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EFFECT OF FIIS BUYING OF EQUITY (IN INDIA) ON BOMBAY STOCK EXCHANGE (BSE) SENSEX : A KARL PEARSON'S CORRELATION ANALYSIS



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ABSTRACT

The subject of finance entails the application of financial theory and instruments to structure solutions to complex financial problems. Modern finance has important mathematical foundations. Mathematical finance comprises the branches of applied mathematics concerned with the financial markets. The subject has a close relationship with the discipline of financial economics, which is concerned with much of the underlying theory. The correlation coefficient is one of the branches of financial mathematics. The present paper is an effort to know the relation between buying of equity by FIIs in India and BSE Sensex. We have selected the period of twelve months, i.e. from Jan. 08 to Dec. 08. For the purpose of study we have used Karl Pearson's Correlation Coefficient (r). Data have been collected from the Monthly Review of the Indian Economy, of CMIE, Feb, 2009.

Introduction

Mathematical finance comprises the branches of applied mathematics concerned with the markets. The subject has a close relationship with the discipline of financial economics, which is concerned with much of the underlying theory. Generally, mathematical finance will derive, and extend, the mathematical or numerical models suggested by financial economics. Thus, for example, while a financial economist might study the structural reasons

why a company may have a certain share price, a financial mathematician may take the share price as a given, and attempt to use stochastic calculus to obtain the fair value of derivatives of the stock. The correlation coefficient is one of the branches of financial mathematics. The term correlation (or co-variation) indicates the relationship between two variables in which with in the changes in the values of one variable, the values of the other variable also change. The *Karl Pearson Correlation Coefficient* (r), or correlation coefficient *is a measure of*

the degree of linear relationship between two variables, usually labeled X and Y. In correlation the emphasis is on the degree to which a linear model may describe the relationship between two variables. The correlation coefficient may take on any value between plus and minus one.

$$-1.00 \leq r \leq +1.00$$

The sign of the correlation coefficient (+, -) defines the direction of the relationship, either positive or negative. A positive correlation coefficient means that as the value of one variable increases, the value of the other variable increases; as one decreases the other decreases. A negative correlation coefficient indicates that as one variable increases, the other decreases, and vice-versa. The buying and selling transactions affect the stock market and sensex movement depends on the transaction of FIIs. Sensex is the commonly used name for the Bombay Stock Exchange Sensitive Index - an index composed of 30 of the largest and most actively traded stocks on the Bombay Stock Exchange (BSE). FII investment is frequently referred to as *hot money* for the reason that it can leave the country at the same speed at which it comes in. In country like India; statutory agencies like SEBI have prescribed norms to register FIIs and also to regulate such investments flowing in through FIIs. In 2008, FIIs represented the largest institution investment category, with an estimated US\$ 751.14 billion.

Literature Review-Correlation analysis gives an idea of short-term linkages between the countries. It may be pertinent to note that most of the studies are focused on financial market integration in developed economies and Organization for Economic Cooperation and Development (OECD) countries; very few

empirical studies are developed to Indian markets and effect of FIIs buying of equity from the Indian market.

Many empirical studies have been conducted to examine the relationship between stock prices and buying of equity by FIIs in Indian stock market. Fang and Loo (1994) studied the relationship between the stock return volatility and international trade for four Asian Countries. Agarwal (2000) based on the correlation of returns during the period 1987-1996 found that emerging markets exhibit a high correlation with one another except for some of the South-East Asian economies, where the overall correlation between the emerging market is low. The study of Thomas J. Flavin, Margaret J. Hurley and Fabrice Rousseau (2001), reveals that a gravity model, frequently used to explain trade patterns, is used to explain stock market correlations. They found that geographical variables still matter when examining equity market linkages. In particular, the number of overlapping opening hours and sharing a common border tends to increase cross-country stock market correlation. These results may stem from asymmetrical information and investor sentiment, lending some empirical support for these explanations of the international diversification puzzle. Mishra (2004) explored the relationship between stock markets and foreign exchange markets using Granger causality test and the VAR technique. The study found that there exists a unidirectional causality between exchange rate and interest rate and money rate. Badhani (2005) has attempted to examine the long-term and short-term relationship among stock prices, dollar-rupee exchange rate and net FII investment in India, using the monthly data of BSE sensex, dollar-rupee exchange rates and net monthly FII investment flows from April

1993 to March 2004. The study shows that there is cointegration between net FII investment flow and stock prices.

Objective and Research Methodology-

The present paper is an effort to know the relation between buying of equity by FIIs in India and BSE Sensex. We have selected the period of twelve months, i.e. from Jan. 08 to Dec. 08. For the purpose of study we have used *Karl Pearson's Correlation Coefficient* (*r*) and following hypothesis is formulated:

H1: Purchase of equity by FIIs in India affects stock market.

Karl Pearson's Coefficient of Correlation-Karl Pearson's, the great biologist and statistician, has given a formula for the calculation of coefficient of correlation.

According to it the coefficient of two variables is obtained by dividing the sum of the products of the corresponding deviations of the various items of the two series from their respective means by the product of their standard deviations and the number of pairs of observations. The formula is:

$$\text{Correlation coefficient, } r = \frac{\sum xy}{\sqrt{\sum x^2 \cdot \sum y^2}}$$

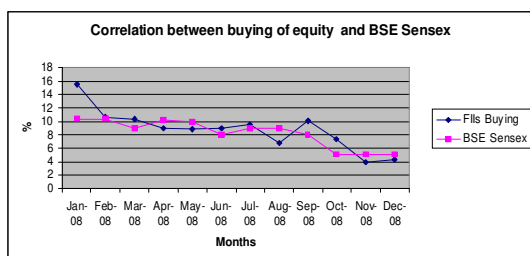
Data Collection and Tabulation

Data have been collected from the Monthly Review of the Indian Economy, of CMIE, Feb, 2009. We have tabulated data in the following table, which reflect the average monthly all India purchases of equity transactions and average monthly BSE Sensex.

Table-1 Monthly Average of All India Purchase of equity by FIIs and BSE Sensex

Months	FIIs Equity buying (Rs. Crore)X	BSE SensexY
Jan 2008	1,05,960.08	17,649
Feb 2008	72,253.8	17,579
Mar 2008	70,322.7	15,644
Apr 2008	61,781.5	17,287
May2008	59,610.6	16,416
Jun 2008	61,490.6	13,462
Jul 2008	64,526.3	14,356
Aug.2008	46,401.9	14,565
Sep 2008	68,029.6	12,890
Oct. 2008	49,339.3	9,788
Nov.2008	28,462.6	9,093
Dec. 2008	28,679.2	9,647

Source: Monthly Review of the Indian Economy, CMIE, Feb, 2009,



Testing of Hypothesis—For the purpose of testing hypothesis we have assumed two variables i.e. purchases of equity by FIIs in India (X) and BSE Sensex (Y). The hypothesis is as follow:

H1: Purchase of equity by FIIs in India affects stock market.

Calculation of Correlation Coefficient (between equity buying x, and BSE sensex y)

Month	Equity BuyingX	X- \bar{X} x	x ²	BSE SensexY	Y- \bar{Y} Y	y ²	xy
Jan	105	+ 49	2401	17.6	+ 3.6	12.96	176.4
Feb	72	+ 16	256	17.6	+ 3.6	12.96	57.6
Mar	70	+ 14	196	15.6	+ 1.6	2.56	22.4
Apr	62	+ 6	36	17.2	+ 3.2	10.24	19.2
May	60	+ 4	16	16.4	+ 2.4	5.76	9.6
Jun	61	+ 5	25	13.4	- 0.6	0.36	- 3
Jul	65	+ 9	81	14.3	+ 0.3	0.09	2.7
Aug	46	- 10	100	14.6	+ 0.6	0.36	- 6
Sep	68	+ 12	144	12.9	- 1.1	1.21	- 13.2
Oct	49	- 7	49	9.8	- 4.2	17.64	29.4
Nov	28	- 28	784	9.1	- 4.9	24.01	137.2
Dec	29	- 27	729	9.6	- 4.4	19.36	118.8
N=12	$\Sigma X=675$	$\Sigma x=+43$	$\Sigma x^2=4817$	$\Sigma Y=168.1$	$\Sigma y= 0.1$	$\Sigma y^2=107.51$	$\Sigma xy= 550.8$

$$\bar{X} = \frac{675}{12} = 56.25 \quad \bar{Y} = \frac{168.1}{12} = 14 \quad r = \frac{\Sigma xy}{\sqrt{\Sigma x^2 \cdot \Sigma y^2}} = \frac{550.80}{\sqrt{4817 \times 107.51}} = 0.764 \quad r = +0.764$$

Result & Finding —We found that the value of r = +0.764, hence there is a high degree of positive correlation between the two variables i.e. purchases of equity by FIIs in India (X) and BSE Sensex (Y). Percentage of two variables i.e. Equity buying X and BSE sensex Y have been used for the preparation of below chart. Chart reveals that there is simultaneous up ward and down ward movement between two variables.

Conclusion—FII dominance of the market established a one-to-one relationship between stock market and potentially volatile foreign exchange market. This has caused increased volatility in the Indian Stock Exchange. As we found in our study that there is high degree of positive correlation between buying of equity by FIIs in Indian financial market and BSE sensex. So it may be concluded that though FIIs have a strong hold on the equity movements in the Indian Stock market and buying of equity by FIIs in Indian stock market affects the Bombay Stock Exchange (BSE) sensex.

R E F E R E N C E

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