Macroeconomic Factors and Stock Returns in India: A Multiple Regression Approach

J. Kirubakaran
Doctoral Research Scholar
Department of Management
Pondicherry University, Karaikal

M. Dharmalingam
Associate Professor
Department of Management
Pondicherry University, Karaikal

Abstract

This study made an attempt to examine the impact of macroeconomic factors on Bombay Stock Exchange (BSE) SENSEX. The study include crude oil prices, Gold price, Food price inflation, Call money rate, Rupee Vs Dollar exchange rate, Foreign Portfolio Investment and Foreign Exchange Reserve (Forex). The study used statistical tools like correlation analysis and multiple regression analysis to found the impact of macroeconomic factors on Sensex. The study finds 25% of variance of Sensex explained by the variables during the study period. The result was useful for all the stock market participants in India.

Keywords:

Indian Stock Market, Sensex, Multiple regression, FII net inflow, Forex, Gold price, crude oil price

Introduction

Stock market is one of the major economic reflectors. Indian economy is currently emerging as a global super power. Due to low labor cost and skillful manpower sectors like textile, garments, manufacturing, banking and insurance has made a significant contribution to foster the growth potentials of the economy. The Structural Adjustment Program adopted in 1991 had focused on stabilization and structural reforms in this respect the changeover from inward orientation to outward strategies has generated euphoria in the stock market. Hence the —opening up of the economy has been successful in spreading its tentacles over the economy. There are several factors which are directly or indirectly related to stock prices. Here while observing stock market behavior we have taken into consideration Bombay Stock Exchange (BSE) sensitive index SENSEX.

Due to the asymmetric information community, most of the people who are involved in share market are not aware of the information for trading. The choice under uncertainty has led to the issue of moral hazards in the capital markets. This paper tries to examine the interrelationship between different determinants affecting Bombay Stock Exchange (BSE) in India. In this paper we considered the following determinants Oil prices, Gold price, Cash Reserve Ratio, Food price inflation, Call money rate, Dollar price, Foreign Portfolio

Investment and Money supply (M2).

Objective of The Study

This study identifies the level of influence of dollar price on BSE Sensex. The oil price of India is dependent on International Oil market. Any developing economy like India is dependent on Oil price, so we tried to find out if oil price influences the BSE Sensex. The strength and stability of the host country's currency is measured by the level and volatility of call money rates. Gold price is included in the model as an additional variable, to examine whether gold price contain any additional significant relation with share price movements. The most popular factor Foreign Portfolio Investment (FII) have been included to find the impact on the volatility in the BSE Sensex. The macroeconomic stability of any developing economy is highly dependent on food price inflation. Its impact on BSE Sensex can be analyzed. On the whole multiple regression has been run in this study by including all this factor as independent variable and Sensex return as variable.

Review of Literature

There are many studies have been conducted in the stock market area with relation to macro economic factors. Kenneth E. Homa & Dwight M. Jaffee (1971) they have used stock price as a dependent variable and supply of money as an independent variable. As he said, the nature of the relationship between the money supply and common stock prices can be most easily described if a share of common stock is dependent viewed as an asset that yields its return to the investor over time. In this study the relationship between the money supply and the stock market is estimated using the techniques of regression analysis. Franck and Young (1972) was the first study that examined the relationship between stock prices and exchange rates. They use six different exchange rates and found no relationship between these two financial variables. Aggarwal (1981) explored the relationship between changes in the dollar exchange rates and change in indices of stock prices. He uses monthly U.S. stock price data and the effective exchange rate for the period 1974-1978. His results, which were based on simple regressions, showed that stock prices and the value of the U.S. dollar is positively related and this relationship is stronger in the short run than in the long run. Solnik (1987) examined the impact of several variables (exchange rates, interest rates and changes in inflationary expectation) on stock prices. He uses monthly data from nine western markets (U.S., Japan, Germany, U.K., France, Canada, Netherlands, Switzerland, and Belgium). He found depreciation to have a positive but insignificant influence on the U.S. stock market compared to change in inflationary expectation and interest rates. Soenen and Hanniger (1988) employed monthly data on stock prices and effective exchange rates for the period 1980-1986. They discover a strong negative relationship between the value of the U.S. dollar and the change in stock prices. However, when they analyzed the above relationship for a different period, they found a statistical significant negative impact of revaluation on stock prices. Tamnun E Mursalin, Ahmed Tanvir and Dr. Md. Jahangir Alam (2006) analyzed the impact of various economical and social determinants to predict decision of investors.

Data and Methodology

Multiple Regression analysis has been used to the data set to find out the impact of the determinants affecting Sensex and at the same time computing the degree of association among the determinants**.** The data used in this study covering the period from 2005 to 2012. For all the variables monthly data have been used and data were collected from cmie-prowess data base and RBI official website.

Empirical Results

The study used multiple regression analysis also to check multiple variables effect on share price changes. Multiple regression is used to account for (predict) the variance in an interval dependent, based on linear combinations of interval, dichotomous, or dummy independent variables. Multiple regression can establish that a set of independent variables explains a proportion of the variance in a dependent variable at a significant level (through a significance test of R2), and can establish the relative predictive importance of the independent variables (by comparing beta weights). Power terms can be added as independent variables to explore curvilinear effects. Cross-product terms can be added as independent variables to explore interaction effects. One can test the significance of difference of two R^2's to determine if adding an independent variable to the model helps significantly. (G. David Garson (2003)).

In general, multiple regression procedures will estimate a linear equation of the form: $Y=a+b1*x1+b2*x2+b3*x3+b4*x4+b5*x5+b6*x6+b7*x7+u$,

Where, y= BSE Sensex a=intercept, x1= Dollar exchange rate, x2= oil price, x3 = inflation rate, x4= gold price, x5= IIP, x6= Money supply (M2), X7= FII net investment. In the above the regression coefficients (or B coefficients) represent the independent contributions of each independent variable to the prediction of the dependent variable.

The data are stationery at their first difference computed by using ADF-test.

Results and Discussions

The table 1 showing the descriptive statistics for all the data, among those data FII net investment showing the negative

mean return during the study period. Standard deviation also very high for FII net investment flow into the Indian capital, it is obvious that FIIs cause more volatility in the market.

The table 1 gives clear idea about the descriptive nature of the data

Table 1
Descriptive Statistics

Variables	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
Sensex	52.15	-23.89	28.26	1.0873	7.89928	62.399
IIP	29.07	-14.13	14.94	.7788	5.98933	35.872
Gold	23.70	-8.80	14.90	1.8242	4.19615	17.608
Crude oil	43.80	-25.00	18.80	1.1606	8.70775	75.825
M2 money	12.32	-4.16	8.15	1.1532	2.24507	5.040
FII net	4550.83	-1907.85	2642.98	-27.2668	466.9199	218014.275

Table 2
Regression Parameters

Intercept and Variable	Un standardized		Standardized	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.344	1.141		1.178	.243
IIP	.259	.177	.177	1.458	.150
Gold	-.421	.248	-.212	-1.699	.095**
crudeoil	.204	.110	.212	1.858	.068**
M2 money	.031	.450	.008	.068	.946
FIInet	.007	.002	.373	2.966	.004*
Dependent Variable: Sensex					

The table 2 revealed the regression coefficients for the data among the coefficients the FII net investment coefficient is significant at 5% level. The gold and crude oil coefficients are significant at 10% level. The remaining M2 money supply and IIP coefficients are not significant. So their impact on the Sensex is not significant.

The Table 3 expresses the proposed model summary of multiple regression analysis for the data. From the table it is concluded that the model has R^2 value of 0.232 showing that the model has a poor fit. So, during the study period the independent variables included in the study had less explanatory power on the dependent variable. The F statistic significance shows that the model is significant at the 5% significant level.

Table 3
Proposed Model Summary

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	Sig. F change
I	.482	.232	.168	7.60504	0.006

Findings and Conclusions

The study used the five macro economic variables and tries to find their influence on the Indian stock market. It is found that during the study period the FII net investment had very high variance and showing the more volatile movements. This study agrees that the FIIs can cause volatility in the Sensex movements followed by gold and crude oil prices. The variables having less explanatory power on Sensex during the study period the findings are in tandem with Efficient Market Hypothesis (EMH) showing the randomness in the movements. There are some other variables not included in this study influencing the Indian capital market, 77% of variance on Sensex is not explained by five variables, and this may leads to further scope of this study. It is proved that on the basis of the above five variables the Indian capital market showing meager amount of predictability in its movement.

References

Arijit Ghosh, Samrat Roy, Gautam Bandyopadhyay and Kripasindhu Choudhuri "Share Market Analysis Using Various Economical Determinants"*, Online Journal of American Institute of Physics,*. Vol.1298, pp. 529-534, Oct. 2010,

Aggarwal. R. "Exchange Rates and Stock Prices: A Study of U.S. Capital Market under Floating Exchange Rates", *Akron Business and Economic Review*, vol.12, no.2, pp. 7-12, Jul.1981

Bartov, E. and Bodnar G. M. "Firm Valuation, Earnings Expectations, and the Exchange-Rate Exposure Effect", *Journal of Finance*, vol.49, no.1 pp.1755-1785. Jan.1994.

Burton G. Malkeil. Equity yields, growth, and the structure of share prices, *American Economic review,* 5, 1004-1031, Oct.1963.

Franck. P. and Young, A., "Stock price Reaction of Multinational Firms to Exchange Realignments", *Financial Management*, vol.1, no.1, pp. 66-73. Jan. 1972

Franco Modigliani and Richard Cohn. "Inflation, Rational valuation, and the market", *Financial Analysis Journal*, vol.35, pp.3-23, Sep. 1979.

John Mauldin, The Connection between Oil and Stock Prices, FLT, Dec 2003 Edition.

Kenneth E. Homa & Dwight M. Jaffee. "The supply of money and common stock prices", *Journal of finance*, vol.26, no.5 , pp.1045-1066, May 1971.

Naeem Muhammad and Abdul Rasheed. "Stock Prices and Exchange Rates: Are they Related? Evidence from South Asian Countries", *Applied Economics,* Research Center, Karachi-Pakistan. 2001

Robert H. Rasche and. Shapiro Harold .T (1968). "The F.R.B.-M.I.T. Economic model: its special features", *American Economic review*,vol.2, pp. 136-137.

R. Smyth and Nandha M. "Bivariate causality between exchange rates and stock prices in South Asia", *Applied Economic Letters,* vol.10, no.11, pp.699-704, Nov.2003.

Smith, C. "Stock Market and the Exchange Rate: A Multi-country Approach", *Journal of Macroeconomics*, vol.14, no.4, pp.607-629, Apr. 1992.

Solnik. B. "Using Financial Prices to Test Exchange Rate Models: A Note", *Journal of Finance*, vol.42 no.1, pp. 141-149, Jan.1987.

Soenen, L.A. and. Hennigar E.S. "An Analysis of Exchange Rates and Stock Prices: the U.S. Experience between 1980 and 1986", *Akron Business and Economic Review*, vol.19 no.4, pp. 7-16. Apr. 1988.

Websites

http://www.bseindia.com

http://www.moneycontrol.com

http://www.rbi.org.in/