

THE EMPIRICAL STUDY OF BRICS COUNTRIES MARKET PERFORMANCE

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ABSTRACT: The study has been focused on the emerging economies of the globe namely BRICS nations. In the post recession era BRICS nations returns found to be superior with the other economies of the world. Augmented Dickey Filler test has been applied to convert the data into stationary for all the selected variables. Cointegration test has been applied and implemented the Granger Causality test to find the impact of the MSCI on the BRICS indices. EGARCH model has proven that MSCI volatility is influenced by the BRICS nation's indices. Global equity flows were having significant impact on BRICS. This analysis is useful to the world financial institutions like World Bank, IMF, FII, Global portfolio managers and mutual fund managers.

KEYWORDS: Brics, Libor, Msci Index, Fii, Repo Rate, Interest Rates.

INTRODUCTION: BRICS is the acronym for an association of five countries viz. Brazil, Russia, India, China and South Africa. These countries are listed among the leading emerging economies in the world, which are all at an advanced stage of economic development. At first, it was an association of 4 countries which were called the BRIC economies or the 'Big Four'. The term was coined in 2001 by the Chief economist of Goldman Sachs. In 2010, South Africa was included and hence it went on to be called as "BRICS". In 2010, the four BRIC countries accounted for more than 25% of the total land mass and about half (i.e. 40%) of the global population, but they accounted for only a quarter of the Gross National Income in the world. The new acronym BRICS accounts for more than 40% of the population, about 30% of the total land area and almost 25% of the world GDP which is expected to reach higher levels in the years ahead. Due to their geography and economy, the BRICS economies are said to be massively influencing global development.

The most significant development that has occurred during the last 10 years is the globalization of stock markets. Several factors contributing to this phenomenon are technology advancement, emergence of financial institutions on international levels and the elimination of the various restrictions imposed on foreign ownership, among others. The phenomenon of globalization may be a boon according to experts, since they estimate that globalization may result in the development of efficiency of the market, and lower its risk by means of diversification. The BRICS

countries are causing changes with respect to finance and trade, and also as emerging donors in the international development. During the last decade, BRICS have significantly managed to expand their position in the world economy. In the period of international relations, BRICS can play a major role in the global economic development. In recent years, the BRICS nations have obtained international prominence for their speed growth in economy and increase in political status. Each of the BRICS countries has different attributes and development potentials.

OBJECTIVES:

1. To find the inter-correlation between BRICS countries indices.
2. To measure the FII impact on BRICS countries indices.
3. To find the global economy impact on BRICS countries.
4. To measure whether the BRICS countries equities are in premium or discount.
5. To find the risk and reward ratio of BRICS countries along with the volatility.
6. To measure the BRICS countries impact on MSCI volatility.

SCOPE: This analysis has been emphasized for 5 years i.e, (2009-2014). In this analysis MSCI has been considered as the global economic indicator. BRICS countries stock indices have been considered. To measure the external factors impact on BRICS nations global FII flows were considered during study period.

Empirical study:

FII – Foreign Institutional Investors

BOVESPA – Brazil index

MICEX – Russia index

NIFTY – India index

SSE – China

FIJSE – South Africa

LIBOR – London Inter bank Offer Rate

NEED OF STUDY: This study is required in order to examine the impact of the global financial crisis and the resilience of the BRICS economies with the implementation of fiscal and monetary policies. It is also needed to evaluate the process of recovery and the contribution of the BRICS countries to global growth.

REVIEW OF LITERATURE:

1. Sergio Biggemann and Kim-Shyan Fam: This Analysis highlights the greater importance of

the BRIC countries (i.e. Brazil, Russia, India, and China) in the world economy. Apart from being the best economic performers the BRICS are also responsible for being a considerable part of the goods and services consumed globally and intensely trade one another which means a significant business interaction failed to be explained by existing research. Therefore this special issue was prepared to encourage publication of empirical research of business marketing which involves one or more BRIC countries.

2. Dagmar Linnertova, Svend Reuse and Blanka Knosova: The phrase BRIC was used at first in 2001. It is the framework from the first sign of countries Brazil, Russia, India and China. In this article I try to answer why these four countries were chosen and what is the main aim of BRIC. I focus on economic and financial appearance in China, chiefly. I also try to draft further anticipation of this country.

3. Luiz Fernando de Paula: Why economic conduct and macroeconomic cohesion has a conflict among the BRICs countries? More precisely, in which way macroeconomic policy establishment and the management of the economic policy has characterized an economic environment that has subsidised for a higher (or lower) economic conduct and macroeconomic cohesion in the BRICs countries? The main objective of this paper is to figure out the relationship between exchange rate establishment, capital account exchange rate and economic conduct within the big emerging countries that establish what has been called BRIC – Brazil, Russia, India and China. The assumption of the paper is that economic conduct of these countries is the conclusion, at least partially, of the quality of the macroeconomic policy management denied in individual country, in which exchange rate policy, capital account exchange rate and the degree of external susceptibility plays a key role.

4. Sun Ying, Li Miao and Chen Yibo: This paper analyzes the ambitious influence of high technology commodity export from BRIC countries to the United States using quantitative and qualitative analyzing of export amount and distribution conduct. We guess a Varying Coefficient Model on tribunal data for BRIC countries from 2000 to 2010, accepting the Seemingly Unrelated Regression estimator to legitimate the cross-sectional heteroscedasticity and serial autocorrelation. We found that BRIC countries big reformatory products have provisional influence. Research and Development expenditure and patents are well positively associated to the high tech export of the United State market while FDI still does not directly advertise the competitiveness. The BRIC countries should enroll from each other's successful ways regarding FDI management, patent utilization and research adjustment to accomplish better and more all-inclusive improvement of high tech export competitiveness.

5. Nakhoda and Aadil: The BRIC countries plus Turkey add a compelling bulk of the exports that arise from developing countries. The array imported from the BRIC countries plus Turkey in the textile, creative and leather business are acceptable to take antecedence over the imported array from smaller

developing countries as either their construction is almost more competent in labor-intensive industries or their assets are relatively more ample. Therefore, the eminence of the exports of the BRIC countries plus Turkey can have conclusions for smaller developing countries that also train in the production of labor-intensive products, such as Pakistan. I study the brunt of the exports of the BRIC countries plus Turkey on the exports of Pakistan to the firm of importing countries placed on their importance as considerable export target of Pakistan for each industry considered and the bent of importing countries based on the geographical area of the importing countries as regional and non-regional targets of the BRIC countries plus Turkey. In this paper, I aim to complete whether the exports from the BRIC countries plus Turkey either tribute or counterfeit exports from Pakistan to the specific set of export targets.

6. Alex Cairns and Karl D. Meilke: In the mid-2000's, Goldman Sachs analyzed two groups of emerging recessions well-known as the BRICs and the Next-11. Chiefly selected on the base of having large community, these countries were announced as the growth centre's to stimulate increased demand for a ample range of assets, including food. This study uses an import demand model to measure how income consequences per capita consumption on agrifood imports in 63 countries. However, disaggregation of the two groups acknowledges significantly larger expenditure adaptability for China, India, South Korea and Vietnam. A forecasting exercise declares the quantity of income and population advance in China, India, Indonesia, Russia, South Korea as well as Vietnam to considerably increase their consumption on imported agrifood products.

7. Terence Tai-Leung Chong And Samo Ho-Sum Cheng And Nga-Yee Wong: The present article views about the stock market efficiency of BRIC. Russian stock market is considered as the most profitable indicators. Most efficient market is considered as Brazil among BRIC. An explanation for such a difference is provided.

8. University of Maryland- School of Business and Technology: It examines economic policy uncertainty in US and any effect on return on stock market in the BRIC .Stock market in 4 countries responded to the US economic policy uncertainty stock is investigated. Granger causality test is used to determine economic policy uncertainty cause. Result shows negative effect on stock market returns in BRAZIL, INDIA, and RUSSIA. Negative effect is 10% level of brazil, and 1% level for India and Russia. Stock returns in china are also negative its effect is not statistically significant. The negative effect on stock market returns becomes statistically insignificant for Brazil and India controlling for the S&P 500 returns; the coefficient for Russia is still considered as statistically significant but at the 1+0% level.

9. Akash Dania; D.K. Malhotra: The Brazil, Russia, India, China and South Africa (BRICS) nations are currently among the emerging markets which are rapidly growing. The interdependence of BRICS' equity market returns on the leading global markets of USA, UK, France and Germany is being analyzed empirically. Results from this study suggest that returns of all BRICS nations are interdependent with that of the countries of UK, USA, France and Germany, with varying degree and magnitude. By means of GARCH, we can also find the evidence of volatility spillover from major global markets to BRICS markets. The observed phenomenon of growing influence is explained – albeit with varying effects – with mature global markets on BRICS equity markets due to the nature of growing trade linkages.

10. Jayati Ghosh, Peter Havlik, Marcos P. Ribeiro, Waltraut Urban: The term 'BRICs' denotes the four fastest growing and emerging economies viz. Brazil, Russia, India and China. These countries share many features in common like land size, population, economic growth etc. The BRICs also make obvious the significant differences which exist among them in the form of economic development models and endowment of resources. The various models of economic development of the individual BRIC countries, along with their external relations as well as possible future developments are being discussed in this report. Brazil is a service economy which is more oriented to domestic sector; Russian economic development is largely dependent on energy and raw material resources; India focuses on service and export sectors; Chinese development is mainly dependent on manufacturing, exporting and investment. At last, the opportunities for EU competitiveness and future challenges for BRICs countries are highlighted in this report.

RESEARCH METHODOLOGY: This analysis has been done on secondary data by using descriptive statistical tools. The following formulas were considered for the analysis purpose.

- 1. Premium:** The premium can be defined as the sum of options intrinsic and time value. Premium is also affected by volatility. Premium is paid by the investors for the investment that returns an amount greater than existing interest rates.

$$\text{PREMIUM} = ((1 + \text{equity rate of return}) / (1 + \text{risk free return})) - 1$$

- 2. Volatility:** Standard deviation or variance between the returns from that same security or market index is used to calculate volatility. When volatility is high, risk for security is also high.

$$\text{VOLATILITY} = (\text{sqrt}(\text{SD}/\text{period}))$$

- 3. Sharpe Differential Measure:** Return on portfolio is compared to the risk on a benchmark. The relationship between risk and return is measured and it does not depend on time.

SHARPE DIFFERENTIAL MEASURE: $(\text{Repo rate} + ((\text{excess returns over market}) * \text{SD}(P))) - 1$

4. Augmented Dickey-Fuller Test: In time series sample for unit root augmented dickey-fuller test is used. For Dickey-Fuller test it is an augmented version. ADF statistics used in this test is a negative number.

$$\text{ADF} : \Delta Y_t = \alpha + \beta T + \delta Y_{t-1} + u_t$$

5. Cointegration: It can be defined as statistical property of time series variables. There exist cointegration between two or more time series when they share common stochastic drift.

$$\text{COINTEGRATION} : Y - Bx = u$$

6. Granger Causality Test: In order to determine whether one time series is useful for forecasting another, the Granger Causality test is used. It is a statistical hypothesis test. If the variables are non-stationary, the test is done using first (Or higher) differences.

$$\text{GCT} : P[Y(t+1) \in A | I(t)] \neq P[Y(t+1) \in A | I_x(t)]$$

LIMITATIONS:

1. MSCI has been considered as global economic indicator.
2. South Africa data has been considered from 2011.
3. Global FII data included BRICS foreign institutional investments.
4. For the risk free rate of return LIBOR has been considered.

DATA ANALYSIS:

1. To find the inter-correlation between BRICS countries indices.

Correlations

		BOVESPA	MICEX	NIFTY	SSE	FTJSE
BOVESPA	Pearson Correlation	1	.447**	.019	.665**	-.216
	Sig. (2-tailed)		.000	.885	.000	.097
	N	60	60	60	60	60
MICEX	Pearson Correlation	.447**	1	.619**	-.028	.578**
	Sig. (2-tailed)	.000		.000	.832	.000
	N	60	60	60	60	60
NIFTY	Pearson Correlation	.019	.619**	1	-.374**	.864**
	Sig. (2-tailed)	.885	.000		.003	.000

N		60	60	60	60	60
SSE	Pearson Correlation	.665**	-.028	-.374**	1	-.545**
	Sig. (2-tailed)	.000	.832	.003		.000
N		60	60	60	60	60
FTJSE	Pearson Correlation	-.216	.578**	.864**	-.545**	1
	Sig. (2-tailed)	.097	.000	.000	.000	
N		60	60	60	60	60

** . Correlation is significant at the 0.01 level (2-tailed).

2. To measure the FII impact on BRICS countries indices.

COINTEGRATION (FII-BRICS)

YEARS	BOVESPA (BRAZIL)	MICEX (RUSSIA)	NSE (INDIA)	SSE (CHINA)	FIJSE(SOUTH AFRICA)
2009-2010	-198.3087	-160.8066	-172.7755	-176.6299	-171.0060
2010-2011	-196.0846	-107.6115	-171.4773	-166.9705	-173.9727
2011-2012	-202.7509	-167.1126	-175.9869	-169.8943	-176.2017
2012-2013	-189.9815	-150.1728	-162.0989	-163.1529	-163.9339
2013-2014	-202.1218	-167.1998	-179.9874	-172.6913	-178.5766

NOTE 1: In the above table all the likelihood values are observed to be in decreasing trend in all trend models and with three alpha levels.

Interpretation: The above table depicts the Jensen cointegration test on the BRICS countries with FII data. All the variables were observed cointegration with FII data.

GRANGER CASUALITY TEST (FII-BRICS)

YEARS	BOVESPA (BRAZIL)	MICEX (RUSSIA)	NSE (INDIA)	SSE (CHINA)	FIJSE(SOUTH AFRICA)
2009-2010	0.3423	0.9591	0.8647	0.1160	0.2658
2010-2011	0.2706	0.2625	0.4147	0.0836	0.4054
2011-2012	0.2322	0.4188	0.6526	0.5829	0.8635
2012-2013	0.2160	0.7673	0.5326	0.4724	0.3272
2013-2014	0.2100	0.5584	0.5175	0.6882	0.8545

NOTE 1: Granger Causality Test Analysis by the EVIEWS package had given above result mentioned does not Granger Cause with FII by the respective countries.

Interpretation: From the above Granger Causality Test Analysis, it has been observed that FII has no influence on BRAZIL. Where as FII has influence on RUSSIA during (2009-2010, 2012-2013,2013-2014). FII has no influence on INDIA except for the period of 2010-2011.CHINA and SOUTH AFRICA have been influenced by FII during (2011-2012, 2013-2014).

3. To find the global economy impact on BRICS countries.

COINTEGRATION (MSCI-BRICS)

YEARS	BOVESPA (BRAZIL)	MICEX (RUSSIA)	NSE (INDIA)	SSE (CHINA)	FIJSE(SOUTH AFRICA)
2009-2010	-137.7170	-106.0043	-113.6710	-123.3168	-108.9696
2010-2011	-141.4038	-100.1552	-121.3297	-113.4068	-111.8836
2011-2012	-143.9230	-108.8360	-120.6856	-114.2920	-111.8892
2012-2013	-148.2793	-97.74887	-110.4229	-111.2335	-105.4662
2013-2014	-144.8721	-102.1015	-118.3049	-114.7142	-110.4032

NOTE: In the above table all the likelihood values are observed to be in decreasing trend in all trend models and with three alpha levels.

Interpretation: The above table depicts the Jensen cointegration test on the BRICS countries with MSCI data. All the variables were observed cointegration with MSCI data.

GRANGER CASUALITY TEST (MSCI-BRICS)

YEARS	BOVESPA (BRAZIL)	MICEX (RUSSIA)	NSE (INDIA)	SSE (CHINA)	FIJSE(SOUTH AFRICA)
2009-2010	0.4783	0.0007	0.0104	0.1502	0.6178
2010-2011	0.3973	0.7008	0.9386	0.5419	0.7109
2011-2012	0.2174	0.0979	0.2758	0.8309	0.3542
2012-2013	0.9028	0.1384	0.5939	0.8622	0.8280
2013-2014	0.9063	0.2063	0.1274	0.9304	0.0321

NOTE: Granger Casuality Test Analysis by the EVIEWS package had given above result mentioned does not Granger Cause with MSCI by the respective countries.

Interpretation: From the above Granger Casuality Test Analysis it has been observed that MSCI has influence on BRAZIL during (2012-2014). Where as MSCI has influenced RUSSIA during 2010-2011. INDIA was influenced by MSCI during (2010-2011, 2012-2013). MSCI has no influence on CHINA during 2009-2010. During the years (2011-2012, 2013-2014) MSCI has no influence on SOUTH AFRICA.

4. To measure whether the BRICS countries equities are in premium or discount.

YEARS	BOVESPA (BRAZIL)	MICEX (RUSSIA)	NSE (INDIA)	SSE (CHINA)	FIJSE(SOUTH AFRICA)
2009-2010	3727.292	4382.612	414.703	223.7799	2606.535
2010-2011	293.8497	3135.902	624.9136	-2447.11	849.6977
2011-2012	-166.053	-1351.99	-939.461	-644.681	451.717
2012-2013	-923.973	-162.241	1298.341	-664.458	149.531
2013-2014	-1402.43	-32.281	2408.51	157.7302	573.0622

Interpretation: From above table we can find that SOUTH AFRICA is in premium in all five years and all the BRICS are in premium in the year 2009-2010. But in the last two years they are into discount except NSE and FIJSE.

5. To find the risk and reward ratio of BRICS countries along with the volatility.

YEARS	BOVESPA			MICEX			NSE			SSE			FIJSE		
	RISK	REWARD	VOLATILITY												
2009-2010	0.011895	48.80998	25.07343	0.475779	57.56506	3.813632	0.158533	54.11939	6.764713	0.19918	25.4903	4.814137	0.191638	33.83667	6.277111
2010-2011	0.024354	1.565192	15.19485	0.562665	26.29105	3.865496	0.13426	4.602048	5.403385	0.50631	2.003059	3.755434	0.299811	6.40107	5.336435
2011-2012	0.016593	-2.45247	19.32196	0.644831	-12.8887	3.130274	0.227842	-9.25846	5.147358	0.253654	-22.2812	4.385251	0.294917	-4.96631	4.77914
2012-2013	0.013572	-8.84527	13.99605	0.991101	-2.37055	2.232383	0.192148	10.0444	5.407695	0.89283	-6.66439	3.531028	0.223164	11.74601	5.259381
2013-2014	-0.00352	-9.82904	15.57454	0.945667	-1.19707	1.737993	0.255644	14.17991	4.787747	-0.08007	-6.63939	2.845084	0.410733	2.616592	3.741461
AVERAGE	0.012579	5.849678	17.83217	0.724009	13.47996	2.955956	0.193685	14.73746	5.50218	0.354381	-1.61832	3.866187	0.284053	9.926806	5.078706

Interpretation: When we compare the risk for the BRICS countries we can see that BRAZIL is having less risk compared to others and in reward NSE, volatility RUSSIA. But when we compare the risk, reward and volatility BRAZIL is having less risk and high reward and high volatility.

6. To measure the BRICS countries impact on MSCI volatility.

	BOVESPA (BRAZIL)	MICEX (RUSSIA)	NSE (INDIA)	SSE (CHINA)	FIJSE(SOUTH AFRICA)
ARCH	0.0000	0.0000	0.0000	0.0000	0.0000
AIC	24.27447	22.29458	21.45066	25.08292	18.86796
SC	24.34490	22.36501	21.52108	25.15334	18.93839
GARCH	0.0000	0.0000	0.0000	0.0000	0.0000
AIC	13.13635	12.36262	11.67215	13.67731	10.25982
SC	13.27597	12.46734	11.81177	13.81693	10.39944
TARCH	0.0000	0.0000	0.0000	0.0000	0.0000
AIC	13.44135	12.41484	11.70527	13.69908	10.28229
SC	13.615880	12.58937	11.8797	13.87361	10.45682
EGARCH	0.0000	0.0000	0.0000	0.0000	0.0000
AIC	13.16116	12.41921	11.72591	13.65859	10.46343
SC	13.30079	12.55883	11.86553	13.79821	10.60305
PARCH	0.0000	0.0000	0.0000	0.0000	0.0000
AIC	13.17775	12.49365	11.70580	13.71378	10.26963
SC	13.35228	12.66818	11.88033	13.88831	10.44415

Interpretation: The above table shows the volatility of MSCI with the BRICS indices. Heteroskedasticity Test found to be significant. The residual test shows that MSCI trend line moving

above the fitted line which indicates that the MSCI is trading in volatile mode. To find the influence of BRICS on MSCI various models has been applied all the models are significant with the MSCI.

FINDINGS:

1. Except for the period 2010-2011, rest of the years of the study period Global FII are influencing on RUSSIA.
2. CHINA and SOUTH AFRICA markets were influenced in the year 2011-2012, 2013, and 2014 by the Global FII.
3. MSCI impact is more for CHINA and SOUTH AFRICA.
4. Out of BRICS except INDIA and SOUTH AFRICA markets are trading in premium but during same period BRAZIL, RUSSIA, CHINA were partially leading in discount.
5. All BRICS are playing crucial role in influencing the MSCI volatility. GARCH model is the best model which is having lowest AIC and SC.

CONCLUSION: We conclude that the analysis of “The Empirical Study of BRICS countries market performance. The study has been emphasized in the post recession period i.e., (2009-2014) BRICS countries were considered as the emerging countries before recession but due to global financial crisis there countries were effected severely. Recovery from the recession from the period 2009 BRICS are playing crucial role. Performances of these countries are found to be stronger in comparison with the global equity benchmark MSCI. Volatility has been measured for the BRICS nations with the help of GARCH model it has been proven the global equity indicator volatility is influenced by the BRICS nations. In BRICS countries largely RUSSIA and INDIA were not influenced with the global economy but rest of the countries indices were affected during the analysis period. Hence there is further scope to do research on the performance of BRICS stock indices along with these nations roles in reviving the global economy from the crisis.

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