



An Analytical Study of the Impact of Macro Economic Variable on Indian Stock Market

KEYWORDS

BSE Sensex, External Debt, Exchange Rate

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ABSTRACT

The present paper is an endeavor to analyse the impact of macroeconomic variable on BSE 100. The present study is purely based on secondary data covering 15 financial years from 2000-01 to 2014-15. The analysis of which was made through the application of Karl Pearson's coefficient of Correlation and Multiple Regression. The study found that exchange rate accounts for 41.3% variations and external debt accounts for additional 54% variation in the outcome variable. It was further indicated through the results that if all the selected independent variables remain constant, then there are other factors which explain BSE 100 up to 10566.758 units.

Introduction

Many developing countries including India, restricted the flow of foreign capital till the early 1990s and depended on external aid and official development assistance. The financial sector reforms commenced in the beginning of 1990's, and the implementation of various measures including a number of structural and institutional changes in the different segments of the financial markets, particularly since 1997, brought dramatic changes in the functioning of the financial sector of the economy (Agrawalla, 2006). Later, most of the developing countries opened up their economies by deregulating capital controls with a view to attracting foreign capital, supplementing it with domestic capital to stimulate domestic growth and output. Since then, portfolio flows from foreign institutional investors (FII) have emerged as a major source of capital for developing market economies (EMEs) such as Brazil, Russia, India, China and South Africa. Besides, the surge in foreign portfolio flows since 1990s can be attributed to greater integration among international financial markets, advancement in information technology and growing interest in EMEs among FIIs such as private equity funds and hedge funds so as to achieve international diversification and reduce the risk in their portfolio. Stock exchange serves a vital function for businesses considering going public. An economy that experiences sustainable growth is likely to have a very effective stock exchange. While developed countries fully usurp the benefits of the raising capital through the stock exchange, developing countries do not have effective stock exchange at the desired level. Being one of the most important pillars of the country economy, stock market is carefully observed by governmental bodies, companies and investors (Nazir et al., 2010). The foreign capital markets integrated rapidly during post globalisation period but contraction in demand for exports (both merchandise and services) and the increase in fuel and gold imports resulted into a record-high current account deficit during 2012 in India. The exports registered a growth from \$18.5 billion to \$309.7 billion between 1990-91 and 2011-12; the average annual growth rate of merchandise exports doubled during the last two decades, from 9 per cent in 1991-92 to 1999-2000 to 20 per cent during 2000-01 to 2011-12; though, exports grew during the last two decades, they were not in line with the growth in imports (export/GDP increased 11 percentage points between 1990-191 and 2011-12 whereas imports/GDP increased by 18 percentage points over the same period); the increase in imports of oil as a proportion of GDP doubled during 2004-05 and 2011-12; non-oil imports increased from 14.4 per cent to 18.5 per cent of GDP, specifically the gold has been an important contributor (increasing from 1.5 per cent to 2.5 per cent of GDP between 2004-05 and 2011-12); the import of oil and gold registered a sharp increment during 2011-12 with growth rates of 45 per cent and 40 per cent respectively (relative to 22 per cent and 18 per cent in the previous year); consequently, the merchandise trade balance aggravated significantly over the last two decades (from 2.9 per cent (-ve) of GDP in

1990-91 to an estimated 10.2 per cent (-ve) of GDP in 2011-12) and the CAD went up to an all time high of 4.8 per cent last year on account of a heavy trade deficit and higher gold imports. The Government of India acted on multiple fronts, curbing gold imports, opening currency swap windows to get fresh dollar flows, and increasing money market rates to reduce speculation, resulting into CAD comes down to 1.2 per cent of GDP in Q2 and the foreign exchange reserves were at over US \$295 billion as of December, 2013.

Review of Literature

Suraksha and kuldeep (2014) analyzed the impacts of foreign exchange reserves, current account and capital account on GDP, Sensex, Nifty and fiscal deficit. The study is purely based on secondary data. The analysis of the study was made through the application of Karl Pearson's coefficient of Correlation and Multi Regression OLS model (Ordinary Least Square). The study found that the current account (CAD) is the most important predictor of GDP, BSE, NSE and fiscal deficit. Though, the current account is a significant factor for all outcome variables yet its impact on GDP and fiscal deficit has been greater than other two outcomes; and the aggregate impact of all the predictors jointly showed more impact on BSE than other outcome variables.

Karampal and Ruhee Mittal (2008) Scrutinized the long-run relationship between the Indian capital markets and key macroeconomic variables such as interest rates, inflation rate, exchange rates and gross domestic savings (GDS) of Indian economy - Quarterly time series data spanning the period from January 1995 to December 2008 has been used. The unit root test, the co-integration test and error correction mechanism (ECM) have been applied to derive the long run and short-term statistical dynamics. The study found that there is co-integration between macroeconomic variables and Indian stock indices which is indicative of a long-run relationship. The ECM shows that the rate of inflation has a significant impact on both the BSE Sensex and the S&P CNX Nifty. Interest rates on the other hand, have a significant impact on S&P CNX Nifty only. However, in case of foreign exchange rate, significant impact is seen only on BSE Sensex. The changing GDS is observed as insignificantly associated with both the BSE Sensex and the S&P CNX Nifty. Study, on the whole, conclusively establishes that the capital markets indices are dependent on macroeconomic variables even though the same may not be statistically significant in all the cases.

Ahmet Ozcan (2012) in his study, the relationship between macroeconomic variables and Istanbul Stock Exchange (ISE) industry index is examined. The selected macroeconomic variables for the study include interest rates, consumer price index, money supply, exchange rate, gold prices, oil prices, current account deficit and export volume. The Johansen's co-integration test is utilized to determine the impact of selected macroeconomic variables on ISE

industry index. The result of the Johansen's co-integration shows that macroeconomic variables exhibit a long run equilibrium relationship with the ISE industry index.

Apergis and Eleftherio (2002) investigated that the relationship among the index of Athens stock exchange, interest rate and inflation and concluded that inflation has greater impact on the performance of the index of Athens stock exchange than interest rate.

Rapach (2001) analyzed the long run relationship between inflation and the stock prices. Using macroeconomic data from sixteen developed countries, it is concluded that there is a weak relationship between inflation and stock prices.

Liuve Shrestha (2008) examined the relationship between a set of macroeconomic variables and the index of Chinese stock market. By employing heteroscedastic co-integration, they found that a significant relationship exists between the index of the Chinese stock market and macroeconomic variables. They concluded that inflation, exchange rate and interest rate have a negative relationship with the index of Chinese stock market.

Akmal, Muhammad Shahbaz (2007) scrutinized the relationship between stock prices and rate of inflation using ARDL approach for the period 1971-2006. The result of the study depicted that stock hedges are not in favour of inflation in long run as well as in short run and found that black economy effects long run and short run prices of the stock.

Objective of the Study

The main objective of the study is to analyse the impact of macroeconomic variable on BSE 100.

Hypotheses of the Study

The hypotheses are developed on the basis of literature review and objective of the study. The null hypotheses framed under the study are stated below:

- 1. H01 : There is no significant impact of external debt on BSE 100.
- 2. H02: There is no significant impact of exchange rate on BSE 100.

Research Methodology

An attempt has been made through the present study to explain the causes and effects of external debt and exchange rate on stock market. The present study is purely based on secondary data covering 15 financial years from 2000-01 to 2014-15. The requisite data related to external debt and exchange rate have been collected from various sources i.e. Hand Book of Statistics and Bulletin of Reserve Bank of India and the data of BSE Sensex has been taken from the website of BSE (www.bseindia).

Statistical Tools & Techniques

In order to analyze the collected data, the statistical tools such as Karl Pearson's coefficient of Correlation and Multiple Regression is used. Correlation coefficient is a statistical measure that determines the degree to which the movements of variables are associated. In the present study, the linear relationship between Independent Variables external debt and exchange rate and dependent variable BSE 100 is established. The multiple regression analysis is a technique used to evaluate the effects of two or more independent variables on a single dependent variable. Here, an attempt is made to study the impact of Independent Variables- external debt and exchange rate on dependent variable BSE 100.

Result and Discussion

Karl Pearson coefficient of correlation was applied to study the statistical relationship among the independent variables exchange rate and external debt and dependent variable BSE 100, for 15 years and the output is expressed through Table no. 1. A strong and very high positive correlation between exchange rate and external debt (r

= .746) was observed which is found to be significant at 1% level of significance. Correlation coefficient between BSE 100 and external debt is 0.642 which is also significant at 1% level of significance.

Regression Analysis of External Debt, Exchange Rate and Stock Market Indices.

Table 1 Pearson Correlation Coefficients

	BSE 100	EXCHANGE RATE	EXTERNAL DEBT
BSE 100	1.000	.234	.642
EXCHANGE RATE	.234	1.000	.746
EXTERNAL DEBT	.642	.746	1.000

Source: Researcher Calculation

Table 2 Model Summary^b

Model	R	R Squared	Adjusted R Squared	Std. Error of the Estimate	Change Statistics					Durbin Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.642a	.413	.368	1683.84241	.413	9.135	1	13	.010	1.223
2	.952b	.906	.891	697.2629	.906	57.958	2	12	.000	1.239

Source: Researcher Calculation

Table 2 exposed the strength of relationship between the model and the dependent variables. The value of R depicts the multiple correlation coefficients between the predictors (independent variables) and the outcome (dependent variable). When external debt is used as predictor, a high correlation i.e. .642 between external debt and BSE 100 is observed. The next column gives the value of R2, which tells us a measure of how much of the variability in the outcome (BSE 100) is accounted for the predictor's exchange rate and external debt. For the first model the value is .413 which means exchange rate accounts for 41 percent variation in BSE 100. When the other predictor external debt is included as well, the value increases to .952 or 95.2%. Therefore, if exchange rate accounts for 41.3% variations, we can say that external debt accounts for additional 54% variation in the outcome variable.

Table 3 ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3427997.446	1	3427997.446	2.981	.110 ^b
	Residual	59331071.888	13	4563928.607		
	Total	62759069.333	14			
2	Regression	34433596.516	2	17216798.258	7.294	.008 ^c
	Residual	28325472.817	12	2360456.068		
	Total	62759069.333	14			

a. Dependent Variable: BSE100

b. Predictors: (Constant), EXCHANGERATE

c. Predictors: (Constant), EXCHANGERATE, EXTERNALDEBT

Table 3 presents the ANOVA analysis, in case of BSE 100 the F-ratio for model 1 and 2 are 2.981 and 7.294 respectively, which are significant (p<.05) but the F-ratio for model 2 is more than other model. So, we can safely conclude that the model 2 is more significant in predicting the outcome variable (BSE 100).

Table 4 Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics		
	B	Std. Error				Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF	
1	(Constant)	672.318	4752.535										
	EXCHANGERATE	84.600	97.615	.234	.867	.102	-126.285	295.485	.234	.234	.234	1.000	1.000
2	(Constant)	10566.758	4374.342										
	EXCHANGERATE	-200.452	105.424	-.554	-1.901	.012	-430.150	29.247	.234	-.481	-.369	.443	2.255
	EXTERNALDEBT	.016	.005	1.056	3.624	.003	.007	.026	.642	.723	.703	.443	2.255

a. Dependent Variable: BSE100

The analytical table 4 exhibits the estimates of b-values (Unstandardized coefficients) which explicate the individual contribution of each independent variable to the model. The positive value depicts positive relationship between the predators and outcome variable and vice-versa. The b-value also explain to what degree each predator affects the outcome variable if the effects of the other predator are held constant if we replace the b-values in equation , we can define the model as follows:-

Model 1: $BSE\ 100 = b_0 + b_1(\text{Exchange Rate}) + b_2\ \text{External Debt}$
 $Debt = 1056.7580 - 200.452\ \text{Exchange Rate} + .016\ \text{External Debt}$.

The standardized beta value (labeled as Beta=B) exposed through the Table 4 indicate the volume change in standard deviation outcome (Dependent variable) due to one standard deviation change in the independent variable.

Exchange Rate (B4= -.554): These values observe that as exchange rate increases by one standard deviation (5.8490) BSE 100 decrease by -.554 standard deviation. Standard deviation for BSE 100 is 2117.26 and so, this constitute a change of 1172.9620 (2117.26 * .554). This interpretation is true only if the effects of external debt held constant.

External Debt (B4= 1.056): These values observe that as external debt increase by one standard deviation(135676.65), BSE 100 increases by 1.056 standard deviation. Standard deviation for BSE 100 is 2117.26 and so, this constitute a change of 2235.82(2117.26* 1.056). This interpretation is true only if the effects of exchange rate held constant.

Testing of Hypothesis

1. H01: There is no significant impact of external debt on BSE 100.

The P- value related to external debt in Table no. 4 is less than 0.05 so null hypothesis H01 is not accepted. Hence, it is concluded that trends of external debt and indices of BSE 100 are dependent and external debt have significant impact on BSE 100.

2. H02: There is no significant impact of exchange rate on BSE 100.

conclusion

The study which was conducted to assess the impact of external debt and exchange rate on Indian stock market found that external debt is the most important predictor in BSE 100 with R square values of .906 and coefficient of correlation .642. It was further indicated through the results that if two selected independent factors remains constant, then there are other factors which are explaining BSE 100 up to 10566.78 units.

The P- value related to exchange rate in Table no. 4 is less than 0.05 so null hypothesis H02 is not accepted. Hence, it is concluded that trends of exchange rate and indices of BSE 100 are dependent and exchange rate have significant impact on BSE 100

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