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Linkages of Foreign Portfolio Investments and Stock Market Indices: Evidence from BRICS Nations

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Abstract
It is difficult for emerging economies like BRICS to sustain growth without steady influx of foreign capital. Foreign Portfolio Investment (FPI) or Foreign Institutional Investors (FII) have impacted, more often than not, positively on the stock markets of these countries.Since 1990, both Advanced and Developing countries have been trying to attract Foreign Portfolio Investment (FPI) or Foreign Institutional Investors (FII) by adopting policies like financial reforms, improved infrastructure, deregulation of policies, effective corporate governance, removal of bureaucratic bottlenecks etc. The main objective of this paper is to analyse the linkages of FPI/FII investments and the equity markets of these countries. It is widely believed that the FII/FPI inflows have varying degrees of relationship (from Highly Significant and Positive to highly Insignificant and negative) with the Stock Market Indices of BRICS Countries. We used net flows of foreign portfolio investments received by BRICS countries and their major stock market indices to establish the relationship. The stationarity of the data series are checked using Augmented Dickey Fuller (ADF) Test and tested for the autocorrelation, Vector Autoregression (VAR) and Wald Test are applied to analyse the data. The results may have policy implications for the FII/FPIs and other investors as well, trying to look out for alternate investment opportunities in BRICS countries.
Keywords: FPI/FII, Stock Market Index, Linkages, BRICS.

1. Introduction

The term BRIC economies came into existence in 2001 when one economist, Mr.JimO'neil, of one of the largest institutional firms Goldman Sachs coined a term BRIC to collectively refer to fast emerging national economies of Brazil, Russia, India and China. With the inclusion of South Africa in 2010, the term has been modified to BRICS. The BRICS members are all fast developing and rapidly growing economies, with the exception of Russia which was regarded as a superpower before its division in 1990. These economies have a considerable clout when seen together as they account for close to forty percent (3 billion) of the world population in 2015, with a combined nominal GDP of over US$ 16 trillion[1] [*World economic outlook, imf.org*,] and an estimated US$ 4 trillion in combined foreign exchange reserves. All BRICS nations are G-20 countries and have a combined GDP which is approximately 20% of world GDP. These economies are seen as promising high rate of GDP growth, huge and growing middle class having substantial purchasing power, possessing large number of well-educated young population which has an urge to succeed and also possessing vast amount of natural resources. At the same time these economies have diverse cultures, different geographical and political circumstances, different rates of growth, etc. which can come in their way of forming a strategic long term alliance.

It is difficult for emerging or developing economies like BRICS to sustain growth without influx of foreign capital. Foreign Portfolio Investors (FPI) or Foreign Institutional Investors (FII) have impacted, on the stock markets of these countries. Since 1990, both developing and developed countries have been trying to attract Foreign Portfolio Investors (FPI) or Foreign Institutional Investors (FII), by adopting policies like financial reforms, improved financial infrastructure, deregulation of economy, effective corporate governance, removal of bureaucratic bottlenecks etc.

Brazil, Russia, India, China, and the group's newest member, South Africa (BRICS) are undoubtedly big. In terms of population, landmass, and economic size, their pure dimensions are impressive and clearly stand out from those of other countries. Some Economists predict that China, India, Russia and Brazil will join the United States among the largest economies in the world by 2050.

In the current scenario, analysts and economists perceive BRICS as having significant influence on regional as well as global affairs and also having potential to drive the world economy in the era of collapsing developed western economies. This paper tries to analyse the returns that each of these economies can provide to global investors and how far these economies together can affect the world economy.

"BRICS economies offer potentially high return but greater risk, so they should be a part of a long term

diversified investment strategy. By conducting proper due diligence and enlisting a team of knowledge advisors, it is possible to create a BRICS investment strategy that makes sense for investors' needs and goals."[1]

1.1 Stock markets in BRICS Countries:

BRICS countries are now being looked as a force to be reckoned in the international financial markets. Though the stock markets of five BRICS economies may be categorised according to certain criteria, but in general, like the countries themselves, their financial markets have little in common.

China and India are Asian giants, heavily outweigh Brazil, Russia and South Africa in terms of importance, population and the size of their economies. The modern stock markets of China are not considered to be international. The salient feature of Chinese economic model is to maintain the State's control in all areas of social and economic life, which is also the case in Russia. However, the steep rate of growth of Chinese stock market since 2000 has attracted huge FPI interest globally. As a result of liberal economic reforms over the past 20 years, Brazil has made a huge progress in socio-economic areas and has brought success to its stock market.

India's stock market which is over 150 years old is totally opposite of China. Despite having a huge population of over 1.25 billion, the stock market penetration is only a little above one percent of savings. India, therefore, needs a constant flow of FII investments in its stock markets. FIIs hold approximately 11 percent of the Indian stock market assets.

BRICS countries are more divergent than alike and investors have to make choices. The BRICS countries appear to be acquiring economic prosperity and social development in the coming decades. It is generally perceived that the economic growth will be tremendous and they can throw competition and challenges towards the developed countries. The following Table indicates the Stock Market Indices used in our analysis.

Table 1.1:BRICS countries and their Stock Market Indices

S.no	Country	Region	Stock Exchange	Index Selected	Abbreviation Used
1	Brazil	America	BM & F, BOVESPA	BOVESPA Index	BOVESPA
2	Russia	Europe	Moscow Interbank currency Exchange	MICEX Index	MICEX
3	India	Asia	Bombay Stock Exchange	SENSEX index	SENSEX
4	China	Asia	Shanghai Stock Exchange	SE Composite Index	SECOMPOSITE
5	South Africa	Africa	Johannesburg Stock Exchange	JSE Top 40 Index,	JASCH

2. Review of Existing Literature :

Since the beginning of twenty first century, the focus of the global economists has been on the emerging economies. The world has experienced a massive transformation in terms of geo-politics, economics and in organisation and distribution of production. Emerging economies of Brazil, Russia, India, China and South Africa (BRICS) have acquired an important role in the world economy as not just producers of goods and services but also as potentially vast markets of consumer and producer goods. The BRIC countries are referred to as emerging economies. The term BRIC was first coined by Jim O'Neil of Goldman Sachs in a 2001 paper titled "*The World Needs Better Economic BRICs."* The BRIC countries have since gone on to meet and seek out opportunities for cooperation in trade, investment, infrastructure development and other areas. China invited South Africa to join the group of BRIC nations in December, 2010 and hosted the *third annual BRICs Summit in April, 2011*. As early as in 2003, **Goldman Sachs** forecasted that China and India would become the first and third largest economies by 2050, with Brazil and Russia capturing the fifth and sixth spots.

Brazil, Russia, India and China have emerged as major destination for Foreign Investment inflows, resulting in BRIC - a strong constructive term which was prominently coined by the *'Goldman Sachs Investment Bank'* to represent Brazil, Russia, India, and China as an economic Block. These nations are looking to develop institutions and maintain policies that are supportive of growth. Some believe that the relative importance of the BRIC countries as an engine of new demand growth and spending power would shift more dramatically and quickly than expected by most. This may lead to increased demand for capital and the importance of the BRICs in investment portfolios could rise sharply. *Therefore, being invested and involved in the right markets i.e. the emerging markets shall be an increasingly important strategic choice for international investment houses.*

*"The combined economies of Brazil, Russia, India and China (BRICs) appear likely to become the largest global economic group by the middle of this century."*Cheng, Gutierrez, Mahajan, Shachmurove, and Shahrokhi (2007). With this trend, the BRICs have attracted more and more Foreign Capital inflow that includes foreign direct investment (FDI) and foreign portfolio investment (FPI) and hence developed rapidly.

International Business Report 2007 indicated that:
"*Many analysts believe that the BRICs economies are not an obvious set as they have vast dis-similarities beyond the similarities of large population, still untapped natural resources, fast growing middle class, demographic dividend, etc. Their internal politics and economics are quite dissimilar. Though all are federal states, but not all are democracies, their stock market capitalisation to gross national product ratio varies from 35% for China (mainly in Hong Kong and Shanghai) to close to 70% for India and Russia. While Russia and China are significantly globalised, India and Brazil are less globally integrated. The challenges that these BRICS economies face are also quite diverse ranging from over population and pollution in India and China to India's woeful physical infrastructure, bureaucracy and corruption, to Russia's vulnerability and corruption to Brazil's inability to grow at a pace being experienced by other emerging economies. Analysts observe that investors are eager to invest in BRICS despite, for example, Korea or Malaysia experiencing greater growth rate than Brazil."*
The Goldman Sachs investment report (2013) also highlights that
" The relative and absolute economic importance of BRICS is expected to accelerate for the foreseeable future. In terms of economic growth, China has been outperforming its four counterparts by a vast margin over the past two decades. Over the past decade, real GDP growth rate averaged 10 per cent in China, 7 per cent both in India and Russia, 4.6 per cent in South Africa and 3.3 per cent in Brazil. At the macro-economic level factors like high savings rate, low level of urbanisation, low per capita income, higher export-orientation, manufacturing-based development strategy underpinned by strong investment in infrastructure and education will combine to sustain BRICS countries as superior economies of world. Thus, BRICS may become the largest economies of the world by the middle of this century."

The Goldman Sachs team called the BRIC nations the four prospective "*engines of growth',* and suggested that these emerging economies provide excellent investment opportunities. It suggested that as the large domestic markets of these nations are expected to grow rapidly, the growth of the middle class will create new customers resulting in rapid increase in demand for consumer products and services. *Though economies of Chile, Portugal and Indonesia are also referred to as emerging economies, but still international investors show greater keenness in investing in large emerging economies because larger markets are found to be less exposed to exogenous shocks than their smaller counterparts partially due to their being less trade dependent and globally integrated.* BRICs economies are also seen as future competitors of the United States and other advanced industrial economies. The relative economic size of the BRIC nations is catalyst for present and future economic growth, as large size also implies economic dynamism.
In the recent times, BRICS as emerging economies, exhibit economic strength in the face of the US credit turmoil and growth slowdown. BRICS countries characterize a cyclical component of strong domestic demand growth. There are also structural factors at work that bode well for the medium-term growth prospects. The characteristics found attractive to foreign investors in BRIC economies are like:
• an enormous potential consumer market with larger middle-income group,
• abundant supply of natural resources,
• well developed financial parameters,
• good communication and network ,
• effective energy and transport sectors and
• sound legal system and modern infrastructure supporting an efficient distribution of goods and services.

Next 11 Emerging Markets
Several Financial analysts suggest expanding the original group of four BRIC nations to include other emerging markets. Goldman Sachs has resisted conferring BRIC status on other developing countries on the grounds that their demographics and economic characteristics do not hold the potential for them to rival the economic size or influence of the BRIC countries or today's leading economies (e.g., U.S. and Japan).**Goldman Sachs** has recently identified another group of economically dynamic and promising developing countries creatively labeling them as *"Next 11"* in its *2005 Economics Paper No. 134 "How Solid are the BRICs?"* The Next 11 consists of a broader group of emerging markets with the potential to play significant roles in the global economy. These are Bangladesh, Egypt, Indonesia, Iran, Korea, Mexico, Nigeria, Pakistan, Philippines, Turkey and Vietnam.

BRICS nations are economically diverse. Russia and Brazil are way ahead in terms of per capita income compared to China and India by a huge amount -- nearly $13,000 compared with China's $5,414 and India's $1,389, according to 2011 IMF data. BRICS also face stiff competition from other emerging powerhouses in the developing world. While China and India have a competitive edge due to their low labour costs, countries like Mexico, Vietnam, Malaysia and Thailand also offer similar advantages. While growth in the BRICS seems to be slowing, many African countries are receiving more foreign investment and are more politically stable.

Table 2.1: Summary of Literature Review is presented in tabular form:

Aktan, Bora, et al	Behaviour of emerging stock markets in the global financial meltdown: Evidence from BRIC-A	US market has a significant effect on all BRICA countries in the same trading day	2007
Armijo, Elliott	The BRICs countries (Brazil, Russia, India, and China) as analytical category	BRICS have potential to be next economic super-powers	2007
Author	Research	Result	Year
Basher, Abul, Haug, and Sadorsky	Oil prices, exchange rates and emerging stock markets	Positive shocks to oil prices tend to depress emerging market stock prices in the short run	2012
Bevan and Estrin	Patterns of foreign direct investment and trade in central and eastern Europe	Country risks are influenced by private sector development, Industrial development, the government balance, reserves and corruption	2000
Bianconi, Marcelo, Yoshino, and De Sousa	BRIC and the US financial crisis: An empirical investigation of stock and bond markets	BRIC bond markets deviate due to stress from US market	2013
Chittedi, Reddy	Global stock markets development and integration: With special reference to BRIC countries	Co integration relationship found between BRIC countries and Developed countries	2010
Chittedi, Reddy	Global stock markets development and integration: With special reference to BRIC countries	Co-integration relationship found between BRIC countries and Developed countries. These markets share the forces of short run adjustment to long run equilibrium.	2010
Chkili, Walid, and Nguyen	Exchange rate movements and stock market returns in a regime-switching environment: Evidence for BRICS countries	Stock markets have more influence on exchange rates during both calm and turbulent periods	2014
Clark and Berko	Foreign Investment Fluctuations and Emerging Market Stock Returns: The Case of Mexico	Emphasise the beneficial effects of allowing foreigners to trade in stock markets and outline the "base-broadening" hypothesis. The perceived advantages of base-broadening arise from an increase in the investor base and the consequent reduction in risk premium due to risk sharing.	1997
Duran	Determinants of foreign investment	The size, growth, domestic savings, country's solvency, trade openness and macroeconomic stability variables are the catalysts of foreign investment.	1999
Gay Jr.	Effect of macroeconomic variables on stock market returns for four emerging economies: Brazil, Russia, India, and China	No significant relationship was found between respective exchange rate and oil price on the stock market index prices of either BRIC country	2011
Hsing	The stock market and macroeconomic variables in a BRICS country and policy implications	GDP growth and US market affect emerging stock market index	2011
Jadhav	Determinants of foreign direct investment in BRICS economies	Economic factors are more significant than institutional and political Factors in BRICS economies	2012
Johnson	The effects of FDI inflows on host country economic growth	Foreign investment flows impact growth in developing countries but not developed countries	2006
Kang, Stulz,	Why is there a home bias? An analysis of foreign portfolio equity ownership in Japan	No evidence that foreign investors outperform domestic investors	1997

Kishore and Singh	Stock Market Return Volatility Effect: Study of BRICS	BRICS stock market except Brazil and Chinese stock market has 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.	2014
Lipsey	Interpreting developed countries' foreign direct investment	Positive effect of foreign investment inflows on growth and has a strong interaction with the level of schooling in the host country.	2000
Loree and Guisinger	Policy and non policy determinants of U.S equity foreign direct investment	Host country policy related variables are significant in developed countries and infrastructure seems to be an important determinant for all the regions.	1995
Mukherjee and Bose	Does the Stock Market in India Move with Asia?: A Multivariate Cointegration-Vector Autoregression Approach.	There is definite information leadership from the U. S. market to all Asian markets. The U. S. market is seen not only to influence, but also to be influenced by information from most of the major Asian markets.	2008
Mukherjee, Paramita, and Bose	Does the Stock Market in India Move with Asia?	US markets influence and get influenced by developing markets	2008
Ono	Oil price shocks and stock markets in BRICs	Contribution of oil price shocks to volatility in real stock returns is significant	2011
Poole	Beyond BRICs The Rest Of the Wall	BRIC economies are likely to become a much larger force in the world economy.	2006
Seasholes	Smart Foreign Traders in Emerging Markets	Better information and greater sophistication available to foreign investors	2000
Shang	How Taxing is Corruption on International Investors?	Tax on MNCs and corruption in host country adversely affect foreign investment	2000
Singh and Jun	Determinants of foreign investment in developing countries	Positive relationship between taxes on international transactions and foreign investment inflows to developing countries	1995
Sridharan, et al	Causal Relationship between Foreign Direct Investment and Growth: Evidence from BRICS Countries	Fortunes of different BRICS nations do not always move together, international investors can diversify their portfolios by holding a variety of financial assets in diverse countries	2010
Sridharan, Vijayakumar and Rao	Causal Relationship between Foreign Direct Investment and Growth: Evidence from BRICS Countries	Emerging economies are viewed by many foreign investors as a single asset class - possessing similar risks, threats and opportunities.	2009
Sridharan, Vijayakumar and Rao	Determinants of Foreign Investment in BRICS Countries	Need to focus on fundamentals of growth for attracting foreign investment	2010
Sultana, Tabssum, and Pardhasaradhi	Impact of Flow of FDI & FII on Indian Stock Market	FDI and FII determine trend of Indian stock market	2012
Wilson, Purushothaman,	Dreaming with BRICS: The Path to 2050	BRICS have become favoured foreign investment destination	2003
Xu, Haifeng, and	Dynamic linkages of stock prices	International transmission of stock	2012

Hamori	between the BRICs and the United States	prices between the BRICs and the United States weakened	
Zhang, Bing, Li, and Yu	Has recent financial crisis changed permanently the correlations between BRICS and developed stock markets?	BRICS stock markets conditional correlation series demonstrate an upward long-run trend with the developed stock markets	2013

2.1: Gaps in existing literature:

A large amount of empirical literature and studies have been developed to analyse the determinants of foreign investment inflows as a whole, but the results on empirical evidences are mixed depending on the choice of country, time-periods and applied methodology. The objective of this study is to complement the existing literature in the following ways:

A) There is a need of extensive research on identifying the linkages of foreign investment inflows in India vs. that of other emerging countries
B) There is a very limited research with respect to institutional and political determinants of foreign investment inflows in emerging countries.
C) While there are extensive research on various aspects of FDI, there are limited research on various aspects of FPI/FII, which gap need to be fulfilled.
D) FPI/FII and its impact on Stock Markets is an ongoing topic and need to be investigated on continuous basis to gain insights on this important aspect of economic growth.

2.2: Future Trends of FII/FPI flows to BRICS Economies:

Members of the BRICS Group have initiated to create a BRICS BANK to focus on infrastructure and development in emerging markets. The members are also planning to pool their foreign reserves as a bulwark against currency crises, part of a growing effort by emerging economic powers to build institutions and forums that are alternatives to Western-dominated ones.[7]

A Bank of America Merrill Lynch (BofAML) report dated 30th July, 2015 said "Foreign Portfolio Investment (FPI) Inflows into India could trip to below US$15 Billion this fiscal(FY 16) amid continued Global uncertainty" The Global Financial Services Major said "*We see a downside risk to our FY 16 FPI Equity inflow forecast of US$15 Billion"*

US based Institute of International Finance in a recent report said, "Net caital flows to emerging markets in 2015 will be negative for the first time since 1988." There will be US$540 Billion net capital outflows this year against net capital inflows of US$32 Billion in 2014. The outflows would continue at a moderate pace of US$ 306 Billion in 2016, on the expectations of the subdued growth prospects for emerging market economies, as well as the US Federal Reserve's Policy tightening, the report said.[9] PTI

3.. Objectives of the Study:

The objective of the present study is to ascertain whether or not foreign institutional investors have an influence on the individual stock markets of BRICS nations. An effort has been made to identify the relationship between foreign portfolio investments in stock markets of BRICS nations and their impact on the movement of stock indices. The main objectives may be enumerated as :

1) To find out whether FPI/FII investments always have an impact om the stock indices, studied separately for all individual BRICS nations, viz.- Brazil, Russia, India, China and South Africa.
2) To find out the extent, direction and degree of linkage shared by FPI/FII and stock markets for all BRICS countries.

4. Research Methodology

4.1 Data and Variables:

The entire analysis has been based on secondary data. The data have been obtained from Bloomberg database, BSE, SEBI and investing.com websites from 2005 to 2015. The data used is the indices data for BRICS countries and their foreign portfolio investment data for the aforesaid time period. The foreign portfolio investment data is in common denomination of US dollars. The selection of indices for different countries is based on their respective importance and popularity/affinity with the investors.

4.2 Hypotheses and Methodology

There is a general perception that FII/FPI investments have an impact on the stock market indices. FII/FPI money is often regarded as "Hot Money" in the sense that in the case of outflows, it drags down the stock market indices and vice versa. For the purpose of our study the following hypotheses have been suggested:

H_0: FII investments do not have a relationship with stock market indices
H_1: FII investments have a relationship with stock market indices

To test these hypotheses, the following tests have been applied:

Stationarity test: Many economic and financial time series exhibit trending behavior or non-stationarity in the mean. An important econometric task is determining the most appropriate form of the trend in the data. Unit root tests are to be used to determine if trending data should be first differenced or regressed on deterministic functions of time to render the data stationary. Moreover, economic and finance theory often suggests the existence of long-run equilibrium relationships among non-stationary time series variables.

The Dickey–Fuller test involves fitting the model

$$yt = \alpha + \rho yt-1 + \delta t + ut$$

by ordinary least squares (OLS), perhaps setting $\alpha = 0$ or $\delta = 0$. However, such a regression is likely to be plagued by serial correlation. *Augmented Dickey Fuller Test* is the extended version of simple Dickey Fuller test. Because of the error term unlikely to be white noise. They extended their test by including extra lagged in terms of the dependent variables in order to eliminate the problem of autocorrelation.

To control for that, the augmented Dickey–Fuller test instead fits a model of the form

$$\Delta yt = \alpha + \beta yt-1 + \delta t + \zeta 1 \Delta yt-1 + \zeta 2 \Delta yt-2 + \cdots + \zeta k \Delta yt-k + t$$

where k is the number of lags specified in the lags option. Theconstant option removes the constant term α from this regression, and the trend option includes the time trend δt, which by default is not included. Testing $\beta = 0$ is equivalent to testing $\rho = 1$, or, equivalently, that yt follows a unit root process.

*Autocorrelation:*Autocorrelation refers to the correlation of a time series with its own past and future values.Autocorrelation is also sometimes called “lagged correlation” or “serial correlation”, whichrefers to the correlation between members of a series of numbers arranged in time. Positiveautocorrelation might be considered a specific form of “persistence”, a tendency for a system toremain in the same state from one observation to the next.

Autocorrelation function(correlogram): An important guide to the persistence ina time series is given by the series ofquantities called the sample autocorrelationcoefficients, which measure the correlationbetween observations at different times.

Instead of two different time series, the correlation is computed between one time series and thesame series lagged by one or more time units. For the first-order autocorrelation, the lag is onetime unit.

Vector Autoregression: VAR is used to capture the linear interdependencies among multiple time series.

Univariate autoregressive model:

AR(1) $Y_t = \alpha + \beta Y_{t-1} + \mu_t$

describes the dynamics of just one random variable Y (i.e., national income) as a linear function of its own past.

*Wald Test:*The Wald test is a parametric statistical test used to test whether a relationship within or between data items can be expressed as a statistical model with parameters to be estimated from a sample. The Wald test can be used to test the true value of the parameter based on the sample estimate.

In the univariate case, the Wald statistic is

$$\frac{(\hat{\theta} - \theta_0)^2}{\operatorname{var}(\hat{\theta})}$$

which is compared against a chi-squared distribution.

Alternatively, the difference can be compared to a normal distribution. In this case the test statistic is

$$\frac{\hat{\theta} - \theta_0}{\operatorname{se}(\hat{\theta})}$$

Where $\operatorname{se}(\hat{\theta})$ is the standard error of the maximum likelihood estimate (MLE).

4.4 Limitations of the Study:

The study is based on the secondary data obtained from *Bloomberg,com.*, *BSE.com*, Sebi websites (in Indian context) and *investing.com*. There are certain variations in the data collected:

- Data for Brazil was available from January 2010 only, on monthly basis, hence the data used for Brazil pertains to 2010-2015,
- Data for Russia was available only on quarterly basis for the ten year time period (2005-2015),
- Data for China, India and South Africa was collected for the ten years time frame (2005-2015) on a

monthly basis.

It is assumed that ten years time period is sufficient for the purpose of our study.

4.5 Analysis and Findings:

In this section attempt has been made to analyse the data pertaining to BRICS economies, viz. their respective inflows of foreign portfolio and their chosen stock markets are analysed using the econometric tools mentioned in section 4.2.

Before analyzing the data, stationarity of time series is checked throughADF test.

Table 1: Unit Root Test for Foreign Portfolio Investments of BRICS Countries

S.No.	Country	At Level ADF Test Statistic	Critical Value 1%	Critical Value 5%	Critical Value 10%	P value
1	Brazil	-2.287425	-2.602794	-1.946161	-1.613398	0.0225
2	Russia	-1.317471	-2.634731	-1.951000	-1.610907	0.1699
3	India	-4.241171	-2.586154	-1.943768	-1.614801	0.0000
4	China	-3.108134	-2.585587	-1.943688	-1.614850	0.0021
5	South Africa	-6.349066	-2.584539	-1.943540	-1.614941	0.0000

The results in Table 1 above indicate that the unit-root is not present in all the cases. In all the cases of BRICS indices the P value of individual country FPI is less than 5 per cent. Therefore, the null hypothesis of existence of unit root is rejected indicating stationarity in data which means Foreign Portfolio Investments of BRICS are stationary.

Table 2: Unit Root Test for Stock Market Indices of BRICS Countries

S.No.	Country	At Level ADF Test Statistic	Critical Value 1%	Critical Value 5%	Critical Value 10%	P value
1	Brazil	-0.589944	-2.602185	-1.946072	-1.613448	0.4579
2	Russia	0.085220	-2.627238	-1.949856	-1.611469	0.7038
3	India	1.027220	-2.585962	-1.943741	-1.614818	0.9194
4	China	0.091735	-2.585405	-1.943662	-1.614866	0.7099
5	South Africa	2.389339	-2.584539	-1.943540	-1.614941	0.9959

The results in Table 2 above indicate that the unit-root is present in all the cases. In all the cases of BRICS stock market indices the P value of individual country FPI is more than 5 per cent. Therefore, the null hypothesis of existence of unit root is not rejected indicating absence of stationarity in data. Therefore, the returns of all the individual indices are calculated. The returns of the indices using log natural returns of each index are calculated which makes the data stationary. For performing the econometrics analysis, it is essential to make sure that the series under reference are stationary. The log of the five series has been taken. In this way five new variables are created which denote the return on respective stock market indices of BRICS countries.

Table 3: Unit Root Test for Returns of Stock Market Indices of BRICS Countries

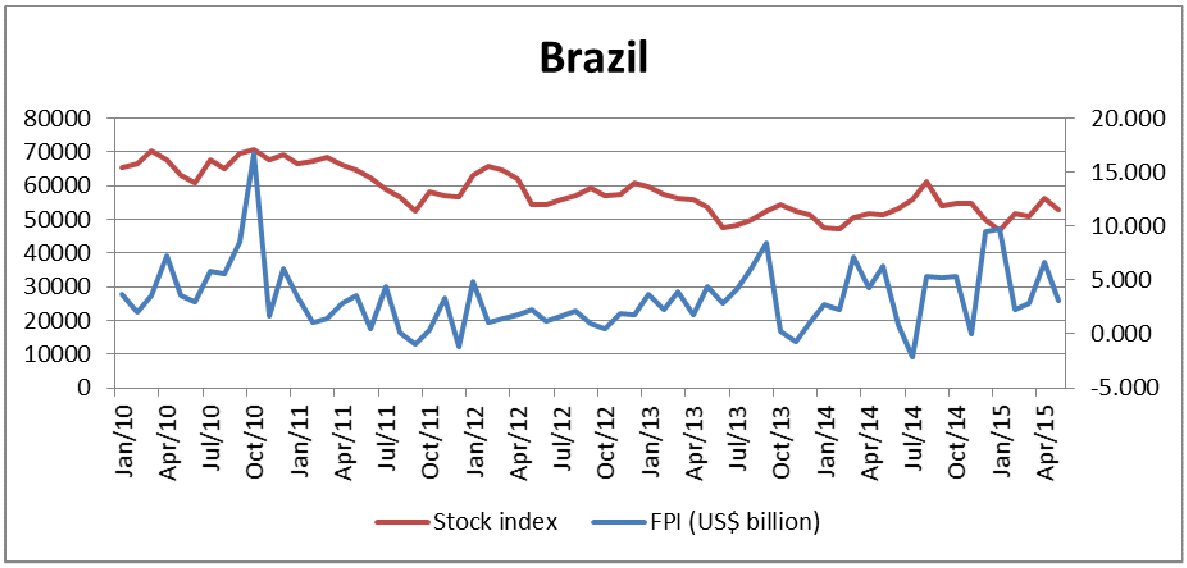
S.No.	Country	At Level ADF Test Statistic	Critical Value 1%	Critical Value 5%	Critical Value 10%	P value
1	Brazil	-7.562610	-2.602794	-1.946161	-1.613398	0.0000
2	Russia	-4.556808	-2.628961	-1.950117	-1.611339	0.0000
3	India	-9.148773	-2.586154	-1.943768	-1.614801	0.0000
4	China	-9.118966	-2.585587	-1.943688	-1.614850	0.0000
5	South Africa	-11.27630	-2.584707	-1.943563	-1.614927	0.0000

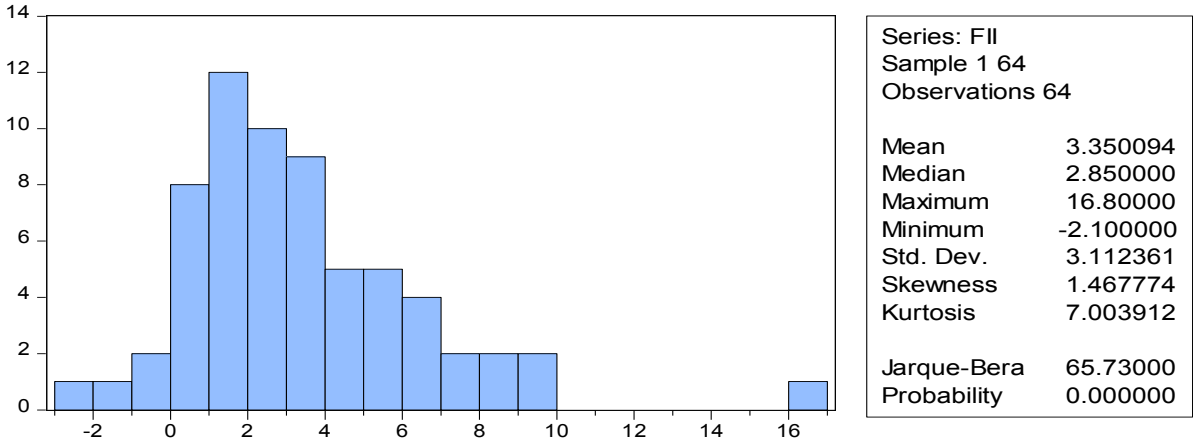
The results in Table 3 above indicate that the unit-root is not present in all the cases. In all the cases of returns of BRICS stock market indices the P value of individual country is less than 5 per cent. Therefore, the null hypothesis of existence of unit root is rejected indicating stationarity in data which means returns of BRICS stock markets are stationary.

For the sake of providing an overview of the trends depicted by the data sets- the FPI, indices and returns of Stock markets data for all BRICS economies are separately represented in a graphical manner.

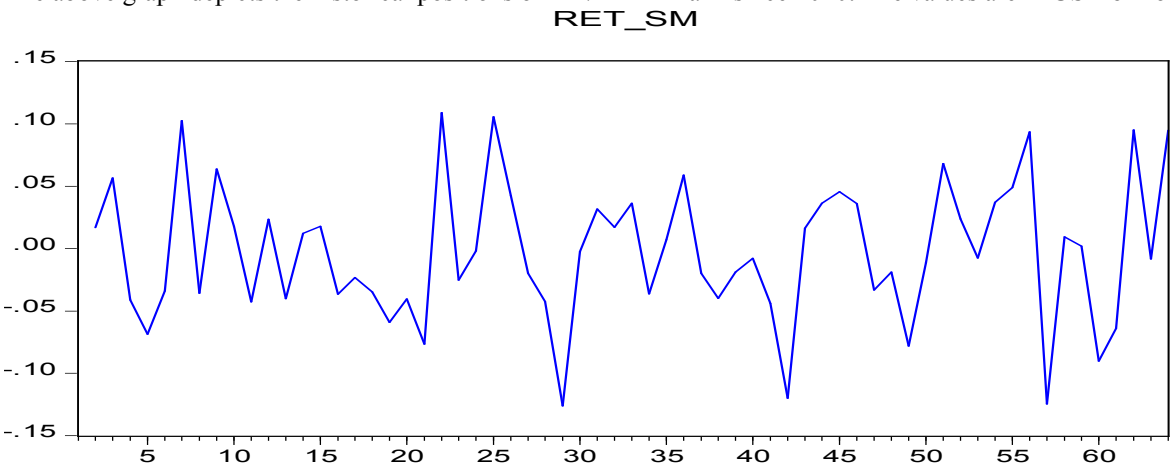
Brazil:

A graphical presentation of the Stock Market Indices (BOVESPA) and FPI/FII inflows is presented below:



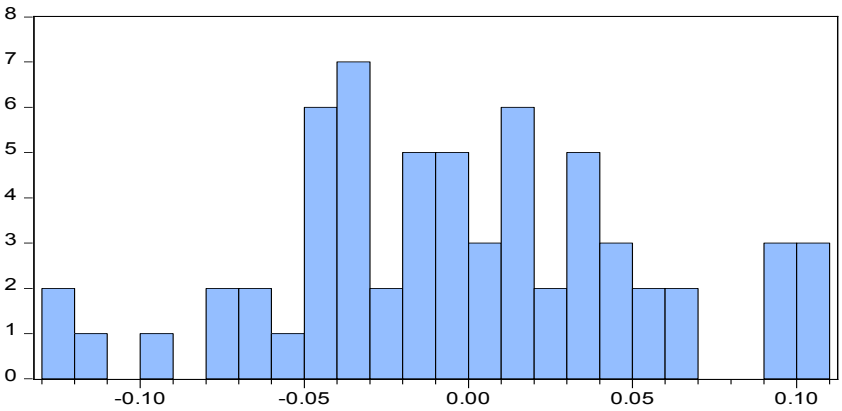


The above graph depicts the historical positions of FPI/FII in Brazil since 2010. The values are in USD billions.



In this diagram, Stock Market Return is shown in X axis as percentages and Y axis denotes the Months under study.

The returns given by the BOVESPA are depicted graphically here. The mean return is a slightly negative number (-0.002399) indicating that the returns experienced by investors over this time frame are not good. Maximum return has been 10.8% while the minimum has been -12.62%.



Series: RET_SM
Sample 1 64
Observations 63

Mean	-0.002399
Median	-0.007531
Maximum	0.108797
Minimum	-0.126206
Std. Dev.	0.055551
Skewness	0.001734
Kurtosis	2.770242
Jarque-Bera	0.138603
Probability	0.933046

Impact of FII on Stock Market
Dependent Variable: RET_SM
Method: Least Squares
Date: 10/16/15 Time: 20:43
Sample (adjusted): 2 64
Included observations: 63 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FII	0.001031	0.002263	0.455325	0.6505
C	-0.005845	0.010340	-0.565301	0.5739

R-squared	0.003387	Mean dependent var	-0.002399
Adjusted R-squared	-0.012951	S.D. dependent var	0.055551
S.E. of regression	0.055910	Akaike info criterion	-2.898932
Sum squared resid	0.190679	Schwarz criterion	-2.830895
Log likelihood	93.31634	Hannan-Quinn criter.	-2.872173
F-statistic	0.207321	Durbin-Watson stat	1.941723
Prob(F-statistic)	0.650492		

Here, Durbin-Watson statistic is 1.94, which is quite close to 2, indicating there is no auto-correlation present. The overall results are indicative that at 5% level of significance, there is no impact of FPI on the Brazil's stock market. It may be seen in connection with the low returns this market has rendered in the recent past.

VAR Granger Causality/Block Exogeneity Wald Tests
Date: 10/16/15 Time: 20:39
Sample: 1 64
Included observations: 59

Dependent variable: FII

Excluded	Chi-sq	df	Prob.
RET_SM	3.204760	4	0.5242
All	3.204760	4	0.5242

Dependent variable: RET_SM

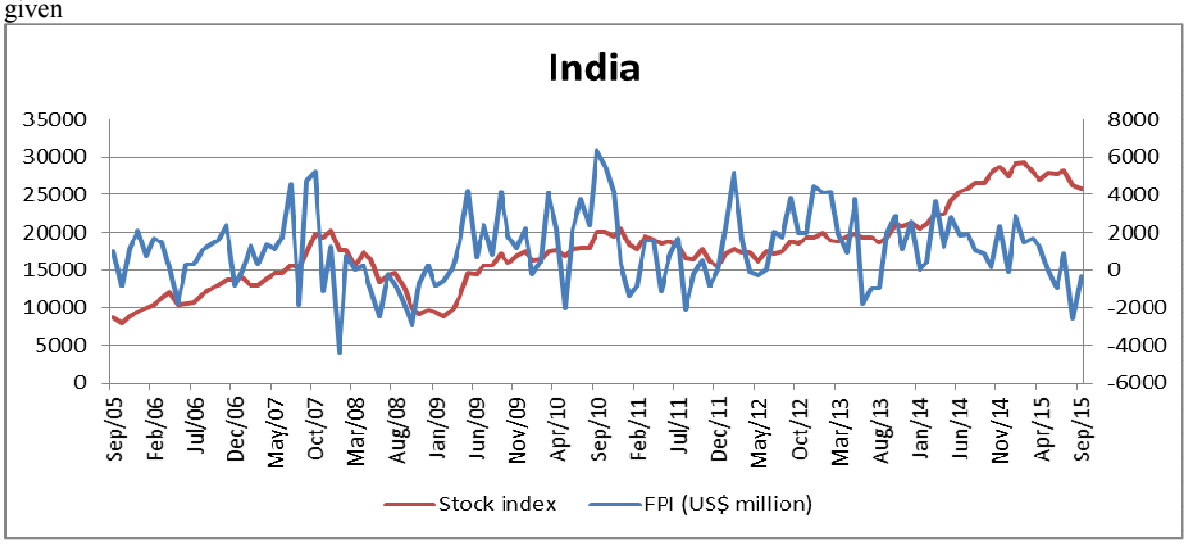
Excluded	Chi-sq	df	Prob.
FII	3.637013	4	0.4574
All	3.637013	4	0.4574

Correlation between the two series is positive. The FPI and BOVESPA return series can be used to predict the future values. Though the relation between the two is not significant.

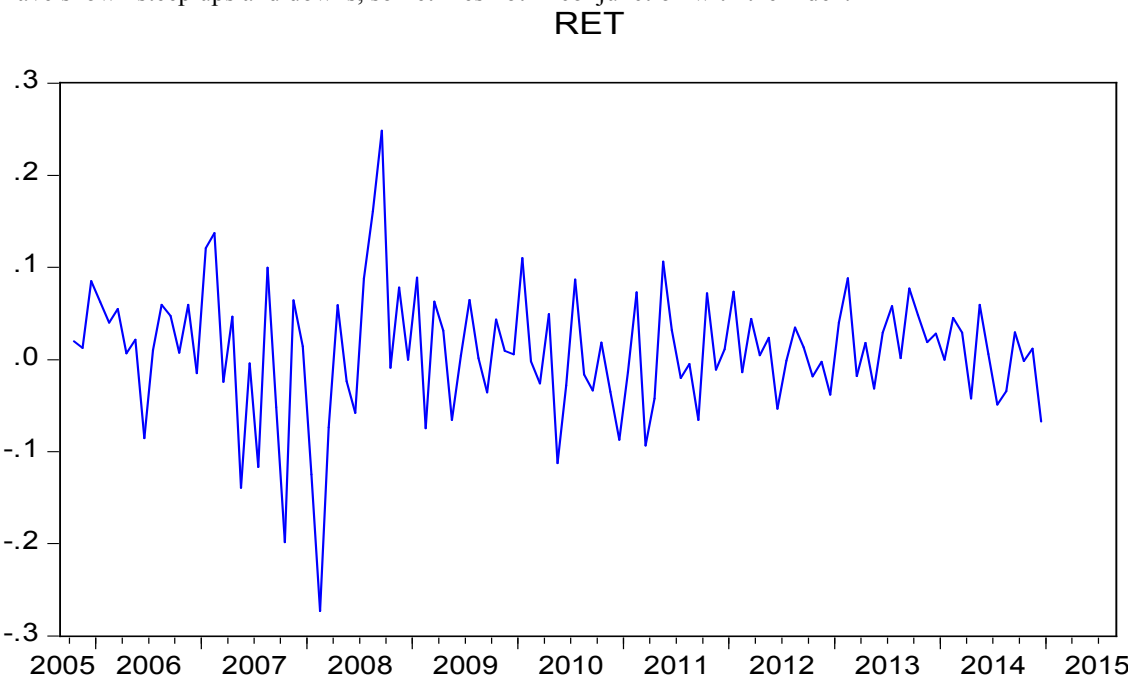
The results can be interpreted in the light of the positive factors of Brazilian economy such as- a growing middle class, strong domestic demand, huge untapped reserves of natural resources, supportive government policies, simplification of licensing procedures and regulatory framework, subsidized credit and easy financing options, large domestic market, long-term economic growth trajectory and wealth of natural resources.

INDIA

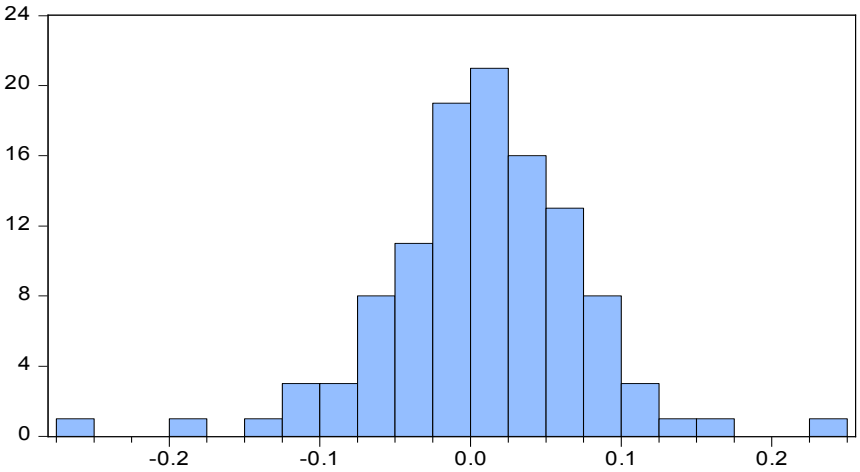
A graphical presentation of the Stock Market Indices (SENSEX) and FPI/FII inflows is given



The co-movement of FPI/FII flows and Sensex is depicted graphically here. It may be observed that FPI flows have shown steep ups and downs, sometimes not in conjunction with the index.



In this diagram, Stock Market Return is shown in X axis as percentages and Y axis denotes the Months under study.



Series: RET
Sample 2005M09 2015M08
Observations 111

Mean	0.008354
Median	0.009412
Maximum	0.248851
Minimum	-0.272992
Std. Dev.	0.069313
Skewness	-0.485824
Kurtosis	5.912698
Jarque-Bera	43.60407
Probability	0.000000

The return of Sensex derived using natural logs is depicted here. The mean return has been an impressive 8%, and the standard deviation statistic is also low.

Dependent Variable : RETURN
Method: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FII	2.06E-05	2.70E-06	7.645197	0.0000
C	-0.014510	0.006114	-2.373403	0.0194

R-squared	0.349056	Mean dependent var	0.008354
Adjusted R-squared	0.343084	S.D. dependent var	0.069313
S.E. of regression	0.056178	Akaike info criterion	-2.902718
Sum squared resid	0.344004	Schwarz criterion	-2.853897
Log likelihood	163.1008	Hannan-Quinn criter.	-2.882913
F-statistic	58.44903	Durbin-Watson stat	1.817781
Prob(F-statistic)	0.000000		

The results in the table above indicate the absence of auto-correlation. It further shows the cause and effect relationship between FPI/FII and Return of Sensex. The coefficient of determination is also significant at 0.349056.

VAR Granger Causality/Block Exogeneity Wald Tests

Sample: 2005M09 2015M08

Included observations: 108

Dependent variable: RET

Excluded	Chi-sq	df	Prob.
FII	5.050261	3	0.1682
All	5.050261	3	0.1682

Dependent variable: FII

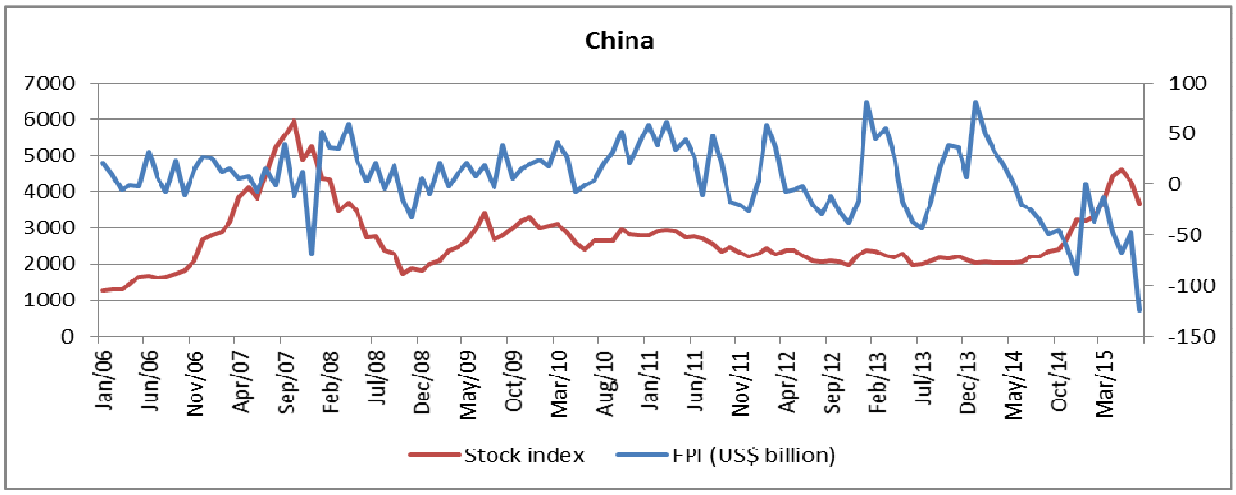
Excluded	Chi-sq	df	Prob.
RET	1.874066	3	0.5990
All	1.874066	3	0.5990

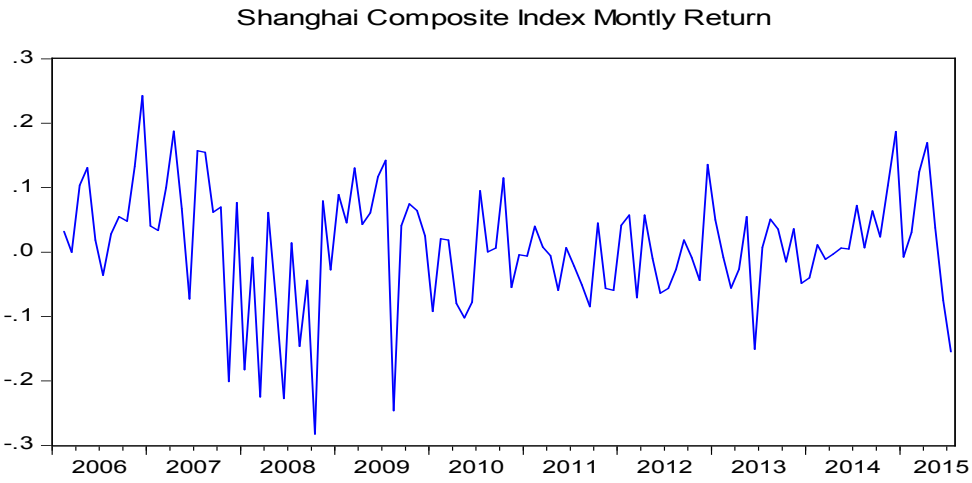
Correlation between Return and Flows (FII) are positive. Regression equation can be established between them.

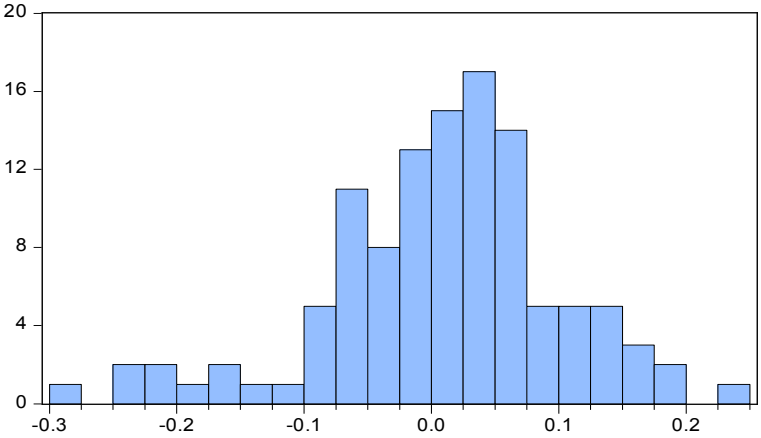
The results may be interpreted in the sense that both the series are significantly related and a cause and effect relationship can be established between them. This can be due to various factors such as competitiveness of Indian economy, expanding consumer base, enhanced pace of financial reforms, proactive Government policies, reliable regulatory framework and sustained economic growth.

CHINA

A graphical presentation of the Stock Market Indices and FPI/FII inflows is given below







Series: RET	
Sample 2006M01 2015M07	
Observations 114	
Mean	0.009376
Median	0.016468
Maximum	0.242526
Minimum	-0.282779
Std. Dev.	0.091999
Skewness	-0.587787
Kurtosis	4.052684
Jarque-Bera	11.82806
Probability	0.002701

The return of SSE Composite Index is presented graphically. While the mean or average return is just 0.9%, the maximum has touched 24.25%. The return has been erratic and seen quite violent fluctuations.

Dependent Variable: RET
Method: Least Squares
Sample (adjusted): 2006M02 2015M07
Included observations: 114 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FII	-0.000135	0.000255	-0.531725	0.5960
C	0.010202	0.008782	1.161638	0.2479

R-squared	0.002518	Mean dependent var	0.009376
Adjusted R-squared	-0.006388	S.D. dependent var	0.091999
S.E. of regression	0.092292	Akaike info criterion	-1.910323
Sum squared resid	0.954002	Schwarz criterion	-1.862319
Log likelihood	110.8884	Hannan-Quinn criter.	-1.890841
F-statistic	0.282731	Durbin-Watson stat	1.722840
Prob(F-statistic)	0.595970		

VAR Granger Causality/Block Exogeneity Wald Tests
Sample: 2006M01 2015M07
Included observations: 112

Dependent variable: RET

Excluded	Chi-sq	df	Prob.
FII	3.531409	2	0.1711
All	3.531409	2	0.1711

Dependent variable: FII

Excluded	Chi-sq	df	Prob.
RET	3.303827	2	0.1917
All	3.303827	2	0.1917

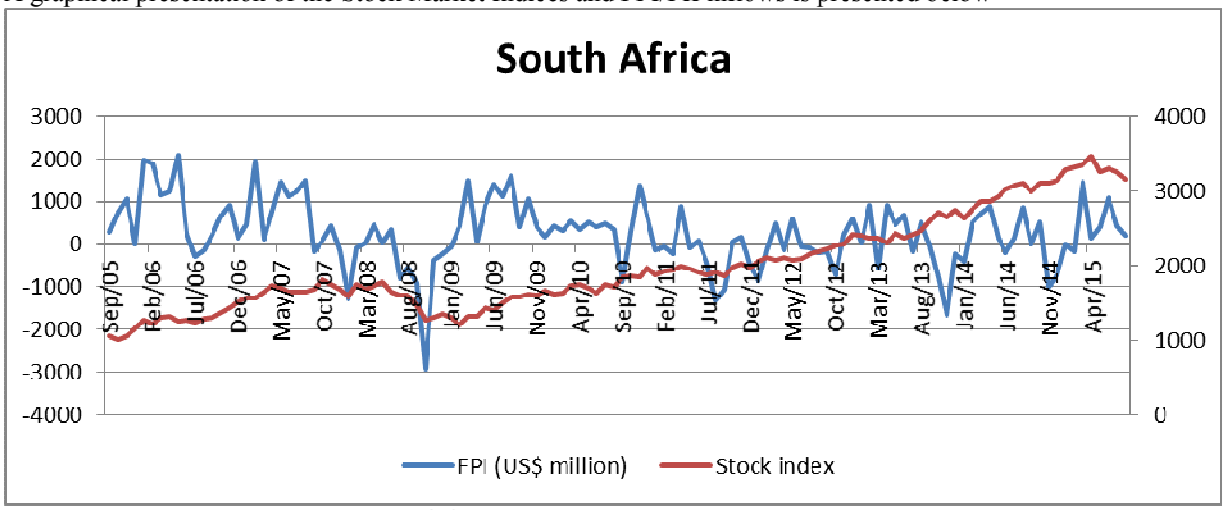
Results:

While a clear relationship cannot be established between the returns on SSE Composite and flows of FPI in China, still a lagged response can be observed from the figures above. The returns as well as FPI flows have been erratic and have kept fluctuating.

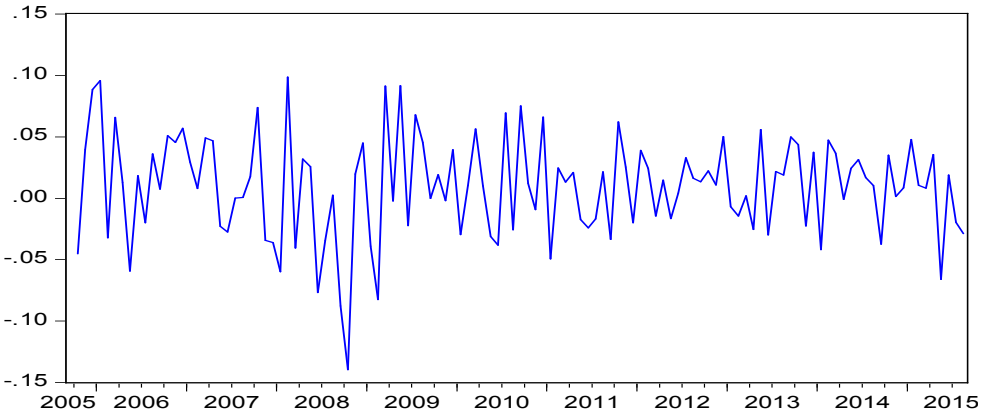
China is perceived as a controlled economy and the foreign investors have to go through more severe checks and balances as compared to other BRICS counterparts. In addition there are Government policy interventions which limit foreign investments in stock markets, the QFII (Qualified Foreign Institutional Investors) quota system and the huge outflow of foreign capital during 2014 can be attributed to such results.

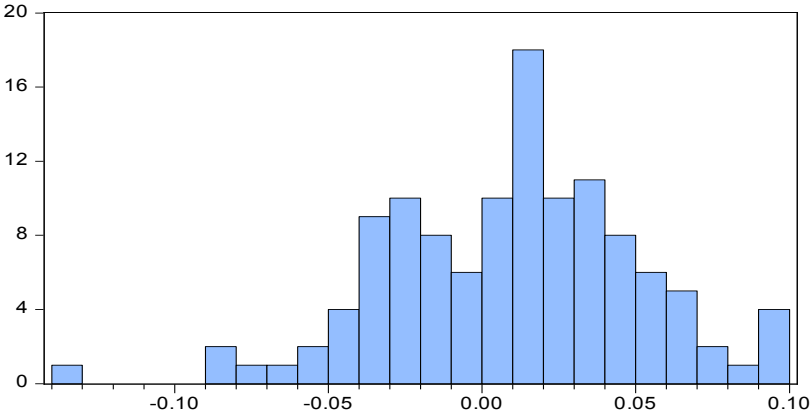
SOUTH AFRICA

A graphical presentation of the Stock Market Indices and FPI/FII inflows is presented below



JASCH Index return





Series: RET	
Sample 2005M09 2015M08	
Observations 119	
Mean	0.009194
Median	0.012241
Maximum	0.098591
Minimum	-0.139628
Std. Dev.	0.041690
Skewness	-0.357621
Kurtosis	3.556579
Jarque-Bera	4.072535
Probability	0.130515

The mean return of JASCH is low at 0.9%, but it has low standard deviation indicating lesser fluctuations in returns for the investors.

Dependent Variable: RET
Method: Least Squares
Sample (adjusted): 2005M10 2015M08
Included observations: 119 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FII	1.18E-05	4.83E-06	2.446457	0.0159
C	0.006142	0.003946	1.556554	0.1223

R-squared	0.048666	Mean dependent var	0.009194
Adjusted R-squared	0.040535	S.D. dependent var	0.041690
S.E. of regression	0.040837	Akaike info criterion	-3.541805
Sum squared resid	0.195114	Schwarz criterion	-3.495097
Log likelihood	212.7374	Hannan-Quinn criter.	-3.522838
F-statistic	5.985150	Durbin-Watson stat	2.251517
Prob(F-statistic)	0.015914		

VAR Granger Causality/Block Exogeneity Wald Tests
Sample: 2005M09 2015M08
Included observations: 118

Dependent variable: RET

Excluded	Chi-sq	df	Prob.
FII	0.608459	1	0.4354
All	0.608459	1	0.4354

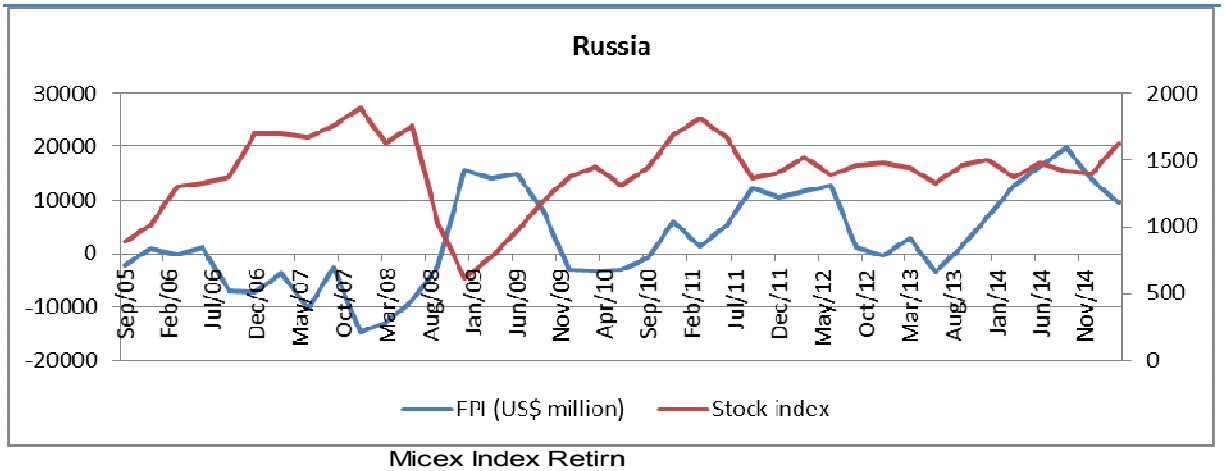
Dependent variable: FII

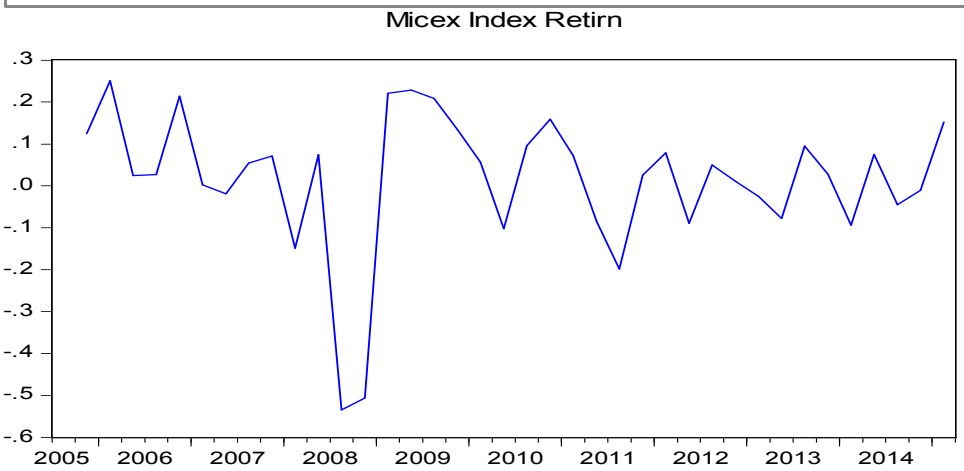
Excluded	Chi-sq	df	Prob.
RET	2.441362	1	0.1182
All	2.441362	1	0.1182

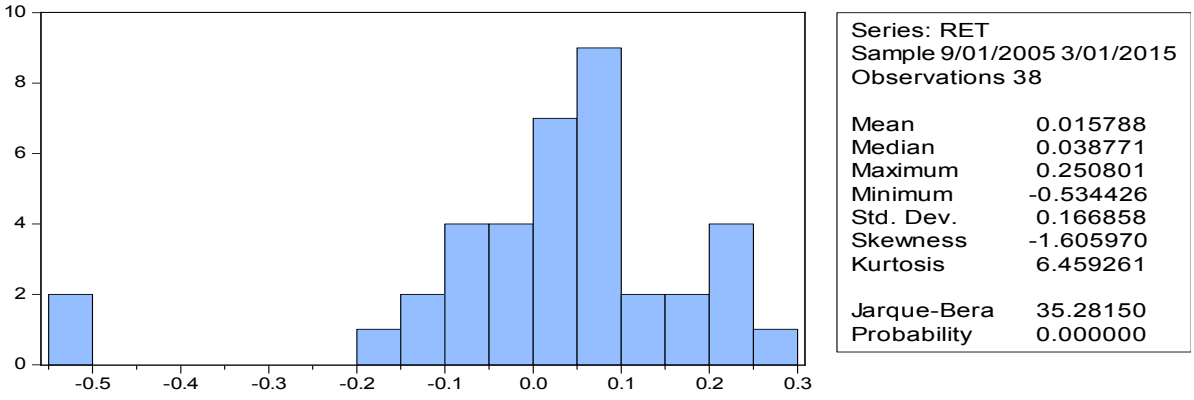
Results:
Using the method of least squares,the relationship has been established between return on JASCH and FPI flows. The response of FPI to the movements in returns of Index is found to be weak.

The relationship is positive though insignificant and such a situation may be a result of factors like very low annual GDP growth rate (currently at 1.20%)[10], high interest rate (14.5%) and high rate of unemployment, poverty and corruption, etc. Yet the economy is in positive zone for FPI investments.

RUSSIA







Dependent Variable: RET

Method: Least Squares

Sample (adjusted): 12/01/2005 3/01/2015

Included observations: 38 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FII	-9.68E-07	3.14E-06	-0.308650	0.7594
C	0.018697	0.028980	0.645174	0.5229

R-squared	0.002639	Mean dependent var	0.015788
Adjusted R-squared	-0.025065	S.D. dependent var	0.166858
S.E. of regression	0.168937	Akaike info criterion	-0.667391
Sum squared resid	1.027424	Schwarz criterion	-0.581202
Log likelihood	14.68043	Hannan-Quinn criter.	-0.636726
F-statistic	0.095265	Durbin-Watson stat	1.450798
Prob(F-statistic)	0.759367		

Sample: 9/01/2005 3/01/2015
Included observations: 37

Dependent variable: RET

Excluded	Chi-sq	df	Prob.
FII	3.738159	1	0.0532
All	3.738159	1	0.0532

Dependent variable: FII

Excluded	Chi-sq	df	Prob.
RET	4.517130	1	0.0336
All	4.517130	1	0.0336

Results

The results are positive and significant in case of Russia. A clear cause and effect relationship can be established between returns on Micex and FPI flows in Russian stock market. There is a bi-variate relationship between the two variables.

5. Testing the Hypothesis

Our null Hypothesis that *FII investments do not have a relationship with stock market indices* is not proved as it is observed that there is no universal relation between FII/FPI investments and stock market indices in BRICS economies. FII/FPI have different effects on different countries depending on different internal and external factors and conditions of each country.

6. Conclusion and suggestions

On the basis of our analysis, it may be observed that it is only in cases of Brazil, India, and South Africa, that there is found to be a positive correlation in varying degrees, in both the series. .In case of China and Russia, either insignificantly negative or negative correlation exists. Both China and Russia are controlled economies and the foreign investors have to go through more severe checks and balances as compared to other BRICS counterparts. In addition there are Government policy interventions which limit foreign investments in stock markets. For instance, China allows quotas to every QFII (Qualified Foreign Institutional Investors) which is revised from time to time by the Chinese Government. By the end of February 2014, the total quotas issued under the QFII programme to $52.3 billion as of Feb. 28 from $51.4 billion at the end of December, and to 180.4 billion yuan ($29.44 billion) from 167.8 billion yuan under the RQFII programme, according to data by the Chinese agency, SAFE. Moreover, since June 2014, there had been huge exodus of QFII investments from Chinese Stock Markets (source: Bloomberg). In case of Russian economy, Foreign Investors see certain drawbacks, which traditionally are bureaucracy and lack of political transparency. The EU-US sanctions imposed during 2014 on Russia has adversely impacted its financial system. In other words, it may be suggested that the FII/FPI inflows have varying degrees of impact on the Stock Market Indices of BRICS Countries.

It is suggested that since FPI/FII and its relationship and impact on Stock Markets is an ongoing topic it needs to be investigated on continuous basis to gain insights on this important aspect relating to economic growth of every country. The study has important policy implications for FII/FPIs as well as other investors looking for alternate investment opportunities in BRICS economies.

7. Policy Implications

Foreign portfolio investors aim tomaintain a diversified portfolio and emerging economies like BRICS provide them such great opportunity. BRICS economies are not alike. While Russia and China are controlled economies where Government exercise control over investments and have various policy interventions (like infusion of money supply to handle crisis, liberal incentives to domestic investors to invest and devaluation of currency, etc.), the economies of Brazil, India and South Africa are democracies which have been gradually adopting policies of structural and financial reforms since 1990 onwards. In BRICS economies, Moscow stock exchange is the only stock exchange that is not in the top 20 stock exchanges of the world. BRICS economies offer potential for higher return but associated with greater risk. As such they should form part of a long term diversified investment strategy. By conducting proper due diligence and enlisting a team of knowledge advisors, FPI/FIIs can create a BRICS investment strategy that makes sense for investors' needs and goals. The present study provides an insight into investment related aspects of BRICS economies. The results of the study might be useful for investors, analysts, academicians and all stake holders, who are looking for alternate investment opportunities in BRICS countries.

8. Scope for Further Research

BRICS economies are tipped to become the engine of growth for the entire globe, therefore the study of relationship between FPI/FIIs and the movement of stock markets/returns, etc should take place as a dynamic and continuous process and as such is a matter of constant further research. This will enable analysts, policy makers, academicians and other stakeholders to make reasonably accurate inferences, forecasts and timely investment decisions. Further research may be undertaken in the following areas:

- Relationship between BRICS stock market indices and FPI/FII investments for a different time frame
- Relationship between BRICS stock market returns and FPI/FII investments
- Comparative analysis of impact of FPI/FII investments in BRICS economies stock markets vs. other emerging economies
- Comparative analysis of impact of FPI/FII investments in BRICS economies stock markets vs. Advanced economies.

Annexure:

The following table depicts the results of Unit Root Test and correlation in a summarized form:

Country	FII stationary	Stock Index stationary	Stock Index Return Stationary	Correlation between FII and Stock Index Return
Brazil	Yes	No	Yes	Positive
Russia	Yes	No	Yes	Positive
India	Yes	No	Yes	Positive
China	Yes	No	Yes	Irrelevant
South Africa	Yes	No	Yes	Positive

Footnotes:
1. Key considerations when investing in BRICS
2. World economic outlook database , October 2012, IMF
3. Alka Banerjee, Head of equity indices at S&P Dow Jones Indices
4. http://www.foreignpolicy.com/articles/2012/10/08/think_again_the_brics
5. http://data.worldbank.org/indicator/CM.MKT.LCAP.CD/countries?display=default
6. http://www.globalsherpa.org/bric-countries-brics
7. http://www.nytimes.com/2013/03/27/world/africa/brics-to-form-development-bank.html?
8. Imfwebsite,world economic outlook, Jan. 2013
9. Reported in the Hindustan Times, New Delhi, 03.10.2015
10. Tradingeconomies.com

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