

Indian Stock market and its Dependency on US Stock Market

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Abstract

The Indian stock market dependency can be well noticed through collapse of the financial giants like AIG, Lehman Brothers and Merrillynch on Wall Street followed by the largest banks namely Washington Mutual and Wachovia which has created shock waves across the global financial markets.

US government has declared the bailout package to absorb these shock waves but the feelings and emotions have travelled around the world and leading to a of slow down in the economy and reaching the stage of recession. At the same time, Indian liquidity was almost drying up because of the low demand in industrial production. GDP growth was estimated at a lower percentage than the earlier (8.5%-7%) and even FII's were pulling their investments out of Indian stock market, which increased the difficulty in raising money for new ventures through IPO's .

So the above situation states that US stock market is correlated with the indices of Indian stock market and to avoid spill over and improve the market functioning, it necessitates a study of the dependency/independence of the stock indices between the two nations. This paper attempts to determine the dependent stock market factors of India with that of the US.

Through Multiple Correlation Analysis, the level of relationship between the two stock markets will be established. Through Multiple Regression Analysis, the dependency level is measured. A hypothesis is also stated and applied to know the intensity of the dependency between the Indian and the US stock markets.

Keywords: BSE, NASDAQ, DOWJONES, IPO'S, Recession, GDP, Foreign Exchange, Returns, and FII's.

Introduction

Foreign Institutional Investors [FII] in India have been correlated with National Association of Securities Dealers Automated Quotation System [NASDAQ] as contemporaneous domestic stock market return was found to be an important determinant for FII flows. In India, capital flows have also indicated that growth in the world income has a favorable impact on capital flows underscoring the significance of the boosting factor. Most of the studies have pointed out that outflow of Foreign Direct Investment [FDI] increased the level of openness of the economy.

Globalization has altered the economic frameworks of both developed and developing nations in ways that are difficult to comprehend. Earliest studies on international stock market linkage have focused on the identification of short term benefits of international portfolio diversification and existence of substantial possibilities to diversify internationally, taking benefits of low correlation among national stock markets.

The globalisation has increased the cross border movement of funds with the world moving towards a free trade zone. The technological development in the field of communication, trading systems and

introduction of innovative financial products, has helped the investors to face today's challenges to maximise their returns by portfolio investments. On the other hand, emerging market economies have turned the corner and recovered sharply but a lot still needs to be done for realizing developed markets.

Therefore, it is very essential for both investors and academicians to know whether stock markets are dependent. The issue is also important for policy makers for the following reason: if stock markets are found to be closely linked then there is a danger that stocks in one market will spill over to the other markets too. Here are some illustrations or instances to justify the argument of the need for studying the dependency factor between the indices:-

"The Sensex surpassed the New York Stock Exchange's Dow Jones Industrial Average index, closing at an all-time high of 11,183.48 on Wednesday. The Dow closed at 11,154.34 on Tuesday.

On Wednesday, as mutual funds stepped up their buying ahead of the financial year-end to prop up their equity fund NAVs and speculators tried to keep prices at higher levels ahead of the close of March derivative contracts on Thursday, Sensex rallied 97 points to near the 11,200-mark. In contrasting style, on Tuesday, after the new US Fed chairman Ben Bernanke announced the first rate hike of his term, the Dow ended 94 points lower, below the 11,200-mark.

So does this signal that India has finally arrived in the big league of global stock exchanges? Not quite. For starters, as Amit Rathi, MD, Anand Rathi Securities pointed out, "Dow is not strictly a comparable index. While the Sensex is a market cap-driven index, Dow is a price-based index."¹

"The Indian stock markets on Monday

tumbled in tune with other markets across the world on fears of widening credit crisis, which would drag the world economy into recession. The Bombay Stock Exchange 30-share sensitive index (Sensex) dipped 724.62 points or 5.78 points to 11801.70. Reflecting an all-round sell-off, all sectoral indices ended with a loss of 3.5-11 per cent.

The BSE-CD index dropped by 11.01 per cent, realty by 9.91 per cent, metal by 9.27 per cent, CG by 7.27 per cent and the BSE-Power by 7.24 per cent.

The U.S. stocks also plunged on Monday on its opening. While writing this report the Dow Jones Industrial Averages were down 493.89 points, or 4.78 per cent, at 9831.49.

The Standard & Poor's 500 index was down 63 points, or 5.73 per cent, at 1036.23. The Nasdaq Composite Index was down 117.52 points, or 6.03 percent, at 1829.87. It was the first time the Dow had broken below the 10000-mark intraday since October 2004. Wall Street's tumble followed a sharp drop in Asian markets, while major European equity indices fell 8 per cent. Japan's Nikkei fell by 465.05 points to 10473.10 and Hong Kong's Hang Seng lost a huge 878.64 points at 16803.30. In the European markets U.K.'s FTSE 100 lost 379.24 points at 4501.04, French CAC 40 lost 314.14 points at 3766.61 and the German Dax lost 362.79 points at 5434.24.²

"There was bloodbath at the Indian bourses today as they danced to the tune of world markets. Sensex, the benchmark index of the Bombay Stock Exchange, or BSE, fell to 4881, losing 291 points, while S&P CNX Nifty, the index at National Stock Exchange, or NSE, registered a 75-point drop to close at 1443 points.

The epicenter of today's tremor in the stock markets all over the world was New York-based NASDAQ, where the NASDAQ

composite index moved down by over 36 per cent in a short period of a week. The bourses suffered heavily with panicky investors indulging in large-scale selling.

“The massive 356-point fall in the NASDAQ and over 600-point fall in the Dow Jones Industrial Average were the major reasons for the crash in the markets,”³

“Even US \$700billion bailout did not provide an Asian salutation. It has witnessed during the US financial crisis. Asian markets have lost close to 50% of their value since the beginning of 2008.”⁴

“FII investment in equities in India have been positively relating to risk on NASDAQ. This inference was drawn from an empirical exercise under taken in a risk–return frame work using monthly data with a view to evaluate the factors influencing FII flows to India”⁵

“It has witnessed that during 14th Aug, 09 to 17th May09 Asia’s largest and world’s second largest economies, saw Indian and US indices sliding sharply.”⁶

Review of Literature

Watson (1980) observed that, in general, stock market linkage between the inter-country stock market returns, correlation coefficients do not change significantly from one period to the other. The results of the above mentioned study suggests that, for many countries, stock price movements have some correlation, but that most of the movements appear to be unique to a country.

Arshanapalli and Doukas (1993) examined the changed interactions among the international stock market indices after a US market crash in October, 1987. However Nikkei’s index increased significantly after the market crash. At the same time, unidirectional

causality from US to French, German and UK stock markets was also witnessed.

Bae and Karolin (1994) observed that volatility spillover from US to Japan stock market is higher after negative returns on US stock market than after a positive return.

Cherian Samuel’s (1999) study on ‘The stock markets as a sources of finance: A comparison of US and Indian firms’ found that the stock market plays a limited role as a source of finance in both India and the US. The key difference between the financing choices of Indian and US firms relates to the smaller role of international finance and bigger role of external debt in Indian firms compared to the US firms. The results stem from the fact that India has a bank oriented economy compared to the market-based system in the US, since there is less separation of ownership and control in Indian firms compared to the US firms.

Fan (2003) examined the linkage patterns between US and other Asian markets, for a period of 1991 to 1999. He found there was a long–term tendency of stock markets in Asia.

Kohers, Gerald, Kohers, Ninon Kohers and Theoder (2006) in their study on ‘Recent changes in major European stock market linkages between the major European stock markets’, based on 25years of evidence, found that stock markets in the European countries move in same direction, although the magnitude of the index varies among various European stock markets but the indices are stable over a period of time.

Shaista Wasiuzzaman and Lin Ali (2009) attempted to obtain the information about the linkage in stock markets namely, Malaysia, Singapore, Japan and the US stock markets. The study reveals that the four stock markets seem to have financial market linkages.

A study on response asymmetry in return and volatility spillover from the US to Indian stock market by K.N. Badhani(2009) reveals that returns in the stock market are more sensitive to negative shocks in the US market rather the positive shocks. While positive shocks in the US stock market do not affect the volatility in the Indian stock markets, negative shocks significantly increase the volatility.

Sameer Purohit(2009) puts forth that recovery in global markets triggered by a strong start to the US earning seasons helped Indian stocks to recover after a steep slide caused by a disappointing Union Budget 2009-10. High expectation had ignited a pre-budget rally. The rush to raise funds by Indian firms through qualified institutional placement also raised concerns that a glut in share sales will suck liquidity from the secondary market.

Puja Guha, Hena Oak, Ganita Bhupal, Rich Gulati and Shivani Daga (Working papers) found in their research "International financial markets integration or segmentation: case study on the equity markets", that there is co-integration between India and Hong Kong stock market whereas it was not there with USA and UK stock markets.

Methodology

Sources of Data

Basic Data: Daily index values of BSE Sensex, NASDAQ and DJIA for 8 years has been produced from the Yahoo Finance website. These values have been counter-checked with BSE and NASDAQ data base. Daily closing values of BSE Sensex, NASDAQ and DJIA for the 8 year period, starting from March1, 2000 to June 30, 2009 have been considered.

There are a total of 2284 observations representing all the trading days during the period of study. The daily computed returns

were calculated for the analysis.

$$\text{Daily Rate of Return} = (P_t/P_{t-1}) * 100$$

Where P_t is the closing Index of the day, and P_{t-1} is the closing Index of yesterday.

Statistical Tools Employed

A multiple regression equation: Is used to describe the average relationship between BSE Sensex, NASDAQ and DJIA. This relationship is used to predict or control the dependent variable (BSE Sensex). In order to find out the dependency on NASDAQ and DJIA, multiple regressions are done to know the dependency factor.

The following regression equation is used:

$$Y_0 = a + b_1X_1 + b_2X_2$$

Here

Y_0 : dependent variable (BSE Sensex)

X_1 : Independent variable (NASDAQ)

X_2 : Independent variable (DJIA)

In addition to the above procedure, one way ANOVA test has also been conducted

Null Hypothesis: There is no significant difference between the average returns of BSE, DOWJONES, NASDAQ indexes and they are equal.

$$X_{\text{BSE}} = X_{\text{DJIA}} = X_{\text{NASDAQ}}$$

Alternate Hypothesis: There is a significant difference between the average returns of BSE, DOW, and NASDAQ Indexes

$$X_{\text{BSE}} \neq X_{\text{DJIA}} \neq X_{\text{NASDAQ}}$$

Degree of freedom (v) = $N - K$,

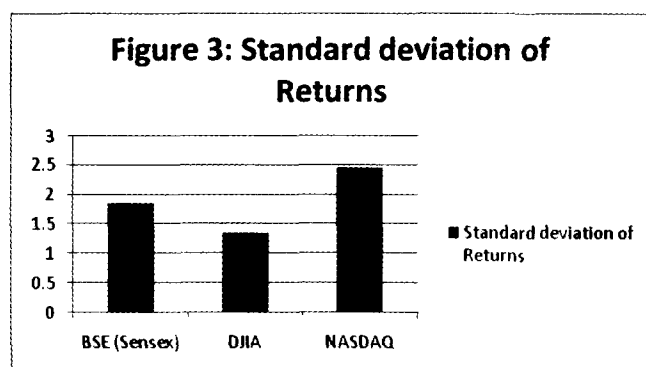
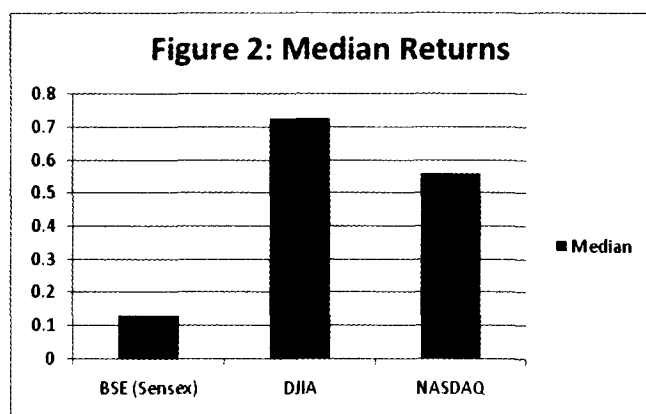
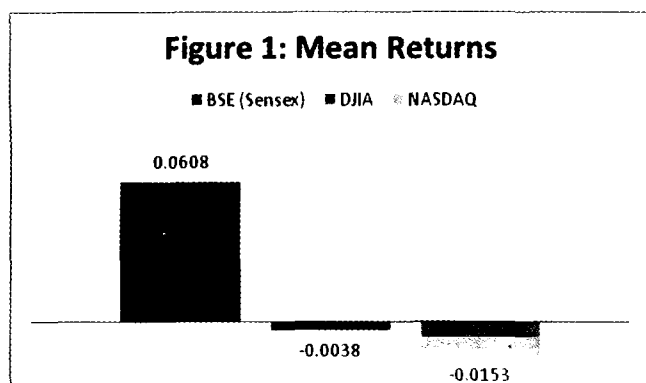
K = numbers of samples and

N = total number of all the observations.

Analysis: Table 1 and Figures 1, 2, and 3 display the descriptive statistics.

Table 1: Descriptive statistics

Statistics	BSE (Sensex)	DJIA	NASDAQ	No. of Observations
Mean Returns	0.0608	-0.0038	-0.0153	2283
Median	0.129293	0.722132	0.556136	2283
Standard deviation of Returns	1.86049	1.35541	2.45323	2283
Range	33.13	19.80	58.38	2283
Skewness	-0.310	0.267	1.113	2283
Std. Error	0.051	0.051	0.051	2283



Since the average return [Mean] is

positive in BSE Sensex, compared with Dow and Nasdaq, it is an evidence that the impact of economic crisis has not affected India to a great extent. When we analyze the variation of returns [Deviation] between the Exchanges, Dow is relatively consistent in its returns.

The negative skew value of BSE Sensex shows that until Sept. 2004, it showed steady growth in returns, but later until June 2009, the returns fell very fast when compared to the other two indices, which behaved steadily even in the later half.

Table 2 and 3 display the results of Regression and ANOVA

Table 2: Degree of Relation between the Indices

Sl. No.	Name of the Index	R	R squared
1	BSE (Sensex) Vs DJIA	0.235	0.055225
2	BSE(Sensex) Vs NASDAQ	0.148	0.021904

The degree of relationship between BSE Sensex and the designated stock exchanges exhibits low degree of positive correlation. Even though to an extent of 5.5% of variation in BSE returns can be explained by DJIA and apparently to the extent of 2.2% of variation in returns of BSE can be explained by NASDAQ, the extent to which the impact of other international exchanges on BSE have been observed is at a minimum level.

Table 3: ANOVA TABLE

Level of Significance = 5%
Degrees of Freedom = 2,6846

	Sum of squares	Degrees of freedom	Mean square	Table Value (0.05)
SSC	7.692	02	3.846	2.9957
ESS	25825.257	6846	3.772	
Total	25832.949	6848		

The calculated F-Ratio is less than the significant value; hence the assumption is accepted and it is concluded that the expected returns between stock exchanges are equal at 5% level of significance.

Conclusion

It has been observed that the comparative returns of the two designated stock exchanges are minimal. Based on the analysis, when we consider the two designated exchanges, any variation in NASDAQ will adversely affect the BSE [-ve sign indicates it], while any variation in Dow will tend to increase the returns of BSE Sensex. The expected returns of BSE have been arrived by the following multiple regression equation:

Regression Equation

$$Y = 0.062 + 0.34X_1 - 0.015X_2$$

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