IS STOCK MARKET A LEADING BAROMETER? –An Empirical Approach (A Study in context of National Stock Exchange of India Limited)

Dr. Sheetal Kapoor

Ex- Senior Research Fellow
Faculty of Commerce
Banaras Hindu University, Varanasi

Abstract

Stock Markets are looked up as an effective barometer in depicting the mood or swings of the economic activities in any country. With economies being globalised, there exists every possibility of stock markets suffering setbacks and is evident from the random movement of stock market indices. The occurrences of toppling of an economy owing to recession, market crash etc has questioned the very prima facie existence of the stock market whether stock markets are wrongly connoted as "barometer" of the economy. The present paper tries to evaluate the predictive ability of the stock market in context of India. The present paper deploys Granger Causality as a tool to investigate the predictive ability of stock exchanges with respect to economic activities. The data for Gross Domestic Product (GDP) is imbied in the study as a cumulative representation of economic activity and the returns of S&P CNX Nifty are taken as a cumulative representation of stock exchanges in India. The empirical results pinpoint that stock prices Granger Cause the economic activities.

The Backdrop

Stock markets are held as an important component of a country's economic and financial set up as they are said to reflect the state of economic activities. It is said that changes in the stock market index is indicative of the concurrent changes in the economy and hence, are turned as "barometer" of an economy. Stock index are taken to be the benchmark both for investors as well as corporate entities. On one hand where movement in stock indices reflect investment avenues at the disposal of investors, on the other hand, indices also reflect the scope of business opportunities for the corporate players for their prospective ventures and business proposals. All and all, stock exchanges are upheld as the barometer of the economy.

Further, the growth and development of a country's stock market is said to have linkages with macro-economic variables; GDP being one of them. In an attempt to recognize the role played by stock exchanges, there exists different set of beliefs about the ability of stock exchanges

in predicting the future economic scenario. In this context, there exist two schools of thought. One school of experts is of the view that stock market activities are closely linked with economic activities represented by GDP. These experts hold that capital market is instrumental in accelerating economic growth leading to a hike in GDP and thus stock market indices are capable of forecasting the upcoming fate of economy. As per these set of experts, it is held that prediction of economic growth is possible on the basis of stock market. Further, these set of scholars argue that as stock market is forward looking and is indicative of future's earning potential and hence can be taken as the "barometer" of economy.

The underlying theory favoring the predictive ability of stock market is based on the "wealth effect". These experts hold that stock prices is a cumulative representation of both current and prospective market savings and is therefore an "able" predictive indicator of any economic set up.

Another set of thinkers are strictly against the that fact stock market prices reflect the state of economy. They hold that if the stock market would have been an intelligent and sharp predictor, there would not have been instances of recession in the world as a whole and in countries in particular. They quote stock market crashes as one of the incidents which pinpoint that stock markets are inefficient and at times, may generate false signals.

Owing to the lack of consensus on the issue of whether or not stock market is a true barometer of the economy, the study proceeds to unfurl the findings on empirical grounds.

Objective of The Study

The paper aims to evaluate whether or not stock prices are a leading indicator of economic activity. In general, one can find the existence of correlation between stock returns and GDP. But merely correlation figures are not sufficient enough to pinpoint if stock prices actually lead economic activity (as represented by GDP) or vice versa. The study proceeds to unearth the evidences related to the following queries:

1. Does stock market lead Indian economy in real terms?

2. Does stock market granger cause economy?

3. Does real economy granger cause the Indian Stock Market?

Several experts have studied the relationship between stock market and GDP but there are not many studies aiming to find out the Causality Effect in context of Indian Stock Market. With the aforesaid objectives, the study proceeds ahead.

Indian Stock Market- An Overview

Indian Stock Market is one of the most flourishing financial markets among the community of developing nations due to an exponential growth in the amount raised through its trading bourses. This can be attributed to the metamorphism owing to the reforms ever since 1991. With liberalization and globalization gaining momentum, Indian Stock Market has succeeded in drawing and maintaining the attention of global investors which has all the more accelerated the market turnover. For the year 2013, the Standard & Poors' Fact Book (2013) assigns India a rank of ninth in terms of market capitalization and seventeenth in context of total value traded in stock exchanges. Further, Indian listed companies accounted for 2.4 percent of the total market capitalization for 2012-13. If we look into the data of the past years, it is found that the trend has been far satisfying than astonishing with an increase in Turnover ratio from 65.40% in 2010 to 72.90% in 2011and market capitalization rose from 1015370 US $ million in 2011 to 1263335 US $ million in 2012.What is interesting to note that this increasing trend is not a day's magic rather had picked up from 2002-03 onwards. The trading volume got a hike from Rs 9689 billion (2002-03) to Rs 16209 (2003-04) with a year-on-year increase of 67.3%. The upsurge continued for the successive years where turnover in 2006-07 registered an increase of 21.4% as compared to 2005-06 and got further strengthened in 2007-08 with an increase of 76.8%.

Figure 1: Pattern of Quarterly Closing Returns of S&P CNX Nifty from 1991-92 to 2012-13
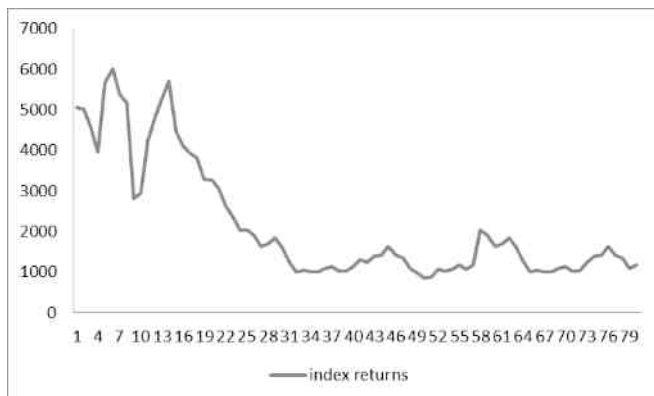
As evident from the above figure, it is seen that the quarterly returns of S&P CNX Nifty is randomly distributed without following any specific pattern. Even it can be said that the returns at National Stock Exchange of India Limited (NSEI) cannot be predicted. But this should not be taken that they are incapable of predicting other macro variables. Henceforth, the study proceeds with evaluating the predictive ability of stock exchange with respect to economic activities, represented by GDP.

GDP: The Story So Far

The increasing force of globalization occurring in the world has placed India in a position to enjoy a cutting edge global competition. India is one of the most progressively emerging markets in the world where private sector contributes for over 75 percent of GDP. This is not resultant out of sudden impetus rather an increase in GDP has close linkages with the new spirit of economic reforms aimed at stimulating the market and there by an increase in production. India ranks as the fourth largest economy in terms of purchasing power parity after the economic giants: USA, China and Japan. The real GDP growth rate in India was recorded at 6.6%, 10.6%, 7.2% for the years 2009, 2010 and 2011 respectively. If a glimpse is taken on the figures of India's GDP as a percentage of the world's GDP, it is found that India's GDP was just 2.45% of the total GDP of the world in the year 1980 and in the year 2010 (after two decades), the same got hiked to 5.48% (more than double), indicating that the production prospects of the country has improved over time. As far as composition of India's GDP is concerned, the proportions in which sectors contribute towards GDP are depicted as follows:

Figure 2: Comparison of Change in Share of Sectors towards India's GDP
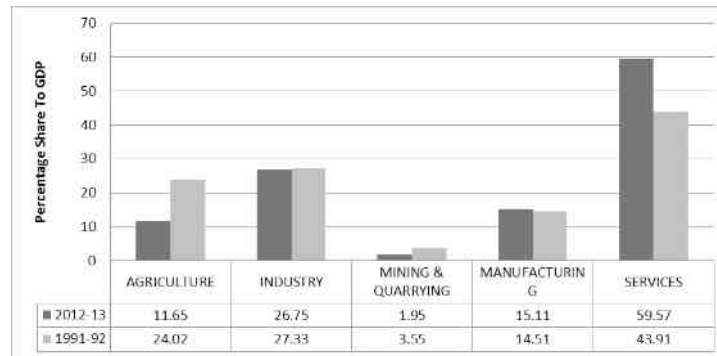
Data Source for the Graph: Planning Commission

Over a period of two decades, the tertiary sector popularly connoted as "service" sector was at a percentage of 43.91% while it was registered at 59.57% in 2012-13 whereas the contribution of agriculture sector towards GDP stood at Rs 328407 crores (1991-92) and was Rs 641363 crores (2012-13) there by registering a percentage share of 11.65 in the recently ended financial year 2012-13 in comparison to 24.02% in 1991-92. With the onset of post reform era, the manufacturing sector's share in GDP rose at a very marginal rate and was just 15.11% in contrast to 14.51%in 1991-92.

Hypotheses

The study proceeds to find out the justification for the following hypotheses:

H_0: The stock market does not lead economic activities (GDP).

H_1: The stock market leads economic activities (GDP).

The above stated hypotheses can also be stated in the following manner:

H_2: NSE does not Granger Cause economic activities (GDP).

H_3: NSE Granger Cause economic activities (GDP).

Data

The secondary data for the present study consists of quarterly percentage change in GDP values for the time spanning from 1991-92 to 2012-13. For the same time frame, the quarterly closing returns of S&P CNX Nifty are also accounted for in the study. In all, the study is based on a set of eighty observations to study the stock exchange's ability to represent and predict the level of economic activities. For measuring the movements in the stock exchanges, the returns of S&P CNX Nifty are chosen as one of the variables in the study. The choice of S&P CNX Nifty is made on the premise that it is a fair representative measure of Indian Stock Market as it is composite of fifty blue chip scrips; another variable of the study being the quarterly percentage change in GDP.

Methodology

In attempt to explore the predictive ability of stock markets, the study deploys Granger Causality out of the several econometric tools. In usual practice, Karl Pearson Coefficient of Correlation is taken as the statistical measure in explaining the degree of relationship existing between the given set of two variables but the fundamental principle underlying the usage of Karl Pearson Coefficient of Correlation is that there has to be theoretical evidence supporting the relationship between variable under study. With the use of Granger Causality, the very basic lacunae in estimating relationship between stock prices and GDP (by the method of correlation) is ruled as Granger Causality test in the initial stage itself answers whether or not the variables are explanatory in depicting a relation. In the preliminary stage, a trend line is fitted to the data set of GDP. Thereafter, correlation coefficient is computed between GDP and stock prices. In order to rule out the deficiencies of the usage of Correlation, the "Granger Causality" test as propounded by C.J. Granger (1969) is made use of in the study. But, before applying the Granger Causality test, it is pertinent to find out whether or not the data set is stationery. At this juncture, Augmented-Dickey Fuller test is applied to answer about the data being stationery or not. With the empirical results of ADF test, the study proceeds to analyze the predictive ability of Indian Stock Market in the environment of Vector Auto Regressive (VAR) is estimated with a suitable "lag". For making choice about the selection of "lag", Schwartz Criterion is used. As optimum "lag" comes out to be one, VAR is estimated using a lag length of one. The next section of the paper discloses the set of empirical results.

Empirical Results

This section presents empirical results relating to the statistical exercise undertaken to evaluate the predictive ability of the stock exchange in India. The correlation coefficient for the variables stock returns and GDP comes out to be r = 0.3863032057, indicating a positive yet less degree of correlation. However, this coefficient of correlation is inefficient in explaining the "cause & effect" relationship between stock returns and GDP.

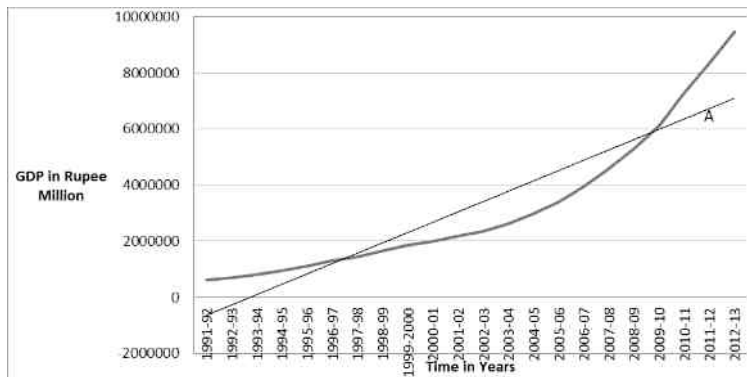**Figure 3: Fitting of Trend Line to the Values of GDP**

Figure 3 is a pictorial representation of the values of GDP and thereafter a trend line is fitted. Moreover, in an attempt to gather a deeper insight, the study goes into time series modeling. But, before applying Granger Causality as such, the ADF test is deployed to find out whether or not the data is stationary. Table 1 portrays the empirical results of ADF test for the stock returns' series.

Table 1 : Estimates of Augmented Dickey-Fuller test

		t-Statistic	Probability
Augmented Dickey-Fuller test statistic		-1.845923	0.3545
Test critical values:	1% level	-3.57131	
	5% level	-2.922449	
	10% level	-2.599224	

Source: Computed

As evident from the table, the probability comes out to be 0.3545 and is significant there by violating the assumption of normality. Further, the empirical result of Vector Auto Regressive (at a lag of 1) is presented in Table 2 as follows:

Table 2: Estimates of VAR Model at a lag of 1

	GDP	NSE
GDP(-1)	0.141641	-120.5947
	(-0.13832)	(-69.1828)
	[1.02401]	[-1.74313]
NSE(-1)	0.000211	0.963531
	(-9.10E-05)	(-0.04527)
	[2.33257]	[21.2829]
C	0.96737	234.0476
	(-0.2983)	(-149.2)
	[3.24293]	[1.56868]

Source: Computed
*Standard errors in ( ) & t-statistics in [ ]

However, the choice of lag is based on the basis of Schwartz criterion. Table 3 presents the results of Granger causality model as follows:

Table 3: Estimates of Granger Causality at a lag of 1

Null Hypothesis:	Observations	F-Statistic	Probability
NSE does not Granger Cause GDP	80	5.44089	0.02358
GDP does not Granger Cause NSE		3.03851	0.08722

Source: Computed

The probability of 0.02358 is not significant and there by the null hypothesis cannot be accepted. In such a case, the alternate hypothesis (H_1) is accepted meaning there NSE leads GDP whereas the probability of 0.08722 is significant or in other words, we can say that alternate hypothesis (H_3)is accepted implying that NSE granger cause GDP. Thus, the results indicate that there exists a causal relationship between stock returns and economic activities (represented by GDP). In addition to this, on one hand where stock market granger cause economy but economic activities does not granger cause stock market returns i.e. stock market as such. These results pinpoint that stock market is capable of predicting the mood of the economy and is well indicated in stock returns.

Conclusion

The current study is taken up to analyze and evaluate the existence of causal relationship between stock market and the economy. The study deployed quarterly percentage change in Gross Domestic Product to represent the quotient of economic activities while the quarterly average returns are symbolic of stock prices. The empirical results indicate that stock prices 'granger cause' economic activity and is said to lead the economy. This further suffices and portrays stock market as a leading indicator of economic set up as a whole. This propounding of the study in context of India is explanatory in the sense that as there occurs negative fluctuations in stock index, it lowers fund in the hand of production entities which in turn lowers final consumption. Such a lowered impulse of consumption is powerful in lowering the level of production activities and in turn GDP gets adversely affected. This clearly is a case of stock market leading the economy. Thus, causality is found to be inter-woven and the pattern/movement of stock returns can be taken as a predictor of the economy. A series of fluctuations in economic activity is preceded by movements in stock prices. It is on these lines, it can be concluded that stock market is a leading barometer.

References

Ahluwalia, Montek. 2000. "Economic Performance of States in the Post-Reforms Period." Economic and Political Weekly (May 6): 1637–48.

Annual report 2011-12, Ministry Of Statistics and Programme Implementation.

Arpan Sheth (2010), An Overview of Philanthropy in India, Bain & Company

Gujarati, D. N. (2003) Basic Econometrics, Fourth edition book, TATA Mcgraw-Hill,

New Delhi.

Economic Survey 2012-13 accessed through http://indiabudget.nic.in.

Engle, R. and Granger, C. (1987) 'Co integration and error correction: representation, estimation and testing', Econometrica, 55, 251-276

Granger. C.W. J. (1986), "Development in the Study of Co integrated Economic variables", Oxford Bulletin of Economics and Statistics, 48, 213-228.

Handbook of Statistics on the Indian Economy accessed through http://dbie.rbi.org.in

Nagaraj R. (2008), 'Indian's Recent Economic Growth: A Closer Look', Economic and Political Weekly, April 12.

Papola T.S. (2012), working Paper No. 2012/02 Structural Changes in the Indian Economy Emerging Patterns and Implications.

www.nseindia.com.

www.rbi.org.in › Publications.

http://indiabudget.nic.in

http://www.slideshare.net/shradha29/security-analysis-assignment-repaired.

planningcommission.nic.in/data.

http://www.undp.org/content/dam/india/docs/india_fact sheet_economic_n_hdi.pdf.

data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG.

http://stats.oecd.org/index.aspx?queryid=350.

http://www.tradingeconomics.com/india/gdp-growth-annual.