

Empirical Analysis of the Stock Markets of BRICS Economies

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ABSTRACT

Developing an understanding of the relationship amongst the stock markets of the five emerging economies of the ever so growing financially integrated world has immense significance. BRICS the group of nations has the capacity to change the business environment of the world as they are highly financially integrated. The primary objective of this paper is to evaluate the integration among BRICS nations during the past 5 years (1st April 2014- 1st April 2019) by analyzing monthly price histories of BOVESPA Index, MOEX Russia Index, BSE Sensex, SSE Composite Index and JSE Index for Brazil, Russia, India, China and South Africa respectively. Descriptive statistics, correlation, ADF unit root test and Johansen Co-integration test have been applied on the data. Since BRICS appears to have a massive financial influence in this financially integrated world, the paper also establishes a good degree of relationship amongst the stock markets of these economies thereby implying the need for the foreign institutional investors to follow a diversified portfolio strategy and study the specific growth areas in these economies in order to take a good investment decision.

Keywords: BRICS, Stock markets, Descriptive statistics, Correlation, ADF Test, Co-integration.

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INTRODUCTION

The liberalization, privatization and globalization processes of the emerging countries of the world picked up the pace after 1990s, contributing primarily to the economic development of the nations. Financial integration amongst the countries grew at a fast pace. According to Agénor (2003), financial integration refers to the extent to which the domestic financial markets are connected to each other at the domestic, regional, or international levels. So in this era of globalization, a magnificent increase has been seen in the transactions of the world financial markets, indicating a more integrated world market. A relationship amongst the nations is established when integration happens at such a rapid pace. Increased correlations amongst the stock markets of the economies can help investors in better designing of their portfolio and diversifying their risk. Also the policy makers study the integrated stock markets to analyze the economy and form policies for the citizens of the country. So, such hulking integration amongst the world markets calls for analyzing the co movements in the stock markets of the top emerging economies of the world. Out of all the developing economies, BRICS form the association of the strongest emerging countries of the world.

BRICS is the acronym for the major emerging economies of the world i.e. Brazil, Russia, India, China and South Africa. In the year 2006, the group was formed among Brazil, Russia, India and China and then South Africa joined in 2010. The main objective of BRICS is to promote dialogue and cooperation among the member countries in an incremental, proactive, pragmatic, open and transparent way. The purpose and association of BRICS is instrumental not only to fulfill the similar interests of the emerging economies, but also to ensure peace, prosperity and amicable relations amongst the government and private players of these nations. The association is considered to be the strongest among the developing economies of the world for the reason that the BRICS countries have a sizable contribution to the global growth, trade and investment.

BRICS plays an immensely crucial role in strengthening the world economy, influencing international monetary arrangements and in according with the Sustainable Development Goals. Persevered BRICS growth and its dialogue, cooperation and policy initiatives have greatly assisted other emerging and developed nations of the world. Approximately 40% of the world population is a part of BRICS. In 2015, the combined economic significance equaled almost one third of the Global Gross Domestic Product in PPP terms. Therefore, BRICS can be contemplated as the new hub of the profundity in the global economic structure. Over the last two decades, BRICS contribution to the world trade transactions has almost increased three times. The overseas inward and outward trades have observed an unceasing growth. Through extensive trade and investment amongst the BRICS, amicable relationships have been established that in turn has led to enhanced nexus, greater organizational formal communication, improved supply chain management, growth oriented deals and projects amongst the private players and governments of these nations. Inward and outward logistics, extensive network and communication between the BRICS and other countries of the world have also

escalated through extended investment and trade. By the year 2030, it is expected from the BRICS economies to increase their contribution to the world economic growth, in case the interest rates and investment rates amongst these nations stay favorable to the economic conditions.

The investments in BRICS stock markets have seen tremendous growth, because investors resort to diversifying their portfolio by investing in different assets globally. As a result of which the financial markets have become more integrated. With such greater financial integration and linkages, it is of utmost importance to understand the relationship amongst the nations in order to maximize the returns from the investments made. It is implied that the more the markets are integrated, the greater the contagion effect can get as was observed in the US financial crisis 2008, and so investors should diversify their portfolio by investing in other countries apart from the ones that are highly co-integrated. Reckoning ever growing role of BRICS nations in the world hence makes it useful to assess the relationship and association amongst the Stock market indices of these nations. Table 1 contains the stock market indices selected for the analysis purpose in this study-

Table 1: BRICS Nations and their Indices

Country	Major Stock Markets	Stock Market Indices
Brazil	BM & FBOVESPA	BOVESPA Index
Russia	Moscow Interbank Currency Exchange	MOEX Russia Index
India	Bombay Stock Exchange	BSE Sensex
China	Shanghai Exchange	SSE Composite Index
South Africa	Johannesburg Stock Exchange	JSE Index

The above stock market indices have been chosen for the purpose of data analysis as these indices are considered to be credible and are representatives of the economy. The composition of these indices captures the maximum capitalization of the stock exchanges for the respective nations. The indices together can be considered to provide a candid snapshot of the state of the stock markets of these nations.



LITERATURE REVIEW

Several empirical studies have been conducted to establish a relationship amongst the BRICS economies. Since the stock markets of the BRICS economies are being analyzed, relevant past studies in this regard have been discussed with a brief global background.

Mohanasundaram and Karthikeyan (2015) analyzed the nature of association and the possibility of existence of a short-run and long-run relationship amongst the stock-market indices of South Africa, India and the USA for the period from April 2004 to March 2014. It was observed that a strong correlation existed amongst the selected stock market indices. Also, according to the Johansen and Juselius multivariate co-integration approach applied, absence of a long-run

relationship was found among the three stock market indices. According to Tripti Nashier (2015), there is evidence of short term static and long term potent integration between the BRICS (Brazil, Russia, India, China and South Africa) economies and the stock markets of the USA and the UK. The tests applied were correlation and Johansen co integration test.

Abas (2009) examined the relationship between the stock markets of China and India and the markets of the US, the UK, Japan and Hong Kong. It has been observed that the markets of China and India are correlated with all four developed markets analyzed by him. According to Shachmurove (2006) a dynamic interrelationship was observed among the stock exchanges of the US and of the four Emerging nations, namely Brazil, China, India, and Russia. It has been observed that the Brazilian stock market returns are affected to a large extent by other stock markets. According to Bhar and Nikolova (2009) India has the highest level of integration amongst the BRIC countries. Bora et al. (2009) examined the stock market indices of developing economies of Brazil, Russia, India, China, and Argentina (BRICA) and analyzed the linkages among the stock markets of the BRICA countries and their relationship with the stock market of the USA. It was observed that the stock market of the USA had a noteworthy impact on all BRICA countries.

According to Chittedi (2009), there existed co-integration between BRIC countries and developed countries, namely, the USA, UK, and Japan. An and Brown (2010) examined the co-movements of the weekly and monthly index returns during October 13, 1995-October 13, 2009, of the US, Brazil, Russia, India, and China stock markets. It was discernible that there was some co integration between the US and China, but there was no co integration between the US and the other emerging markets. Sharma et al. (2013) using the conventional indices of the stock markets of Brazil, Russia, India, China, and South Africa (BRICS), attempted to study the relationship amongst the economies. The study revealed that the BRICS stock markets were influenced by each other, but not to a marked extent. Kishor & Singh (2017) attempted to establish relationship and linkages among BRICS economics and found the effect of one stock index of one country on the other countries stock indices. The cause and effect relationship among various indices was noted by the ADF, Unit root test and Granger Causality. For instance, a significant and positive correlation existed among Nifty and other BRICS indices. Albeit no long term relationship was discernible among Nifty and other stock indices. Anbarasu & Selvaraju (2015) studied the performance of the bourses movement on the secondary platform. Several indices were selected and historical data was taken to study share market prices from 2013 to 2014. Tools like Descriptive Statistics, ADF Unit Root Examination and Corelogram Analysis were used to analyze the stock market prices. Gupta (2014) focused on the formation of dependence between the emerging stock markets of BRIC countries. The study aimed to provide a better theoretical approach to the BRICS countries' stock market and to find out which countries were more affiliated with the prices between India and other countries in BRICS. Various tools were used to evaluate data on stock indices - the Shapiro Wilx W test. These tools established the relationship among BRICS countries.

Ouattara (2017) analyzed the quarterly data from 2000 to 2015 and observed that no long term relationship existed among the stock market indices of BRICS economies. However, high positive linkages among the stock markets were noted and a bi directional causal relationship existed between Indian and Brazilian stock markets. Tripathy (2017) using GARCH, CHARMA, APARCH AND CGARCH models established the presence of asymmetric and leverage effects in all BRICS countries stock market returns. Time varying long-run volatility component was also reported to be more persistent in Chinese and Russian stock markets. The study further exhibited that volatility shocks were quite persistent in all BRIC countries stock markets revealing the changing pattern of volatility over time. Nasr, Cunado, Demirer & Gupta (2017) examined the linkages among the BRICS stock market returns, country risk ratings and international factors using NARDL models. It was established that quite a degree of heterogeneity existed in the interaction of the stock market returns with country-specific political, financial and economic risk ratings.

Panda & Thiripalraju (2018) using VAR Granger causality test and EGARCH model established the presence of bidirectional and unidirectional return spillover and it also established that negative news impacts more on volatility of BRICS stock markets. They also acknowledged that the transformation of information from one market to another market helps in developing hedging strategy, finding diversification opportunities and capturing the efficiency of the market. Dahiretal (2018) studied the dynamic links between the exchange rates and stock markets of BRICS economies. The results revealed a positive relationship between the stock prices and exchange rates in the medium and long-term and out of the five economies South Africa seemed to have a more bidirectional causality. Lima (2019) examined the sectoral dynamics of co-integration between the BRICS (Brazil, Russia, India China and South Africa) and developed stock markets, represented by Germany, Japan, the UK and the US. The results supported the existence of financial co-integration across sectors and among all the nine countries during the Global Financial Crisis and European Sovereign Debt Crisis. Only developed countries exhibited co-integration during the UK Brexit crisis. Allimuthu (2019) used the daily closing prices of the major stock indices of BRICS from 1 January 2000 to 31 December 2017 to examine the integration among the BRICS nations. After employing ADF test and PPP test for stationarity and value at risk techniques like Granger Causality test and Johansen & Juselius co-integration test, it was observed that short-run and long-run relationship did exist among these nations.

Mroua (2019) examined the causality and the dynamic links between exchange rates and stock market indices of Brazil, Russia, India, China, and South-Africa (BRICS). Generalized Method of Moments (GMM) model and the ARDL method were applied and it was observed that exchange rate changes had a significant effect on past and current volatility of the BRICS stock indices. Al-Mohamad et al (2020) applied the Augmented Dicker-Fuller (ADF) and Philips-Perron tests (PP) tests to analyze stationarity among the selected variables. The pre- and post-BRICS formation long-term linear relationship was investigated using Johansen and Juselius co-integration test while the Granger Causality was applied to assess the

direction of the causality between the stock market indices. It was noted that the degree of financial integration among the BRICS stock markets had moderately strengthened in the post-BRICS formation period compared to the pre-BRICS formation period. It was also observed that the Chinese stock market was mostly independent from other BRICS markets and a unidirectional causal relationship existed from the Russian stock market to its BRICS counterparts in both periods. There was an increased responsiveness of stock markets in BRICS countries to shocks in each other after the formation of the bloc as compared to pre-formation period.

Most of these studies found enhanced level of integration amongst the stock markets of BRICS. The aim of this paper is thus to further analyze the stock markets of these emerging economies using the latest monthly data of the past 5 years (1 April 2014-1 April 2019). Anything more than 1 year, is considered to be long-term and in this ever so rapidly growing world economy where economies have become financially integrated and extremely dynamic to the external environment, 5 years time period is therefore more than enough to analyze the long-term association amongst the stock markets of the BRICS nations.



DATA ANALYSIS

For the purpose of data analysis, 5 years monthly historical data have been taken of the stock market indices of the BRICS economies. Analysis has been conducted using EXCEL and E-views.

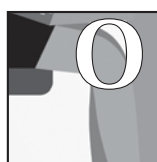


DESCRIPTIVE STATISTICS

The descriptive statistics has been used to summarize the general trend and pattern of the dataset. The results obtained from the Table 2 imply that out of the all stock exchanges only Russia's data set is negatively skewed indicating a long left tail of the distribution. All other distributions of the stock indices except for Russia are positively skewed i.e. they have a long right tail. Analyzing the kurtosis, we find that all the stock indices are having values that are less than 3. So, in comparison with a normal distribution, the height of the distribution selected for the study is short and tails of the distribution are thinner. Also,

Table 2: Descriptive Statistics

BOVESPA		MOEX		SENSEX		SSE		JSE	
Mean	64264.82	Mean	1951.45	Mean	30062.21	Mean	3060.42	Mean	53303.45
Standard Error	2009.58	Standard Error	42.93	Standard Error	556.87	Standard Error	64.55	Standard Error	394.94
Median	61288.20	Median	1953.05	Median	28452.17	Median	3095.47	Median	52388.87
Mode	#N/A	Mode	#N/A	Mode	#N/A	Mode	#N/A	Mode	#N/A
Standard Deviation	15695.32	Standard Deviation	335.28	Standard Deviation	4349.27	Standard Deviation	504.14	Standard Deviation	3084.56
Sample	246342950.25	Sample	112412.68	Sample	18916162.15	Sample	254154.84	Sample	9514497.89
Kurtosis	-0.76	Kurtosis	-0.95	Kurtosis	-0.91	Kurtosis	1.75	Kurtosis	-0.70
Skewness	0.58	Skewness	-0.03	Skewness	0.49	Skewness	0.46	Skewness	0.63
Range	56987.70	Range	1253.31	Range	16613.75	Range	2585.39	Range	10902.73
Min	40406.00	Min	1306.01	Min	22417.80	Min	2026.36	Min	48870.10
Max	97393.70	Max	2559.32	Max	39031.55	Max	4611.74	Max	59772.83
Sum	3920154.20	Sum	119038.21	Sum	1833795.10	Sum	186685.78	Sum	3251510.41
Count	61.00	Count	61.00	Count	61.00	Count	61.00	Count	61.00



OBJECTIVE & RESEARCH METHODOLOGY

The objective of the study is to analyze the inter-relationship among the bourses of the BRICS economies by studying select stock market indices i.e. BOVESPA Index, MOEX Russia Index, BSE Sensex, SSE Composite Index and JSE Index. The study also analyzes the movement of BSE Sensex with other indices of BRICS nations. For selecting the samples, purposive sampling technique has been employed. The Sample size consists of the monthly prices of the stock market indices of BRICS nations. The sample period consists of last 5 years data from 1st April 2014 to 1st April 2019. Secondary sources were used for data collection. For the purpose of data analysis, descriptive statistics, correlation, Augmented Dickey Fuller test and Johansen Co-integration test have been used.

there exists a negative kurtosis among the Stock indices of Russia, India and South Africa. So, in comparison with a normal distribution, the peak of the distribution selected for the study is flatter and tails of the distribution are lighter.

To compare the variability of the distributions, coefficient of variation is calculated as per equation no. 1:

Coefficient of variation- (standard deviation / Mean) *100.....(1)

Table 3: Coefficient of variation of Stock Market Indices

	BOVESPA	MOEX	SENSEX	SSE	JEE
C.V.=(STD/MEAN)*100	24%	17%	14%	16%	6%

From Table 3 it is apparent that the stock market of Brazil is the most volatile in comparison with the stock markets of other 4 countries, its variability being the highest i.e. 24%. The most uniform out of all the markets is that of South Africa, its variability being the lowest. India's stock market is less uniform and consistent as compared to South Africa, but is more consistent and uniform as compared to the stock markets of Brazil, Russia and China.

Various reasons can be attributed to the high volatility in the stock markets of Brazil. One prime reason can be the political instability that was observed in 2016 with the impeachment of the president Dilma Rousseff for breaking Brazil's budget laws. The mentality of the investors where they tend to follow each other while buying securities as soon as a change in the government is announced, can also be a reason for high volatility in Brazil in comparison to the stock markets of Russia, China, India and South Africa. It can also be implied that the stock markets of India and China are less volatile for the reason that they are the prime developing countries of the world. Their consumer and industrial markets have been expanding rapidly and domestic as well as international investors have generally viewed them as a profitable investment option. But their volatility is more than that of South Africa. So, from the point of volatility, markets of South Africa can be preferred as a stable investment option as the coefficient of variation is the least out of all the BRICS economies.



CORRELATION

Correlation analysis is used to find whether there exists a relationship between any two or more than two data sets. Strength and direction of the relationship can be calculated and an association among the select data sets can be established. For the analysis purpose, correlation for the 5 stock indices has been calculated using Excel Analysis ToolPak.

Table4: Correlation among the Stock Market Indices

	BOVESPA	MOEX	SENSEX	SSE	JEE
BOVESPA	1				
MOEX	0.839982	1			
SENSEX	0.903708	0.821333	1		
SSE	-0.09219	0.066151	0.039323	1	
JSE	0.674672	0.659956	0.774087	0.25906	1

From Table 4, correlation among the BRICS economies is computed. Highest correlation of 90% is there between SENSEX and BOVESPA which indicates a strong relationship between the stock markets of Brazil and India. A strong correlation of 83% and 82% is there between MOEX and BOVESPA and SENSEX and MOEX respectively, indicating a strong positive relationship between the stock markets of Russia and Brazil as well as of India and Russia respectively. Stock market of India is highly correlated with Brazil followed by Russia and South Africa. A negative correlation of 9.2% is there between SSE and BOVESPA, indicating an opposite direction movement between the stock markets of China and Brazil. A very low degree of correlation i.e. of 3% is there between SENSEX and SSE, indicating a poor relationship

between the stock markets of India and China. Also between the markets of South Africa and China, relatively lower degree of correlation i.e. 25% is visible.

From the data, it can be concluded that Indian stock markets have a strong relationship with the stock markets of Brazil, Russia and South Africa. The stock markets of Russia, Brazil and India share a greater degree of relationship amongst each other as compared to the other nations. It can be implied that the possible reasons for such a good degree of correlation can be the increased dialogue, cooperation and policy initiatives of the BRICS economies. In 2015, BRICS economic significance expanded one third of GDP in PPP terms, thereby showing the increased trade and investment linkages amongst these nations. Amicable political relations amongst Russia, Brazil and India can also be one of the possible reasons for good degree of correlation amongst these nations. Thus, the global investors can gain an idea of how to diversify their portfolio of securities if they decide to invest in India then investment in countries apart from Russia, Brazil and South Africa would be a preferable option in order to minimize their risks and increase their possibility of returns, thereby reducing their risk of contagion effect.



AUGMENTED DICKEY FULLER TEST

Stationarity test is a preliminary test used before applying major statistical tools. It is the test that leads to the next set of statistical tools such as Unit root, Johansen Co-integration and Granger causality test. The time series data should have absence of unit root thereby making the data stationary and fit for applying further econometric tests. The movement of time series data should revolve around a mean value. It should not reflect any fluctuations during the period. For the data to be stable, there must be absence of unit root. If data set with unit root elements are applied in the analysis, it would lead to

spurious or nonsensical regression.

So, existence of stationarity is tested through Augmented Dickey-Fuller (ADF) Unit Root test. Eviews software is used to apply the test to the 5 stock market indices.

The hypothesis is set to test the existence or non- existence of unit root in the stock market indices of the BRICS economies. The indices are tested for the presence of unit root using ADF test. The lag truncation parameter is based on Akaike Info Criterion with a lag length of 4. The test has been conducted on the level and on the first difference and respective 'intercept' and 'trend and intercept' values have been recorded as shown in table 4. When calculated, it was found that the values of

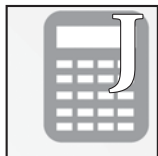
Table 5: ADF Unit Root Test

Indices	Level				1st Difference			
	Intercept		Trend & Intercept		Intercept		Trend & Intercept	
	t-statistic	Prob	t-statistic	Prob	t-statistic	Prob	t-statistic	Prob
BOVESPA	-0.009942	0.9536	-2.040325	0.5676	-4.257722	0.0013	-4.722107	0.0019
MOEX	-1.005064	0.7462	-3.732436	0.0276	-8.890801	0.0000	-8.804934	0.0000
SENSEX	-0.022059	0.9523	-2.043812	0.5657	-6.994089	0.0000	-6.986442	0.0000
SSE	-3.20933	0.0243	-3.189273	0.0965	-5.237677	0.0000	-5.313315	0.0003
JSE	-2.099878	0.2455	-3.075146	0.1216	-8.126243	0.0000	-8.051853	0.0000

Null Hypothesis: Unit root exists in the selected indices.

Alternate hypothesis: Unit root does not exist in selected indices.

'intercept' and 'trend & intercept' at the first difference, are significant to reject the null hypothesis. ADF statistics for the indices are -BOVESPA (-4.722107), MOEX (-8.804934), SENSEX (-6.986442), SSE (-5.313315) and JSE (-8.051853). Hence, the null hypothesis is rejected. It can be concluded that the indices are stationary at first difference i.e. unit root does not exist. This makes the indices ideal for further econometric testing.



JOHANSEN CO-INTEGRATION TEST

Johansen Co integration test is used to ascertain the long-term association among the variables. If the two variables are co-integrated with each other, then they are

presumed to have long-term relationship. In this study, Johansen Co-integration Test has been used using EViews, to analyze the co-integrating relationship between variables.

Null Hypothesis: No long-term association exists among the selected indices.

Alternate Hypothesis: Long-term association exists among the selected indices.

Johansen test is conducted on the 5 stock market indices of the BRICS economies. Trace test and maximum Eigen value tests can be conducted under it. In both trace and Max-Eigen Statistics, the p value should be more than 0.05 to accept the null hypothesis. In table 6 since the p value for trace test and

Table 6: Johansen Co-integration Test among the Five Stock Market Indices

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical value	Prob.**
None *	0.558319	86.67901	69.81889	0.0013
At most 1	0.279417	40.10046	47.85613	0.2189
At most 2	0.178741	21.42184	29.79707	0.3319
At most 3	0.159439	10.19762	15.49471	0.2658
At most 4	0.005206	0.297523	3.841466	0.5854
Trace test indicates 1 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical value	Prob.**
None *	0.558319	46.57855	33.87687	0.0009
At most 1	0.279417	18.67862	27.58434	0.4398
At most 2	0.178741	11.22422	21.13162	0.6249
At most 3	0.159439	9.900093	14.26460	0.2186
At most 4	0.005206	0.297523	3.841466	0.5854
Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

the maximum eigen value test in 'none' hypothesis is less than 0.05, therefore the null hypothesis is rejected and the alternate hypothesis is accepted, which means that there exists a long-term association among the stock markets of BRICS economies. The results indicate that all the variables are co-integrated.

The possible reasons for such co-integration can be increased bilateral trade relations, amicable political relations, common foreign international investments and increased foreign direct investments since the formation of BRICS that has all added up to the economic proximity amongst these nations. The presence of the co-integrating relationship amongst the BRICS nations, suggests that the markets move together and there is some common risk factor that makes them co-integrated in the long run. Such co-integration thus implies that the international investors have limited investment opportunities for minimizing their risk in these nations. To protect the investments from the contagion effect, they should resort to diversifying their portfolio by investing in other countries in tandem with the BRICS nations. However, certain benefits can be derived from the co-integration of stock markets like increased liquidity and reduced transaction costs. Hence the global portfolio managers can still add value from investments in these countries. But increased level of co-integration of these nations necessitates the need for global investors to follow diversified portfolio strategy and ascertain specific growth areas within these economics before making investment decision.



CONCLUDING OBSERVATIONS

The importance of BRICS countries can be assessed from the fact that it accounts for 40% of the global population and the combined economic weight in 2015 equaled almost a third of the global Gross Domestic Product in PPP terms. BRICS is contemplated to be the novel economic strength in the global financial arrangement. The BRICS share of world trade has nearly tripled over the last twenty years. Outward and inward investment and overseas trade has experienced a sustained growth. Inward and outward logistics, inter connected network and communication between the BRICS and other countries of the world have also escalated through extended investment and trade. Due to the fact that BRICS has become such a powerful association in the past few years, an attempt has been made in this paper to examine the

relationship amongst the stock markets of BRICS economies by analyzing the monthly data of the past 5 years (1 April 2014-1 April 2019). The paper is useful for policy makers, global investors and researchers who want to examine the financial interconnectedness amongst these nations. The analysis started with descriptive statistics, wherein skewness, kurtosis and coefficient of variation were studied. It was observed that the stock market of Brazil was the most volatile and the distribution sets of all the indices were having tails thinner than the normal distribution. It was implied that from the point of volatility, markets of South Africa could be preferred as a stable investment option as the coefficient of variation was the least out of all the BRICS economies. Correlation analysis helped in establishing the highest degree of positive relationship between the markets of India and Brazil. Also the markets of Russia, Brazil and India shared a greater degree of relationship between each other as compared to the other nations. Global investors should diversify their portfolio of securities, for if they decide to invest in India then investment in countries apart from Russia, Brazil and South Africa would be a preferable option in order to minimize their risks and increase their possibility of returns, thereby reducing their risk of contagion effect. After this the variables were tested for stationarity using Augmented Dickey Fuller Test, wherein it was found that the indices were stationary at first difference i.e. unit root was absent. The indices were then considered for Johansen Co-integration test. According to Johansen Co-integration test, it was observed that a long term association existed among the bourses of BRICS nations, the possible reasons of which could be increased bilateral trade relations, amicable political relations, common foreign international investments and increased foreign direct investments since the formation of BRICS that has all added up to the economic proximity amongst these nations. The presence of the co-integrating relationship amongst the BRICS nations, suggested that the markets move together and there is some common risk factor that makes them co-integrated in the long run. Such co-integration, thus, implied that the international investors have limited investment opportunities for minimizing their risk in these nations. To protect the investments from the contagion effect, they should resort to diversifying their portfolio by investing in other countries in tandem with the BRICS nations. From the study, it can be concluded that the variables are co-integrated and the BRICS economies are financially integrated and have an immense potential to remain powerful and influence the globalized economy.

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