

AN EMPIRICAL STUDY ON BRICS NATION WITH REFERENCE TO STOCK MARKET MOVEMENTS

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ABSTRACT

This empirical study aims to investigate the relationship between stock market movements and the economic growth of BRICS nations, namely Brazil, Russia, India, China, and South Africa. The study uses yearly stock market index data of each country over a period of fifteen years (2007-2022) and applies statistical methods to identify the extent of interdependence between the stock market and economic growth. The findings suggest that there is a positive relationship between the stock market movements and economic growth in BRICS nations. However, the extent of this relationship varies across countries, with China and India demonstrating the strongest relationship between the stock market and economic growth. The study also finds that external shocks such as changes in global commodity prices and political events can impact the stock market movements in BRICS nations. Overall, this study provides valuable insights into the relationship between the stock market and economic growth in BRICS nations, which can assist investors and policymakers in making informed decisions regarding their investment strategies and economic policies.

Keywords: BRICS, stock market, economic growth, correlation, cointegration, causality.

INTRODUCTION

The BRICS nations, which include Brazil, Russia, India, China, and South Africa, are some of the fastest-growing emerging economies in the world. In recent years, there has been a growing interest in studying the stock market movements of these countries. This empirical study aims to analyze the stock market movements of the BRICS nations and identify the factors that contribute to these movements.

The study will utilize various statistical methods to examine the relationships between the stock market movements and macroeconomic variables such as GDP, inflation, exchange rates, and interest rates. The study will also explore the impact of global events such as the COVID-19 pandemic on the stock markets of the BRICS nations.

The findings of this study are expected to contribute to a better understanding of the stock market movements in the BRICS nations and provide insights for investors and policymakers. The study could also help in identifying potential investment opportunities and risks in the stock markets of these emerging economies.

STATEMENT OF PROBLEM

In the current study focus primarily to investigate how dependent the stock markets of BRICS countries. If the BRICS stock markets are dependent on one another, portfolio diversification among these nations is impossible. Investors can diversify their portfolios and invest in various nations' stock markets only if there is no causal relationship. If there is no causal relationship between these stock markets, investors can diversify their portfolio by investing in the stock markets of these nations. The questions addressed in this study are as follows:

- Are there any connections between the BRICS nations' stock exchanges?
- Does any BRICS country's stock market aid in the forecasting of the behaviour of the other stock exchanges in the group?

OBJECTIVES

1. To access the accomplishment of BRICS indices and stock markets.
2. To look into the connection between the indices of the BRICS stock market

REVIEW OF LITERATURE

Dr. Vijay Kumar (2017) the main objective of the study is to analyze the performance of various stock markets and their indices of BRICS nations. To find out the correlation among stock market indices of BRICS nations. The correlation clearly shows that the Indian stock market is highly correlated with the South African stock market, whereas the Chinese stock market is least correlated with the South African stock market.

Yu Hsing (2011). The major goal is to keep a healthy stock market, and the government is expected to pursue economic expansion, fiscal responsibility, a greater money supply to GDP ratio, a lower real interest rate, rand depreciation, and/or reduced inflation rates. The South African stock market index is positively influenced by real GDP growth.

Jitin Gambhir and Jitender Bhandari (2011). The aim of this study is to investigate the stock market Integration in the context of BRIC stock markets. It can be concluded that global stock market interdependence has increased, and there is no clear direction of relationships in the sense of Granger Causality, indicating that the influence of a few markets has eroded over time.

Levi Sriyank, Garag G AnilKumar, Merlyn Sarah, (2016). the goal is to assess whether there is any return and relationship exists in Indian stock markets when compare to international developed and developing stock markets. The results show that the majority of the indices have a positive correlation with each other, with only a few having a negative correlation.

Somar Al-Mohamad, Audil Rashid, Walid Bakry, Ammar Jreisat & Xuan Vinh Vo, (2020). This shows understanding present financial market difficulties and trends in the aftermath of the expansion of financial and economic amalgamations such as the establishment of the BRIC bloc, According to the findings of this study, the degree of financial integration among the BRICS stock markets has moderately increased in the post-BRICS formation period as compared to the pre BRICS formation period. Except for China, all BRICS stock markets now contribute to the cointegration relationship, compared to only three markets prior to the foundation of the BRICS (China, Russia and South Africa).

Mourad Mroua, (2020), The objective is to analyze the impact exchange rates changes on stock market returns. This research investigates the causation and dynamic dependency between exchange rate fluctuations and the volatility of BRICS stock market indexes. The findings show that exchange rate variations have a considerable impact on all BRICS nations' short- and long-term market index performance.

Sarfraz A. BHUTTO, Rizwan Raheem AHMED, Dalia STREIMIKIENE, Saifullah SHAIKH and Justas STREIMIKIS, (2020). This study aims to investigate the short and long-run investment relationship between the BRICS-(P) Group. The findings show that foreign and domestic investors combine their investment proposals across these economies and build a well-diversified portfolio since a shared risk value protects investors.

G. Naresha, Gopala Vasudevanb, S. Mahalakshmic, S. Thiyagarajan, (2018). This study aims to explore whether there is any presence of spillover effects of exchange rate on the stock indices of BRICS. According to the findings, the strengthening of the BRICS currencies versus the US dollar has improved the value of the respective nation's stock index

Vanita Tripathi, Arnav Kumar, (2014). This paper aims at establishing long term relationship between stock returns and inflation for emerging BRICS economies. Cointegration results for specific markets show that Russia, India, and South Africa have no long-term equilibrium relationship, but Brazil and China have contradictory results demonstrating a long-term equilibrium link.

Rajneesh Prakash Verma and Poonam Ran, (2015). To find the causality among the Indian stock market and other BRIC nation's stock markets. The data also indicate that the return on the Indian stock market (NIFTY) is heavily influenced by its own invention, but innovations in other BRIC stock markets do not dominate in the case of the Indian stock market.

Ranjan Dasgupta, (2014). This study aims at finding the short and long-run relationships in between the BRIC stock markets. According to this report, the BRIC stock markets would be the most appealing to global investors in the next years, with the Indian stock market dominating the group.

Godfrey Osaseri1 & Ifuero Osad Osamwonyi, (2019). To study the examined relationship between the stock market development and economic growth of the BRICS, the findings show that the development of the stock market has a major influence on economic growth. According to the study, there is a favourable relationship between stock market development indices and BRICS economic growth. The report advises that the weaknesses of each BRICS member countries be used as a policy focus, and that governments implement the required policies to address them as soon as possible.

Ankita Bhatia, Professor Nawal Kishor, (2015). To find out whether FPI/FII investments always have an impact on the stock indices, studied separately for all individual BRICS nations, viz.- Brazil, Russia, India, China and South Africa. To find out the extent, direction and degree of linkage shared by FPI/FII and stock markets for all BRICS countries. The findings may have policy consequences for FII/FPIs and other investors looking for alternative investment options in BRICS nations.

Ramaprasad Bhar, Biljana Nikolova, (2008). The objective is to examines the level of integration and the dynamic relationship between the BRIC countries, their respective regions and the world. According to the data, India has the highest level of regional and global integration among the BRIC countries, followed by Brazil and Russia, and finally by China. There is a negative association between India's conditional volatility and that of the Asia-Pacific region, which can be attributed to the South Asian crisis's low impact on India.

Dr. Vanita Tripathi, Mr. Arnav Kumar, (2015). To examines short run causal relationship between inflation and stock return in emerging BRICS markets. Only in the instance of Brazil do the regression findings show a substantial positive association between changes in inflation and stock gains. The findings are relevant in today's climate, when developing markets are dealing with growing inflation and fluctuating stock returns.

Collins Ngwakwe, (2020). objectives of the study are to analyze the causal relationship between the BRICS stock markets during the covid-19 and to identify which BRICS market trigger a change in other BRICS countries' stock market performance during this current COVID-19 disease pandemic. The outcomes of this study add to investors' discernment and stock investing decisions amid a moment of unparalleled risk and uncertainty caused by a rapid illness pandemic. Understanding how stock market performance may relate during this era is critical for making risk-adjusted investing decisions in the BRICS markets. As a result of the above findings, India and China's stock market performance during the COVID-19 era can give a predictive insignia for understanding stock market behavior in Brazil during the COVID-19 period.

Pradiptarathi Panda, M. Thiripalraju, (2018). The aim is to find the presence of bidirectional and unidirectional return spillover and negative news impacts more on volatility of these countries' stock markets. Return and volatility can represent the transformation impact across markets. We found that the occurrence of bidirectional and unidirectional return spillover implies a close interaction between the stock markets of the BRICS nations. The presence of considerable volatility spillovers across stock markets demonstrates that markets are informationally inefficient, and that one market may be predicted using information from other markets. This demonstrates that investors can make a lot of money.

BK Surya Prakasha, P. Raja Babu Lien, Dr. A. Suresh Kumar, (2021). The objective is to investigate the impact of socioeconomic and hospital resources due to the effect of Covid-19 on BRICS Nations. According to the findings of this study, India had the largest number of afflicted people (18.76 million), followed by Brazil (14.45 million), Russia (4.81 million), and South Africa (1.58 million), with China having the lowest figure (0.10 million). South Africa, a BRICS country, had a low vaccine dosage of 0.18 million as of April 30, 2021. The current analysis focuses on socioeconomic concerns and pandemic circumstances that influence BRICS stock market

Anubha Srivastava, Dr. Manjula Shastri, (2018). To analyze the effect of volume of trade due to volatility in BRICS nations. To investigate the impact of exchange rate variations on the market movements of the BRIC countries. This research focuses on determining the link between the BRIC nations and examining each country's volatility, risk, closing prices, and interdependence. The study's findings demonstrate that there is no reliability among the stock exchanges of any country.

Tom Jacob, Rincy Raphael, (2020). "Financial Integration of BRICS Equity Markets: An Empirical Analysis", To analyze the growth and trend of BRICS countries stock market return. The analysis demonstrates that there is a dynamic relationship between the stock markets of the BRICS countries. The association between India, Russia, China, and South Africa's economy is favourable and quite high. India and Brazil have a strong link.

The regression model is sound, and it indicates that India's stock market returns are heavily impacted by the returns of the other two economies, Brazil and Russia. Knowledge of information transition from one market to another market aids in the development of hedging strategies, the identification of diversification possibilities, and the capture of market efficiency.

Nikunj Patel, Dr. Pankajray Patel, (2014). To determine the direction and degree of the exerted effect on the stock markets of the BRIC countries. This research investigates the BRIC nations' spillover effects. Data has been discovered to be stagnant. According to the data, all markets exhibited positive returns, with the Russian market providing the largest return and moving to the positive side of the average return. The Russian market fluctuated the most, whereas the Chinese market fluctuated the least.

Isha Narula, (2018). To study the impact of international alliances on stock prices of respective stock markets. The study's overall findings demonstrate the inefficiencies of stock markets throughout history. Markets show evidence of overreaction at various times in time, whereas equilibrium is regained in a short amount of time. Markets exhibit mean reversion tendencies throughout history. The results also showed that the moving average and channel trading rules do not yield large, positive gains in general.

Dharmendra Singh, M. Theivanayaki and M. Ganeshwari, (2021). to investigate the volatility spillover impact between the foreign exchange market and the stock markets of Brazil, Russia, India, China, and South Africa (BRICS) nations. The study concluded that there is two-way asymmetric volatility spillover between the Indian and Japanese stock markets, but only one-way volatility transmission from the US to the Indian stock markets. Asymmetric volatility spillover was also seen between the Indian stock market and the foreign currency market.

Dirceu PEREIRA, (2018). The study was designed to test for contagion during the last two international financial crises. The findings show that both long-run and short-run connection patterns exist across BRICS stock markets, and that they have altered dramatically during tumultuous periods compared to calm ones, indicating the prevalence of contagion phenomena among BRICS markets over the previous two crises. These findings also suggest that changes in the indices of the United States and the European Union have a short-term impact on BRICS stock markets, functioning as a leading indication for investing in BRICS markets.

M Jegadeeshwaran, VM Sangeetha, (2018). The aim is to assess the stock market returns of BRICS economies. To summarize, the findings of this study would be especially beneficial to overseas investors, as there is an opportunity to diversify their portfolio. However, investors must exercise caution while investing in many overseas markets at the same time.

RESEARCH METHODOLOGY

The analysis is based on information from the BRICS nations' stock market indexes. The BRICS alliance consists of Brazil, Russia, India, China, and South Africa. In 2015, it made up around 43% of the total population of the planet. BRICS is a group of growing, economically linked nations that is important for the growth of developing nations. The analysis that follows looks at the performance of a particular stock market as well as index volatility and stock market movement. This essay makes the assumption that the reputable stock markets in five nations are the top stock market exchanges. The information used in this study was acquired from a number of government organizations, stock exchange websites, and investing.com. The sample of the time period spans is from 2007 to 2022. The study tested the association between chosen variables using a number of different statistical and econometric methodologies. Across the sample period, many tests were used, including the Unit Root Test, Correlation Analysis, Cointegration Test, and Granger Causality Test.

Stock Market Movement in BRICS nations : Brazilian Stock Market, Russian Stock Market, Indian Stock Market, Chinese Stock Market, South African Stock Market are considered for the study

DATA ANALYSIS AND INTERPRETATION

4.1 Descriptive Statistics

Table 4.1.1 Descriptive statistics analysis findings

Descriptive statistics	Brazil	Russia	India	China	South Africa
Mean	71064.8	1333.601	28291.89	2980.304	40908
Median	63489	1287.09	26145.67	2959.36	44160.31
Standard Deviation	23103.85	372.1966	13428.64	684.5338	13222.04
Coefficient of Variation	32.510965	27.90915	47.46460	22.96859	32.321410
Minimum	36596	535.04	8891.61	1728.79	16514.3
Maximum	126802	2459.88	63099.65	5954.77	69675.69

The descriptive data for the BRICS stock markets are shown in table above. Brazil has the highest average stock value (71064.8), followed by South Africa (40908), and Russia has the lowest average stock value (1333.601). The Standard Deviation serves as a surrogate for raw data in this case, the statistic also explains that Brazil (23103.85) is the most unstable market, followed by India (13428.64), while Russia is the least volatile (372.1966) market. The variance in the chosen stock markets revealed that India (47.46%) remained a very variable market, followed by Brazil (32.51%), South Africa (32.32%), Russia (27.90%), and China (22.96%). Brazil had the highest stock index value (126802), while Russia had the lowest (535.04).

4.2 Correlation Test

Table 4.2.1 Findings from the Correlation Analysis

Countries	Brazil	Russia	India	China	South Africa
Brazil	1				
Russia	0.483762	1			
India	0.671716	0.840726	1		
China	0.418955	0.710602	0.784419	1	
South Africa	0.367443	0.334147	0.319597	0.232809	1

Pearson correlation coefficient was used to calculate the BRICS countries' stock market indices have a symmetrical and linear link, whereby is shown in the accompanying table. The association between a number of chosen criteria from 2007 to 2022 is shown in the table. The correlation table unmistakably demonstrates that the South African and Chinese stock market have the lowest correlations, while the Russian and Indian stock market have significant to high correlations.

4.3 Unit Root Test

Table 4.3.1 Results of Unit Root Test

Variable Name	Test Statistic	Critical Value at 5 %	P-value	Decision
Brazil	-11.83155	-2.876677	0.0000	Accepted
Russia	-10.85854	-2.876677	0.0000	Accepted
India	-12.98201	-2.876677	0.0000	Accepted
China	-12.58163	-2.876677	0.0000	Accepted
South Africa	-14.17193	-2.876677	0.0000	Accepted

Validating the data's stationary state has always been necessary for time series modelling. In order to ensuring the stationary nature of the underlying data series, the study ran the ADF test. The result showed that every variable is stationary at its current level. The data are stationary because the level of each underlying series hypothesis is accepted.

4.4 Cointegration Test

Table 4.4.1 Johansen’s Cointegration Test Findings

Hypothesized No. of Cointegrating equations	Eigen Value	Trace Statistics	Critical Value at 5 % (p-value)	Max Eigen statistics	Critical Value at 5 % (p-value)	Results
None	0.343788	229.1424	69.81889 (0.0000)	77.93534	33.87687 (0.0000)	Rejected
At most 1	0.242988	151.2070	47.85613 (0.0000)	51.49966	27.58434 (0.0000)	Rejected
At most 2	0.196323	99.70739	29.79707 (0.0000)	40.43330	21.13162 (0.0000)	Rejected
At most 3	0.183098	59.27409	15.49471 (0.0000)	37.41367	14.26460 (0.0000)	Rejected
At most 4	0.111450	21.86042	3.841466 (0.0000)	21.86042	3.841466 (0.0000)	Rejected

Two criteria are proposed by the Johansen cointegration technique. The maximum Eigen value test and the trace test are both used to ascertain the number of cointegrating vectors. At a 5% significance level, both tests reveal that one cointegrating equation is the original null hypothesis. These tests were then utilized to evaluate test for the supplied variables. As a result, equations are all cointegrated.

4.5 Granger Causality Test

Null Hypothesis	Observation	F-Statistics	Probability	Decision
China is not Granger Caused by Brazil	188	1.71202	0.1834	Accepted
Brazil does not Granger Cause China		0.47907	0.6201	Accepted
India doesn’t Granger Cause Brazil	188	0.61093	0.5440	Accepted
Brazil is not the cause of India's granger		1.86700	0.1575	Accepted
Russia does not Granger Cause Brazil	188	1.85645	0.1592	Accepted
Brazil doesn’t Granger Cause Brazil		0.27181	0.7623	Accepted
South Africa is not Granger Cause Brazil	188	0.87540	0.4184	Accepted
Brazil does not Granger Cause South Africa		0.06355	0.9384	Accepted
India doesn’t Granger Cause by China	188	0.04779	0.9533	Accepted
China fails to Granger Cause India		7.28802	0.0009	Rejected
Russia do not Granger Cause China	188	1.46669	0.2334	Accepted
China fails to Granger Cause Russia		0.81818	0.4428	Accepted
South Africa does not Granger Cause China	188	0.07871	0.9243	Accepted
China doesn’t Granger Cause South Africa		0.76861	0.4651	Accepted
Russia do not Granger Cause India	188	4.90766	0.0084	Rejected
India does not Granger Cause Russia		2.12655	0.1222	Accepted
South Africa fails to Granger Cause India	188	2.57743	0.0787	Accepted
India is not cause of South Africa granger		1.11098	0.3314	Accepted
South Africa doesn’t Granger Cause Russia	188	1.43876	0.2399	Accepted
Russia fails to Granger Cause South Africa		0.40229	0.6694	Accepted

Table 4.5.1 Granger Causality Test Results

The effect of the granger causality test is displayed in above table, suggesting that the null hypothesis is accepted someplace and rejected somewhere else based on their F-statistics. China does not Granger Cause India and Russia does not Granger Cause India has been rejected and another null hypothesis has been accepted.

FINDINGS

- This article examines the long-run development of a particular stock market from 2007 to 2022.
- According to the descriptive statistic test results Brazil has the greatest average stock index price, while Russia has the lowest the average value of the stock index. Brazil (23103.85) has the most volatility, followed by India (13428.64), while China has the lowest volatility (684.5338).
- According to the Coefficient of Variation results, India (47.4646) remained a highly diverse market, followed by Brazil (32.5109), South Africa (32.3214), Russia (27.9091), and China (22.9685). The BRICS stock market indices are symmetrically and linearly linked.
- The outcomes of the correlation analysis reveal that the Russian stock market is strongly correlated with stock market of India, whereas the Chinese stock market is inversely related to the South African stock market.
- All cointegrating equations have a 5% significance threshold as the initial null hypothesis, according to the Johansen's cointegration test. The outcome shows that the system has all cointegration equations, as shown by trace statistics and maximal Eigen statistics.
- The ADF test result shows that all the data are steady since the assumptions at each level of the series hypothesis are agreed.
- Results of the causality test shows other null hypotheses are accepted whereas the null hypothesis that China and Russia do not cause India is rejected.
- From the test conducted, we come to know that there is a **long-term relationship between India and other selected countries, so we accept the null hypothesis** suggesting that there is the positive correlation with India and other countries.

CONCLUSION

Based on the empirical study on BRICS nations and their stock market movements, it can be concluded that the stock markets of these countries are influenced by various factors, including global economic conditions, political instability, and investor sentiments. The study found that there is a high degree of co-movement between the BRICS stock markets, which suggests that these markets are integrated and can be considered as a single entity to some extent. Additionally, the study highlights the importance of diversification for investors looking to invest in BRICS stock markets, as different sectors and industries perform differently in these markets. Overall, the study provides valuable insights into the behavior and performance of the BRICS stock markets and can be useful for investors, policymakers, and researchers.

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