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ORIGINAL RESEARCH

Does Governance Quality Impact Stock Market Development? An Insight of BRICS Economies

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Abstract
BRICS nations are playing a critical role in the global economic setting, but to maintain sustained economic growth they are required to make relentless efforts towards certain challenges. These challenges pertain to diverse governance areas including political, socio-economic, and legal conditions. This paper unfolds the impact of the level of governance quality indicators on stock market development for BRICS nations during the period from 2007 to 2021. Using panel data regression, our empirical findings confirm that governance indicators are critical for the development of the stock market. Our results show that governance indicators such as Government Effectiveness, Rule of Law, and Voice and Accountability are significant variables affecting the stock market development. We find that giving citizens more autonomy to participate in the formulation and execution of policies, improves the development of stock markets. Similarly, lesser political influence will also lead to better growth of the stock market. Additionally, the study evidence that a stronger legal environment in BRICS nations promotes lesser corrupt practices such as insider trading, but at the same time hinders the growth of the stock market. Policymakers in BRICS nations should follow a consistent policy to improve their governance indicators which are now becoming essential for stock market development.

Keywords BRICS · Country level governance indicator · Stock market development · WGI

JEL Classification G15 · G18 · C23 · E6

1 Introduction

Stock market development is integral to the economic growth of the country (Chakraborty et al., 2022; Guru & Yadav, 2019; Levine & Zervos, 1996). Over the past few decades, stock markets of countries across the world have faced a boom whereby emerging markets are contributing to a majority of this increase. As

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compared with developed countries, stock markets of emerging economies experienced development much later (Panda, 2023). Research across countries has been conducted to determine what makes stock markets function smoothly. The variations in the financial system around the world are at least partly a result of the differences in the investor protections against insider expropriation reflected in the legal rules of a country and how well they are implemented (La Porta et al., 1997). The global financial crisis further emphasized on the need for good governance quality for smooth economic growth and financial development. This stresses the fact that to develop a financial market, governance quality is a pre-condition. Although there isn't any consensus among scholars and policymakers on the conceptual definition of governance, Kaufmann et al. (2011) defined it as "governance as the traditions and institutions by which authority in a country is exercised. It contains a process by which governments are selected, monitored, and replaced; and the capacity of the government to effectively formulate and implement sound policies. Effective governance is measured through the six governance indicators including Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption as depicted by (Kaufmann et al., 2011).

The governance laws of a country affect a company's corporate governance requirements, which influence a performance of the firm and may indirectly affect the stock market performance. An institutional environment that promotes informed arbitrage in stocks by protecting property and shareholder rights ensures efficiency in the market. A country with a weak legal environment such as anti-insider trading laws and poor standard of corporate governance deter investors from participating in the stock market (Aggarwal et al., 2005; Bhattacharya & Daouk, 2002). Previous studies have shown that a strong legal system motivates the investors to participate in the stock market and promotes external financing (La Porta et al., 1997). Countries with strong governance including high bureaucratic quality, lower political stability, and democratic accountability positively influence the stock market (Hooper et al., 2009; Imran et al., 2020; Yartey, 2012). Lehkonen & Heimonen, 2015 also supports the positive influence of political stability on returns of stock markets. However, according to the previous literature a contrarian view is that countries with a poor governance system leads to higher stock market returns. Low et al. (2014) and Narayan et al. (2015) finds the political instability, poor regulatory quality and high corruption positively influences the stock market returns. The economic intuition behind the contrarian view may be that the stock return increases because of the risk premium associated with the poor governance practices. The indeterminate relationship of governance indicators with stock market development further encouraged us to empirically test this relationship.

Further our study focuses on the role of country level governance indicators as these are more informative than governance at firm level. Most of the existing literatures concentrated on the role of firm-specific governance on stock market performance (Chen et al., 2009; Chui et al., 2001; John et al., 2008; Klapper & Love, 2003; Shleifer & Vishny, 1997; Wang & You, 2012). There are only limited studies that highlight the importance of world governance indicators on stock market development which further directs us to work in this area. Furthermore, our study

primarily tests the influence of country level governance quality on stock market development for the BRICS nations. The foremost reason behind selecting BRICS nations was that they are the emerging stars in the world market. It has tremendous scope for growth in the stock market performance that provides ample opportunities to the investors around the world. BRICS nations contribute about one fourth (24.4 trillion U.S. dollars in 2021; Statista, 2021) in the overall world economy with continuous improvement in stock market performance which in turn offers a variety of diversification opportunities to investors globally, ensuring higher returns (Ogbeide & Akanji, 2018). It has tremendous scope for growth in the stock market performance that provides ample opportunities to the investors around the world which further attracts the concern of regulatory bodies, policy makers, and administrators. Also, there are limited studies to the best of our knowledge that focuses on BRICS nations except (Lakshmi et al., 2021) who analyzed the association empirically between stock market returns and corruption. This provides us sufficient ground to analyze the relationship of stock market development with country level governance in BRICS economies. The aim of the current study pertains to majorly three research questions: firstly, does country level governance influence the stock market development in BRICS nations? Secondly, what is the nature of relationship between them? Lastly, which area of governance should be focused upon to improve stock market development?

Based on these research questions, the current study grows the existing literature and shows how government effectiveness, rule of law, and voice and accountability are critical for the equity market development. Our study suggests that when citizens are given more freedom to participate in the policy making and its execution, they show more faith on the system and thereby increases their participation in the stock market. The study finds negative influence of government effectiveness and rule of law with stock market development. This highlights the presence of political influence and corrupt practices hindering the growth of stock market. Our results recommend strong code of conduct for investors to ensure better behaviour in the stock market. Our findings add on available literature on state level governance and provides insightful observations for the academicians, and policy makers related to areas in BRICS economies as strong institutional quality strengthens the stock market performance by offering reforms and solutions in the system. On this note, our research aims to study that how governance quality affects equity market development in BRICS nations for the time from 2007 to 2021.

Remainder of the manuscript is divided into the following sections: Sect. 2 critically reviews the previous studies whilst Sect. 3 explains overview of the BRICS nations. Section 4 furnishes the data and methodology followed by Sect. 5 that reveals the results & findings. Finally, Sect. 6 summarizes and concludes our study.

2 Literature Review

Governance quality has a profound impact on the stock market development as it ensures stable and efficient market supporting efficient market hypothesis hypothesis (EMH). According to EMH of (Fama, 1970) the prices of stocks traded on

exchanges reflect fair market value and complete information, but due to the presence of market anomalies such as momentum return as evidenced by Imran et al. (2022) which makes the market inefficient (Anjum, 2020), hampering the growth of stock market. An anomaly in the market can be addressed by implementing a corporate governance structure that improves informational efficiency, lowers capital costs, and efficiently allocates resources (Lee et al., 2016). Thus, a good corporate governance mechanism which further depends on governance systems of a country not only resolves problems at the firm level such as agency problems but may assist in the stock market development by addressing such anomalies.

In a sample of 40 countries, (Imran et al., 2022) finds a negative relationship of momentum returns with government effectiveness, political stability and avoidance of violence, and control over corruption. The results complemented with the findings of (Chui et al., 2001) those investors in a country with weak quality governance value private information more compared to publicly available information that leads to overreaction in the market. In the same vein, using a sample of firm and country level data from 39 countries during 1992–2002, (John et al., 2008) finds that countries with protective environments for investors reduces probable private gain for dominant insiders within the firm that motivates them to undertake risky investment. On the other hand, investors always search for those financial instruments that hedge their risks related to the stocks (Panwar et al., 2023).

The study finds a positive relationship between quality of investors' protection in a country and corporate risk taking. This relationship further raises a question on the enforceability of contract's clauses since firms take higher risk at the cost of investors. Shleifer and Vishny (1997) identified agency problems as a critical component of the firm's contractual clause that requires right corporate governance mechanism which is dependent on the judicial framework of a country. The legal environment of a nation is likely to provide safety and security to the investors and entrepreneurs from expropriation of their rights. This ensures an increase in market participation which strengthens the countries capital market. The past literature on governance quality and stock market development relationship has mainly two strands. First strand, focuses on corporate specific governance mechanism and shows how the investors are protected against firm's high risk taking, asymmetric information, disclosure practices, transparency, accountability and role of institutional investors (Chen et al., 2009; Chui et al., 2001; John et al., 2008; Klapper & Love, 2003; Shleifer & Vishny, 1997; Wang & You, 2012) while the second strand demonstrates the impact of country-level governance factors including legal system, enforcement quality, governance score, laws related to investor protection and role of regulatory bodies (La Porta et al., 1997; Lehkonen & Heimonen, 2015; Narayan et al., 2015).

Our study focuses on the role of state-level governance indicators on the stock market development as these indicators are more informative compared to corporate governance (Doidge et al., 2006). Country level governance strengthens the firm specific governance and plays a significant role in the improvement of market valuation of firms and increases return for the shareholders. Most of the studies concluded that world governance indicators play a critical role in the development of the economy but still the relationship is unclear. (Hooper et al., 2009) demonstrated a positive relationship between the country level governance quality and stock

market returns. The study suggests that risk reduces for the countries with strong governance mechanisms and there are higher returns. In a seminal paper, from a sample of 49 countries, (La Porta et al., 1997) analyzed a sample of 49 countries and hypothesized that legal rules and enforcement quality of a country governs capital market efficiency. Those countries with weak investor protection systems have the least developed capital markets in terms of security valuation and firm participation in the stock market. In a similar vein, (John et al., 2008) provides empirical evidence that strong judicial systems promote greater participation in external financing by protecting the rights of corporate and individual investors. Klapper and Love (2003) extended this idea and observed that a country with poor legal systems have a weak governance mechanism at the firm level which impacts their operating profit and market valuation.

Law and order are not the only institutional factors contributing to the development of stock markets but additionally democratic accountability, political risk, and bureaucratic quality also plays a notable role. In addition to the governance factor, the author finds that income level, domestic investment, private capital flows, banking sector development, and stock market liquidity are key determinants of stock market development in emerging markets (Yartey, 2012). In similar vein, another study analysed the impact of democracy level (Democratic accountability, Political rights and polity Index) and political risk (political stability indices) on stock market performance for 49 emerging nations. The authors suggest that degree of democracy and political risk in a country significantly affects the stock market. Additionally, the result shows that political stability induces higher returns (Lehkonen & Heimonen, 2015). On the other hand, a contrarian view is that poor governance systems result in higher stock returns compared to a country with strong governance mechanisms. The countries with political instability, ineffective government, poor regulatory quality, and high corruption increase the stock market returns. The political stability plays a critical role in the smooth functioning of capital markets (Low et al., 2011). The work on governance was extended by comparing the role of governance on risk exposure of investor instead of stock market returns in emerging countries vis-à-vis developed countries and finds that governance framework is relatively more critical to investors in emerging markets comparatively.

Previous research studies governance system's impact on stock market in terms of corruption as well. The countries with cumbersome bureaucratic practices use corruption to overcome the challenges posed by them which impacts investments unfavorably (Mauro, 1995). Lakshmi et al. (2021) examined the relationship between corruption and stock returns in BRICS economies and found a negative relationship. They conclude that strong institutions enhance the return on stocks while weak institutions reduce the returns (Lakshmi et al., 2021). There are certain studies which establish a direct connection of governance quality with stock market development. Based on 23 countries from 1996 to 2014, the impact of quality of governance on development of stock markets was examined. Fixed effect panel data regression techniques were employed to incorporate country fixed effects (Boadi & Amegbe, 2017). The same findings were replicated in another study which re-emphasized that institutional quality has a significantly positive effect on the stock market development. They further concluded that better institutional quality is a precondition for

reducing transaction costs and agency costs and is helpful in providing profitable projects available to firms which automatically leads to higher demand for equity financing (Imran et al., 2020). A related study in European Union countries by Barbu and Boitan (2020) discovered that countries' governance indicators impacted the banking and stock markets' development between 2007 and 2017. They employed 4 governance indicators to represent good governance and 21 financial indicators to collectively represent banking and stock market. In the past, the literature has studied the governance indicators role individually as well as collectively in fostering the growth of stock markets. The results revealed that in the short run as well as in the long run, the stock market reaction to democracy is negative. The study highlights the weakness of governance, mismanagement of the economy and failure to grant autonomy to monetary agencies as major challenges behind the Nigerian stock market development (Ajide, 2019). One of the individual governance indicators has been studied is the legal environment of a country and its effect on the risk and performance of stock markets for 37 nations. The findings revealed that countries with English common law provide higher risk premium than those in civil law countries particularly for countries having French or Spanish code. The variables representing a vigilant law system, low rate of corruption, strong legal protection of investors, and stable political environment leads to low risk and high return performance. Further, they concluded that the nature of the legal environment shapes the variation in stock market return (Chiou et al., 2010). Similarly institutional quality was studied which had a positive and significant effect on stock market development by using generalised moment of method regression technique (Ernest et al., 2016).

In addition to government influence, other factors also influence the stock market development, according to the research. The relationship was examined between institutional development, capital account liberalization, and stock market development. The findings show that increased levels of financial openness led to development of the equity market only if a certain level of bureaucratic quality and law is maintained. Additionally, the study finds that development in the banking sector is a prerequisite for development of equity market. Furthermore, these findings suggest that a stock market is not only determined by governance indicators, but also by the stage of development specifically financial and economic development (Chinn & Ito, 2005). The findings of (Chinn & Ito, 2005) was supported by Doidge suggesting that with the increase in financial and economic position of a country encourages to adopt better governance practices by the firm. Such benefits may increase or decrease depending on the level of relationship shared by corporate governance practices and state level safety to investors (Doidge et al., 2006). Additionally, the investor sentiments also work as an intermediary between asset prices and policy uncertainty in a country (Su et al., 2023). A sample of 1732 unique firms depicting 22 nations was studied to understand the joint effect of a host country's legal system and financial system while explaining the link between corporate governance and firm level performance. The study concluded that higher market valuation and better corporate governance of firms was seen in countries having common combinations than firms operating in bank/civil combination country (Anderson & Gupta, 2009).

The discussion based on the literature studied above highlights the contradictory relationship between the country level governance indicator and stock market development (Hooper et al., 2009; Imran et al., 2020; Low et al., 2011, 2014; Narayan et al., 2015). Our study is primarily motivated by the inconclusive results, which prompts further scrutiny. Moreover, we expect that the stock market performance, economic development as well as the price of oil would be relevant control variables that would explain the development of the stock market (Anderson & Gupta, 2009; Chinn & Ito, 2005; Doidge et al., 2006). The economic variables are captured by Growth rate (Imran et al., 2020), Inflation rate (Hooker, 2004) and Real interest rate while stock market performance has been expressed in terms of increased participation of the investors i.e. Stock traded volume (Hooper et al., 2009; Imran et al., 2020). Thus, we aim to investigate the relationship between country level governance indicators and stock market development in BRICS nations.

3 BRICS Nations and Stock Market Development

BRICS nations are the growing emerging economies in the world. Initially the acronym represented a set of five economies namely Brazil, Russia, India, and China, established in the year 2001 and South Africa joined the bloc in the year 2010. BRICS economies play a pivotal role in setting up of global economic framework. Investors see emerging economies as plausible opportunity to mitigate their risk (Yadav & Sharma, 2022). They are considered as a source of foreign expansion because of lower labour cost and production which provide ample opportunities to investors to invest in these countries and thereby leading to an increase in GDP. Based on the World Bank data (2019), BRICS nations comprise of one fourth of World GDP, 16% of world trade, and 41% of world population which shows tremendous possibility in terms of human capital. Based on Statista (2021), China has the largest GDP of 16.86 trillion US dollars. Overall GDP of the BRICS nations is 24.4 trillion U.S. dollars in 2021 which is substantially more than the US GDP Statista (2021). South Africa was embraced in the year 2010 in the BRICS nations. However, its absence from the analysis in the current study would lose its significance of the developing countries. Thus, it is crucial to explore countries beyond BRIC (Vijayakumar et al., 2010). It is minor amongst the BRICS nations in terms of economy size but has huge potential being the most advanced and stable economy (Statista, 2021).

As per Goldman Sachs report, 2005, Globally, BRICS consistently provide the best environment for sustainable economic growth, ranking in the top half. Although they are the major contributors to the world trade but due to their corporate governance structure, diverse political climate, imperfect infrastructure, and country level governance structure, the smooth development of their stock market is essential (Lakshmi et al., 2021; Nayyar, 2013; O'Neil, 2001). This can be clearly interpreted from the Fig. 1 showing country wise graphs of the stock market capitalization in the recent years. Country wise graphs shows years on x- axis and stock market capitalization on y- axis. It is clearly evident from the graphs that size and performance of the individual BRICS nations differ notably

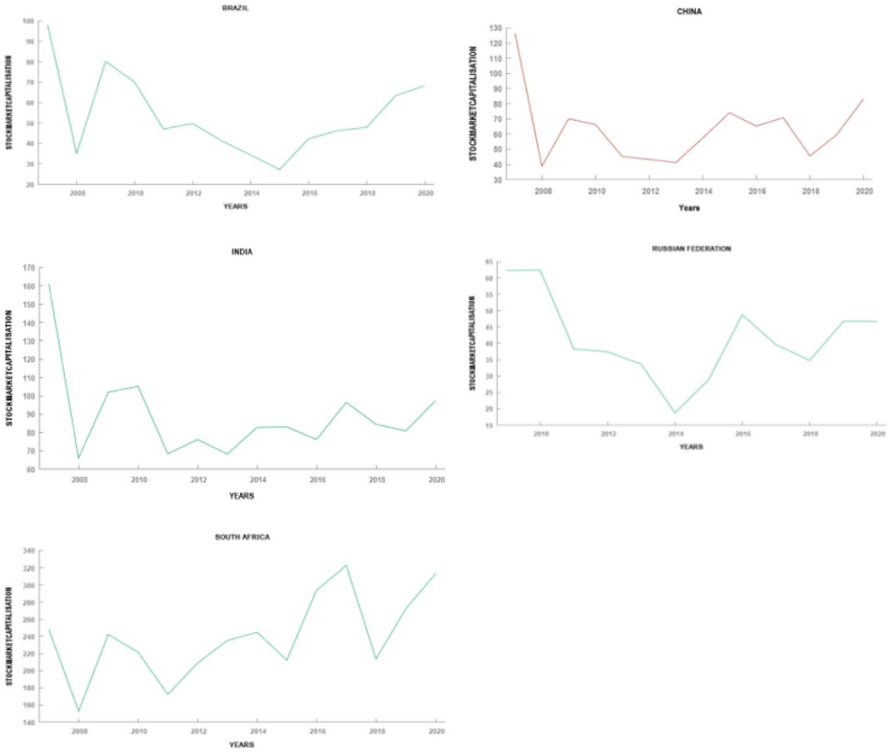

Fig. 1 Country-wise Market capitalization of BRICS stock markets. *Source*: Authors' calculations

from each other. However, performance of each stock market of BRICS is in growing phase which provides ample trading opportunities to the diverse set of investors.

On the other hand, all the six governance indicators operate differently amongst BRICS nations. China and Russia have autocratic structures in terms of political stability and the absence of violence, but India, Brazil, and South Africa are substantially more democratic in character. Rule of Law and Control of Corruption is relatively stronger for South Africa and Brazil as compared to India, China, and Russia (SGI, 2012). Figure 2 below shows the panel plot of all five independent variables namely, political stabiltiy and absence of violence, rule of law, governemnt effectiveness, and voice and accountability. The horizontal axis represents the years and vertical axis values of five governance indicators and stock market capitalization. Group 1 to 5 shows various cross-sectional units (BRICS nations). It is clear from the graphs that value of each variable of BRICS nations are different but few BRICS nations have the values in same direction. Thus, the panel plots represents that there may be a possibility of individual effect.

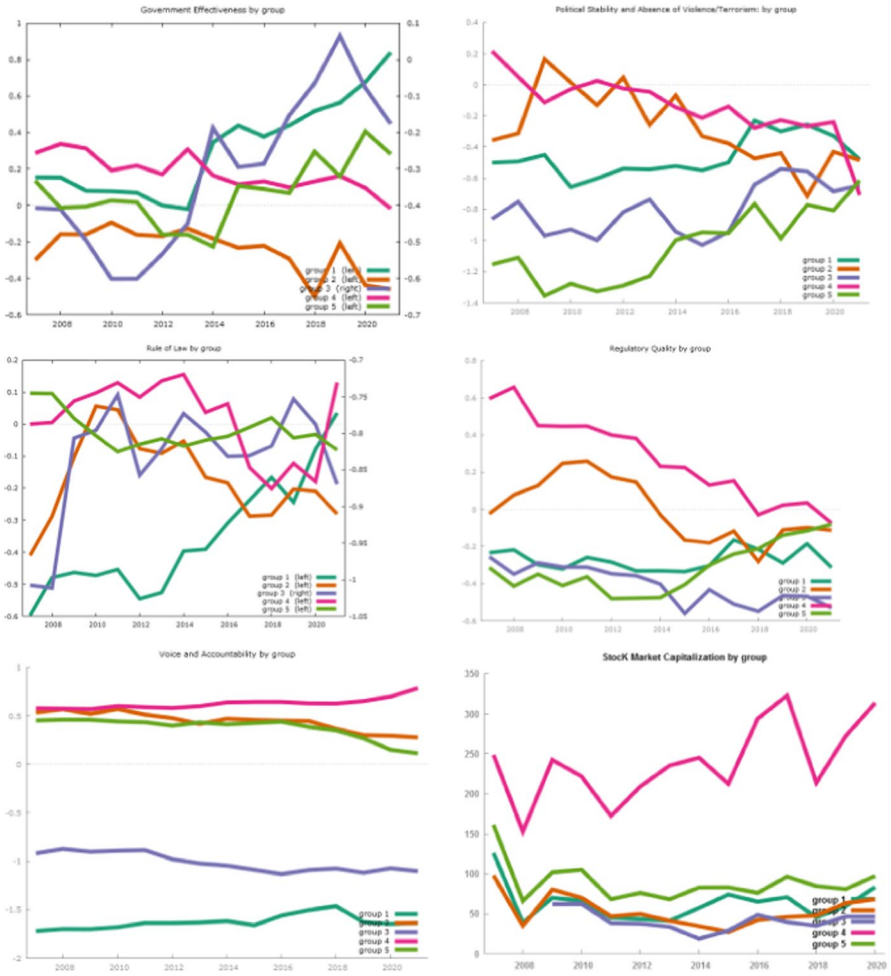

Fig. 2 Panel plot of Governance Indicator. *Source*: Authors' calculations

4 Data Selection and Methodology

The present section discusses the data selection procedure and methodology used to examine the role of state level governance indicators on development of equity markets for BRICS nations. The yearly data was collected for BRICS nations for the period from 2007 to 2021. Throughout the analysis, World Bank was used to source data for all the dependent and independent variables because it offers the most up-to-date global development data which is based on variety of other existing databases (Kaufmann et al., 2011).We include six world governance indicators, including Government Effectiveness, Control of Corruption, Voice and Accountability, Political Stability and Absence of Violence/ Terrorism, Regulatory Quality, and Rule of Law as core independent variables of interest (Kaufmann et al., 2011). The

measurement method and definition for each governance variable is discussed in Table 1 below. The stock market development is captured by Market capitalization of listed domestic firms as percentage of GDP. The second proxy for stock market development is S&P global equity indices (annual percentage change). To avoid the impact of omitted variable bias; Inflation (Hooker, 2004), Real interest rate, Annual per capita growth (Levine & Zervos, 1996), Stock volume, and Oil Rents (Hooper et al., 2009; Imran et al., 2020) were incorporated as control variables to account for any influence of observable variables on the equity market development.

4.1 Empirical Model and Econometric

To analyze the role of WGI on equity market development, the study uses balanced panel data regression to incorporate more information and variability in the dataset. Following the theoretical discussion from Sect. 2, we base our empirical analysis on the expression in Eq. (1) below which represents stock market development as a function of world governance indicators, growth cycle and market development control variables for each unit i and t time period.

$$\begin{aligned}\text{MARKET DEVELOPMENT}_{\text{i, t}} = f\big(&\text{WGI}_{\text{i, t}}, \text{GROWTH CYCLE}_{\text{i, t}},\\ &\times \text{MARKET DEVELOPMENT CONTROL VARIABLES}_{\text{i, t}}\big)\end{aligned} \tag{1}$$

An explicit panel regression model used in our study can be expressed below:

$$\begin{aligned}MC_{i,t} = {} & \alpha_i + \beta_1 IDV1_{it} + \beta_2 IDV2_{it} + \beta_3 IDV3_{it} + \beta_4 IDV4_{it} + \beta_5 IDV5_{it}\\ & + \beta_6 IDV6_{it} + \beta_7 C1_{it} + \beta_8 C2_{it} + \beta_9 C3_{it} + \beta_{10} C4_{it} + \beta_{11} C5_{it} + e_{it}\end{aligned} \tag{2}$$

where $MC_{i,t}$ is the dependent variable; stock market development across i countries for time period t. The independent variables are shown as $IDV_{i,t}$ varying from 1 to 6 reflecting six WGI indicators representing Government Effectiveness, Control of Corruption, Political Stability and Absence of Violence/Terrorism, Rule of Law, Regulatory quality and Voice and Accountability where the subscript i represents the cross- sectional unit and t indicates the time period associated with each variable. Control variables are Inflation, Growth cycle, interest rate, oil rents and stock volume shown by $C1_{i,t}$ to $C5_{i,t}$ respectively. α_i is the intercept and $e_{i,t}$ is the error term /noise in the model.

The study employed panel data regression model to consider the individual and temporal effects to incorporate the heterogeneity in the dataset studied. Panel data is comparatively advantageous than time series or cross section series data as it incorporates high degree of freedom, greater amount of information, and deals with endogeneity problems (Gujarati, 2014). In order to apply panel data regression model, broadly there are three models: Pooled Ordinary Least Square (POLS), Fixed Effect Model (FEM), and Random Effect Model (REM). We initiated the analysis by applying POLS on the dataset, the results revealed that the data is not poolable due to the presence of heterogeneity among the countries. The results from POLS are biased, inconsistent, and inefficient estimates. Therefore, we extend our study by introducing FEM and REM both (Gujarati, 2014).

Table 1 Definition and measurement method for variable. *Source*: Author's presentation

Variable	Indicator	Definition
Stock market development	Market capitalization and percentage change in S&P global equity indices	Overall growth in the stock market
Government effectiveness	Government effectiveness	Indicates high-quality services to citizens, independent from political influence, formulates and implements policies effectively, and accountable for its policies (Kaufmann et al., 2011)
Control of corruption	Control of corruption	"Limiting the exercises of public power for private gain (petty and grand gain), as well as 'capturing' the state by elites and private interests" (Kaufmann et al., 2011)
Voice and accountability	Voice and accountability	"Freedom of expression, association, and participation in selecting government officials" (Kaufmann et al., 2011)
Political stability and absence of violence/terrorism	Political stability and absence of violence/terrorism	"An indicator of the likelihood that terrorism and political violence will be used to destabilize or overthrow the government" (Kaufmann et al., 2011)
Regulatory quality	Regulatory quality	An assessment of the government's ability to formulate and implement sound policies and regulations that permit and promote development (Kaufmann et al., 2011)
Rule of law	Rule of law	It measures how confident and adherent agents are to the rules of society. It includes the enforcing of contract rights, property rights, the police, and courts, as well as a risk of crime and violence (Kaufmann et al., 2011)
Growth rate	GDP per capita growth	
Real interest rate	Real interest rate (%)	
Stock volume	Total value of Stocks traded as % of GDP	
Oil rent	Oil rent	
Inflation	Inflation (annual %)	

In this table defines the dependent variable 'equity market development', independent variable World Governance Indicator (WGI), and control variable 'growth cycle, interest, inflation, oil prices, and volume', *Data Source* All the variables are collected from World Bank DataBank

Fixed effect method controls unobserved time invariant heterogeneity which makes estimated coefficients BLUE (Yadav & Yadav, 2021). In Eq. (1), the WGI variables uncorrelated with the unobserved time invariant variables and behaves in a random fashion. Random Effect Model (REM) assumes no correlation between independent variables and unit specific time invariant heterogeneity and acts randomly. Equation (3) shows Random Effect Model equation used in this study. The significant difference between FEM and REM arises because the former method represents collinearity of independent variables with unobserved cross-section heterogeneity and $\boldsymbol{\alpha_i}$ is fixed while the later assumes no correlation and $\boldsymbol{\alpha_i}$ is random. The rationale to choose random effects model over FE model is that the variation across BRICS nations is assumed to be random and uncorrelated with the independent variables included in the model (Kaur et al., 2013) and will provide valid results. Hausman Test was applied to select appropriate method between FEM and REM. The test estimates the consistency between two methods where the failure to reject null hypothesis results into selection of Random effect model.

Random effect model employed in this study:

$$MC_{i,t} = \beta_2\, Governemnt\ Effectivness_{it} + \beta_3\, Political\ Stability\ and\ Absence\ of\ Volience_{it} + \beta_4\, Regulatory\ Quality_{it} + \beta_5\, Rule\ of\ Law_{it} + \beta_6\, Voice\ and\ Accountability_{it} + \beta_6\, C1_{it} \ldots + \beta_{10} C5_{it} + \nu_{it} \tag{3}$$

where MC_{it} represents the dependent variable Market capitalization for the period t and i^{th} unit. Independent variable in the Eq. (3) are governance quality factors and control variables are represented from C_1 to C_5 including Inflation, Growth rate, Real interest rate, oil rents and stock volume respectively. ν_{it} Constitutes of α_i and e_{it} which behaves randomly.

4.2 Descriptive Statistics

In summary statistics, we find that equity market which is measured by market capitalization (99.1) shows less than moderate performance between the years 2007–2021 across BRICS nations. According to Table 2, the results concerning world governance indicators shows that on an average among the variables considered only Government Effectiveness is highest with standard deviation of 0.303. We find that Political Stability (IDV3), Regulatory Quality (IDV4), Rule of Law (IDV5), and Voice and Accountability (IDV6) score negative. The negative score indicates an increasing likelihood of politically motivated instability in a country, poor regulations, weak laws, and lower accountability. Additionally, Voice and accountability has highest standard deviation, indicating lower participation of country's citizens in selection of their representatives and very little say in public. We control economic variables impacting the stock market development including inflation rate, growth rate, real interest rate and oil rent and found positive mean values of 5.66, 2.95, 8.27 and 2.45 respectively. Real

Table 2 Summary of panel descriptive statistics. *Source*: Author's calculation

Variable	Mean	Median	Min	Max	S.D
Government effectiveness (IDV2)	0.00136	0.0198	− 0.602	0.841	0.303
Political stability and absence and violence (IDV3)	− 0.545	− 0.523	− 1.36	0.215	0.386
Regulatory quality (IDV4)	− 0.147	− 0.233	− 0.560	0.657	0.289
Rule of law (IDV5)	− 0.272	− 0.167	− 1.01	0.155	0.334
Voice and accountability (IDV6)	− 0.238	0.366	− 1.72	0.788	0.919
Inflation	5.66	5.13	− 0.728	15.5	2.99
GDP	2.95	3.63	− 7.83	13.6	4.26
Real interest rate (%)	8.27	3.94	− 12.9	41.7	12.2
Oil rents	2.45	1.17	0.00322	11.6	3.39
Stock volume	67.1	53.8	7.77	356	55.5
Market capitalization	99.1	68.3	18.7	323	78.9
S&P global equity indices	8.22	5.44	− 73.4	125	37.8

In this table explains panel-wise summary of all the variables assist in the study

interest rate highly fluctuates among the economic variables with standard deviation of 12.2.

4.3 Examination of Correlation

To estimate our regression model shown in Eq. (2), we first detected the multicollinearity problem in the independent variables incorporated. Multicollinearity problem results in biased estimates which makes our results of lower significance. According to our results, there exists serious multicollinearity issue as control of corruption with rule of law exceeds the threshold value of 0.8 (Kennedy, 2003). Therefore, control of corruption is dropped from WGIs to overcome the problem of multicollinearity. The Table 3 below shows the correlation of various regressand's used in our model.

Table 3 shows pairwise correlation for variables with values in the range of 0.0087 to 0.7843. All WGIs factors have positive correlation with stock market development. Regulatory Quality (IDV4) has the highest correlation (0.6296) with the stock market development indicator while lowest correlation (0.3901) is found with the Government Effectiveness (IDV2).

5 Empirical Results and Discussion

To investigate the impact of our dependent variable WGI factors on equity market development across BRICS nations, Table 4 below highlights the effect of each governance indicator individually on stock market development through Market Capitalization. Column 2 in Table 4 exhibits the second proxy (DV2) of equity

Table 3 Correlation matrix. *Source*: Authors' calculation

	IDV1	IDV2	IDV3	IDV4	IDV5	IDV6	C1	C2	C3	C4	C5	DV1	DV2
IDV1	1.0000	0.6065	0.6193	0.7328	0.8515	0.5163	−0.3445	−0.0689	0.2675	−0.8392	0.2575	0.5719	−0.0193
IDV2		1.0000	0.3050	0.2550	0.5025	−0.1389	−0.4544	0.1957	−0.3159	−0.6616	0.5712	0.3901	−0.0121
IDV3			1.0000	0.7843	0.3029	0.1725	−0.3897	−0.2163	0.3234	−0.3511	0.1483	0.4081	−0.0336
IDV4				1.0000	0.5780	0.5542	−0.0679	−0.2765	0.2474	−0.4424	0.0237	0.6296	−0.0238
IDV5					1.0000	0.6825	−0.1239	−0.1011	0.2144	−0.8469	0.1091	0.5082	0.0040
IDV6						1.0000	0.2696	−0.4275	0.4211	−0.4071	−0.3760	0.4920	−0.0087
C1							1.0000	−0.2210	−0.0397	0.3300	−0.3867	−0.0301	−0.0902
C2								1.0000	−0.3372	−0.0278	0.3249	−0.2604	−0.0176
C3									1.0000	−0.2076	−0.2574	−0.2441	0.1333
C4										1.0000	−0.3602	−0.4562	−0.0971
C5											1.0000	0.1997	0.1020
DV1												1.0000	0.1222
DV2													1.0000

In this table shows pair-wise correlation between Dependent and independent variable. Variable with Correlation coefficient more than 0.8 have been dropped (Kennedy, 2003). DV1: Market Capitalization of listed domestic firms' % of GDP, DV2: S&P Global Equity Indices (annual % change)

Table 4 Panel data regression Results. *Source*: Author's calculations

	DV1	DV2
Const.	107.040***	2.06920
Government effectiveness (IDV2)	3.78723	− 70.1189*
Political stability and absence of violence/terrorism (IDV3)	2.97172	8.01362
Regulatory quality (IDV4)	− 9.19228	45.5840
Rule of law (IDV5)	− 79.5803*	25.8606
Voice and accountability (IDV6)	85.2937***	− 23.0161
Inflation (C1)	− 1.90901	− 1.57046
GDP per capita growth (C2)	− 0.590045	0.363915
Real interest rate (C3)	− 1.15955	2.97780**
Oil rents (C4)	− 4.57360	− 5.36801
Volume (C5)	0.348423***	0.207636*
Rho	− 0.137009	− 0.41509
No. of observations	74	74
Hausman test	Yes	Yes

In this table provides panel data result obtained by using Random effect model. ***, ** and * indicates significance level at 0.01, 0.05 and 0.1 respectively

market development which is S&P Global Equity Indices (annual % change). Moreover, Table 4 reveals the number of observations, value of rho, and Hausman test.

5.1 Findings

Our study suggests the profound impact of governance indicators on the equity market development. In Table 4, Rule of law (IDV 5) has significant negative impact on market capitalization with a significance level at 10%. This indicates that even if the laws are strengthened by a percent change, the market capitalization drops at a higher pace (− 79.5803). On a similar vein another study shows that countries with stronger legal environments have a negative impact on the stock market development (Boadi & Amegbe, 2017). Our results suggest that stronger legal environments in BRICS nations promote lesser corrupt practices such as insider trading but at the same time it hinders the growth of stock market. The same has been evidenced by another study that poor governance framework increases the risk premium demanded by investors, leading to higher equity returns (Chen et al., 2009; Low et al., 2014). However the results are contrary to few of the studies which suggest that countries with stronger investor protection laws, where shareholder's rights attached to securities are protected and enforceable by law, increases shareholder confidence and encourage them to surrender more funds to firm to finance their business activities (Imran et al., 2020; La Porta et al., 1997). The contradiction is

due to the fact that the studies use different cross-sectional units compared to current study.

The regression result in the above table finds highly positive significant impact of Voice and accountability on equity market development at 1% level of significance which has been recommended by (Ernest et al., 2016; Imran et al., 2020). The findings indicate that when citizens are given freedom to freely express their views in media then value of market capitalization highly inflates. Additionally, improvement in democracy leads to higher performance of the stock market.

We employ S&P Global Equity Indices (annual % change) of the BRICS nations as the second variable for measuring stock market development as depicted in Table 4 (column 2). Our study outcome shows a significantly negative impact of government effectiveness on equity market development which indicates a drop in the share value traded on the stock exchange when policies are better formulated and implemented in a country. This was supported by (Liu, 2024) that revealed that firms having political networks gains during market uncertainty. The possible reason could be that investors' decisions to trade might be highly induced by the information floated privately by Political groups, High officials and Individuals playing crucial role in the decision making of companies as compared to the information available publicly. Countries with better institutional quality and effective government curtails such practices and promotes fair practices in the market which increases the confidence and faith of the investor in the stock market (La Porta et al., 1997) but at the same time impacts their decision which is highly dependent on private news and information specifically seen in developing countries (Low et al., 2014).

Among control variables, volume of stock traded influences the market capitalization and equity indices significantly and positively supported (Imran et al., 2020), Real interest rate has a significantly positive impact on equity indices but has insignificant relationship with market capitalization. The other variables controlled in the studies including Growth cycle, Inflation and Oil rents are insignificant with market capitalization and equity indices supported by (Hooper et al., 2009; Imran et al., 2020).

5.2 Diagnostic Checks

The robustness of the results obtained from the panel data regression are checked by applying additional tests which are shown in Table 5. The first assumption is that

Table 5 Diagnostic test. *Source*: Authors' calculations

Robustness	Test	Result of DV1	Result of DV2
Residual mean	Mean	Presence of constant	Presence of constant
Homoscedasticity	BREUSCH AND PAGAN TEST	*P* value: 0.7512	*P* value: 0.2068
Autocorrelation	DW test	1.98	2.63
Multicollinearity	Correlation matrix	Dropped IDV1	Dropped IDV1
Endogeneity	Hausman Test	0.5212	0.6832

the mean of the error term must be zero. The presence of a constant in the model shows that mean of the error term is zero. The second assumption is the presence of heteroscedasticity. The Breusch Pagan test reveals presence of homoscedasticity in the dataset. Third assumption is the presence of serial autocorrelation for which we applied Durbin Watson test to check the presence of autocorrelation. The values were within the limit, which confirmed the presence of no autocorrelation in the model. To check multicollinearity and endogeneity we used Correlation matrix and Hausman test.

6 Conclusions

Countries across the globe are making significant efforts to develop their stock markets that contributes towards a better economy. Governance quality is a powerful catalyst for the growth of the equity exchange. Previous research articles have captured the relationship of governance quality with the stock market development but there is no consensus on the findings (Hooper et al., 2009; Imran et al., 2020; Low et al., 2011, 2014; Narayan et al., 2015). Thus, current study explored how governance quality is the catalyst for the stock market development after considering the impact of controlled variables. Our result supports the notion that institutional development such as governance indicators is a pre-requisite to develop stock market of BRICS nations. Of the five governance indicators analysed, voice and accountability, governance effectiveness, and rule of law are only governance quality indicators that have significant effect on the equity market. Our findings indicate that in BRICS nations, development of equity market can be improved by providing more autonomy to citizens to participate in the formulation and execution of government policies. Further, the findings shows that investors in BRICS nations prefer to rely on the private information relative to public information while investing and therefore better enforcement of laws negatively impacts the stock market development. The result confirms the findings of (Narayan et al., 2015; Low et al., 2011) that countries with weak governance use the private information to frame portfolio strategy. Furthermore, there exists a negative influence of government effectiveness on equity market development which indicates that stock markets of BRICS nations are highly influenced by their political structure and thereby restricting the growth of the stock market. Our control variables, stock volume and interest rate, influences the stock market development significantly positive.

Based on our findings, we recommend strong steps by regulators, policymakers and public administrators towards policies concerning political stability. Reforms in other policy areas will not have much effect in the countries with weak governance laws and effectiveness unless political framework is improved. Our study suggests critical importance of political structure in BRICS nations and attracts immediate attention of regulators towards political reforms including insider trading and private information. Further, our study suggests necessary steps by regulators to motivate investors to change their investing behaviour and attitude which corresponds to code of fair-trade practices. However, our study has certain limitation as it is confined to BRICS nations only and for a specific time period. Therefore, the results cannot be

replicated to countries which are not a part of BRICS. The future work may focus on capturing the COVID 19 impact on equity market development as the study is limited to the period 2007–2021. Our study can further be extended by including more variables of equity market development and the robustness of our result can be checked by employing GMM methodology. Future avenues of research includes: (a) A comparative study between developed and developing nations (b) combined study of country level and corporate governance indicators (c) how governance indicators affect the efficiency of stock markets.

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