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A Relative Study of Stock Market Returns of 'BRICS' Economies

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Abstract: *Brazil, Russia, India, China and South Africa (BRICS) are leading emerging economies and political powers at international and regional level. These economies are attracting a large number of foreign institutional investors, foreign direct investment into their economy. The present study examines the comparative study of stock exchanges of BRICS economies. It tries to find out the relationship of stock market among these economies and the volatility in the markets. For the purpose of this study data has been collected through secondary sources. A period of 13 years i.e. 2004 to 2016 has been considered for the purpose of the study. Statistical tools like Correlation, Regression and ANOVA have been used for the purpose of the study.*
Key Words: *Stock Exchange, Market Capitalization, Volatility.*

I. Introduction

The term, "BRICS", was coined by economist Jim O'Neill in his publication, Building Better Global Economic BRICs. BRICS is the acronym for of five major emerging economiesnamely Brazil, Russia, India, China, and South Africa. Till 2010 it was called BRIC as there were only four nations and with the inclusion of SouthAfrica in 2011, it was changed to BRICS. All the BRICS nations are developing and walking toward rapid industrialization.

The combined population of all BRICS nations is around 300 Crores which is almost 40 % of world population. Whereas the combined nominal GDP is around 20 % of world's GDP. They also represent around 18 % of world economy. It is speculated that by 2020 BRICS would become a formidable player in the world economy posing a serious challenge to the USA overtaking its economy.

The timeline history of BRICS is as follows:

1989	Brazil emerges from military rule, electing Fernando collar de Mello who puts in place a drastic economic stabilization plan to reverse hyperinflation and boost privatization.
1998	While investors and industry focus on the struggling "tiger" economies of south east Asia, china quietly emerges from the Asian crisis largely unscathed. The Russian economy melts down amid investors' fears of a massive debt default, leading to a Rouble collapse.
1999	Little known former KGB operative Vladimir Putin becomes president in Moscow, vowing to rebuild the power and prestige of Russia.
2001	China joins the world trade organization. State owned newspaper people's daily declares "this historic moment in china's reform and opening up and the process of modernization.
2003	Left wing union leader Luiz Inacio Lula da Silva becomes president of Brazil, kicking off a period of unprecedented economic prosperity.
2001-2005	Rise in oiled fuelled Russian stock market – 761%, Indian stock market – 190%.
2006	Dow Jones introduces the BRIC 50 index, a basket of 50 of the biggest companies listed in the stick markets of Brazil, Russia, India and China, initial capitalization $446 billion. At Putin's insistence BRIC foreign ministers meet informally in New York on the side-lines of 61st UN General Assembly.
2007	China overtakes Germany as the world's third largest economy.
2008	Brazil becomes a net creditor for the first time. In May 2008, Brazil launches its own sovereign wealth fund joining Chinaand Persian gulf states in creating a vehicle to invest excess capital.
2009	The international financial crisis generally acts as a boon to BRICS. At the time of crash's lowest point, India's GDP growth rate was 9.7%; BRIC leaders hold their first summit in Yekaterinburg, Russia, calling for "a more democratic and just multi-polar world order based on the rule of international law, equality, mutual respect, cooperation and coordinated action and collective decision making of all the states.
2010	At their second summit held in Brasilia, BRIC leaders call for UN reform but stop of supporting Brazil's and India's bids to join the security council as permanent members. China overtakes Japan as second largest economy in the world. 9 years after Goldman Sachs forecast their rise. The BRICs constitute a quarter of global economic activity and more than a third of all GDP growth. China invites south Africa to join an expanded BRICS.
2013	China committed $41 billion towards the pool; Brazil, India and Russia $18 billion each; and South Africa $5 billion.
2014	Plan to setup a US$100 billion BRICS Development Bank.
2018	The year BRICS will overtake USA according to Goldman Sachs.

Source: https://www.questia.com/magazine/1G1-251724798/brics-how-did-a-wall-street-buzzword-coined-by-goldman

II. Literature Review

Terence Tai-Leung Chong, Sam Ho-Sum Cheng, Elfreda Nga-Yee Wong in their article titled "A Comparison of Stock Market Efficiency of the BRIC Countries", compared the stock market efficiency of Brazil, Russia, India and China. The Brazilian stock market is found to be the most efficient market among the BRIC. Muskan Karamchandani, Shubhra Mohadikar, Savera Jain in their research paper titled "Stock Indices of BRIC economies: Explored for Non Linear Dynamics and Volatility", explored the dynamics of the major stock indices of BRIC economies. The findings highlighted trend reversals in Russian, Indian and Chinese markets. Also, the Indian market was found to be the least volatile amongst the 4 economies. Nawal Kishor and Raman Preet Singh in their paper titled "Stock Return Volatility Effect: Study of BRICS" examined the stock return volatility relationship of emerging economies from 2007 to 2013 which also includes the financial crisis of 2008 and its impact on emerging economies of the world. The study found that BRICS stock market except Brazil and Chinese stock market have been significantly affected by the news of in US stock market. There exists a significant difference in the stock return volatility in all the countries stock markets.

Research Objectives

1. To study the Economies of BRICS nations using stock market indices.
2. To compare the stock market performance of BRICS economies using appropriate statistical tools.

III. Methodology

The research is purely based on secondary data collected from official stock exchange websites of respective countries namely Brazil, Russia, India, China and South Africa. The data was collected for a period of 13 years i.e., from 2004 to 2016.

Data Analysis Tools:

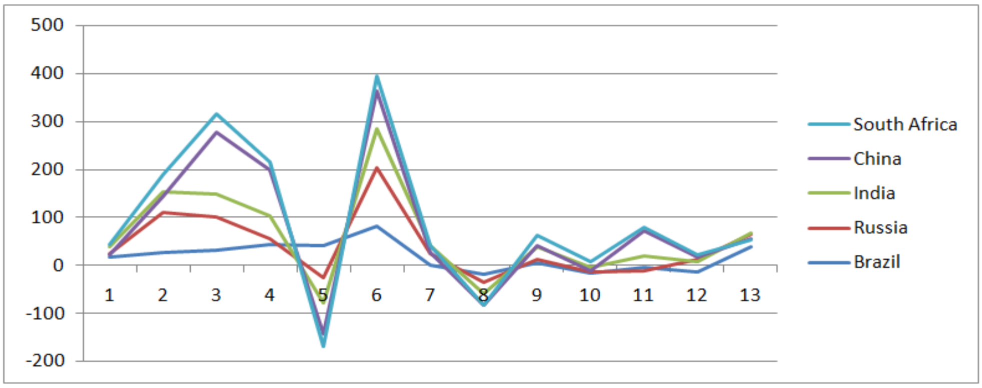
Tools such as Correlation, Descriptive statistics and Regression analysis were used in the research.

IV. Data analysis:

Stock market returns of BRICS Economies (In %)

Year	Brazil	Russia	India	China	South Africa
2004	18	7	13	-15	20
2005	28	83	42	-8	44
2006	33	68	47	130	38
2007	44	12	47	97	16
2008	41	-67	-52	-65	-26
2009	83	121	81	80	29
2010	1	23	17	-14	15
2011	-18	-17	-25	-22	-1
2012	7	5	26	3	22
2013	-15	2	9	-7	19
2014	-3	-7	30	53	6
2015	-13	26	-5	9	4
2016	39	27	2	-12	-4

(Source: Computation based on data from respective Stock exchange Websites)



Interpretation:

The returns of stock market returns of BRICS economies are plotted on a line graph. From the graph it can be inferred that the trend among all these five emerging markets is almost the same. The movement of stock market returns indicate similar trend as these five economies have similar demographic, economic and industrial outlook. During the initial period i.e. from 2004 to 2006 the returns of South African JSE dominated followed by China. During 2007-08 all the stock markets crashed due to Global Financial Crisis. Russia was least affected followed by India. From then we can see a fluctuating trend in the reruns and surprisingly all the economies moved together. They made real the notion that these five emerging economies are similar in their economies.

Descriptive Statistics:

Year	Brazil	Russia	India	China	S. Africa
Mean	18.85	21.77	17.85	17.62	14.00
Standard Error	8.16	13.15	9.50	15.39	5.15
Median	18.00	12.00	17.00	-7.00	16.00
S D	29.42	47.41	34.25	55.50	18.58
Sample Variance	865.31	2248.03	1172.97	3080.09	345.33
Range	101	188	133	195	70
Minimum	-18	-67	-52	-65	-26
Maximum	83	121	81	30	44
Sum	245	283	232	229	182
Count	13	13	13	13	13

Interpretation:

The above table shows descriptive statistics of the daily closing return series of Brazil, Russia, India and China. The maximum return index of Brazil is 83, and minimum is -18 which has produced standard deviation of 29.42. The Mean of Brazil returns is 18.85, median is 18 and range is 101. The Sample Variance is 865.31.The maximum return index of India is 121, and minimum is -67 which has produced standard deviation of 47.41. The Mean of India returns is 21.77, median is 12 and range is 188. The Sample Variance is 1172.97.The maximum return index of Russia is 81, and minimum is -52 which has produced standard deviation of 34.25. The Mean of Russia returns is 17.85, median is 17 and range is 133. The Sample Variance is 2248.03.The maximum return index of China is 130, and minimum is -65 which has produced standard deviation of 55.50. The Mean of China returns is 17.62, median is -7 and range is 195. The Sample Variance is 3080.09.The maximum return index of South Africa is 44, and minimum is -26 which has produced standard deviation of 18.58. The Mean of South Africa returns is 14, median is 16 and range is 70. The Sample Variance is 345.33.

Correlation Matrix

	Brazil	Russia	India	China	S. Africa
Brazil	1				
Russia	0.493202917	1			
India	0.480967743	0.833901768	1		
China	0.382184443	0.566144563	0.778605	1	
S. Africa	0.173330379	0.786999389	0.821485	0.548720959	1

Interpretation:

There is high correlation between India and Russia with a correlation of 0.83 followed by correlation between South Africa and India with a correlation of 0.82. China and India are also highly correlated with a coefficient of 0.78 and South Africa and Russia are correlated with 0.78. Brazil is the least correlated country among BRICS.

Regression Model

A regression model was constructed taking India a dependent variable and other BRICS nations as Independent variables using the hypothesis mentioned below.

Hypothesis:
H_0 = India's stock market returns are not significantly influenced by the returns of other four economies i.e. Brazil, Russia, China and South Africa.
H_1 = India's stock market returns are significantly influenced by the returns of other four economies i.e. Brazil, Russia, China and South Africa.
The regression model is as follows:
$Y = \alpha + \beta 1\ X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \varepsilon$ ……………………. (1)
Where, α = Intercept, $\beta 1$…….. $\beta 4$ are respective slopes of Stock market returns.
Y = BSE Sensex Returns (India)
X1= Bo Vespa Returns (Brazil)
X2= Moscow stock exchange Returns (Russia)
X3= Shanghai Composite Index Returns (China)
X4 = SA/ JSE Index Returns (South Africa)

Regression statistics:

R	**R Square**	**Adjusted R square**	**Durbin Watson Statistic**
0.942	0.888	0.832	2.48

According to the regression, R square is 0.88 and adjusted R square is 0.83 which indicates that 83% of Indian (Sensex) Stock returns are explained by Independent variables which are Brazil, Russia, China and South Africa. According to Adjusted R square i.e. 0.832, it is assumed that this regression model is good. The probability value is 0. Durbin- Watson statistic is calculated using the residuals of regression to check for auto-correlation and it is 2.48 which indicate that there is no auto-correlation among the variables used for regression. It Durbin –Watson statistic is near 0 or 4, it indicates correlation and if it is nearer to 2, it indicates no auto-correlation.

	Coefficients
Intercept	-4.078472797
X Variable 1 (Brazil)	0.222732921
X Variable 2 (Russia)	0.791061478
X Variable 3 (China)	0.191900518
X Variable 4 (South Africa)	0.15203354

	df	**SS**	**MS**	**F**	**Significance F**
Regression	4	12505.00236	3126.250591	15.9229419	0.000706061
Residual	8	1570.689944	196.336243		
Total	12	14075.69231			

Considering F-test and the critical value and table values of F, we can say that the Null hypothesis can rejected and hence, we accept Alternative Hypothesis i.e. H1.
That is India's stock market returns are influenced significantly by the returns of other four economies i.e. Brazil, Russia, China and South Africa.
The regression equation using the intercepts of regression output is as follows
BSE Sensex Returns = - 4.078 + 0.22 Bo Vespa + 0.79 Russia + 0.19 China + 0.15 South Africa + Error.
The entire coefficients are positive and Russia has the highest impact on the stock market returns of India i.e., BSE Sensex.

V. Conclusion

BRICS countries are one of the fastest growing economies of the world. The present study which examined the stock market returns of major stock indices of these five economies has found similarity in the stock market returns of these economies. The correlation among the five economies is positive and very strong between India, Russia, China and South Africa. The regression model is good and it says that India's stock market returns are influenced significantly by the returns of other four economies i.e. Brazil, Russia, China and South Africa.

BRICS economies have immense potential to remain powerful and influence the world economy. Till now BRICS only is a forum and not an organization. It BRICS nations form either a free trade area or customs union the trade can be increased manifold and a stronger force can be incorporated.

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