Chapter-2

REVIEW OF LITERATURE

Theoretical and empirical studies have been conducted about the relationship between stock market volatility and multiple macroeconomic variables. On the earliest studies, a research survey was conducted by the Famma (1970) on the behavior of stock market. Famma's theory suggested that stock markets are efficient which are reflected by the fundamental various macroeconomic variables. Famma defines an efficient market as a market in which stock prices reflect the available information and advises three level of efficient market: *Weak form efficienct market, Semi-strong efficient market and Strong efficient market*. Under weak form efficient market, investors have only information of past prices and returns of stock. Under semi-strong form efficient market, investors have all public available information of stocks. And finally strong form market provides all information weather it may be public or non-public. Famma's efficient capital market concludes that stock prices 'fully reflect' the all available information at any point of time. Mishra P.K. et al. (2009) examined the efficient market hypothesis in Indian stock market in context of global financial crisis. The study utilized the daily stock return data computed from daily closing stock prices from National Stock Exchange (NSE) and Bombay Stock Exchange (BSE). The study reached to conclusion that the weak form inefficiency of Indian stock market in selected period. The share prices may not be necessary reflected by true value of stocks. So company may be able to generate more capital with low true values while company can face difficulties to raise capital with high true values of stocks. S.K. Chaudhuri (1991) attempted to examine the short-run share price behavior by using the serial correlation test and the runs test to daily log price changes. The study concluded that the does not appear to support the hypothesis of weak form efficient market and investors are unlikely to benefit much by studying and utilizing historical data of stocks.

Pilinkus Donatas (2010) examined the macroeconomic indicators and their impact on stock performance in the short run and long run. The study used the macroeconomic indicators as GDP, inflation, short run interest rates, money supply, industrial production index, unemployment, Foreign direct investment, export, import and trade balance that were selected on the basis of connection with the most important processes of the country economy, frequency and accessibility,

and state of the country's economy and its peculiarity. This empirical study was conducted for the Baltic States: Lithuania, Latvia, and Estonia. The study utilized the monthly data from the January 2000 to December 2008. Vector Auto regression method was applied to investigate the short run relationship macroeconomic indicators and stock market index and Johansen co-integration was applied to determine the long run relationship between stock market indices and macroeconomic indicators. Granger Causality tests were employed to analyze the causality of macroeconomics indicators and stock market indices. The stationarity of data was tested using a unit root test or the ADF test which depicted that most of the macroeconomic variables are non-stationary at the level difference. The first level difference was applied to convert the available non-stationary data into stationary and later on in order to avoid more errors of statistical analysis for all data the second level difference was performed. The vector autoregressive test showed that the selected macroeconomic indicators in Lithuania, Latvia, and Estonia explain proportionately 37%, 39.9%, and 36.4% fluctuations of stock market index. Three macroeconomic indicators viz. gross domestic product, import and money supply have no significant influence on the stock market indices. Impact of other macroeconomic indicators on stock market index was varying depending on the countries. Some macroeconomic indicators viz. foreign direct investment (lagged by two periods), harmonized consumer price index (lagged by one period), short term interest rates (lagged by one periods), short term interest rates (lagged by two periods), money supply (lagged by one period), money supply (lagged by two period) were significantly only for Latvian stock market index. The results of Johansen multiple co-integration test revealed the statistical significance of almost all macroeconomic indicators. The unemployment macroeconomic indicator was not statistically significantly influenced to stock market index in especially in Lithuanian and Latvian co-integration equations. The trade balance and short term interest rates, macroeconomic indicators were not statistically significant in case of Estonian. The study concluded that the Johansen multiple co-integration reveals the long term relationship between the stock market indices and all macroeconomic indicators with reliability of 99% and the investors should consider the different impact macroeconomic indicators on stock market index in the Baltic States.

Maysami Ramin Cooper et al. (2004) carried out a research study on the long term equilibrium relationship between selected macroeconomic variables and Singapore stock market indices: the finance index, the property index, and the hotel index. This study hypothesized certain

relationships between short and long term interest rates, industrial production, price levels, exchange rate and money supply with the SES All-S Equities Finance, Property and Hotel Sector Indices. The SES All-S Equity Finance was an ambitious plan to develop Singapore into a national and international portfolio fund management centre. The SES all-S Equity Finance Index tracks the share price performance of all listed financial institutions on the SGX Main board. The SES ALL-S Equity Property Index follows the share price performance of all listed property companies on the SGX Main board including stocks of companies with residential exposure. The SES ALL-S Equity Hotel Index tracks the share price performance of the 17 listed hotels on the SGX Main board. The study utilized the monthly time-series data which obtained from the Public Access Time-Series system, an online service by the Singapore Department of Statistics. The SES ALL-S Equities indices figures were obtained from the Singapore Statistics published by the Singapore Department of Statistics. The study used the sample period from January 1989 to December 2001. Engle and Granger (1987) used in a multivariate context, and the Johansen's (1990) VECM method used to estimate co integrating vectors more efficiently. Unit roots test employed the Augmented Dickey-Fuller (ADF) and Phillips-Peron (PP) test to test the stationarity of variables in levels and first differences. The study concluded that the Singapore stock market and the SES ALL-S Equities Property Index made significant relationships with all macroeconomic variables while the SES ALL-S Equities Finance Index and SES ALL-S Equities Hotel index formed made significant relationships only with selected variables. Specially, the SES ALL-S Equities Finance Index was not significant with money supply and real economic activity, and in case of SES ALL-S Equities Hotel Index, money supply, and short and long term interest rates were insignificant. A co-integrating relationship between macroeconomic variables and stock prices revealed the efficient market hypothesis in doubt.

Gay, Robert D. (2008) investigated the effect of macroeconomic variables on stock market returns for four emerging economies viz. Brazil, Russia, India, and China (BRIC). The study took Exchange Rate and Oil Price as independent variables to examine the time-series relationship with dependent variable (stock market index prices). The study utilized the monthly time-series data for the period 1999:3 to 2006:06 for stock market price index, exchange rate, and oil price for the emerging countries: BRIC. It was used 90 observations per variables for each BRIC for a total of 1080 observations. The data of these variables were obtained from the Organization for Economic Cooperation and Development (OECD). The Box-Jenkins ARIMA model used to analyze the

time-series relationship between independent variables and dependent variable. The model used the moving-averages at the on-month MA(1), three-month MA(3), six-month MA(6), and twelve-month MA(12) for the lagged dependent of stock market price and the two intervening variables of exchange rate and oil price. This empirical research hypothesized a positive relationship between the exchange rate and the stock market price index because of other studies viz. Ma and Kao (1990) and Mukherjee and Naka (1995) suggested that currency depreciation has a favorable impact on the domestic stock market for an export-oriented economy. It hypothesized to be negative relationship the oil price and stock market price index. As energy prices rise, production, and input costs generally increase, than gross profits and cash flow will decrease. Therefore, investors will search for alternatives investments or cost-cutting activities. The Box-Jenkins time-series modeling process requires discrete time-series data that should be equally spaced over time with no missing values and stationary is the mean, variance, and auto covariance. The stationarity or non-stationarity of data was confirmed by using the Dickey-Fuller test with the subsequent transformations to stationarity using first-order differencing. First-order differencing removed any stochastic trend, with the variable series. The Durbin-Watson and the modified Ljung-Box Q-statistic were applied to test for autocorrelation. More emphasis had placed on the modified Q-statistic, as it does not inflate the autocorrelation under conditions of short series. The results of Durbin-Watson statistic showed no presence of autocorrelation for Brazil, Russia, and China at the on and five percent significance levels while it showed negative autocorrelation after the MA(1) level. The Ljung-Box modified Q-statistic showed the significance value not less than 0.05 for the BRICs except India at MA(3), MA(12) for each model. Further more on the India dataset using the Durbin-Watson statistic showed no autocorrelation at the MA(1) level for the significance values by using the exchange rate and oil prices respectively, but positive correlation for both variable at the MA(3), MA(6), and MA(12) levels. The study concluded that the empirical analysis of effect of macroeconomic variables of exchange rate and oil prices on the stock market price index revealed the insignificant relationship. This was also suggested as other international and domestic macroeconomic variables i.e. production, inflation, dividend yield, interest rates, trade balance, and rate structure may also play a significant role in the determination of stock price expectations.

A recent study was conducted by Oguzhan ydemir (2009) to examine the effect of macroeconomic variable on stock prices. The study analyzed the Bi-directional causal relationship between stock

prices and exchange rates for Turkey. The study utilized the national 100 stock price indices including services, financials, industrials and technology indices. The stock prices data obtained from electronic delivery system compiled by Central Bank of Republic of Turkey. The data were employed daily from February 23, 2001 to January 11, 2008. The study gave a reason of selecting this period that exchange rate regime was determined as floating in 2001. Augmented Dickey-Fuller (ADF) (1979), Phillips-Perron (PP) (1988), KPSS (1992) tests were employed in order to determine the integrated status of each series. The stationary status of series was detected by using these tests. The study recommended that Johansen's procedure should be employed to determine relationship when the series are in one order integration. In this procedure, trace and maximum statistics are computed.[1]If series are integrated different orders, we are not able to investigate the causality via error correction model. We should use Toda-Yomamoto (TY) method in this situation. Toda and Yomamato (1995) proposed in order to employ causality test modified Wald Test (MWALD).[2]The empirical results of study revealed that ADF and PP tests indicate integrationof order zero while KPPS test showed that this is not valid. The study selected the optimal lag length of the VAR by applying Toda and Yomamato (1995).The study gave concluding remarks that the results of empirical analysis indicate a positive bi-directional causal relationship between exchange rate and technology stock market indices. On the other hand, the study also revealed negative causal relationship between exchange rate and remaining stock indices: National 100, Services, financials, and Industrials indices.

Ahmed Shahid (2008) investigated the nature of the causal relationships between stock prices and the key macroeconomics variables representing real and financial sector of the Indian economy for the period March, 1995 to March, 2007. The study utilized the macroeconomic variables viz. Export earnings, Money Supply, Exchange Rate, Interest Rate, Index of Industrial Production, Foreign Direct Investment, NSE Nifty and BSE Sensex. The study employed the quarterly time-series data for the above mentioned period. Three unit root tests had been applied to test whether a series is stationary or not. Stationarity condition had been tested using Augmented Dickey Fuller (ADF) (1979, 1981) and Phillips-Perron (PP) (1988) tests. KPSS (1992) test had also been applied for robustness. ADF test makes a parametric correction in the original DF test for higher-order correlation by assuming that the series follows an AR (p) process. The ADF approach controls for

[1]Johansen (1988) and Johansen and Juselius (1990).
[2]Toda and Yomamato (1995).

higher-order correction by adding lagged difference terms of the dependent variable to the right-hand side of the regression. Phillips and Perron (1988) adopts a nonparametric method for controlling higher-order serial correlation in a series. The test regression for the Phillips-Perron test is the AR (1) while the ADF test corrects for higher order serial correlation by adding lagged differenced terms on the right-hand side, the PP test makes a correction to the t-statistic of the coefficient from the AR (1) regression to account for the serial correlation. Johansen's co-integration test had been applied to explore long-run relationship between Indian stock markets and macroeconomic variables such as exports earnings, exchange rate, Index of industrial production, foreign direct investment, interest rate and money supply. The number of lags in co-integration analysis chose on the basis of Akaike Information Criteria. The results of Johansen's co-integration test indicated that NSE Nifty-Index of Industrial production and Money Supply co-integrated in the long run as the results vary depending on the varying assumption about trend and intercept. However, NSE Nifty was co integrated in the long run under all assumptions. In case of Exchange Rate- NSE Nifty, Export- NSE Nifty, and Interest Rate- NSE Nifty, there was no evidence of co-integration. Similarly, test was employed between macroeconomic variables and Sensex. The results remain the same except relationship between FDI and Sensex as reported. Toda and Yamamto Granger causality test was also applied to test the long run direction of causality between macroeconomic variables and NSE Nifty. The results showed no causal relationship between exchange rate-NSE Nifty, interest rate-NSE Nifty, and IIP-NSE Nifty. The study revealed that export performance did not have any effect on NSE Nifty while NSE Nifty affected export flows from India. However, FDI-NSE Nifty had causal relationship. Similarly Toda and Yamamto test was conducted to test the causality between BSE Sensex and above referred macroeconomic variables. The result revealed that exchange rate did not influence the BSE Sensex while movement in BSE Sensex cause changed in exchange rate. It was also found that Index of Industrial Production did not influence on Sensex movement while movement in BSE Sensex had significant effect on IIP.

Atsuyuki Naka et al. (1998) investigated the performance of the Indian stock market with the effect of selected macroeconomic variables. This study focused on the long-term relationship between BSE stock price and certain macroeconomic variables vis-à-vis industrial production, inflation, money stock, and interest rate. Industrial production represented the Industrial Production Index in this study. Inflation was measured by consumer price index (CPI) and M1 was used as a money

stock. Eventually, interest rate represented the money market rate in the Bombay interbank market in this study. All data sets were obtained from the International Financial Statistics (IFS).[3] Similar sets of variables had been used by Chen, et al. (1986), Darrat and Mukherjee (1987), Hamao (1988), Brown and Otsuki (1988), Darrat (1990), Lee (1992), and Mukerjee and Naka (1995). All variables except interest rate were transformed into natural logs. Logged values of the nominal stock index, output, inflation, and money stock were denoted as BSE, y, P, M, while interest rates were denoted as R. The study employed the Vector Error Correction Method that was developed by Johansen (1991). The VECM procedure involves the following steps.[4] First, an appropriate lag (k) was selected such that the residuals from each equation were not autocorrelated. Second, the eigenvectors were estimated based on the full information maximum likelihood method proposed by Johansen (1991). Third, the order of co-integration (r) was determined by using test statistics (trace test). And final step, summarizing long-run responses of nominal stock prices to selected macroeconomic variables. The study used the raw data over the sample period spanning the first quarter of 1960 through the fourth quarter of 1995. The empirical study used the 140 observation for each variable and 700 observation for sample study. The empirical results revealed that these five variables were co-integrated and three long-term equilibrium relationships exist among these variables. First one was long-run monetary neutrality, second one related interest rate to output, and the third related nominal stock prices to nominal GDP and a downward trend. The analysis of results indicated that industrial production is the largest positive determinant of Indian stock prices, while inflation is the largest negative determinant. In addition, the study found a modest downward trend in Indian stock prices that could not be explained by variables, which were publicly available.

Muhammad Naeem (2002) examined the short run and long run relationship between stock prices and exchange rates for four South Asian Countries including Pakistan, India, Bangladesh and Sri-Lanka. The study employed monthly data on for South Asian countries for the period January 1994 to December 2000. The study employed major stock indices of these countries and exchange rates between the currencies of these countries with the U.S. dollar (Rs/$ rate for India). The data on South Asian stock market indices were obtained from KSE 100 index for Pakistan, BSE 200 index for India, CSE Sensitive index for Sri-Lanka and DSE all share price index for Bangladesh and exchange rates. All the indices were dominated in local currency units. Johansen (1988, 1991) and

[3]IFS code 62, 66c, 64, 34, and 60b, with 1985 as a base year.
[4] For details of the methodology description, see Johansen (1995).

Johansen and Juselius (1990) bivariate co-integration tests were employed to examine the long-rsun relationship between stock prices and exchange rates. Augmented Dickey Fuller (ADF) and Phillips-Perron tests were applied to find out the order of integration of both the series. The tests were performed for the entire sample on both the levels and first differences of the stock indices and exchange rates series. ADF test revealed that the null hypothesis of a unit root in the level series cannot be rejected in the stock prices and exchange series of Pakistan, India, and Sri-Lanka but cannot rejected for both stock price and exchange rate series of Bangladesh. The empirical result revealed that no found the long-run and short-run association between stock prices and exchange rates for Pakistan and India. It was also found no short-run relationship between selected variables for Bangladesh and Sri-Lanka. However, there was seemed to be a bi-directional long-run causality relationship between these variables for Bangladesh and Sri-Lanka. The results of this study suggested that at least short-run relationship does not exist between stock prices and exchange rates in South Asian Countries.

Humpe, A., et al. (2009) have tried to relate the macroeconomic variables with long term stock market movement in US and Japan within the framework of a standard discounted value model by using monthly data over 40 years. A co integration analysis has been applied to model the long term relationship between the industrial production, the consumer price index, money supply, long term interest rates and stock prices in US and Japan. Various techniques like Arbitrage Pricing Theory (APT), Present Value Model (PVM), and Granger (1986) and Engle Granger (1987) methods have been discussed in this study to relate the said variables. Further, the authors have used PVM and Co-integration methodology to find out if the same model can explain US and Japanese stock market while yielding consistent factor loadings. In the US data, they found that a single co-integration vector between stock prices, industrial production, inflation and the long-term interest rate. The coefficients from the co-integrating vector, normalized on the stock price, thus implying that the US stock prices were influenced, positively by industrial on the production and negatively by inflation and the long-term interest rate, but at the same money supply was found to have an insignificant influence over the stock price. In the Japanese data, two co-integrating vectors were found. One of which normalized on the stock price thus providing that stock price are positively related to industrial production and negatively related to the money supply. The second vector normalized on industrial production, that industrial production was negatively related to the interest rate and the rate of inflation. The reason for this difference in the behavior

of both the stock markets could be Japan's slump after 1990 and its consequent liquidity trap of the late 1990s and the early twenty-first century. But whatever the outcome the authors have found a significant relation between the macroeconomic variables and stock market in the long-term.

Hussain, F. (2006) examined the causal relationship between stock price and real sector variables of Pakistan economy by using annual data from 1959-60 to 2004-05. The study divided the data set into two parts- pre and post liberalization and studied the causal relationship between these variables by using various econometric techniques like ECM, Engle-Granger co integrating regressions and Augmented Dickey Fuller (ADF) Unit Root tests. In all the cases lag lengths are decided on the basis of Minimum Final Prediction Error and Akaike Information Criteria (AIC). By using data set and methodology, this analysis has indicated the presence of a long run relationship between the stock prices and real sector variables. Regarding the causal part, he has founded unilateral causation from real sector to stock prices. This implies that stock exchanges in Pakistan are still not that developed to influence the real sector of the economy and also can not be taken as leading indicator of the economic activity. It implies that Government can use real sector variable to influence the stock market.

Kanakaraj, A. et al. (2008) analyzed the trend of stock prices and various macroeconomic variables between the time periods 1997-2007. They tried to explore upon and answer that if the recent stock market boom can be explained in the terms of macroeconomic fundamentals and have concluded by recommending a strong between the two. As per this empirical study at given time period, Indian stock market and macro economy is going on boom phase. The market capitalization in the stock market was 95% in March 2007, which is a clear evidence of strong positive attitude amongst the investors and a thriving business environment. Eventually, the risk in the stock market has fallen and real returns have shown positive upward trend mainly since July 2003 onwards. In addition, it has shown 30.5% growth in IPOs in the year 2006. It was all about story of stock market, similarly, real economy part also tells about the growth story of economy. The GDP growth in India has grown consistently at high levels touching the highest average from 2003-04 to 2006-07 since independence, and is strongly supported by manufacturing sector growth and services sector growth. The Gross Domestic Investment and Gross Domestic Saving as percentage of GDP have also grown extremely remaining under control most of the time. Due to all this there was robust growth in India's external sector with Foreign Exchange Reserves increasing steadily.

Authors have justified the role of macroeconomic fundamentals in the formation of stock prices with the help of EMH and other econometric tools and have concluded that Indian economy is undergoing semi-strong form of EMH. The study has found a similar line of trend followed by the business cycle and the stock market. The study employed the simple and restricted regression model to find out the relation between the real economic variables and the one time period lagged stock market growth, inflation, interest rate and bond return. The study concluded that the stock market can be called a leading indicator of an economy mainly because of its predictive capacity of real economic growth components. The study has shown that investors' rational expectations in the stock market predict real GDP. Further, the sector wise analysis showed that the stock market is a significant predictor of manufacturing sector growth, services sector growth, investment growth and index of industrial production and IIP manufacturing. Regarding the control variables, inflation being one of them, the authors have observed that it does not influence the real macroeconomic growth variables significantly, and another control variable- bond return or cost of capital in terms of 5- years Government Bond showed a negative correlation with the real GDP growth and other many macroeconomic variables. Thus, concluding that expectation about future macroeconomic growth is significantly explained through rising stock market returns.

Emrah Ozbay (2009) investigated the causal relationship between stock returns and macroeconomic factors such as interest rate, inflation, exchange rates, money supply and real economy. The study employed the monthly data covering the period of 1998:01 to 2008:12 from Turkey. The study utilized the Industrial Production Index (IPI), Current Deficit to Gross Domestic Production (CDGDP), Foreign Transaction and price index (Producer Price Index and Consumer Price Index) to proxy the goods market, money supply (M1, M2, M2Y, Central Bank Money) and nominal interest rate (Overnight interest rate, Treasury bill interest rate) to proxy the money market, currency basket to proxy the exchange rate, and Istanbul Stock Exchange National-30 Index to proxy stock market. Simple interest weighted average overnight was used for overnight interest rate. The data for selected variables such as M1, M2, M2y, IPI, PPI, CD-GDP, Central Bank Money were extracted from Central Bank of the Republic of Turkey's Electronically Data Dissemination System (EDDS). Treasury bill interest rate data obtained from the website of Turkish Treasury and daily closing values of the ISE National-30 Price Index were obtained from Istanbul Stock Exchange database. The closing prices of the last trading day in each month were determined as monthly stock prices of the ISE-30. The study employed the Granger Causality test

(1969) to analyze the causal relationship between selected macroeconomic factors and the ISE-30 Price Index. The hypothesis test was used in order to answer whether the macroeconomics variables cause the stock returns as Ho: The macroeconomics variables do not Granger cause the ISE 30 Index and H1: The macroeconomics variables do Granger cause the ISE 30 Index. ADF test was performed on the variables in levels to determine the presence of unit roots. The results of the ADF test has reported the first difference of the variables have a unit root in the level specification. Dickey fuller test statistics for less than the 5% critical value do not reject the null of non-staitonarity. In other words, the first difference variables are stationarity series. According to the results of study, there were low positive relationships between stock prices and M1, M2, Central Bank Money. Nevertheless, the relationship between stock returns and money supply was found insignificant. The results of the study indicated that there is no relationship between stock returns and money supply in Turkey case. The correlation coefficients between stock returns and consumer price index were respectively 0.04 and 0.09. The results indicated that there is no relationship between stock returns and inflation in Turkey case. The stock returns and industrial production have a low positive relationship, while stock returns and the current deficit to gross domestic production ratio have a low negative relationship of 0.09 and -0.06 respectively. The study indicated the negative but insignificant relationship between stock returns and exchange rate and negative relationship between stock returns and interest rates.

Kaur Deepinder (2009) has been made an attempt to analyze the correlation and causality between stock market and macroeconomic variables in India. In this study, the major objective was set to find the correlation and causal relationship between selected variables. The study employed the annual data from 1950-51 to 2007-08 for the certain variables vis-à-vis Gross Domestic Product (GDP), SENSEX (Sensitive Index of BSE), per capita GNP (Gross National Product), Bank Rate, Foreign Exchange Reserves, Wholesale Price Index (WPI), Domestic Saving, Gross Domestic Capital Formation (GDCF), and monetary ratio M3 (Broad Money).The major source of data of all the above macroeconomic variables is Handbook of Statistics on Indian Economy maintained by Reserve Bank of India (RBI) and for Sensex is International Financial Statistics maintained by International Monetary Fund on-line data source. The study applied the Engle-Granger Causality test in order to fulfill the research objectives. The Unit Root Test was performed to test the stationarity of the variables. The Augmented Dickey fuller (ADF) (1979) and Phillips-Perron (PP) (1988) tests were employed to test unit roots of variables. If the variables don’t have unit root

problem then Granger causality can be estimated. The ADF test has been concluded that all variables are stationary. The Phillips-Perron Statistic showed that the all variable are stationary at either 1% or 5% significance level. The Engle-Granger (1969) causality model was used to test the causality between the stock market and macroeconomic variables. The results revealed that Sensex has no causal relationship with the Gross Domestic Capital Formation (GDCF). Implying that all the fixed net capital added to the economy every year neither influences nor is influenced by the Sensex. On the other hand, Sensex has found to Granger cause with bank rate. In case of domestic savings, it also has no causal relationship with Sensex. Another significant point came out here that Sensex does not Ganger cause GDP but it do Granger cause per capita GNP. The study concluded that stock market boom is not much supported by the real economic fundamental and the Granger causality has come out just amongst a few real economic variables. Moreover, the effect of real economic variables is almost nil on stock market index in case of causality.

Gagan Deep Sharma and Mandeep Mahendru (2010) analyzed the long term relationship between BSE and macroeconomic variables vis-à-vis, change in exchange rate, foreign exchange reserves, inflation rate, and gold price. Authors set the some objectives for analysis such as to explore the major macroeconomic variables, to study the effect these macroeconomic variables on stock price, and to study their correlation between stock price and macroeconomic variables. The analysis was conducted by using weekly data for the period spans form January 2008 to January 2009. The data consist of stock data (BSE Sensex), macroeconomic factors such as inflation rate, foreign exchange reserve, exchange rate and gold price. The study used only secondary data for empirical analysis. The gold price data was obtained from NASDAQ. BSE stock returns were obtained from Bombay Stock Exchange. Inflation data and foreign exchange reserve data were collected from Reserve Bank of India. Exchange rate data was collected from the Federal Reserve Statistical Release. The study performed the multiple regression equation model (Galton, 1877) in order to investigate the relationship among these factors. The empirical results revealed that exchange rate and gold price to affect the entire BSE Stock price. There was 88.9% correlation of exchange rate with stock price and 90.2% correlation of gold price with stock price. Independent variables except inflation rate and foreign exchange reserve have a significant relation with stock price.

Alexandra Horobet, and Sorin Dumitrescu (2008) investigated the causal relationship between monetary, financial and real macroeconomic variables for the Central and Eastern Europe: the

Czech Republic, Hungary, Poland and Romania. The study considered the goods markets, the money market, and the securities market for empirical analysis. The goods market variables considered the gross domestic product (GDP) and the consumer price index (CPI). The market variables were the money supply (M1) and the real interest rate (12-month rate adjusted for inflation). While the foreign exchange market was represented by the real effective exchange rate. The security market variable considered the stock price index. Authors hypothesized a positive relation between stock prices and GDP as well as stock prices and nominal exchange rate and negative relationship nominal interest rate and stock prices. The empirical analysis has been carried out on quarterly data for the period January 1998 to September 2007. A VAR analysis was employed to explain the dynamic relationship between monetary, financial, and real macroeconomic variables. All variables, except the stock index, the interest rates and the foreign exchange rate, were seasonally adjusted. The data of macroeconomic variables were obtained from the Eurostat and OECD database. The Hungarian, Polish and Czech stock indices series were obtained from the MSCI historical database. The Romanian stock market index data extracted from the Romanian Stock Exchange website. The study used three traditional unit root tests, namely the Augmented Dickey-Fuller (ADF) test, the Phillips-Perron (PP) test and the Kwiatkowski, Phillips, Schmidt, and Shin (KPSS) test to investigate the stationarity of data. The study employed the econometric methods co-integration, Granger causality tests and Innovation accounting techniques in order to investigate the causal relationship between stock prices and macroeconomic variables. The results of empirical analysis showed that the consumer price index is positively related to stock prices, while the real exchange rate revealed an opposite behavior except Romania. The real interest rates were positively correlated with stock prices in the Czech Republic, Poland and Romania. The result of the impulse response analysis pointed out a number of similarities among the four countries: first, shocks in macroeconomic variables generate innovations in stock prices mainly over the short-run; second, the responses of stock prices to shocks in themselves are negative are negative over the first quarter and positive, except for Romania, after four quarter; third, shocks in gross domestic product determine positive responses of stock prices in all four countries.

Anokye M. Adam and George Twendeboah (2008) examined the impact of macroeconomic variables on stock prices in Ghana. The study utilized the independent variables vis-à-vis Exchange rate, Inward FDI, Oil price, Interest rate, and Inflation. These variables were selected

on the basis of Miller and Modigliani (1961) Dividend Discount Model which provides a useful framework for understanding the relationship between stock prices, the stream of future cash flows from the stock, and the discount rate. The study used the quarterly data from 1911:1 to 2007:4 for the empirical analysis. All the macroeconomic variables data except Inward FDI and oil prices were extracted from International Financial Statistics (IFS) database. The data on Inward FDI were obtained from UNCTAD while the data DSI were obtained from Data bank group Research. The oil prices were obtained from the World Bank Economic Outlook data base. The FDI data were obtained in annually form and interpolated by the method proposed by Goldstein and Khan (1976). The rate of inflation was measured by consumer price index. The interest rate represents the 91-day Treasury bill rate. The study utilized Nominal Effective Real Exchange Rae for the exchange rate. The study employed the Johansen (1991)and (1995) maximum likelihood procedure, which is based on a vector error correction model (VECM). The Augmented Dickey-Fuller test and Alkaike Information Criterion used to test the unit root of the data series. The result indicated that all the data were non-stationarity at level but become stationary after first differencing at 5% significant level. The next step involved the estimating the model and determining the rank of p to find the number of co-integrating relations in our model. The study concluded that the Ghana stock market formed significant relationships with the macroeconomic variables identified. And it was also cleared from the study that will give hint to whether there exist opportunities for profit from the inefficiencies of stock market mechanisms in the transfer of information between stock market and the macro economy. The presence of a co integrating relationship between macroeconomic variables and stock prices brings the conclusions of the efficient market hypothesis in doubt.

Ray et al. (2003) attempted to explain the linkage between real macroeconomic variables and the capital market in the post-reform era in Indian context. The study aimed to detect the relationship between Sensitive Index (Sensex) Bombay Stock Exchange and real economic variables vis-à-vis Interest Rate, Inflation, Money Supply, Index of Industrial Production, Fiscal Deficit of Central Government Foreign Institutional Investment in Capital Market, and Exchange Rate. Authors selected these variables following the theory of Chen, Roll & Ross (1986) on what they described as “simple and intuitive financial theory”. The study employed the monthly average data from April 19994 to March 2003 because all the variables data were available for this period. The study has taken Index of Industrial Production as the proxy for national output, which reflects the

industrial growth in India. SBI Prime Lending Rate (SBIIPLR) has taken as proxy for the interest rate and Broad money supply (M3) as proxy money supply. The study utilized the Wholesale Price Index with base year 1993-94 to account the rate inflation. The Rs./$ exchange rate (ER) used to check the linkage with the external world. The study employed the Vector Autoregrassion (VAR) and Artificial Neural Networks (ANN) to investigate the relationship between real economic variables and stock prices.The results of the study revealed that certain variables like exchange rate, interest rate, index of industrial production, inflation, money supply have consistent relationship with stock market evidence from both models. However, a few variables like fiscal deficit and foreign institutional investment in the capital market have shown very negative influence on the stock market. Finally, the study concluded that a single variable like money supply or the inflation has a dominant influence with stock market for brief period December 1998- February2000 and February 2000 to September 2001 respectively.

Johann Burgstaller (2002) examined whether stock returns are a leading indicator for real macroeconomic developments or not in Austria, Japan and the USA. The study focused on the concept of stock market efficiency, whether or not stock market of Austria, Japan and the USA are efficient with respect to information as well as whether or not returns on these stock markets adjust to deviations from long-term equilibrium in goods and financial markets. The study employed the quarterly time-series data on eight variables for the period 1976 to 2000 for the empirical analysis. Domestic real activity was represented by industrial production and retail sales. The financial and international variables are the three months interest rate, the effective exchange rate, the inflation rate, an index reflecting oil price developments, a stock price index and OECD industrial production. The inflation rates (in %) were calculated from the respective CPI. The Real Effective Exchange Rate used as the exchange rate. The study employed the vector autoregression (VAR) and corresponding vector error correction model (VECM) to examine to relationship between the financial, domestic & international macroeconomic variables and stock market. The study also used the Granger Causality tests to examine to predictive content of stock prices for real macroeconomic development as well as the issue of stock market efficiency. The results of Granger causality tests, impulse response functions and variance composition lead to the conclusion that the data do not support the hypothesis of perfect stock market efficiency. It also concluded that past U.S. and Japanese stock returns also are Granger causal for current one. Variance composition results suggested that U.S. stock market valuations are comparatively

exogenous. The study also founded that real appreciations of the Yen precede increases of real Japanese stock returns. Granger causality was reverse for the USA as rising stock returns signed a real appreciation of the dollar.

Brad Comincioli (1996) examined whether or not stock market is a leading indicator of economic activity. The time-series analysis and the notion of Granger causality were used to estimate relationships between stock prices and the economy. The study took sample data cover the period 1970:1Q-1994: IIIQ and containing a total of 99 quarterly observations. The study took a poor's Composite Index of 500 stocks (SP 500) because it is fair representative measure of the stock market. Other one reason for choosing that was a "value-weighted" as opposed to a "price-weighted" index. The variable used to measure change in real economic activity is the quarterly percent change of real Gross Domestic Product (GDP). In using real value of GDP, the year 1987 was used as the base year for the implicit price deflator. The study used the Granger Causality test for testing statistical causality between stock prices and the real economic activity. The empirical results of study found a causal relationship between the stock market and the real economic activity. Furthermore, it was found that statistically significant lag lengths between fluctuations in the stock market and changes in the real economy are relatively short. In conclusion, the results of this study revealed that the stock market does help to predict the future economy.