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Factors Affecting the Movement of Stock Market: Evidence from India

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Abstract: *This paper examines the impact of changes in selected macro variables upon the movement of stock Market Index, i.e., CNX NIFTY for the period from January 2004 to December 2013. A Multiple Regression Model has been used to estimate the relationship. Based on regression coefficient, it was found that exchange rate and gross domestic product have influence the NSE Stock Index. But Exchange rate and Index of Industrial Production influenced the stock prices in Negative way and Gross domestic Product influenced the stock prices in positive way.*

Keyword: Stock Price, Macroeconomic, Multiple Regression Model.

Introduction

It is the general view that the stock market reflects the economic condition of any country and also it is one of the major economic reflectors. Indian economy is currently emerging as 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. Moreover, in any financially developed country stock market is considered to be one of the alternatives to financing. Investors get into the stock market primarily with a return motive. The reform brought by financial liberalization and Financial sector reform program open up new dimension to equity investors to invest in the stock market to earn return as a prime field of the investment in India. As Cootner (1964) says, "the prices of securities are typically very sensitive, responsive to all events, both real and imagined". Basically, stock return has been affected by lots of fundamental factors and external factors which are directly and indirectly related to stock prices. Here while observing stock market behavior we have taken into consideration National Stock Exchange index (NSE) in our database. This paper tries to examine the interrelations between different determinants affecting National Stock Exchange in India. In this paper we considered the following determinants Gross Domestic Product, Index of Industrial Production and Exchange Rate.

The paper is divided into two sections. In section one, an attempt has been made to discuss the scope, the importance of selecting the determinants affecting the stock market and interrelationship between them. In section two, the methodology has been applied to examine the influence of those determinants and grouping them using Multiple Analyses.

Scope and Objective

It is well known fact that Dollar Price or money exchange rate has a great influence on NSE Nifty. Our research identifies the level of influence of dollar price on NSE Nifty. The fundamental measure for the performance of the economy is the level of gross domestic product, or GDP. GDP measures the total income in an economy earned domestically, including the

income earned by foreign-owned factors of production (Mankiw, 1997). GDP is important to the stock market in that it serves as a measure of the health of the economy. So, we try to find out if GDP influences the NSE Nifty. Industrial production index is a macroeconomic indicator, used to measure the volume of output related with the manufacturing, mining and utilities sectors. As suggested by Erdem et. al, (2005), the level of economic activity that is proxied by industrial production should have a positive effect on equity prices as higher production should lead to larger expected future cash flows. So, the role of industrial production also occupies the important place of influencing the stock market.

Literature Review

Chen (1986) argued that stock return should be affected by any factor that influences future cash flows or the discount rate of those cash flows by using discounted cash flow or present value model (PVM). He has tried to relate the stock price to future expected cash flows and the future discount rate of the cash flows. Again, all macroeconomic factors that influence future expected cash flows or the discounted rate by which the cash flows are discounted should have an influence on stock price. Darrat (1990) examines the effect of monetary and fiscal policy on share returns in Canada and concludes that budget deficit and long term bond rate and interest rate volatility and industrial production determine share returns. Ajayi and Mougoue (1996) showed that an increase in stock price has a negative short term effect on domestic currency but in the long term this effect is positive, while currency depreciation has short and long term effect on the stock market. Nishat (2004) evaluates long term association among macroeconomic variables, stock prices and employed money supply, CPI, IPI, and foreign exchange rate as explanatory variable. The result shows that there are causal relationships among the stock price and macroeconomics variables. The data used in this study from 1974 to 2004. Most of the time series data is non stationary therefore unit root technique is used to make data into stationary. The result also indicates that industrial production is significantly affects to macroeconomic variables. Nishat used Karachi stock exchange 100 index price from 1974 to 2004. Grange causality test is used to find the correlation among the variables the result of granger causality shows that interest rate is not granger cause by stock price.

Dimintrova (2005) used multivariate model and try to find out link among stock prices, exchange rate and economics policy (fiscal and monetary policy). The study defines the interest parity condition affects on stock prices. The result shows that ambiguous affects of deprecation on stock prices. Sulaiman D. Mohammad and Adnan Hussain (2009) explore the correlation among the macroeconomics variables and share prices of KSE (Karachi Stock Exchange) in context of Pakistan. The study considers several quarterly data for different macroeconomics. The result shows that after the reforms in 1991 the influence of foreign exchange rate and foreign exchange reserve significantly affect the stock prices, while other variables like IPI and GFCF are insignificantly affect stock prices. The result also highlighted the internal factors of firm like increase in production and capital formation insignificant while external factor like M2 and foreign exchange affect positively. The study will be very helpful for national policy makers, researchers and corporate managers. Keithwade, Anja May (2013) analyze the relationship between GDP growth and equity market returns. The result showed that the correlation between GDP growth and equity market returns does appear to be unstable over long time horizons. Dickey,A.A, and W.A. Fuller, (1979) confirmed that to avoid spurious regressions which may arise as a result to carrying out regressions on time series data without subjecting them for test

whether they contain unit root, we first subject the data to stationarity test by using the widely acclaimed Augmented Dickey Fuller (ADF) test by Dickey and Fuller (1979).

Research Methodology

Database: Data required for the present study is secondary in nature. The quarterly data of Macroeconomic variables have been used. The data were collected from Monthly Review Publication issued by Centre for Monitoring Indian Economy (CMIE) and RBI Bulletin. The official websites of National Stock Exchange (www.nseindia.com) is also used for numerous data collection purpose.

Sample Design: The macroeconomic variables considered for the purpose of the study include Gross Domestic Product, Exchange Rate and Index of Industrial Production were taken quarterly for analysis, for the period from January 2004 to December 2013. For December took only first 2 quarter data because of availability.

Model Specification

This study uses Multiple Regression Analysis computed by Standard OLS formula to investigate the impact of Macroeconomic variables on NSE Nifty index in India. At the beginning we transformed all the variables into log. Then, because of existence of a unit root in NSE Nifty index, GDP, Exchange rate and IIP data (Table: 2) series we have taken the first difference of logarithm of all these three variables. Then the multiple regression model is developed by the following specification:

$$Dlog(SP)=\alpha_1 + \beta_1 Dlog(GDP)_t + \beta_2 Dlog(IIP)_t + \beta_3 Dlog(ER)_t + \epsilon_1$$

Methodology

This study examines the explanatory power of three macro economic variables to explain our dependent variable. We have taken NSE Nifty Index as dependent variable and Exchange Rate, Industrial production index and Gross Domestic Product as macroeconomic predictor variable. At first we have taken quarterly data of all the dependent and independent variables from January 2004 to June 2013 (total 38 quarterly observations from each variable). Then each of the variables are examined with respect to their descriptive statistics. After then we transformed all the raw data into natural logarithms. Then all these variable data series are tested for their stationarity because Granger and Newbold (1974) noted that the regression result with non-stationary data will be spurious. For incorporating stationary data series, it is significant to examine the existence of unit root in the data series. In this case unit root test is applied by considering Augmented Dickey-Fuller (ADF) Test and then Phillips-Perron (PP) Test. Then a Multiple Regression Model based on Standard OLS formula has been designed to measure the impact of selected micro and macroeconomic variables on stock returns based on the above unit root test estimates. In addition residual diagnostic test was applied by examining Breusch-Godfrey Serial Correlation LM Test. Tests for Residual Diagnostic is used to examine Normality test of the variables by using histogram. The Presence of Heteroskedasticity was examined by White Heteroskedasticity Test. Finally, regression coefficients were tested for their statistical significance at 5 percent by Wald Test.

Empirical Results

Summary Statistics: Table: 1 presents the summary of descriptive statistics for the selected dependent and independent variables under study. We have examined 38 observations of all the variables to estimate the following statistics.

Table 1: Descriptive Statistics

	CNXNIFTY	GDP	IIP	ER
Mean	86363.4784	10733.2487	646.96	2810.5358
Median	96435.22	10663.17	629.10	2777.730
Maximum	132940.30	14707.82	999	3425.15
Minimum	34849.23	6907.79	171	2446.89
Std. Dev.	29964.91692	2274.59457	169.073	244.57439

The descriptive statistics for all four variables used study, namely, NSE Stock index (CNXNIFTY), Gross Domestic Product (GDP), Industrial Production Index (IIP), Exchange rate(ER) are presented in Table 1. We have 36 observations of the all the variables to estimate the following statistics. As mean describes the average value in the series and Std. Dev. Measures the dispersion or spread of the series then GDP, IIP AND ER are highly volatile data series. The Maximum and minimum statistics measures upper and lower bounds of the variables under study during our sample time frame.

Test for Stationarity: This tool summary of unit root test for all the dependent and predictor variables using Augmented Dickey-Fuller (ADF) Test and Phillips-Perron (PP) Test.

Table 2: Unit Root Test

Variables	**ADF**			**PP**		
	Level	**First Difference**	**Inference**	**Level**	**First Difference**	**Inference**
CNXNIFTY	-1.74 (0.0762)	-4.679 (0.0006)	I(1)	-1.03 (0.7297)	-4.62 (0.0007)	I(1)
GDP	-0.52 (o.87)	-5.86 (0.0001)	I(1)	0.24 (0.9722)	-9.26 (0.0000)	I(1)
IIP	-3.77 (0.0068)	-7.98 (0.0001)	I(1)	-3.75 (0.0071)	-8.60 (0.0000)	I(1)
Ex Rate	-2.62 (0.0964)	-5.94 (0.0001)	I(1)	-2.55 (0.1119)	-6.34 (0.0000)	I(1)
Note : Figures in brackets are ρ-values.						

ADF and PP of these two tests has been conduct with constant and liner intercept and assumed the null hypothesis of unit root in the data series. After comparing test statistics value with that of test critical value at 5 percent significance and considering p-value, all the series found to be non-stationary at first difference with intercept. However, after taking the first difference these series are found to be stationary at 1, 5 and 10 percent level. Thus all the two stationary tests indicate that all series are individually integrated of the order I (1).

Multiple Regression: Table 3 presents the test output of the Multiple Regression Model based on Standard OLS formula which has been designed and developed in accordance with the methodology discussed earlier.

Table 3: Multiple Regression

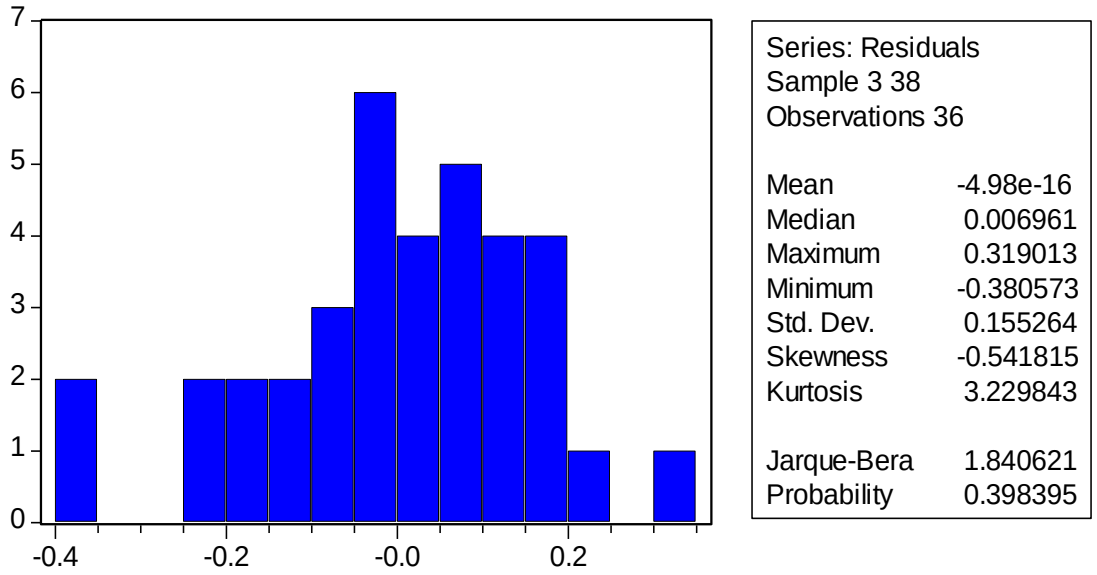
Dependent Variables: LSP				
Method L Least Squares				
Sample : 2004-05 to 2012-June 2013				
Included Observation after adjustments : 36				
Variables	Coefficient	Std.Error	t-statistics	Prob.
C	8.414801	3.077416	2.734372	0.0101
LER	-1.915827	0.425174	-4.505983	0.0001
LIIP	-0.054040	0.089613	-0.603033	0.5507
LGDP	1.989725	0.150078	13.25797	0.0000
R-Squared	0.851983	Mean dependent Var.		11.26833
Adjusted R-Squared	0.838107	S.D. dependent Var		0.403568
S.E. of regression	0.162379	Akaike info criterion		-0.693324
Sum Squared resid	0.843745	Schwarz criterion		-0.517378
Log likelihood	16.47984	F-Statistic		61.39728
Durbin-Watson stat	0.804537	Prob.(F-statistic)		0.000000

The above analysis shows that a negative relationship between first difference of log sp and the first difference of log LER with a low standard error and regression coefficient was also statistically significant at 5 percent. Another negative relationship was found between first difference of log DSP and LIIP. But the estimates of low standard error here implied less statistical noise in the estimates of regression coefficient. However, positive relationship was found between DSI and LGDP. The relationship is strong between them with low standard error and regression coefficient was also statistically significant at 5 percent.

From this table we can judge that the above model doesn't have multicollinearity. Because the guideline is most of the independent variables should be significant. So, we can say this particular model is significant. Then, if we check the R-squared value, it is high. And also the F – statistic is significant. That is all the independent variable jointly influences the dependent variable 'stock price'. Normally, R2 value estimates the fit of the model within the sample. But, F-statistic estimate the fit of the model within the population. Here, R2 and F value jointly says the model is fit exactly. And Adjusted R-squared value which is also an indicator of good fitting model indicating 83 percent variation in DSP can be explained by the combined change of all the explanatory variables by 100 percent. The unexplained portion in the Adjusted R-squared may due to some significant explanatory variables which were not incorporated or specification problem. Small Standard error in the regression model evidence of very small statistical noise in the regression estimation.

Tests for Residual Diagnostic:

Chart 1 - Histogram Normality Test



From the Chart and table, the value of Jarque-Bera is 1.84 and its p value is 0.39. From this value we can judge that we can't reject the null hypothesis i.e., the residuals are normally distributed. From the above result also, we can say the model is good. Then check the series correlation test.

The Presence of Serial correlation is examined by Breusch-Godfrey Serial Correlation LM Test.

Breusch-Godfrey Serial Correlation LM Test

F-statistic	2.506026	Probability	0.043384
Obs*R-squared	27.47330	Probability	0.070536

From the above serial correlation test, the observed R2 value is not significant. So, we can't reject the null hypothesis that, the model doesn't has serial correlation. This is also support the goodness of fit of the model.

The Presence of Heteroskedasticity is examined by White Heteroskedasticity Test.

White Heteroskedasticity Test

F-statistic	0.807439	Probability	0.613584
Obs*R-squared	7.863965	Probability	0.547911

The above analysis, the F-statistics and Obs*R-squared value along with their respected p-value indicate that the regression residuals don't have heteroskedasticity. So, we can't reject the null hypothesis that the model doesn't have heteroskedasticity problem. Finally this analysis also supports the goodness of fit of the model.

Table-4 presence the analysis of statistical significance of regression coefficient. In this test, we have assumed that all the three regression coefficients estimated earlier is equal to zero as null hypothesis. We have performed this significant test at 5 percent level.

Table 4: Statistical Significance Wald Test

Test Statistic	Value	Df	Probalility
F-statistic	3.258333	(3, 29)	0.0357
Chi-square	9.775000	3	0.0206
Null Hypothesis Summary			
Normalized Restriction (=0)		Value	Std.Err.
DLOG(GDP)		-0.000274	0.000158
DLOG(IIP)		0.005734	0.002089
DLOG(ER)		-0.000125	0.000594

From the above analysis all three variables reject our null hypothesis and also the combined F-statistic value is significant to reject null hypothesis that is all the regression coefficients are zero. That means our multiple regression estimates were statistically significant at 5 percent. And also it suggests that there is a long-run relationship among the variables.

Suggestions

The study suggests that Indian Stock Market is positively influenced by Gross Domestic Product and negatively influenced by Exchange rate and Index of Industrial Production. It can be used to predict the stock market price fluctuations. So investors in India obtain abnormal returns using historical data of stock prices, and macroeconomic indicators. This may enable the traders and investors to work out profitable strategy for trading or to take investment decision.

Conclusion

The function of stock markets in the economy is not only to raise capital but also to channel funds to the most profitable opportunities and to ensure that those funds are well utilized. Our multiple regressions to test result showed that Exchange Rate and Industrial Production Index are negatively related with stock prices indicating the fact that additional funds flow through Exchange Rate and Industrial Production Index increase the supply side while demand side remains unaffected. Static condition in the demand side in the security market puts downward pressure in the stock price. On the other had positive relationship is found between stock price and remaining independent variable i.e., Gross Domestic Product. In general sense, growth of gross domestic product which induce the demand side and ultimately give positive pressure in stock price. The test of Statistical Significance Wald test result also support the behavior of the macro variables and stock index and also it suggests that there is a long-run relationship among the variables.

References

Ajayi, R. A., and Mougoue, M. (1996). On the Dynamic Relation between Stock Prices and Exchange Rates. *Journal of Fiance, 19*, 193-207.

Chen, N., Roll, R., and Ross, S. A. (1986). Economic Forces and the Stock Market. *Journal of Business, 59*, 383-403.

Darrat, A. F. (1990). Stock Returns, Money, and Fiscal Deficits. *Journal of Finance and Quantitative Analysis, 25*(3), 387-398.

Dickey, D. A., and Fuller, W. A. (1979). Distribution of the Estimators for Autoregressive Time Series with a Unit Root. *Journal of American Statistical Association*, (74), 427-431.

Gujarati, D. N. (2004). *Basic Econometircs*. New Delhi, India: Tata McGraw Hill Publishng Company Ltd.

Mohammad, S. D., Hussain, A., & Ali, A. (2009). Impact of Macroeconomics Variables on Stock Prices: Emperical Evidance in Case of KSE (Karachi Stock Exchange). *European Journal of Scientific Research, 38*(1), 96-103.

Nath, G. C., and Samanta, G. P. (2003). Relationship between Exchange Rate and Stock Prices in India - An Empirical Analysis. *SSRN Electronic Journal*. doi:10.2139/ssrn.475823

Nishat (2004). Macro economics factors and Pakistan equity market. *Pakistan Development Review, 43*(4), 619-637.

Sharma, J. L., and Kennedy, R. E. (1977). A Comparative Analysis of Stock Price Behavior on the Bombay, London, and New York Stock Exchanges. *Journal of Financial and Quantitative Analysis, 17*, 391-413.