts but within an authoritarian governance framework (Brown, 2018).

Figure 2.11: Bar graph showcasing South Africa's CPI scores.



Source: Authors composition using data from the Transparency International Index (2022)

Between 2010 and 2011, South Africa's CPI scores ranged from 4.1 to 4.5 (Transparency International, 2022), highlighting challenges tied to historical inequalities and weak regulatory frameworks. Corruption was particularly prevalent in public procurement and service delivery. In response, South Africa established multiple anti-corruption agencies, such as the Special Investigating Unit (SIU) and the Public Protector, while also encouraging civil society participation to enhance transparency. However, under the presidency of Jacob Zuma, accusations of state capture severely impacted governance. From 2012 to 2022, South Africa's CPI scores remained around the mid-40s, indicating ongoing struggles despite the establishment of oversight mechanisms (South African Government, 2020).

2.6. Chapter Summary

This chapter delved into the intricate dynamics of corruption within the stock markets of BRICS countries, providing a comprehensive analysis of its multifaceted impact. It began by defining corruption and outlining its various forms, followed by a historical perspective on its evolution. The chapter then explored the structure and regulatory environment of BRICS financial markets, identifying key trends from 2010 to 2022. It evaluated the influence of both

corporate corruption and broader economic corruption on financial markets, highlighting and providing insight in their detrimental effects. It broadened its focus by examining the factors contributing to corruption in financial markets and assessed its significant repercussions on economic development within the BRICS nations. Finally, the chapter discussed methodologies employed in studying these dynamics and offered insights relevant to policy formulation aimed at mitigating corruption's impact.

Chapter Three

Literature Review

3.1 Introduction

Expanding on the examination of BRICS stock markets and corruption provided in the previous chapter, the presented chapter will examine existing research and theories pertinent to the relationship between corruption and stock market performance within the BRICS nations and beyond. This exploration aims to identify inconsistencies, conflicts in prior studies, and lingering questions left unanswered by previous research.

The first section of the chapter delves into macroeconomic theories that assist in comprehending the correlation between corruption and stock market performance. This exploration unfolds in the opening segment, focusing on three crucial theories – the 'Corruption as Grease' theory, the New Institutional Economics (NIE), and the 'Corruption as Sand' theory. The primary objective is to assess the effectiveness of these theories in offering insights into how corruption shapes the trajectory of stock market performance.

The second section of the chapter examines empirical research on corruption and stock market performance, with a focused exploration of the BRICS countries and those related. The primary objective is to acquire a nuanced understanding of the current body of research and ongoing debates surrounding the intersection of corruption and stock market dynamics. This chapter aims to contribute to the broader knowledge base by synthesizing existing work and shedding light on the multifaceted relationship between corruption and stock market performance, especially within the unique context of the BRICS nations.

3.2. Theoretical literature

3.2.1 The corruption as sand theory

The theory of corruption as sand, advanced by Meng, Macaulay, and Peng (2019), explores how corruption affects investment decisions for multinational enterprises (MNEs) and domestic firms. It highlights the critical role of institutions in shaping the investment landscape

and underscores that corruption introduces inefficiencies and uncertainties into regulatory frameworks, impeding smooth investment processes. This framework aligns with the study's aim to investigate how corruption within institutions influences investment decisions and performance. Research by Hugo et al. (2021), Kaufmann (1997), and Murphy, Shleifer, & Vishny (1993) supports this view, indicating that while corruption might initially seem to expedite bureaucratic procedures, it ultimately deters investors by increasing transaction costs and reducing the quality of goods and services.

In Brazil, corruption significantly hindered development during the 2016 Rio Olympics. Major projects, such as a new subway line and the Marvelous Port redevelopment, were plagued by bribery. Odebrecht, a key construction firm, is under investigation for allegedly paying bribes to secure these contracts. The Operation Car Wash investigation revealed that Odebrecht and others paid around \$3 billion in bribes, involving 316 politicians from 24 parties. This scandal has stalled progress, inflated costs, and deepened Brazil's economic and political crises. For example, Odebrecht paid R\$1 million (about \$270,000) for the port project and R\$2.5 million (around \$680,000) for the subway line, illustrating how corruption has acted as "sand" in Brazil's development and deterred investment (Sandy, 2016).

In South Africa, corruption has similarly impacted investment. In the late 1980s, MNEs such as Coca-Cola, Exxon, Mobil, and Steiner Company withdrew due to concerns over corruption and pressure from anti-apartheid activists (Luiz & Stewart, 2014; Kibbe, 1988). This disinvestment reflected ethical dilemmas and legal and reputational risks associated with corrupt policies. Corruption in South African institutions, particularly in state-owned enterprises like Eskom, has been severe, with issues such as theft, maladministration, and collusion (Godinho & Hermanus, 2018). This has eroded public trust and deterred investment from firms like General Electric (U.S. Department of State, 2023).

In essence, the theory and the study focus on understanding the intricate relationship between corruption in institutions and investment behaviour. By applying the theoretical lens of 'corruption as sand' to the empirical analysis of disinvestment trends and investor behavior in South Africa, the study sheds light on how corruption impacts investment decisions and outcomes. This highlights the importance of considering corruption in institutions as a significant factor influencing investment decisions and outcomes.

3.2.2. The New Institutional Theory of Corruption

The New Institutional Economics (NIE), led by Coase, Williamson, and North, examines how institutions shape economic outcomes, emphasizing the importance of robust frameworks for capitalist success (Richter, 2005). Coase's work on transaction costs reveals market imperfections, driving the emergence of firms (Ménard & Shirley, 2014), Williamson and North distinguish between institutional environments and governance mechanisms, highlighting the impact of formal and informal institutions on investments (Faundez, 2016). Through institutional analysis, NIE enriches economic theory by illuminating the intricate relationship between institutions and investment dynamics (Ménard & Shirley, 2014).

The NIE extends neoclassical economics, which prioritizes free markets, utility maximization, and equilibrium (Agboola, 2015). While neoclassical economics emphasizes individual rationality and market forces' invisible hand, it faces criticism for methodological individualism, utility maximization assumptions, and reliance on equilibrium (Agboola, 2015). NIE intersects with neoclassical economics but emphasizes institutions' role in shaping economic behavior, acknowledging social structures, and highlighting transaction costs and institutional quality (Zinnbauer, 2001.) The NIE offers a broader framework integrating institutional analysis to address its limitations (Zinnbauer, 2001).

The theory offers practical insights into economic behavior, studying cases like Fisher Body-General Motors' vertical integration and coal supply arrangements in 2006 (Furubotn, & Richter, 2008). It analyzes how regulatory frameworks affect industries with natural monopolies, such as Eskom, by examining institutional quality, including regulatory policies and governance structures (Furubotn, & Richter, 2008). It's important to clarify that the theory doesn't directly regulate these entities, it evaluates how institutional factors influence their operations, pricing strategies, and market behavior. (Furubotn, & Richter, 2008).

By exploring contractual relationships and governance structures, NIE extends understanding beyond neoclassical frameworks, addressing real-world challenges (Agboola, 2015). Despite criticism for deviating from neoclassical principles, its focus on transaction costs and institutional quality enriches understanding, particularly in investment decisions (Schneider & Nega, 2016). Incorporating institutional analysis, the NIE offers valuable guidance on how

institutional frameworks shape economic outcomes for policymakers and practitioners (Shearer et al, 2016).

The study explores how corruption impacts institutional frameworks, a foundational concept within the NIE. Using metrics like the Corruption Perceptions Index reflects NIE's emphasis on analyzing institutional contexts and their influence on economic behavior, including investment decisions. This provides invaluable insights into institutional quality and effectiveness, crucial aspects within the NIE framework. Additionally, analyzing transaction costs associated with corruption aligns with NIE's focus on understanding their impact on economic decisions and behaviors, contributing to our understanding of institutional economics within the NIE paradigm.

3.2.3 The corruption as grease theory

While corruption is often condemned, alternative perspectives, like the corruption as grease theory suggest it can have positive economic effects under specific circumstances. Transaction cost theory (Rindfleisch, 2020) suggests that corruption, typically seen as a cost, may reduce other expenses, especially in environments with weak institutions and regulations. In such settings, corruption can expedite bureaucratic processes, boosting productivity and operational efficiency (Fleta-Asín & Muñoz, 2021). This streamlined approach is particularly attractive to investors seeking resources, who may pay bribes to navigate complex regulations and enhance operational effectiveness (Lui, 1985).

The corruption as grease theory framework suggests that corruption can sometimes yield positive economic effects by delving into the intricate relationship between investments and institutional and regulatory quality. This framework aligns closely with the primary objective of the study, which aims to investigate the impact of corruption on investment dynamics within institutions. The theory explores this relationship, to understand how corruption mitigates bureaucratic inefficiencies, reduces costs, and circumvents policy obstacles, potentially leading to improved investment outcomes, this perspective is further supported by research from Locatelli et al, (2017), Méon & Sekkat, (2005) and Cuervo-Cazurra, (2016). This coincides with the study which focuses on analysing the impact of corruption on investment behaviour across various institutional contexts, particularly in terms of bureaucratic efficiency and policy

challenges. In doing so, we use this theory as a guiding framework to provide insights into the complex interplay between corruption, institutional quality, and investment decisions.

In 2015, MTN Group encountered a regulatory hurdle in Nigeria when it was fined \$5.2 billion by the Nigerian Communications Commission for failing to adhere to SIM card registration regulations (Akisanmi 2018). To address this issue swiftly and potentially reduce the hefty penalty, MTN engaged in negotiations with Nigerian officials (Ogunyombo, 2023). While the specifics of these negotiations remain undisclosed, it is widely believed that MTN offered substantial payments or concessions to government representatives. This backdoor dealing likely facilitated a resolution that ultimately saw the fine reduced to \$1.7 billion, showcasing how corruption may have expedited a more favorable outcome for MTN amidst regulatory challenges.

This scenario highlights how corruption, in the form of behind-the-scenes negotiations and potential payments, played a role in resolving a significant regulatory issue for MTN in Nigeria. Despite the lack of transparency surrounding the interactions between MTN and Nigerian authorities, the outcome suggests that corruption served as a "grease" in navigating bureaucratic hurdles and achieving a more advantageous resolution for the company.

Considering the focus on institutional effectiveness, regulatory impacts, and the overarching effects on market operations and investor behaviour, the corruption as sand theory appears to be the most relevant theoretical framework for analysing stock market performance and corruption within institutions in BRICS countries (Ahmed & Anifowose, 2024). It provides a lens through which to examine how corruption impedes institutional efficacy and potentially undermines stock market dynamics in these emerging economies (Ahmed & Anifowose, 2024).

The corruption as sand theory emerges as the most relevant framework for analysing stock market performance and institutional corruption within BRICS countries, focusing on their governance challenges and prevalent corruption levels (Arif et al; 2023; Simo-Kengne & Bitterhout; 2023). These nations—Brazil, Russia, India, China, and South Africa—struggle with institutional integrity due to widespread corruption, which undermines transparency, weakens regulatory oversight, and introduces uncertainties (Arif et al; 2023; Simo-Kengne & Bitterhout; 2023). This theory posits that corruption acts as a significant barrier, eroding the

efficiency and reliability of institutional mechanisms essential for robust stock market operations (Arif et al; 2023; Simo-Kengne & Bitterhout; 2023). BRICS countries show varying levels of economic development and institutional maturity. While China has made significant progress, others struggle with governance issues, worsened by corruption, which distorts markets, reduces efficiency, and increases transaction costs (Arif et al; 2023; Simo-Kengne & Bitterhout; 2023).The theory highlights corruption's role in hindering regulatory frameworks, crucial in BRICS nations where regulations may be inconsistently enforced or susceptible to manipulation for personal gain, compromising market integrity (Arif et al; 2023; Simo-Kengne & Bitterhout; 2023).

Moreover, the corruption as sand theory provides a comprehensive framework for understanding investor confidence and market stability in BRICS countries. Perceptions of corruption significantly influence investor behaviour, emphasizing the need to address institutional weaknesses (Transparency International, 2022). This framework underscores the imperative for robust anti-corruption measures to foster a conducive environment for sustainable economic growth and resilient stock markets across BRICS nations.

3.3 Empirical Literature

Research on the impact of corruption on stock market performance across BRICS nations reveals diverse findings due to varying methodologies, variables, and regional contexts. This synthesis of insights from the most relevant studies highlights key findings and implications.

Empirical Findings from Mixed Countries

The studies by Wang & You (2012), Lin, Officer, and Sun (2016), Ekşi & Doğan (2020), Ahmed (2020), and Chowdhury, Khraiche, and Boudreau (2022) collectively illuminate the intricate relationship between corruption and stock market development, each offering unique perspectives shaped by diverse geographic scopes and methodological approaches. Wang & You's study on China from 2005 to 2012 presents a contrasting perspective, revealing a positive influence of corruption on firm growth, based on panel data analysis covering 12,400 firms across 30 provinces. In contrast, Lin et al., (2016) focus on US-listed firms, highlighting a direct negative correlation between corruption and stock market performance, emphasizing governance challenges within corporate structures.

Ekşi & Doğan's findings from 19 Eastern European countries and Central Asia between 2012 and 2017 suggest neutrality, positing no significant relationship between corruption levels and financial development in the region, underscoring regional variations. Ahmed's extensive study across 44 countries reveals systematic corruption's pervasive harm on equity markets, employing robust methodologies like the two-step system GMM estimator to detail impacts such as bribery and fraud.

Chowdhury et al. (2022) conducted a global analysis of 87 countries from 1995 to 2017, demonstrating that corruption significantly hinders stock market growth in low-income nations, while having minimal impact on high-income economies. The study highlights the critical roles that income levels and investment climates play in moderating this relationship. Overall these studies affirm corruption's universally detrimental impact on financial markets, advocating for tailored governance frameworks to mitigate risks and enhance market efficiency. The divergent conclusions emphasize the complexity of corruption's effects across different economic contexts, prompting the call for further nuanced research to comprehensively understand and address its impacts on global stock market dynamics.

Developing Countries

The studies by Ayaydın and Baltacı (2013), Mujtaba and Arshad (2020), Ziernhold and Jung-Ivannikova (2021), and Tran (2022) collectively investigate the complex relationship among corruption, financial sector development, and economic growth across diverse emerging markets and specific countries. They consistently identify a negative correlation between corruption and various aspects of financial sector development and economic growth, employing diverse econometric techniques like ARDL bounds testing to highlight the complexity and variability of corruption's impacts across different geographic and sectoral contexts.

Ayaydın and Baltacı's (2013) analysis of 42 emerging economies from 1996 to 2011 reveals a universal negative influence of corruption on banking sector progress and subsequent stock market growth. Their findings suggest that corruption acts as a significant barrier to economic development across nations. In contrast, Mujtaba and Arshad (2020) focus on Pakistan from

1997 to 2016, using qualitative methods to uncover adverse links between corruption, crime rates, credit ratings, and stock market development, illustrating unique governance challenges within Pakistan. While both studies underscore corruption's detrimental effects on financial markets, they differ in geographic focus, methodological approaches, and nuanced insights into regional dynamics.

Ziernhold and Jung-Ivannikova (2021) offer a nuanced analysis of Ukraine from 1996 to 2019, using sophisticated statistical techniques to reveal dual dynamics where economic growth positively influences financial development, while corruption exerts a distinctly negative influence. Their study illustrates complex regional dynamics where economic resilience coexists with significant governance challenges related to corruption. Finally, Tran(2022) conducted a study in Ukraine from 2005 to 2016 highlights regional variations in corruption's impact on financial development. Despite overall economic growth supporting financial resilience, Tran finds that corruption significantly inhibits corporate risk-taking in Ukraine's emerging stock markets, emphasizing context-specific challenges. Together, these studies deepen our understanding of corruption's detrimental impact on financial sectors, emphasizing both shared findings and nuanced regional variations.

BRICS Countries

The studies explore the intricate interactions among corruption, economic growth, financial markets, and foreign direct investment (FDI) across diverse regions, with a focus on BRICS nations. Ayaydin and Baltacı (2013), Mujtaba and Arshad (2020), and Tran (2022) provide insights from broader emerging markets, illustrating the negative correlation between corruption levels and financial sector development. Employing methods such as ARDL bounds testing, Generalized Method of Moments (GMM), and dynamic panel estimators, these studies examine varying levels of institutional quality, regulatory frameworks, political stability, and economic diversification. Collectively, they emphasize the complexity of corruption's impact on economic and financial outcomes, advocating for tailored governance reforms to foster sustainable development and attract investment in emerging markets.

Arif, Khan, and Waqar (2020) extend this analysis specifically to BRICS nations, establishing a consensus on corruption's negative influence on economic growth. Using econometric techniques such as panel data analysis, fixed effects models, and dynamic panel estimators,

they explore how corruption impedes financial market expansion and deters FDI inflows. The study suggests a 'U-shaped' relationship between corruption and FDI attractiveness, where factors such as regulatory efficiency, infrastructure development, and political stability play a moderating role.

Rashid et al., (2021) and Abdu et al., (2021) use panel data and auto-regressive distributive lag models to analyse long-term relationships, demonstrating that corruption undermines institutional efficacy and financial development. Lakshmi, Saha, and Bhattarai (2021) examine the effects of corruption on stock market returns in BRIC nations, employing an error correction model (ECM) to show that corruption can reduce stock returns by up to 3%.

Osamwonyi and Osaseri (2020) and Simo-Kengne and Bitterhout (2023) analyze the relationship between stock market development and economic growth in BRICS nations. Osamwonyi and Osaseri (2020) highlight a positive correlation between stock market development and economic growth despite the presence of corruption, illustrating the nuanced outcomes shaped by local governance, economic policies, and regional dynamics. Simo-Kengne and Bitterhout (2023) reaffirm the negative effects of corruption, further illustrating how local governance and regional factors influence the complex relationship between corruption and economic growth.

3.4. Chapter Summary

This chapter delved deeply into the intricate relationship between corruption and stock market performance, focusing specifically on BRICS countries and global contexts. It examined various theoretical frameworks such as Corruption as Grease, New Institutional Economics, and Corruption as Sand, highlighting their implications for understanding how corruption influences investment dynamics and market efficiency. The empirical literature reviewed underscored diverse findings, revealing both the detrimental impacts of corruption on financial markets and occasional complexities where corruption might facilitate economic activities. Overall, the chapter aimed to synthesize existing research, address gaps in understanding, and provide insights crucial for policy-making and institutional reforms to foster transparent and efficient market environments within the BRICS nations and beyond.

Chapter Four

Data and Methodology

4.1. Introduction

The presented chapter will discuss the data collection methods and analytical techniques used in the study. It plays a pivotal role in advancing the objectives outlined in Chapter 1 and building upon the theoretical framework established in Chapter 3. As a vital part of the research, this chapter directly contributes to achieving the goals of the thesis by facilitating the empirical investigation and analysis of the research questions posed. By explaining the data collection and analysis procedures, this chapter reinforces the commitment to generating new insights and knowledge.

The chapter will explore the research design, methods, and techniques underpinning the study. The first section will begin with a discussion of the research paradigm, it will draw from established literature to explain the philosophical underpinnings guiding the investigation. Ontology, epistemology, methodology, and methods will be dissected to provide clarity on how these components shape the understanding and approach to the research questions. Building upon this foundation, unveiling the adoption of the post-positivist paradigm, highlighting its relevance in navigating the complexities of corruption and stock market behavior within the BRICS nations.

The second part of the chapter outlines the research design, offering a structured framework for data collection, analysis, interpretation, and reporting. It employs a panel data analysis approach known for its effectiveness in managing individual differences and time-specific effects. Highlighting its quantitative nature and adaptability, the discussion emphasizes its capability to uncover relationships across diverse datasets and periods. The importance of diagnostics tests is stressed to ensure analysis reliability, addressing concerns such as multicollinearity, heteroscedasticity, and autocorrelation. These discussions pave the way for systematically exploring the relationship between corruption and stock market performance in BRICS nations, aiming to enhance existing knowledge in this area.

4.2. Research paradigm

Anand et al. (2020) and Kivunja & Kuyini (2017) discuss research paradigms as collective belief systems guiding problem-solving approaches. Anand et al. (2020) highlights ethical practices, good behavior, and societal norms, while Kivunja & Kuyini (2017) focus on worldviews, valid explanations, knowledge formation, and knowledge value. Both stress the role of paradigms in shaping understanding and addressing challenges. However, Anand et al. (2020) emphasizes ethical practices and societal norms, whereas Kivunja & Kuyini (2017) delve into knowledge formation and the nature of knowledge within paradigms.

To know which research paradigm best fits, it is important to first look at the four components of a research paradigm which are ontology, epistemology, methodology, and methods (Rehman & Alharthi 2016). In the study, ontology, explored by Kivunja and Kuyini (2017), involves examining fundamental beliefs about what is considered rational or real. This entails exploring the inherent characteristics and patterns observed in the societal occurrence of corruption and its relationship with stock market performance. Assumptions about corruption's pervasive societal presence and its implications for stock market functioning in BRICS countries are carefully considered.

Epistemology, within the research paradigm, concerns how knowledge is acquired and its validity (Rehman & Alharthi, 2016). In this context, it entails understanding and interpreting the link between corruption and stock market performance, analyzing theories and empirical evidence to gain insight into this complex phenomenon. Methodology refers to the overall approach used in research (Goundar, 2012). It involves employing a quantitative approach to analyze data on corruption perceptions and stock market performance indicators. This enables systematic investigation into the relationship between corruption and stock market performance in the BRICS countries over a specific time.

Methods involve using techniques to collect and analyze data. This includes using secondary sources like the Corruption Perceptions Index to measure corruption and official stock market data. Statistical methods like panel ARDL analysis and the Granger causality method will be used to examine the relationship between corruption and stock market performance.

The main research paradigms include positivist, post-positivist, and interpretive approaches (Pickard, 2013; Tubey et al, 2015). This study follows insights from Pickard (2013) and Tubey et al. (2015), adopting the post-positivist paradigm for its ability to address the complexities of social phenomena by integrating quantitative and qualitative methods to understand corruption's impact on stock market performance comprehensively.

Quantitative analysis involves statistical techniques like panel ARDL data analysis and the Granger causality method, using data from sources such as the Corruption Perceptions Index. This allows for examining numerical trends and patterns within the data. Qualitative analysis, like content analysis done in this study, investigates the underlying factors influencing corruption and its impact on stock market performance. By combining both methods, the study aims to understand the dynamics between corruption and stock market performance in BRICS countries, aligned with the post-positivist paradigm.

The post-positivist paradigm encourages a comprehensive understanding of social phenomena through both quantitative and qualitative methods. Following this approach, the study presents the following hypotheses:

H₀: There is no relationship between corruption, and stock market behaviour among the selected BRICS countries.

H₁: There is a relationship between corruption and stock market behaviour among the selected BRICS countries,

4.3 Research Design

A research design serves as a structured plan for collecting, analysing, interpreting, and reporting data in research studies (Boru, 2018). It outlines how theoretical research problems will relate to empirical data collection and analysis methods (Boru, 2018). This design is essential as it guides the entire research process, ensuring that methods align with research questions or hypotheses, thus maintaining validity and reliability (Kabir, 2016).

This study adopts a quantitative approach by employing panel data analysis, which involves collecting data from multiple entities over several time periods. As defined by Baltagi (2008), panel or longitudinal data combines two dimensions: cross-sectional data from different entities

and time series data across various time points. In this research, the cross-section includes five BRICS countries—Brazil, Russia, India, China, and South Africa—while the time series spans ten years, from 2013 to 2022. This approach allows for a more comprehensive understanding of the dynamics between corruption and stock market performance within these economies.

Panel data analysis, as emphasized by Eom et al. (2008), is crucial for controlling individual differences and time-specific effects. It allows for the control of individual differences and time-specific effects (Eom et al, 2008), ensuring that factors unique to each country and period are appropriately accounted for. By mitigating issues like omitted variables and unobservable heterogeneity, panel data analysis enhances the reliability of findings. This comprehensive approach ensures a more accurate assessment of corruption's influence on stock market behavior, ultimately bolstering the validity of the study's findings.

Within the study's context, It is important to understand the interplay between various factors, such as governance structures and economic conditions, and their impact on corruption levels. The study seeks to investigate whether there is a correlation between corruption and stock market performance, particularly examining whether higher corruption perceptions coincide with lower stock market performance. This methodological approach is essential for generating accurate information, aiding informed decision-making, and capturing perspectives of the wider population, as underscored by Apuke (2017).

4.3.1 Justification of theoretical framework

The Corruption as Sand theory, Corruption as Grease theory, and New Institutional Economics (NIE) theory provide distinct perspectives on understanding corruption within stock markets and institutional environments, especially in BRICS countries. The Corruption as Sand theory is particularly pertinent, illustrating how corruption compromises institutional integrity, increases transaction costs, and undermines investor confidence, thereby adversely affecting stock market performance (Charp, 2016). This theory underscores the imperative of implementing robust anti-corruption measures to mitigate these effects and cultivate a conducive environment for sustainable economic growth and market stability (Charp, 2016). Conversely, the Corruption as Grease theory offers insights into how corruption, despite its negative perception, can facilitate economic activities by navigating bureaucratic inefficiencies

(Yi et al, 2019). It recognizes the varied impacts of corruption across firms and industries, influenced by their risk tolerance and strategic responses to regulatory challenges in emerging markets.

The NIE theory enriches understanding by emphasizing how institutions shape economic outcomes, including the influence of regulatory frameworks and transaction costs on investor behaviour and market dynamics (Greif, 2006). While NIE may overlook cultural factors in institutional evolution, its focus on property rights enforcement and institutional development remains crucial for analysing corruption's broader implications for financial markets and economic strategies in BRICS nations (Arrow, 1978; Williamson, 2000). These theories collectively provide a robust framework for examining corruption's multifaceted impacts on institutional effectiveness and stock market dynamics in diverse economic contexts.

4.3.2 Content Analysis

4.3.2.1 Unit of Analysis

The BRICS nations are the focus of this study, which examines the relationship between corruption and stock market performance. To analyse corruption, the study reviews a variety of sources, including Transparency International's Corruption Perceptions Index, which quantifies perceived corruption levels. a comprehensive view of each country's governance structures and their impact on corruption and government reports for accurate insights

Stock market performance and inflation data were sourced from the World Bank, offering reliable insights crucial for analysing BRICS economies. These include reports on market trends, economic policies, and reforms, such as China's market liberalization, that have shaped these markets. This data helps in understanding the factors influencing market dynamics, including domestic reforms, geopolitical challenges, and technological advancements, particularly in India and China.

By integrating these data sources with corruption-related documents, the study conducts a content analysis that explores how corruption and stock market performance intersect. This qualitative approach complements the broader quantitative analysis, providing deeper insights into the dynamics shaping BRICS stock markets.

4.3.2.2 Category Development

The study categorizes content into key themes for a comprehensive analysis. Corruption Perception encompasses corruption scores in BRICS countries. Stock Market Performance includes market capitalization and volatility, and events such as Brazil's political instability. Economic Reforms focuses on policies and reforms, like China's market liberalization, that influence stock market growth. Technological Advancements highlights innovations in India and China driving economic and market development.

These categories provide a structured framework for analysing the relationship between corruption and stock market performance, revealing how various factors shape financial dynamics in BRICS economies

4.3.2.3 Coding Scheme

Corruption Perception Index (CPI) is employed for references to corruption scores and ratings, capturing the perceived levels of corruption within BRICS countries. MCAP (Market Capitalization) is used to discuss stock market size, trends, and performance, providing insights into the overall market dynamics.

4.3.3 Estimation Techniques

4.3.3.1 Unit root testing

Testing for stationary variables is essential when dealing with time-series data, as non-stationary variables can lead to misleading results and violate standard assumptions in regression analysis (Brooks, 2008). Stationary series have constant mean, variance, and autocovariance. Non-stationary data can cause spurious regressions and affect the reliability of analysis (Wolters, J & Hassler, 2006). Examining autocorrelation functions graphically is an informal way to test for unit roots, revealing data issues or structural breaks (Brooks, 2008).

Unit root tests such as the Augmented Dickey-Fuller (ADF) and Philips-Perron (PP) tests, while efficient for time series data, often lack the power to distinguish between a unit root and stationary alternatives. As a result, empirical researchers increasingly turn to panel unit root tests when working with panel datasets, which offer enhanced statistical power. The panel unit root tests adapted from Levin & Lin (1992, 1993), Levin et al. (2002), and Im, Pesaran & Shin

(1997, 2003) are particularly favoured. These tests improve upon single time series tests by considering data across multiple cross-sectional units simultaneously (Maddala & Wu, 1999).

There are two generations of panel unit root tests. The first generation assumes cross-sectional independence among units, while the second generation relaxes this assumption to allow for cross-sectional dependency (Menegaki, 2018). First-generation tests, such as those by Hadri (2000), Im et al. (2003), Levin and Lin (1992, 1993), and Maddala and Wu (1999), posit a homogeneous unit root process across cross-sectional units. In contrast, second-generation tests, exemplified by Pesaran (2003), account for heterogeneous cross-sectional characteristics to better handle cross-sectional dependence (Menegaki, 2018). This study opts for a first-generation panel unit root test due to software constraints, specifically using EViews. The test's primary role is to determine the number of differences required to achieve stationarity in a variable or series. Integration, denoted as $I(d)$, indicates a variable Y of order d is integrated if it achieves stationarity after being differenced d times (Engle & Granger, 1987).

(a) First-generation panel unit root tests

As stated above, first-generation panel unit root tests assume that the data is independent and identically distributed (i.i.d.) across individuals (Barbieri, 2006; Choi, 2001). This study will employ the two main first-generation unit root tests the, Levin, Lin & Chu (LLC) and IM, Pesaran & Shin tests.

Levin, Lin, and Chu test:

(Levin & Lin (1992, 1993) and Levin et al. (2002) assume homogenous autoregressive between individual, i.e. $\rho_j = \rho$ for all j , the alternative hypothesis is:

$$H_a : \rho_j = \rho < 0, \forall j$$

They assume that the fixed effects are captured by inter-individual heterogeneity.

Im et al. (2003) build upon the framework introduced by Levin & Lin (1992, 1993) by incorporating heterogeneity in the autoregressive coefficient. This modification expands the scope of the test to consider varying values of the autoregressive coefficient across different units, thereby broadening the alternative hypothesis under examination defined as:

$$H_a : \rho < 0, j = 1, \dots, N_1 \text{ and } \rho_j = 0, j = N_1 + 1, \dots, N$$

This test includes an individual $j = 1, \dots, N_1$ where x_{jt} is stationary, and individual $j = N_1 + 1, \dots, N$ where x_{jt} is non-stationary. The t-statistic is an average and can be computed as follows:

$$\hat{t} = \frac{1}{N} \sum_1^n t_j \dots \dots \dots (4.1)$$

Where t_j is the individual ADF t-statistics for the unit root test.

Based on research by Fischer (1932) and Maddala & Wu (1999) suggested joining the p-values of the t-statistic for a unit root in the respective cross-sectional unit. The test statistic of Maddala & Wu (1999) is as follows:

$$MW = -2 \sum_{j=1}^n \ln(p_j) \dots \dots \dots (4.2)$$

Where p_j is the p-value of the t-statistic of the ADF test.

Im, Pesaran & Shin (1997, 2003):

Im, Pesaran, and Shin (2003) introduce a flexible and computationally simple unit root testing procedure for panels, known as the t-bar statistic. This method accommodates both stationary and non-stationary series by allowing the autoregressive coefficient (ρ) to vary between individuals. The IPS test accounts for residual serial correlation and heterogeneity in dynamics and error variances across groups.

The IPS (Im, Pesaran, and Shin) approach addresses serially correlated error terms that may vary across cross-sectional units. It computes the mean of the ADF statistics for each unit in the panel, considering different serial correlation patterns and a linear trend for each cross-section unit as follows:

$$\Delta y = \alpha_i + \beta_i y_{it-1} + \sum_{j=1}^{p_i} \gamma_{ij} \Delta y_{it-j} + \epsilon_{it} \dots \dots \dots (4.3)$$

The null hypothesis:

$$H_a : \rho_i = 0, \text{ for all } i$$

Against the alternative

$$H_o \{ \rho_i < 0, \text{ for } i=1 \dots \dots N$$

$$\{ \rho_i < 0, \text{ for } i=N_i + 1 \dots \dots \text{ With } 0 < N \leq N$$

The IPS approach allows for some (but not all) individual series to have unit roots. It computes separate unit root tests for the N cross-sectional units and defines the t-bar statistic as the average of the individual ADF statistics, t_{iT} , under the null hypothesis.

$$\hat{t} = \frac{1}{N} \sum_{i=1}^N t_{iT} \dots \dots \dots (4.4)$$

The IPS approach assumes that the t_{iT} statistics are i.i.d. with finite mean and variance. Therefore, by the Lindeberg-Levy central limit theorem, the standardized t-bar statistic converges to a standard normal distribution as $N \rightarrow \infty$ under the null hypothesis. To standardize the t-bar statistic, the mean and variance values have been computed via Monte Carlo methods for different values of T and t_{iT} these values are tabulated by IPS (2003).

4.3.3.2 Hausmen Test.

The study will conduct a Hausman test to examine the homogeneity of the Mean Group (MG) and Pooled Mean Group (PMG) estimators. MG, introduced by Pesaran & Smith (1995), calculates coefficient means and assesses their distribution across groups, assuming parameter independence. PMG, proposed by Pesaran et al. (1999), is an intermediate estimator between MG and Dynamic Fixed Effect (DFE). It allows varying intercepts, short-run coefficients, and error variances across groups while maintaining homogeneity in long-run coefficients. The key difference lies in their treatment of long-run coefficients' homogeneity.

In the context of our analysis, the null hypothesis for the Hausman test posits that the MG and PMG estimates significantly differ, with PMG being more efficient. A p-value greater than 5 percent indicates the inability to reject the null hypothesis, suggesting the use of PMG. Conversely, a p-value less than 5 percent leads to reject the null hypothesis and the use of an MG. This approach ensures the selection of the most suitable estimator based on its efficiency in our estimation process.

4.3.3.3 Panel ARDL

This study will utilize the panel ARDL model, a widely used tool in financial analysis, to uncover long-run relationships between variables. Past research by Khan et al. (2020), Rafindadi & Yosuf (2013), and Salisu & Isah (2017) has employed this model. Developed by

Pesaran (1997) and Pesaran et al. (1999, 2001), it allows for simultaneous estimation of short-run and long-run components and is robust to sample size variations. The panel ARDL method accommodates variables of different orders, effectively addressing residual serial correlation and endogenous regressors. Its estimates demonstrate greater efficiency and reliability in small samples compared to the Johansen technique (Pesaran et al., 1999, 2001).

Expanding the traditional ARDL model to panel data facilitates a more comprehensive analysis, particularly beneficial for datasets involving numerous entities across various periods (Bitterhout & Simo-Kengne, 2020). Panel data techniques are highly regarded in econometrics due to their effectiveness in addressing significant issues like heterogeneity, endogeneity, and the lasting impact of shocks in dynamic models (Bitterhout & Simo-Kengne, 2020). These challenges pose difficulties when solely relying on time-series or cross-sectional models.

Introduced by Pesaran & Shin (1995), the ARDL model, denoted as ARDL (p, q, ..., q), is characterized by equation (4.1) as follows:

$$SMP_{it} = \alpha_0 + \sum_{j=1}^p \lambda_{ij} SMP_{i,t-j} + \sum_{j=0}^q \delta'_{ij} X_{i,t-j} + \varepsilon_{it} \dots\dots\dots (4.5)$$

Where SMP_{it} is the Stock Market Performance and is the dependent variable; X_{it} is a 4x1 vector of the explanatory variables, and ε_{it} is the error term. The above model, equation 4.1 is used to establish the relationship between stock market performance and corruption using a panel ARDL analysis.

4.3.3.4 Cointegration tests

First formalized by Granger (1981) and Engle & Granger (1987), cointegration assesses the long-run relationship between stock market performance and corruption in BRICS. It represents a phenomenon indicating a long-run equilibrium between economic time series, maintaining their long-term information (Engle & Granger, 1987; Granger, 1981). This involves a stationary linear combination of variables that are individually non-stationary but integrated at the first difference, I (1) (Nkoro & Uko, 2016). While the connection may not be immediately apparent in the short run, cointegration reveals a stable, long-term relationship between variables (Mohanasundaram & Karthikeyan, 2015). Neglecting cointegration tests risks yielding misleading results (Mohanasundaram & Karthikeyan, 2015).

4.3.3.5 Pedroni tests

Pedroni (1999, 2004) developed seven tests for panel data cointegration, facilitating the examination of long-term relationships while accommodating heterogeneous short-term dynamics and fixed effects across panel members. The null hypothesis for these tests posits that the variables under consideration are not cointegrated within each panel member. Conversely, the alternative hypothesis suggests the presence of a single cointegration vector for each panel member, potentially differing across members. These tests offer the advantage of allowing variations in fixed effects and dynamics across panel members, as well as differences in the cointegrating vector under the alternative hypothesis.

When preparing and running panel cointegration tests, the residual values of the regression conducted for hypothesized cointegration are determined in the following manner.

$$y_{j,t} = \alpha_j + \delta_j t + \beta_{1jx1j,t} + \beta_{2jx2j,t} + \dots + \beta_{MjxMj,t} + e_{j,t} \dots\dots\dots(4.6)$$

$$\Delta y_{i,t} = \sum_{m=1}^M \beta_{mi} \Delta X_{mi,t} + \eta_{i,t}$$

$$\hat{e}_{i,t} = \gamma \hat{e}_{i,t-1} + \hat{\mu}_{i,t}$$

$$\hat{e}_{i,t} = \gamma \hat{e}_{i,t-1} + \sum_{k=1}^K \gamma_{i,k} \Delta \hat{e}_{i,t-k} + \hat{\mu}_{i,t}$$

Where $m = 1, \dots, M$ represents the number of regression variables, $t = 1, \dots, T$ denotes the number of observations over time $i = 1, \dots, N$ signifies the number of individual members in the panel, and $k = 1, 2, \dots, K$ stands for the number of lags in the ADF regression.

The seven tests are divided into two categories: group-mean statistics, which combine the individual variable test statistic, and panel statistics which pool the statistics along the within-dimension (Pedroni, 1999, 2004). In both categories, there are nonparametric (ρ and t) and parametric (augmented Dickey-Fuller [ADF] and v) test statistics.

The following equations can then be used to construct the seven statistics (Pedroni, 1999).

$$\text{Panel } v: T^2 N^{3/2} \left(\sum_{i=1}^N \sum_{t=0}^T \hat{L}_{11}^{-2} \hat{e}_{i,t-1}^2 \right)^{-1} \dots\dots\dots(4.7)$$

$$\text{Panel } \rho: T \sqrt{N} \left(\sum_{i=1}^N \sum_{t=1}^T \hat{L}_{11}^{-2} \hat{e}_{i,t-1}^2 \right)^{-1} \sum_{i=1}^N \sum_{t=1}^T \hat{L}_{11}^{-2} (\hat{e}_{i,t-1} \Delta \hat{e}_{i,t} - \lambda_i)$$

$$\text{Panel } t: (\sigma_{N,T}^2 \left(\sum_{i=1}^N \sum_{t=1}^T \hat{L}_{11}^{-2} \hat{e}_{i,t-1}^2 \right))^{-1/2} \sum_{i=1}^N \sum_{t=1}^T \hat{L}_{11}^{-2} (\hat{e}_{i,t-1} \Delta \hat{e}_{i,t} - \lambda_i)$$

$$\text{Panel ADF: } (\hat{s}_{N,T} \sum_{i=1}^N \sum_{t=1}^T L_{11}^{-2} \hat{e}_{i,t-1}^2)^{-1} \sum_{i=1}^N \sum_{t=1}^T L_{11}^{-2} (\hat{e}_{i,t-1} \Delta \hat{e}_{i,t} - \lambda_i)$$

$$\text{Group } \rho: T^{1/\sqrt{N}} \sum_{i=1}^N \sum_{t=1}^T L_{11}^{-2} \hat{e}_{i,t-1}^2)^{-1} \sum_{i=1}^N \sum_{t=1}^T L_{11}^{-2} (\hat{e}_{i,t-1} \Delta \hat{e}_{i,t} - \lambda_i)$$

$$\text{Group } t: 1/\sqrt{N} (\sigma_{N,T}^2 (\sum_{i=1}^N \sum_{t=1}^T L_{11}^{-2} \hat{e}_{i,t-1}^2)^{-1/2} \sum_{i=1}^N \sum_{t=1}^T L_{11}^{-2} (\hat{e}_{i,t-1} \Delta \hat{e}_{i,t} - \lambda_i)$$

$$\text{Group ADF: } 1/\sqrt{N} \sum_{i=1}^N (\sum_{t=1}^T \hat{s}_i^2 \hat{e}_{i,t-1}^2)^{-1/2} \sum_{t=1}^T \hat{e}_{i,t-1} \Delta \hat{e}_{i,t}$$

The adjustment of test statistics ensures conformity to a standard normal distribution ($N(0, 1)$) under the null hypothesis, with modifications dependent on factors like the number of regressors, time trends, and the type of test statistics utilized. In instances where the null hypothesis of no cointegration is refuted, the panel v statistic tends towards positive infinity, while other statistics trend towards negative infinity. According to Neal (2014), rejection of the null hypothesis occurs when individual cross-sections' statistics significantly deviate from the theoretical means expected under the null hypothesis.

The relative power of each test statistic remains somewhat ambiguous, leading to potentially conflicting outcomes. Specifically, when $T < 100$, the group and panel ADF statistics exhibit better power properties compared to the panel v and group statistics (Pedroni, 2004). Additionally, ADF statistics perform more effectively when errors follow an autoregressive process (Neal, 2014).

4.3.3.6 Granger causality

The Granger causality test, introduced by Clive Granger in 1969, assesses if one time series influences another (Granger, 1969). Instead of mere correlations, Granger proposed predicting future values of a series using prior values of another (Granger, 1969). For instance, if time-series X significantly predicts future values of time-series Y , X is said to be Granger-cause Y (Granger, 2003). This test is crucial to understand potential predictability between variables (Granger 1969). In our study, we use it to explore the relationship between corruption and stock market performance amongst BRICS, a preliminary step before building a model.

4.3.3.7 Heterogeneity

Scholars like Gyimah-Brempong (2002), Swaleheen, Stansel (2007), Ahmad, Ullah, and Arfeen (2012) highlight the importance of acknowledging heterogeneity in corruption and economic growth studies. Variations in factors such as religion, culture, and institutions significantly affect how corruption influences economic growth globally. Neglecting these unique national factors can result in inconsistent research results (Hsaio, 2003).

Differences in political systems like China's one-party state and Russia's centralized government introduce heterogeneity (Joo & Shawl, 2023). North (1991) notes that variations in formal and informational institutions, as well as the significance of economic growth factors, contribute to this diversity. BRICS nations also vary in economic development, with China leading in size, growth, and trade (Saran, Singh & Sharan, 2012). They differ in resources, consumption, energy use, and demographics (Saran, Singh & Sharan, 2012). For example, Brazil is mainly urban, India is largely rural, Russia has an aging population, and South Africa has a young demographic (Saran, Singh & Sharan, 2012).

Acknowledging these diverse elements within BRICS nations is essential. This recognition suggests that corruption's influence on stock market performance might differ significantly because of these distinct national characteristics. It's vital to factor in these unique attributes when examining the connection between corruption and stock markets in these countries.

4.3.3.8 Endogeneity

Endogeneity in a model indicates the correlation between explanatory variables and disturbances, leading to inconsistent ordinary least squares (OLS) estimates due to factors like omitted variables, measurement errors, sample selectivity, or self-selection (Baltagi, 2005). Stock market development concerning corruption, and endogeneity can stem from simultaneity bias, where factors like economic growth, corruption, and investment mutually influence each other, causing simultaneous random shocks (Gyimah-Brempong, 2002; Swaleheen, 2011; Islam, 1995). Omitted variable bias may occur if essential determinants of stock market development, such as human capital, are left out due to data limitations, leading to biased estimates (Baltagi, 1995). Measurement errors in corruption data, based on perceptions, can be

biased due to economic development, religious beliefs, and democratic institutions, influencing the analysis (Donchev & Ujheyli, 2014; Kauffman, Kraay & Mastruzzi, 2006).

Endogeneity can arise from the dynamic structure of economic growth models used in stock market studies, incorporating lagged dependent variables to account for persistence, causing correlation issues between lagged variables and error terms (Hsiao, 2003; Judson & Owen, 1999). Endogeneity can be addressed through regression analysis and employing robust econometric techniques like dynamic panel data models which are employed in this study. This is crucial for accurate research outcomes in stock market development studies (Ullah, et al 2018). These methods help control for endogeneity by capturing unobserved heterogeneity and lagged effects over time, thereby enhancing the validity of research findings (Ullah, et al 2018).

4.4.1 Model specification

The research will adopt a model based on Bitterhout & Simo-Kengne (2020) who explored the effect corruption has on economic growth in BRICS countries using a panel ARDL data analysis and Hasan & Nuri (2013) who explored the relationship between corruption, the banking sector and stock market development on 42 emerging economies using a panel data analysis.

Research Model

The general model is expressed as:

$$SMP = f(SMP_{it-1}, CPICorruption_{it}, Inflation_{it}, \dots \dots \dots)(4.8)$$

SMP_{it-1} refers to the value of the stock market performance variable in the previous time representing a lagged variable in a time series analysis. *Control* represents the control variable that may be required when running the estimation.

A detailed econometric form of equation (1) will be as follows:

$$SMP = f(\beta_0 + \beta_1 SMP_{it-1} + \beta_2 SM-CAP_{it} + \beta_3 CPICorruption + \beta_4 INFLTN_{it} \mathbf{u}t \dots \dots \dots)(4.9)$$

SMP = Stock Market Performance

SM – MCAP = Stock Market Capitalization

INFLTN= Inflation

CPICorruption = Corruption Perception Index (Corruption),

Equation 2 is a basic form of the model we will use in testing the cointegration between the mentioned variables. ut is given to be an error term and $\beta_1, \beta_2, \beta_3, \& \beta_4$ denote the model parameters.

4.3.3 Definition of variables

4.3.3.1. Dependent variables

Stock market performance refers to the overall performance and behavior of a stock market or a specific stock index over some time (Paulet & Rowley, 2017). It is commonly assessed by tracking changes in stock prices, market indices, and other financial indicators that reflect the value and movement of stocks traded on an exchange (Knight & Bertoneche, 2000). Stock market performance (SMP) will be measured using proxies such as stock market capitalization value relative to GDP (SM-MCAP)

(i) Stock market capitalization, representing the aggregate value of all listed stocks on an exchange, serves as a key indicator of market activity relative to its size (Levine, 1996). Derived from the multiplication of a company's stock price by its outstanding shares, higher market capitalization typically signifies stability, whereas lower values may indicate volatility (Levine, 1996). Investors utilize this metric to classify stocks such as large-cap, mid-cap, and small-cap (Levine, 1996). Stock market capitalization stands as the sole prevalent indicator that exhibits long-term cointegration with corruption, illustrating its robustness in reflecting systemic economic impacts over time.

Theoretical perspectives from Meng et al., (2019) and Hugo et al., (2021), combined with empirical findings by Arif et al., (2023) and Rashid et al., (2021), suggest a negative correlation between corruption and stock market capitalization. Higher corruption levels tend to increase market volatility, reducing stability, while lower corruption levels enhance stability, decreasing volatility. This implies an expected negative relationship between corruption and stock market capitalization, impacting investor sentiment and behaviour, leading to capitalization fluctuations.

4.3.3.2. Independent variables

Lagged Stock Market Performance - According to Wilson (2019), a lag variable is a variable based on the past values of the time series. Lagged stock market performance refers to the historical performance of a stock market index or individual stocks in the past, usually measured over a specific period Wilson (2019). It involves looking at the returns, price changes, or other indicators of stock market activity over a previous period, such as the past month, quarter, or year (Knight & Bertoneche, 2000).

Corruption Perception Index (CPI) - The Corruption Perception Index (CPI) is an index published annually by Transparency International, a global non-governmental organization. It measures the perceived levels of corruption in the public sector of various countries (Transparency International, 2022). The CPI ranks countries and territories based on how corrupt their public sector is perceived to be by experts and businesspeople (Transparency International, 2022). Scores on the CPI range from 0 to 100, with 0 indicating highly corrupt and 100 indicating very clean (Transparency International, 2022). Countries with higher scores are perceived as having lower levels of corruption and higher levels of transparency and integrity in their public sector institutions (Transparency International, 2022). The CPI is widely used by researchers, policymakers, and organizations to assess and compare corruption levels across different countries and regions (Transparency International, 2022).

4.3.3.3. Control Variable

Inflation - Inflation, measured by the Consumer Price Index (CPI), reflects the general rise in prices for goods and services, impacting purchasing power (Feldstein, 1983). Rising inflation, indicated by an increasing CPI, prompts investors to anticipate higher future consumer prices, leading to portfolio adjustments (Feldstein, 1983), and potentially reducing stock market prices due to expected decreased demand (Feldstein, 1983). The Fisher Effect theory suggests that higher steady-state inflation rates lead to faster increases in share prices to maintain constant price-to-earnings ratios (Cooray, 2002), while expectations of future inflation increases can lower current price-to-earnings ratios due to higher effective tax rates on corporate income (Feldstein, 1983; Cooray, 2002). In emerging economies, managing inflation is crucial, with policies designed to attract investment (Ha et al., 2019). Egypt's 1990s economic reforms aimed to control inflation, promoting a robust stock market, and illustrating how effective inflation management can enhance stock market performance (Omran & Pointon, 2001).

When examining the impact of corruption on stock market performance, controlling for inflation is crucial due to its significant influence on investment decisions and market dynamics (Omran & Pointon, 2001; Ha et al, 2019). By doing so, the analysis can isolate the specific effects of corruption on stock market dynamics, providing a clearer understanding of how these rapidly developing economies are affected. This approach ensures that the observed impact of corruption is accurately assessed without being confounded by inflationary pressures, thereby facilitating more precise policy recommendations aimed at enhancing market performance and economic governance.

4.3.4 Diagnostics test

Multicollinearity - Multicollinearity refers to the presence of linear relationships among independent variables (Shrestha, 2020). It implies that two or more variables are highly correlated and can be expressed as almost perfect linear combinations of each other (Shrestha, 2020). This phenomenon occurs when the regression model incorporates several variables that are not only strongly correlated with the dependent variable but also exhibit significant correlations among themselves (Shrestha, 2020). Multicollinearity can complicate the analysis by making it challenging to isolate the individual effects of each independent variable, leading to less reliable and interpretable results in regression models (Shrestha, 2020).

Heteroskedasticity in panel data analysis refers to the uneven variability in the standard deviations of dependent variables across diverse entities or periods (Astivia & Zumbo, 2019). This variance can manifest as either conditional or unconditional heteroskedasticity, compromising the reliability of regression models that assume constant error variance (Astivia & Zumbo, 2019). Diagnostic tools like the EGLS panel method are pivotal in detecting and mitigating such issues, adjusting for both heteroskedasticity and serial correlation (Wooldridge, 2010; Sarpong & Ntiamoah, 2011). By conducting these checks, researchers ensure that panel regression models maintain their validity, thereby facilitating precise estimation of parameters across different entities and over various time frames (Wooldridge, 2010; Sarpong & Ntiamoah, 2011). Addressing heteroskedasticity enhances the robustness and accuracy of empirical findings in panel data studies.

4.3.5 Data source and sample.

The research employs an annual time series quantitative approach from 2010 to 2022, using the panel ARDL model for detailed econometric analysis. This time frame was chosen to capture critical economic and geopolitical developments affecting BRICS stock markets, including the post-global financial crisis recovery, the rise of BRICS as a significant global economic bloc, and major domestic reforms such as India's GST and China's market liberalization. It encompasses challenges like political instability in Brazil, sanctions on Russia, and the global impact of COVID-19, all of which contributed to market volatility. Technological advancements in India and China during this period spurred substantial market growth and sectoral shifts, making this era crucial for understanding BRICS financial market dynamics.

The panel ARDL model is particularly suited for analyzing the relationship between corruption and stock market performance across BRICS nations, offering a diverse and comprehensive sample. Data will be meticulously sourced from trusted platforms, including the World Bank and central banks of BRICS countries, ensuring accuracy and relevance. This approach allows for a thorough examination of both long-term trends and short-term adjustments within these economies.

4.4 Chapter Summary

This research chapter provides a detailed plan for investigating the relationship between corruption and stock market performance in BRICS countries. Grounded in the post-positivist paradigm, the study integrates quantitative and qualitative methods through a panel data analysis approach. The theoretical framework incorporates Corruption as Grease, Corruption as Sand, and New Institutional Economics theories. Estimation techniques like unit root testing, Granger causality, and cointegration tests are utilized. The study addresses issues like multicollinearity, heteroscedasticity, and autocorrelation and spans data from 2010 to 2022. This comprehensive approach aims to contribute significantly to understanding the complex dynamics between corruption and stock market performance in BRICS nations.

Chapter Five

Estimation and Interpretation of Results

5.1. Introduction

The main objective of this chapter is to meticulously present, evaluate, and analyse the outcomes derived from the models introduced in Chapter 4. Building on the groundwork laid in preceding chapters, this chapter thoroughly examines the impact of corruption on stock market performance within the BRICS nations. It focuses on empirically unraveling the intricate relationship between corruption and stock market dynamics across these countries from 2010 to 2022. Specifically, our investigation delves into how corruption influences stock market capitalization and turnover, employing the robust panel ARDL model. The chapter aims to maintain clarity and readability while retaining the original content and flow of the passage.

This chapter is structured into five sections. The first section covers descriptive statistics and the correlation analysis matrix. The second section discusses unit root tests for assessing stationarity. The third section examines Pedroni tests for long-term cointegration and the Hausman test for determining the appropriate model. Moving forward, the fourth section analyses the Panel ARDL model and presents cross-sectional short-run results. Finally, the fifth section includes causality and heteroskedasticity tests. Each section contributes uniquely to the comprehensive analysis of the data, focusing on key relationships and dynamics throughout

5.2. Stylised Facts

5.2.1 Descriptive statistics

This section discusses the descriptive statistics related to stock market performance and corruption in BRICS, as presented in Table 5.1 for MCAP, CPI, and INFLT. Descriptive statistics are crucial for summarizing sample data. Central tendency measures, such as the mean and median, provide insights into the average and middle values, while standard deviation illuminates data spread (Mishra et al., 2019). Normality is assessed through kurtosis and skewness, with kurtosis distinguishing distribution shapes—mesokurtic (normal), leptokurtic (higher peaks), or platykurtic (lower peaks)—and skewness measuring asymmetry (zero for symmetry, positive for a long right tail, and negative for a long-left tail) (Mishra et al., 2019).

The Jarque-Bera test compares distribution characteristics to normality by examining kurtosis and skewness differences; a significant probability value rejects the normality hypothesis. These measures succinctly capture returns and gauge volatility (Mishra et al., 2019).

Table 5.1: Descriptive Statistics of Key Variables - Stock Market Capitalization, Corruption, and Inflation

	MCAP	CPI	INFLT
Mean	95.47070	32.74058	5.340742
Median	66.16911	38.00000	5.018997
Maximum	322.7110	45.00000	15.53441
Minimum	18.74120	2.100000	0.981015
Std. Dev.	80.96076	13.58120	2.704929
Skewness	1.552387	-1.415019	1.056577
Kurtosis	4.094451	3.597201	4.877670
Jarque-Bera	24.83582	22.65728	21.30726
Probability	0.000004	0.000012	0.000024

Source: EViews output using Transparency International (2022) and World Bank Databank (2023).

The descriptive statistics provided in Table 5.1 offer insights into the characteristics and spread of the data. The mean values, which indicate the average of each variable—95.47070 for MCAP (Market Capitalization), 32.74058 for CPI (Consumer Price Index), and 5.340742 for INFLT (Inflation)—provide a measure of central tendency, showing where the data tend to cluster. Median values—66.16911 for MCAP, 38.00000 for CPI, and 5.018997 for INFLT—represent the middle values of the datasets, indicating the point where half of the observations fall below and half above. The maximum and minimum values highlight the range within which the data fluctuate: MCAP ranges from 18.74120 to 322.7110, CPI from 2.100000 to 45.00000, and INFLT from 0.981015 to 15.53441, illustrating the extent of variability in each variable. Standard deviation measures this variability around the mean: 80.96076 for MCAP, 13.58120 for CPI, and 2.704929 for INFLT. Skewness, which indicates asymmetry in the distribution,

shows positive skewness for MCAP (1.552387) and INFLTIN (1.056577), suggesting a longer right tail with more higher values, while CPI (-1.415019) exhibits negative skewness, indicating a longer left tail with more lower values. Kurtosis measures the peaked Ness of the distribution: MCAP (4.094451) and INFLTIN (4.877670) are leptokurtic, indicating heavier tails and a higher likelihood of extreme values, whereas CPI (3.597201) is closer to mesokurtic, suggesting a distribution closer to normal but with slightly heavier tails. The Jarque-Bera test confirms significant departures from normality for MCAP (24.83582), CPI (22.65728), and INFLTIN (21.30726), with probabilities below 0.05, implying non-normal distribution shapes for MCAP and INFLTIN, despite CPI's significant Jarque-Bera test result, its kurtosis value suggests a more normal distribution shape.

5.2.2 Correlation analysis matrix

The table below elaborates on the type of relationship the dependent variable (MCAP) shares with corruption (CPI) and the control variable (INFLTIN). This relationship is explained by conducting a correlation analysis on all three variables.

Table 5.2: Correlation Analysis of MCAP, CPI, and INFLTIN

Correlation Probability	MCAP	CPI	INFLTIN
MCAP	1.000000	0.232926	-0.081381
CPI	0.232926	1.000000	-0.278556
INFLTIN	-0.081381	-0.278556	1.000000

Source: EViews output using Transparency International (2022) and World Bank Databank (2023).

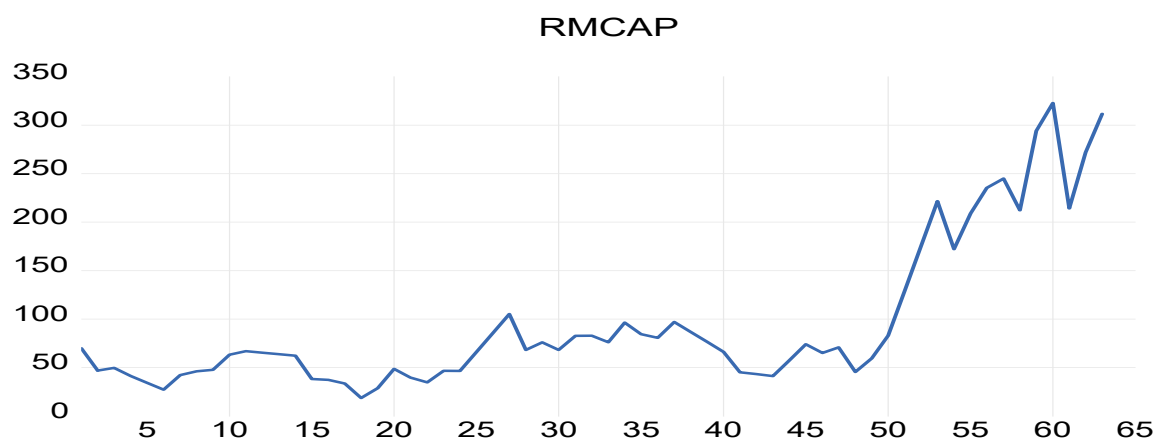
Correlation assesses the linear relationship between variables. A correlation value closer to +1 indicates a strong positive relationship, while a value closer to -1 signifies a stronger negative relationship. Table 5.2 presents the correlation analysis between MCAP, CPI, and INFLTIN. The correlation coefficient of 0.232926 between MCAP and CPI suggests a tendency for the two variables to move in the same direction, indicating a weak positive relationship. While the correlation is not close to +1, it signifies that an increase in one variable tends to correspond with an increase in the other. The negative correlation of -

0.081381 between MCAP and INFLTN indicates a weak negative relationship, implying that an increase in INFLTN tends to correspond with a decrease in MCAP. The negative correlation of -0.278556 between CPI and INFLTN suggests a weak negative relationship, indicating that higher levels of corruption are associated with higher inflation rates.

5.2.3. Stationary testing

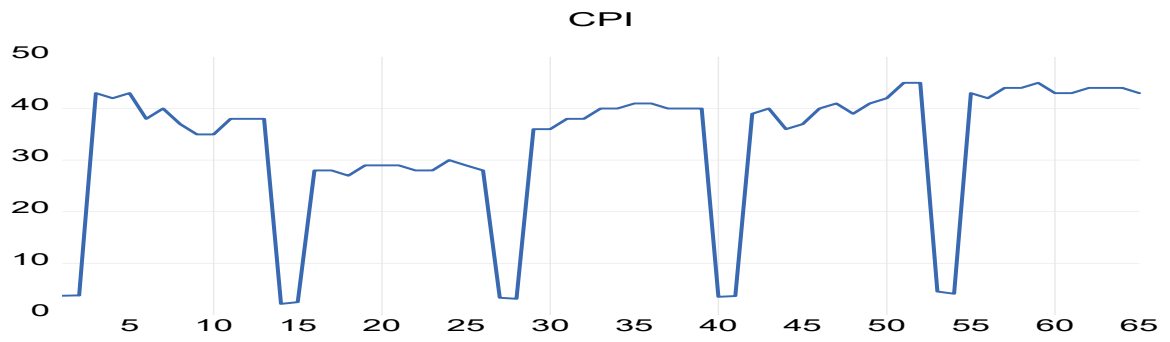
Stationarity testing is essential to avoid false regressions and to select appropriate estimation methodologies. Both formal and informal stationarity tests were employed, including graphical analysis. The graphs below show the stationarity of the data by illustrating how it trends around its mean at level series and first difference. A variable is likely stationary if the graph crosses the mean or average value multiple times. If this does not occur, the data is more persistently trending.

Figure 5.1 Graphical plot showcasing Stock Market Capitalisation at level.



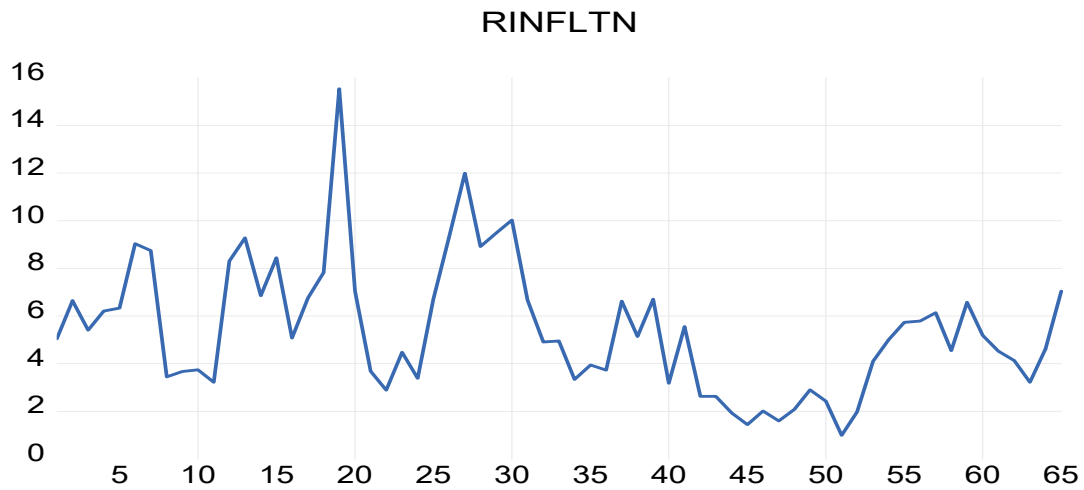
Source: Author's computation using E-views 12

Figure 5.2: Graphical plot showcasing Corruption Perception Index Scores at level.



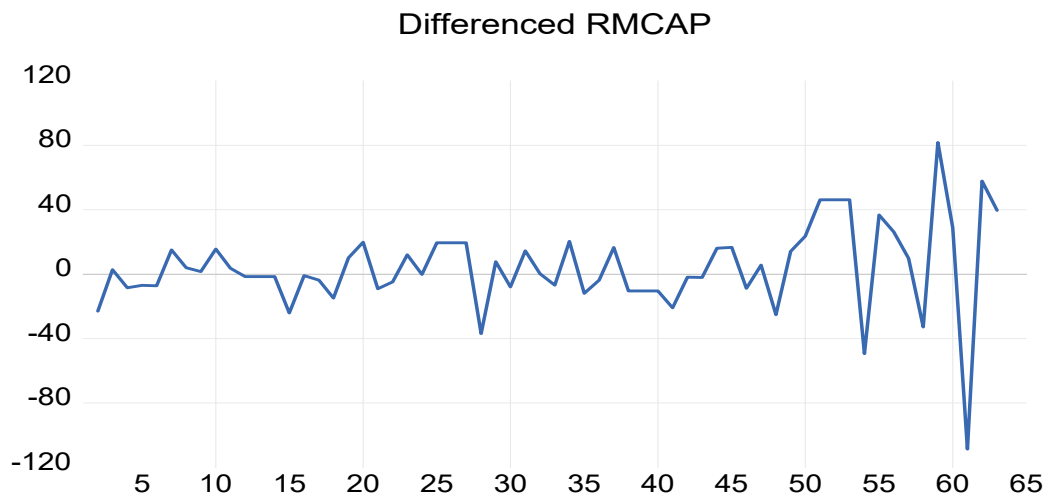
Source: EViews output using Transparency International (2022) and World Bank Databank (2023).

Figure 5.3: Graphical plot showcasing Inflation at the level.



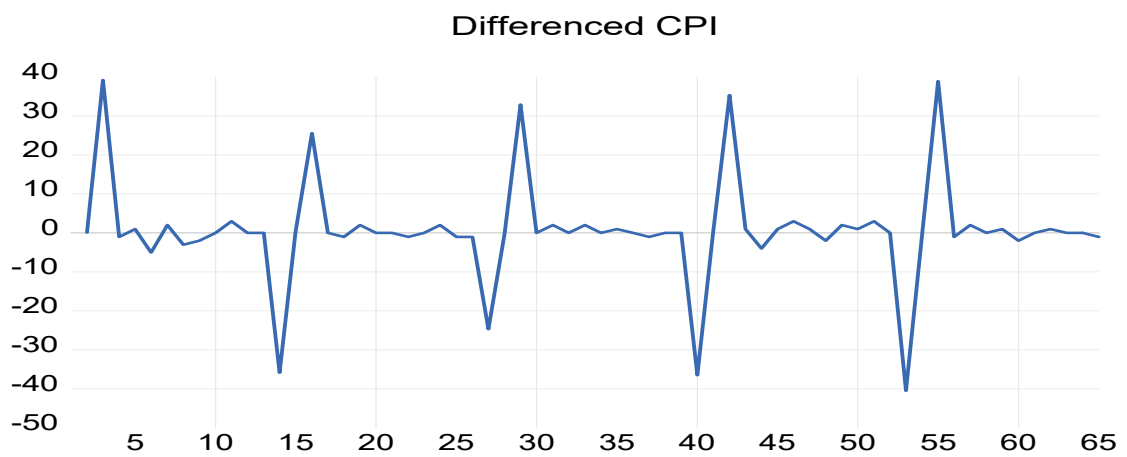
Source: Author's computation using E-views 12

Figure 5.4: Graphical plot showcasing Stock Market Capitalisation at first difference.



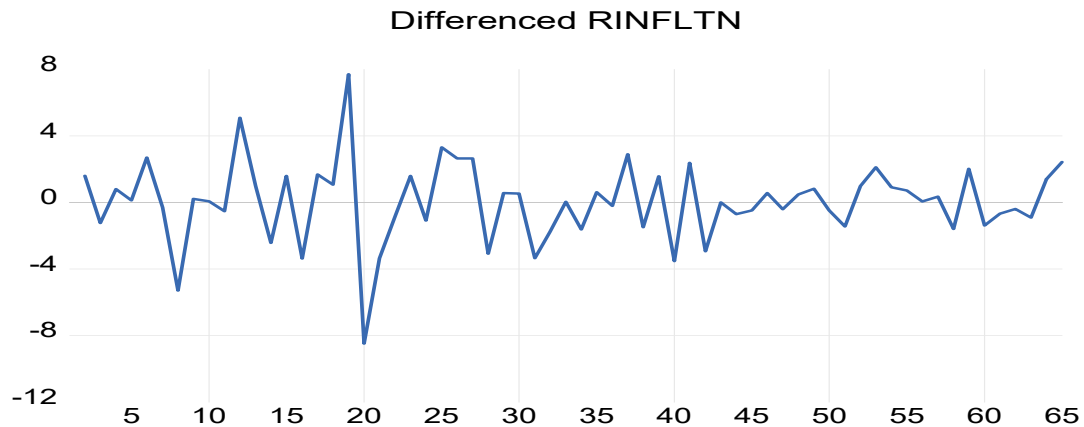
Source: EViews output using Transparency International (2022) and World Bank Databank (2023).

Figure 5.5: Graphical plot showcasing Corruption Perception Index Scores at first difference.



Source: EViews output using Transparency International (2022) and World Bank Databank (2023).

Figure 5.6: Graphical plot showcasing Inflation at first difference.



Source: EViews output using Transparency International (2022) and World Bank Databank (2023).

5.2.4 Unit root

5.2.4.1. Unit root tests: Levin, Lin & Chu (LLC) and IM, Pesaran & Shin

The next step involves formal stationarity tests using unit root tests before proceeding to cointegration testing. The Levin, Lin & Chu (LLC) and IM, Pesaran & Shin unit root tests are utilized in this panel analysis. LLC tests are conducted at three levels: none, intercept, and trend with intercept, while IM, Pesaran & Shin tests are performed at intercept and trend with intercept levels. Tables 5.3 and 5.4 present the panel unit root test outcomes for three key variables in the regression: stock market capitalization, corruption, and inflation across five countries. These tests determine whether variables are stationary at level $I(0)$ or require differencing to achieve stationarity at $I(1)$. For ARDL model applicability, none of the variables should be integrated at order $I(2)$.

Significance levels denoted by asterisks (*) aid in interpreting the statistical relevance of results, with *** (1%), ** (5%), and * (10%) indicating levels of significance, crucial for assessing variable stationarity.

Table 5.3 Panel unit root test at the level and first difference

Variables	Levin, Lin & Chu (LLC) Unit root Tests		
	Intercept	Trend & Intercept	None
Stock Market Capitalisation	1.18526 (0.8820)	-1.43969* (0.0750)	1.07687 (0.8592)
Differenced Stock Market Capitalisation	-2.99097*** (0.0014)	-4.17270*** (0.0000)	-6.30671*** (0.0000)
Corruption Perception Index	-75.9612*** (0.0000)	59.8775*** (0.0000)	0.28224 (0.6111)
Differenced Corruption Perception Index	-44.7601*** (0.0000)	-30.5731*** (0.0000)	-46.2949*** (0.0000)
Inflation	-3.14612*** (0.0008)	-0.95212 (0.1705)	-2.04450** (0.0205)
Differenced Inflation	-7.92915*** (0.0000)	-8.24533*** (0.0000)	-9.21493*** (0.0001)

Notes: Statistically significant at the: 10% level (*), 5% level (**), 1% level (***)

Source: EViews output using Transparency International (2022) and World Bank Databank (2023).

Table 5.4 Panel Unit root test at the level and first difference

Variables	IM, Pesaran & Shin Unit root tests	
	Intercept	Trend & Intercept
Stock Market Capitalisation	0.18513 (0.5734)	-0.25541 (0.3992)
Differenced Stock Market Capitalisation	-4.74056*** (0.0000)	-1.98690** (0.0235)
Corruption Perception Index	-53.7517*** (0.0000)	-46.1308*** (0.0000)
Differenced Corruption Perception Index	-31.8805*** (0.0000)	-19.7981*** (0.0000)

Inflation	-1.68690** (0.0458)	0.60250 (0.7266)
Differenced Inflation	-5.51144*** (0.0000)	-4.10195*** (0.0000)

Notes: Statistically significant at the: 10% level (*), 5% level (**), 1% level (***)

Source: *EViews output using Transparency International (2022) and World Bank Databank (2023).*

The variables exhibit varied stationarity patterns based on panel unit root tests using Levin, Lin & Chu (LLC) and IM, Pesaran & Shin methodologies in Tables 5.3 and 5.4. Stock Market Capitalisation shows mixed results: the LLC test finds non-significance for the intercept ($p = 0.8820$) but significance for trend & intercept ($p = 0.0750$) at the 10% level, suggesting potential stationarity, while the IM, Pesaran & Shin test indicates non-significance for both intercept ($p = 0.5734$) and trend & intercept ($p = 0.3992$), implying potential non-stationarity. However, after differencing, Differenced Stock Market Capitalisation demonstrates strong stationarity across both LLC (intercept $p = 0.0014$, trend & intercept $p = 0.0000$) and IM, Pesaran & Shin (intercept $p = 0.0000$, trend & intercept $p = 0.0235$) tests, at a 1% level, supporting its suitability for ARDL modelling.

The Corruption Perception Index exhibits robust stationarity in its levels form, with highly significant results across LLC and IM, Pesaran & Shin tests ($p = 0.0000$), indicating a stable relationship at 1% levels. Inflation shows mixed results initially: the LLC test suggests non-significance ($p = 0.8592$), while the IM, Pesaran & Shin test shows a significant intercept ($p = 0.0458$) but non-significant trend & intercept ($p = 0.7266$). Nevertheless, Differenced Inflation confirms stationarity across both tests (LLC: intercept $p = 0.0000$, trend & intercept $p = 0.0000$; IM, Pesaran & Shin: intercept $p = 0.0000$, trend & intercept $p = 0.0000$) at 1% levels. These findings indicate that after differencing, all variables exhibit stationarity, supporting a long-term integration relationship among them. This empirical foundation is crucial for subsequent econometric modeling within an ARDL framework.

5.3. Panel Cointegration Test

After conducting unit root tests, it was found that some variables have integrated orders of $I(0)$ and $I(1)$, meeting a critical requirement for the panel ARDL model. Following Humpe & McMillan's (2020) recommendation for variables with mixed integration orders, Pedroni

(1999) cointegration tests were employed. Subsequently, a Hausman (1978) test was conducted to choose between the Mean Group (MG) and Pooled Mean Group (PMG) models, determining the most suitable for this study.

The research utilizes Pedroni's (1999) panel cointegration tests, which encompass seven statistics accommodating panel heterogeneity. These tests allow for variations in short-run and long-run coefficients, making them applicable for diverse panel data settings (Pedroni, 1999, 2004). Unlike traditional time-series approaches, these tests focus on establishing cointegration—a long-term relationship among variables—specifically within panel datasets spanning multiple entities and periods (Pedroni, 1999, 2004).

5.3.1 Panel Cointegration Test Results

Table 5.5: Pedroni Panel Cointegration Test Results

Alternative hypothesis: common AR coefs. (within – dimension)				
	Statistic	Prob	Weighted Statistic	Prob.
Panel v-statistic	-0.173188	0.5687	0.458811	0.3232
Panel rho-statistic	0.009562	0.5038	-0.288182	0.3866
Panel PP-statistic	-2.843535	0.0022	-2.492237	0.0063
Panel ADF-statistic	-3.340668	0.0004	-3.035499	0.0012
Alternative hypothesis: individual AR coefs. (within – dimension)				
Group rho-statistic	0.716277	0.7631		
Group PP- statistic	-2.854151	0.0022		
Group ADF- statistic	-3.522434	0.0002		

Source: *EViews output using Transparency International (2022) and World Bank Databank (2023).*

Null Hypothesis (H_0): There is no cointegration among the variables, indicating that no long-run relationship exists.

Alternative Hypothesis (H_A): There is cointegration among the variables, suggesting a long-run relationship exists.

Given the mixed results in Table 5.5, where a majority decision is statistically significant at the 1% level, the conclusion is to reject the null hypothesis (H_0) of no cointegration. This finding

suggests strong evidence supporting a long-run relationship among the variables examined. With cointegration established, the next step involves implementing the panel ARDL model within the cointegrated series, providing insights into their economic implications over time.

Table 5.6: Hausman Test Results

Variable	Chi-sq. Statistic	Chi-sq. d.f.	Prob
Cross-section random	1.745642	2	0.4178

Source: EViews output using Transparency International (2022) and World Bank Databank (2023).

Null Hypothesis (H_0): The Pooled Mean Group (PMG) model is efficient.

Alternative Hypothesis (H_A): The Mean Group (MG) model is efficient.

After conducting the Hausman test shown in table 5.6, the results show a probability value of 0.4178, which exceeds the 5 percent significance level (0.05), indicating insignificance. As a result, we fail to reject the null hypothesis that the Pooled Mean Group (PMG) model is efficient. Therefore, it can be concluded that the PMG model is appropriate for this study.

5.3.2 Panel ARDL model

Table 5.7: Pooled Mean Group Panel ARDL Estimations for BRICS Stock Market Capitalization

Variable	Coefficient	Std. Error	t-statistic	Prob
Model: ARDL (1,1,1)				
Long Run Equation				
CPI	-1.042962	0.223267	4.67136	0.0001
INFLTN	-1.709154	0.077278	-22.11690	0.0000
MCAP (-1)	0.716466	0.000000	N/A	0.0000
Short Run Equation				
ECT	-1.991829	0.686135	-2.902969	0.0080
D(CPI)	0.143250	0.531023	0.269762	0.7897
D(INF)	2.397152	2.383598	1.005686	0.3250

D (MCAP (-1))	0.676456	0.210678	3.210850	0.0039
C	102.0392	44.41039	2.292482	0.0314

Source: *EViews output using Transparency International (2022) and World Bank Databank (2023).*

MCAP (-1) represents the lagged dependent variable of MCAP to help capture the temporal dynamics and potential autocorrelation in the time series for a more accurate estimation. Significance can be deduced from both the t-statistic and the p-value. If the p-value is above 0.05 the variable is deemed insignificant, if it is below 0.05 the variable is significant.

Based on the results of the Pooled Mean Group Panel ARDL Estimations for BRICS Stock Market Capitalization shown in Table 5.7 using the ARDL model (1,1,1), several significant findings emerge. In the long-run equation, the Corruption Perception Index (CPI) exhibits a statistically significant negative coefficient of -1.042962 (t-statistic = 4.67136, p = 0.0001). This suggests that higher perceived corruption is associated with lower stock market capitalization over time in BRICS countries. Similarly, inflation (INFLTIN) shows a significant negative coefficient of -1.709154 (t-statistic = -22.11690, p = 0.0000), indicating that higher inflation levels correspond to reduced stock market capitalization in the long run.

In the short-run equation, the Error Correction Term (ECT) plays a critical role in the dynamics of stock market capitalization, as shown by its significant negative coefficient of -1.991829 (t-statistic = -2.902969, p = 0.0080). This indicates statistical significance at the 1% level. An ECT coefficient greater than -1 suggests that, instead of steadily converging to equilibrium, the error correction process varies around the long-run value in a gradually diminishing pattern. This reflects fluctuations in the relationship between stock market capitalization and corruption in BRICS countries (Narayan & Smyth, 2006). Specifically, a coefficient of -1.991829 indicates a process known as oscillating convergence (Narayan & Smyth, 2006). This coefficient shows that instead of a steady return to equilibrium, the error correction process fluctuates around the long-run equilibrium before eventually stabilizing.

This corrective process involves various market mechanisms, investor reactions, potential policy interventions, and other economic factors that collectively work to restore stability over time. The changes in CPI (D(CPI)) and inflation (D(INF)) yield insignificant coefficients of 0.143250 (t-statistic = 0.269762, p = 0.7897) and 2.397152 (t-statistic = 1.005686, p = 0.3250),

respectively. These results suggest that neither CPI nor inflation has a significant effect on short-term stock market capitalization dynamics in the BRICS countries, according to the model specification.

Table 5.8: Cross-sectional short-run results from the PGM Model

Stock Market Capitalisation for BRICS				
Variables	Coefficient	Std. Error	t-Statistic	Probability
Brazil				
ECT	-0.683532	0.099329	-6.881506	0.0063
D(CPI)	0.136662	0.046229	2.956206	0.0597
D(INFLTN)	-1.224106	1.857512	-0.659003	0.5570
C	42.16901	564.2224	0.074738	0.9451
Russia				
ECT	-1.089745	0.124220	-8.772671	0.0031
D(CPI)	-0.042002	0.111243	-0.377569	0.7309
D(INFLTN)	-0.242957	0.510831	-0.475611	0.6668
C	58.35933	650.4440	0.089722	0.9342
India				
ECT	-1.535275	0.111148	-13.81283	0.0008
D(CPI)	-0.226738	0.051486	-4.403864	0.0217
D(INFLTN)	2.121447	2.111433	1.004743	0.3890
C	153.7285	2136.790	0.071955	0.9472
China				
ECT	-0.518577	0.123576	-4.196497	0.0247
D(CPI)	-0.929358	0.217030	-4.282158	0.0234
D(INFLTN)	-8.193631	18.52232	-0.442365	0.6882
C	38.70281	580.8103	0.067201	0.9506
South Africa				
ECT	-0.767228	0.244420	-3.138967	0.0517

D(CPI)	-0.643569	2.163261	-0.297500	0.7855
D(INFLTN)	-0.236264	293.4795	-0.000805	0.9994
C	207.7123	16749.16	0.012401	0.9909

Source: EViews output using Transparency International (2022) and World Bank Databank (2023).

The cross-sectional short-run results from the Pooled Mean Group (PMG) Model, detailed in Table 5.8, offer insights into stock market capitalization dynamics across BRICS countries.

The ARDL model employed in this analysis effectively captures both short-term and long-term dynamics of stock market capitalization in response to changes in inflation and CPI across BRICS nations. This aligns with existing studies on emerging market stock markets. For instance, Sobhy et al., (2024), who also used the PMG ARDL model for panel data for Middle East and North African countries, found that corruption negatively impacts market capitalization and trading volume, while positively influencing trading ratios in the short term. In the long term, their results show a continued negative effect of corruption on trading volume.

In Brazil, the Error Correction Term (ECT) coefficient of -0.684 indicates a quick adjustment of stock market capitalization toward long-term equilibrium. The percentage change in the Corruption Perception Index (D(CPI)) has a coefficient of 0.137, suggesting a potential short-term positive effect, though not statistically significant. This result coincides with Onody et al. (2022) found that in São Paulo, companies often pay bribes to expedite lengthy bureaucratic procedures, reducing costs and navigating regulatory complexities, illustrating how corruption can act as a “grease” for investment. In contrast, the coefficient for inflation (D(INFLTN)) is -1.224, pointing to a short-term negative impact, consistent with Madadpour and Asgari (2019), who noted that inflation generally lowers stock returns.

Russia’s ECT coefficient of -1.090, significant at the 1% level, indicates a rapid adjustment towards equilibrium. The coefficient for D(CPI) is -0.042, reflecting the negative impact of corruption on stock market performance, as highlighted by Omodero and Dandago (2018). D(INFLTN) shows a coefficient of -0.243, consistent with Madadpour and Asgari (2019), though neither D(CPI) nor D(INFLTN) is statistically significant.

For India, the ECT coefficient of -1.535 signifies significant adjustments in stock market capitalization, pointing to a rapid convergence toward long-term equilibrium. The coefficient for $D(CPI)$ is -0.227, significant at the 5% level, suggesting a short-term negative impact, aligning with Chowdhury et al.'s (2023) findings that corruption adversely affects stock market returns in BRIC countries. The coefficient for $D(INFLTN)$ is 2.121, though not statistically significant, indicating a potential positive short-term effect.

In China, the ECT coefficient of -0.519, significant at the 5% level, demonstrates a moderate speed of adjustment towards equilibrium. The coefficient for $D(CPI)$ is -0.929, indicating a short-term negative impact, consistent with Pan and Tian (2020), who found that political corruption significantly affects corporate investment. Similarly, $D(INFLTN)$ shows a negative coefficient of -8.194, significant at the 5% level, underscoring inflation's adverse short-term effect.

South Africa's ECT coefficient of -0.767, significant at the 10% level, reflects slower adjustments in stock market capitalization. The coefficient for $D(CPI)$ is -0.644, statistically insignificant, aligning with Bond (2024), which suggests that the negative impact of corruption in South Africa extends beyond political leaders to systemic corporate exploitation, though this effect is less pronounced in the short run. The coefficient for $D(INFLTN)$ is -0.236, indicating a negative impact, but neither $D(CPI)$ nor $D(INFLTN)$ is statistically significant. These findings highlight the complex and varied short-term effects of inflation and the Corruption Perception Index on stock market capitalization within BRICS nations.

5.4. Causality tests

The Granger causality test investigates whether CPI Granger causes changes in MCAP. The null hypothesis posits that CPI does not have a Granger causal effect on MCAP, implying no significant influence of corruption perception on stock market capitalization. Conversely, the alternative hypothesis suggests that CPI does Granger cause MCAP, indicating a directional impact from corruption perception to stock market capitalization. A p-value exceeding 5 percent from the test suggests insufficient evidence to reject the null hypothesis, implying that CPI does not significantly cause changes in MCAP within BRICS nations. In contrast, a p-value below 5 percent would support rejecting the null hypothesis in favor of the alternative, indicating that corruption perception indeed Granger causes fluctuations in stock market capitalization across the BRICS countries.

Table 5.9 Granger Causality Test

Null Hypothesis	Obs	F-Statistic	Prob.
CPI does not Granger Cause MCAP	45	0.16837	0.8456
MCAP does not Granger Cause CPI		10.6788	0.0002
INFLTN does not Granger Cause MCAP	45	0.60689	0.5500
MCAP does not Granger Cause INFLTN		0.74188	0.4827
INFLTN does not Granger Cause CPI	54	2.17071	0.1249
CPI does not Granger Cause INFLTN		0.20405	0.8161

Source: EViews output using Transparency International (2022) and World Bank Databank (2023).

Null Hypothesis (H_0): The corruption perception index (CPI) does not cause changes in stock market capitalization (MCAP) over time.

Alternative Hypothesis (H_1): Corruption perception index (CPI) causes changes in stock market capitalization (MCAP)

Based on the results of the Granger causality test in Table 5.9, several key findings emerge regarding the relationships between stock market capitalization (MCAP), corruption perception index (CPI), and inflation (INFLTN). Firstly, the test indicates insufficient evidence to reject the null hypothesis that CPI does not Granger-cause changes in MCAP, with an F-statistic of 0.16837 and a p-value of 0.8456. Conversely, strong evidence supports rejecting the null hypothesis that MCAP does not Granger-cause CPI, as indicated by an F-statistic of 10.6788 and a very low p-value of 0.0002. This implies that variations in stock market capitalization precede and influence changes in corruption perception over time.

The analysis finds insufficient evidence to reject the null hypotheses that INFLTN does not Granger cause MCAP (F-statistic = 0.60689, $p = 0.5500$), MCAP does not Granger cause INFLTN (F-statistic = 0.74188, $p = 0.4827$), INFLTN does not Granger cause CPI (F-statistic = 2.17071, $p = 0.1249$), and CPI does not Granger cause INFLTN (F-statistic = 0.20405, $p =$

0.8161). These results indicate that neither inflation nor corruption perception significantly caused changes in the other variable in the contexts tested.

These findings highlight a unidirectional Granger causality from MCAP to CPI, suggesting that movements in stock market capitalization led to subsequent changes in corruption perception over time. However, no significant causal relationships were found in the other tested directions, emphasizing the nuanced dynamics between stock market performance, corruption perception, and inflation within the studied framework.

5.5. Diagnostics tests

Panel diagnostics tests assess the presence and extent of cross-sectional dependencies in panel data models, providing insights into the reliability and validity of statistical inferences drawn from these models (Pesaran, 2004). Including heteroskedasticity tests such as the EGLS (Efficient Generalized Least Squares) play a crucial role in assessing the robustness and reliability of statistical analyses in panel data research, detecting heteroskedasticity can indicate that the variance of errors differs systematically across cross-sectional units or over time, potentially biasing estimation results if not appropriately addressed. This diagnostic process ensures that the statistical inferences drawn from panel data analysis are valid and reliable, enhancing the overall robustness of your thesis findings in examining the dynamics of heteroskedasticity (Pesaran, 2004).

Table 5.10 Panel Heteroskedasticity Test Results Using EGLS (Cross-Section Weights) method.

Variable	Coefficient	Std. Error	t-statistic	Prob.
CPI	-2.029163	1.155119	-1.756670	0.0864
INFLTN	5.458279	3.340426	1.634007	0.1099
CPI^2	0.054236	0.030988	1.750197	0.0876
INFLTN^2	0.290592	0.178074	-1.631860	0.1104
Weighted statistics				
R-squared	0.099455	Mean dependent var	484.9534	
Adjusted R squared	0.063562	SD dependent var	655.8804	
S.E of regression	759.9776	Akaike info criterion	12.04414	

Sum of squared resid	23679579	Schwarz criterion	12.20473
Log likelihood	-266.9931	Hannan-Quin criterion	12.10401
Durban-Watson			

Source: EViews output using Transparency International (2022) and World Bank Databank (2023)

Null Hypothesis (H_0): The error terms are homoscedastic across cross-sectional units.

Alternative Hypothesis (H_A): The error terms exhibit heteroskedasticity across cross-sectional units.

The heteroskedasticity test for panel data using EGLS (Efficient Generalized Least Squares) in Table 5.10 with cross-section weights revealed all probability values (prob) above the 5% significance level, indicating no significant variation in error terms across cross-sectional units. This confirms that homoskedasticity is present in the panel dataset analyzed, ensuring that error term variance remains consistent among entities. Upholding the null hypothesis (The error terms are homoscedastic across cross-sectional units) underscores the method's efficacy in addressing heteroskedasticity, thereby enhancing the reliability of parameter estimates in the panel data analysis.

5.6. Chapter Summary

This chapter presents a comprehensive examination of the intricate relationship between corruption perception and stock market performance across BRICS nations from 2010 to 2022. The primary objective was to investigate whether corruption impacts stock market capitalization using advanced econometric methodologies, notably the panel ARDL model. Initially, descriptive statistics provided insights into the central tendencies, variability, and distributions of Market Capitalization (MCAP), Corruption Perception Index (CPI), and Inflation (INFLTN) within the BRICS context.

Stationarity tests, including unit root tests, were crucial for validating the panel ARDL approach. Mixed integration orders among variables were observed, essential for determining the correct model specifications. Pedroni tests for long-term cointegration confirmed a stable relationship among MCAP, CPI, and INFLTN, indicating a long-term equilibrium where

corruption perception and inflation significantly influenced stock market dynamics over time. This foundational analysis established a robust basis for exploring the impact of corruption on financial markets within BRICS nations.

Applying the Pooled Mean Group (PMG) model within the ARDL framework yielded significant insights into long-term relationships. Results indicated that higher corruption perception and inflation levels were associated with lower stock market capitalization throughout the study period. The Error Correction Term (ECT) revealed that short-term dynamics involved prompt adjustments towards equilibrium following deviations caused by corruption perception and inflation. These short-run adjustments highlighted the market's responsiveness to temporary shocks or disturbances, offering a nuanced understanding of how governance and economic stability factors shape market resilience within the BRICS context.

Granger causality tests further examined directional relationships between variables, revealing a unidirectional causality where changes in stock market capitalization preceded changes in corruption perception. This finding underscores the market's influence on broader governance perceptions over time, with no significant evidence found for causality in the reverse direction. These results illustrate the complex nature of these relationships within BRICS economies.

Chapter Six

Summary, Conclusions, and Recommendations

6.1. Summary

This study aimed to investigate the relationship between corruption perception and stock market indicators, specifically focusing on stock market capitalization (MCAP), the corruption perception index (CPI), and inflation (INFLT_N) within BRICS nations. Employing Panel ARDL models suited for analyzing both short- and long-term dynamics, the research provided a nuanced understanding of how corruption influences these financial metrics.

Using empirical data from 2010 to 2022, the study explored the complex interactions between corruption perception and stock market performance. The choice of Panel ARDL models enabled a comprehensive examination of immediate and prolonged effects, offering insights into how corruption and inflation impact market capitalization across varying timeframes. This approach ensured robust findings that could inform policy and economic governance strategies.

The investigation focused on assessing the influence of corruption perception on stock market indicators while considering the stability and variability of these effects over time. By examining data through lenses of short-term fluctuations and long-term trends, the study aimed to contribute valuable insights into financial markets and corruption, particularly in emerging economies represented by the BRICS nations. This holistic approach underscores the importance of understanding corruption's multifaceted impact on financial markets to guide policymakers in enhancing market integrity and economic stability.

6.2. Key Findings

This chapter provides a comprehensive analysis of the relationship between corruption perception and stock market performance in BRICS nations from 2010 to 2022. Descriptive statistics show significant variability in market capitalization (MCAP), the corruption perception index (CPI), and inflation (INFLT_N), with notable mean values. Correlation analysis indicates a weak positive relationship between MCAP and CPI, a weak negative relationship between MCAP and INFLT_N, and a weak negative relationship between CPI and

INFLTN. Stationarity tests confirm that MCAP and INFLTN become stationary after first differencing, while CPI remains stationary throughout, ensuring the reliability of subsequent analyses.

Pedroni cointegration tests suggest a long-run relationship among the variables, supported by Hausman test results favouring the use of the Pooled Mean Group (PMG) model. The Panel ARDL model reveals significant long-term dynamics, where both CPI and INFLTN negatively impact MCAP. This indicates that higher perceived corruption and inflation are associated with lower stock market capitalization over the long term. The Error Correction Term (ECT) shows a significant negative coefficient, indicating rapid adjustments towards long-run equilibrium. However, short-term changes in CPI and INFLTN are generally insignificant, highlighting distinct short-term and long-term effects.

Cross-sectional analysis shows varying speeds of adjustment towards equilibrium across BRICS countries. Brazil and Russia demonstrate rapid adjustments, while China and South Africa exhibit moderate adjustments. Short-term impacts of CPI and INFLTN are generally insignificant, except for specific effects observed in India and China. Heteroskedasticity tests confirm homoscedasticity of error terms across units, reinforcing the reliability of the panel data analysis. Overall, the study underscores a significant long-term negative impact of corruption perception and inflation on stock market capitalization in BRICS nations, with nuanced short-term dynamics. These findings enrich our understanding of how corruption and inflation influence financial markets, guiding policy, and governance strategies in the BRICS context.

6.3 Policy Recommendations

Based on the study findings, policymakers should prioritize addressing the impact of corruption perception on stock market dynamics. The identified negative long-term relationship underscores the need for targeted interventions to enhance transparency within financial markets, which can bolster investor confidence and potentially improve stock market performance. Strengthening institutional and regulatory frameworks is crucial to mitigate corruption's adverse effects on stock market indicators. Effective regulatory measures and enforcement mechanisms are essential to deter corrupt practices and ensure compliance with financial standards. Policymakers should consider implementing stricter regulations and

empowering regulatory bodies to monitor and address corruption effectively, fostering a stable and trustworthy financial market environment. Promoting integrity and ethical behavior within financial institutions through best practices and robust corporate governance standards is equally essential. This comprehensive approach integrating regulatory reforms, enforcement measures, and ethical standards can mitigate corruption's negative impacts and support sustainable stock market growth in the long term.

6.4 Recommendation for Future Research

Future research in the BRICS context should explore additional factors influencing the complex relationship between corruption perception and stock market performance, an area often overlooked. Variables such as economic policies, political stability, and international trade dynamics warrant further investigation to understand how they interact with corruption perception in shaping stock market outcomes over time. Longitudinal studies across diverse geographical contexts can provide valuable insights into the evolving dynamics of this relationship.

There is a critical need for studies that examine the mediating mechanisms between corruption perception and stock market performance within BRICS nations, investigating how institutional factors like regulatory frameworks and governance practices influence this relationship can yield important insights. Exploring investor behavior, risk perception, and market sentiment as potential mediators can deepen the understanding of how corruption perception impacts stock market indicators. By elucidating these pathways, future research can enhance the understanding of the causal mechanisms driving the relationship.

Future research efforts should expand beyond current foundations by investigating a broader range of influencing factors and mediating mechanisms specific to the BRICS nations. Adopting a multidimensional approach that integrates longitudinal analysis and explores mediating variables will advance the understanding of the complexities underlying the relationship between corruption perception and stock market dynamics.

6.5 Limitations of the Study

The study's findings are influenced by several acknowledged limitations. Firstly, challenges with data availability and quality, including gaps, inconsistencies, and varying detail across sources, constrained the depth and robustness of the analysis on corruption perception and stock market performance in BRICS countries. Methodologically, while panel ARDL models were robust for analysing short- and long-term dynamics, choices in variable selection, model specification, and econometric assumptions could introduce biases. Assumptions related to stationarity, cointegration, and error term structure are critical in panel data analysis, influencing reliability and generalizability. Future research should address these limitations to enhance understanding and inform more comprehensive analyses and policy decisions.

6.6 Conclusion

This chapter provides a comprehensive overview of the study's key findings and offers actionable recommendations for policymakers and future research. Using Panel ARDL models and data from 2010 to 2022, the research reveals a significant negative relationship between corruption perception and stock market capitalization across BRICS countries. It demonstrates that higher perceived corruption levels correlate with poorer stock market performance over the long term, highlighting corruption's adverse impact on market integrity and investor confidence in emerging economies. Policy recommendations stress the critical need for transparency-enhancing measures and stronger regulatory frameworks to mitigate these effects and promote sustainable market growth.

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8. Appendices

Pairwise Granger Causality Tests

Date: 06/28/24 Time: 03:48

Sample: 2007M02 2019M12

Lags: 2

Null Hypothesis	Obs	F-Statistic	Prob.
CPI does not Granger Cause MCAP	45	0.16837	0.8456
MCAP does not Granger Cause CPI		10.6788	0.0002
INFLTN does not Granger Cause MCAP	45	0.60689	0.5500
MCAP does not Granger Cause INFLTN		0.74188	0.4827
INFLTN does not Granger Cause CPI	54	2.17071	0.1249
CPI does not Granger Cause INFLTN		0.20405	0.8161

Source: EViews output using Transparency International (2022) and World Bank Databank (2023)

Date: 06/29/24

Time: 5:18

Sample: 2010 2022

	MCAP	CPI	INFLTN
Mean	95.47070	32.74058	5.340742
Median	66.16911	38.00000	5.018997
Maximum	322.7110	45.00000	15.53441
Minimum	18.74120	2.100000	0.981015
Std. Dev.	80.96076	13.58120	2.704929

Skewness	1.552387	-1.415019	1.056577
Kurtosis	4.094451	3.597201	4.877670
Jarque-Bera	24.83582	22.65728	21.30726
Probability	0.000004	0.000012	0.000024
Sum	6336.903	2128.138	341.8075
Sum Sq. Dev	436888.1	11804.73	460.9884
Observations	65	65	64

Source: EViews output using Transparency International (2022) and World Bank Databank (2023)