CHAPTER- I
INTRODUCTION AND DESIGN OF THE STUDY

1.1 INTRODUCTION

Over the last two decades, the emergence of globalization, structural changes, and advanced information technology undertaken by emerging markets has integrated the world financial market. The integrated global market helps to make economic ties and transmit shocks between countries. It has created a surge in the mind of the investors across the world to mobilize funds and channels those funds into productive investment. Therefore, stock market is used as a platform to collect savings from different pools and convert them into fruitful investment.

The stock market by nature is a highly volatile market and sensitive to any changes appeared in a country. A highly volatile market makes the investor to take away the investment from the stock market and to invest in securities where investment becomes safe with the minimum rate of return. Therefore, the policy makers and financial analysts always concentrate on studying the dynamic behavior of stock market prices. It is highly important for the investors to understand the nature of stock markets and evaluate the factors driving the stock market returns. An efficient and stable stock market is identified as a trigger that helps to attract domestic and foreign investment for sustainable growth and development of an economy.

The nature and broad complexity of stock market motivate researchers and investors to know the driving factors behind the volatility of share prices. Therefore, a single factor model was developed by Sharpe (1964) and named as Capital Asset Pricing Model (CAPM). The single factor model has considered market risk alone as the driving factor influencing the stock market. A replacement model was developed by Ross (1976) and considered multiple factors as the explanatory factors of stock market. The model is named as Arbitrage Pricing Theory (APT) that assumes that the return on asset is a linear function of various macroeconomic factors or the indices changes according to the changes in the factors. Chen et al. (1986) found that changes in aggregate production, inflation, short-term interest rates, the maturity risk premium, default risk premium are the relevant economic factors. There are number of theories developed and evaluated the prices of risky securities but still an important
research that has been used as the basis for all the new research is Capital Asset Pricing Model (CAPM).

1.2 CAPITAL ASSET PRICING MODEL

The Capital Asset Pricing model, one of the fundamental model in finance, was introduced by Jack Treynor (1961, 1962) developed independently by William F. Sharpe (1964), John Linter (1965) and Jan Mossin (1966) based on the work done by Nobel Laureate Harry Markowitz. Markowitz model gave a birth to mean variance portfolio effects and it assumed investors are risk averse when choosing security among portfolio structure. As the model indicates, investors choose mean variance efficient portfolio return, and maximize expected return for given variance. Thus, Markowitz approach is often called as a mean variance model. Based on the Markowitz model, the CAPM model studied the interdependence between risk and return of a security. The capital Asset pricing model is depicted in the figure 1.1.

![Figure 1.1: Capital Asset Pricing Model](image)

In finance, the capital asset pricing model (CAPM) is used to determine a theoretically appropriate required rate of return of an asset, if that asset is to be added to an already well-diversified portfolio, given that asset's non-diversifiable risk. The model considers the security sensitivity to non-diversifiable risk which is otherwise
known as systematic or market risk represented by beta (β) and the expected return is measured as risk free asset. From an individual security perspective, by making use of a security market line and relation to expected return and non-diversifiable risk, it is shown that the market must price individual securities in relation to their security risk class. The basic assumptions of CAPM are that investors had identical information and identical preferences and hold identical portfolio in the market.

The CAPM gives the security appropriate required return (discount rate) which is the rate of future cash flows produced by the security should be discounted given the security’s relative riskiness. Betas exceeding one signify more than average indicates that the security known as risky and beta below one indicate lower than average risk. A more risky stock will have a higher beta and will be discounted at a higher rate with less sensitive stocks having lower betas and being discounted at a lower rate. The CAPM is consistent with intuition of investors requiring a higher return for holding a more risky security. Since beta reflects security specific sensitivity to non-diversifiable market risk, the market as a whole, by definition has a beta of one. Stock market indices are frequently used as local proxies for the market and by definition have a beta of one. The main disadvantage of the model is that it explains that market portfolio is the only systematic risk that influences the stock returns. Therefore the CAPM model is called as single factor model. In order to overcome the problems of CAPM, Arbitrage Pricing Theory (APT) was emerged and has now become influential in the pricing of security assets.

1.3 ARBITRAGE PRICING THEORY (APT)

Arbitrage pricing theory proposed by the economist Stephen Ross, (1976) holds that the expected return of a financial asset can be modeled as a linear function of various macroeconomic factors or theoretical market indices, where sensitivity to changes in each factor is represented by a factor- specific beta coefficient. The model-derived rate of return will then be used to price the asset correctly, but if the price diverges from the calculated rate of return the process of arbitrage bring it back to line. If APT holds, then the uncertain return of an asset ‘y’ is a linear relationship among ‘n’ macroeconomic factors.
The factor model is expressed as follows. 
\[
E(R_i) = \alpha + \beta_{i1}F_1 + \beta_{i2}F_2 + \beta_{i3}F_3 + \ldots + \beta_{ik}F_k + \epsilon_i 
\]
Where

- \( \alpha \) is a constant for asset \( j \)
- \( F_k \) is a systematic factor
- \( \beta_{ij} \) is the sensitivity of the \( j \)th asset to factor \( k \), also called factor loading,
- and \( \epsilon_i \) is the white noise error term

The APT along with the CAPM is one of two influential theories on asset pricing. The APT allows for an explanatory model of asset returns and assumes each investor will hold a unique portfolio with its own particular array of beta as opposed to the identical market portfolio. In some ways, the CAPM can be considered a special case of the APT in that the securities market line represents a single-factor model of the asset price, where beta is exposed to changes in value of the market. Additionally, the APT can be seen as a supply-side model, since its beta coefficients reflect the sensitivity of the underlying asset to economic factors. Thus, factor shocks would cause structural changes in assets expected returns, or in the case of stocks, in firm’s profitability. On the other side; the capital asset pricing model is considered a demand side model.

Following the development of APT theory, the impact of macroeconomic factors on stock returns has attracted attention from the academicians, financial analyst and policy makers across the world. Though these models were tested by many researchers, Fama (1981) contributed significantly in this regard and documented a strong positive relationship between common stock returns with the macroeconomic variables consisting of capital expenditure, industrial production, real Gross National Product, Money supply and lagged inflation and interest rate.

1.4 STATEMENT OF THE PROBLEM

For sustainable growth and development of an economy, Stock market plays a vital role by augmenting the investment from foreign investors and gives a positive signal to domestic investors to upkeep the investment for a longer period of time. In the 1990s, most stock markets experienced considerable growth and turbulence due to
structural changes and the liberalized policy adopted by many emerging countries. The synchronization among international stock market shows that the emergence of liberalization brings the world into a single market. The rationale behind the study is to examine the relationship between macroeconomic variables and selected developed and emerging stock markets.

1.5 SIGNIFICANCE OF THE STUDY

A well functioning stock market contributes to development of an economy by boosting savings and allowing for more efficient allocation of resources. A market which is highly sensitive to macroeconomic variables is highly a volatile market and makes the investors to go away from investing in the market. Evaluating the relationship between macroeconomic variables and stock return is of crucial concern for an economy. Therefore a need for in-depth and intensive evaluation of the variables influencing on international stock market returns becomes essential to predict the outcome of the volatility of stock market returns.

1.6 NEED FOR THE STUDY

Stock market analysis is the foremost thing which is mandatory prior to any financial investment. Market analysis refers to the entire procedure of monitoring and analyzing the stocks and thereby calculating the future trends. With the stock prices having the tendency to rise and fall, the whole scenario becomes volatile. However, since a defined pattern is followed by the stocks an insight can be procured subsequent to a thorough analysis. The fundamental analysis is the one is primarily used for the evaluation and estimation of the returns from stocks. The importance of stock markets analysis holds more value for the beginners who are new to the field of stock trading. Hence, an attempt has been made to analyze the impact of macroeconomic fundamentals on stock market returns of the chosen countries.

1.7 OBJECTIVES OF THE STUDY

This study is undertaken with the following objectives.

1. To identify and select the key macroeconomic variables influencing the stock market returns.
2. To examine the short run and long run linkages between the selected key macroeconomic variables and stock market returns.
3. To find out the model that fits the data and select the model that explains the cause and effect relationship between the key macroeconomic variables and stock market returns.

4. To find out the direction of causal relationship between stock market returns and macroeconomic variables.

5. To study the response of stock market returns to shocks given to the macroeconomic variables influencing the stock market returns significantly.

6. To find out if the developed stock market returns are synchronized with the emerging stock market returns.

1.8 SCOPE OF THE STUDY

The present study covers both the developed and emerging stock markets as classified by the MSCI world index. The stock exchanges have been selected based on the market capitalization measured by the world exchange federation as on January 2015. Among the developed stock markets, the top two stock exchanges such as NYSE stock exchange and the London stock exchange have been selected for analysis.

From the emerging stock markets, the top two stock exchanges such as Shanghai stock exchange and Bombay stock exchange have been selected. In order to analyze the association between macroeconomic variables and stock market return, the composite index of stock exchanges are selected. Based on the report generated by world exchange federation, the stock exchanges selected for the study are listed below in the table 1.1.

<table>
<thead>
<tr>
<th>Stock Exchanges</th>
<th>Rank</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York Stock Exchange</td>
<td>First</td>
<td>United States of America</td>
</tr>
<tr>
<td>London Stock Exchange</td>
<td>Third</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>Shanghai Stock Exchange</td>
<td>China</td>
<td>China</td>
</tr>
<tr>
<td>Bombay Stock Exchange</td>
<td>Eleventh</td>
<td>India</td>
</tr>
</tbody>
</table>

Source: World Federation of Exchanges
The economic reforms introduced in emerging markets such as India and China attracted worldwide attention and developed as the Investment icon in the world. The similar spurt is not experienced by any other countries that implemented economic reforms in the same period. The ultimate goal of any investor is to earn return from the investment by restructuring the portfolio investment and diversifying the risk into investing on various assets. This study gives a vivid picture on the possibility of unforeseen linkage between stock markets and macroeconomic variables. This study will make the investor to understand the interdependence between financial markets and respective macroeconomic variables.

1.9. RESEARCH DESIGN

Research design is the basic plan which guides the researcher to collect relevant information economically for the objective framed for the study. The present study is analytical and empirical in nature. The prime objective of the study is to investigate the relationship between key macroeconomic variables and selected international stock market returns.

1.10 RESEARCH QUESTIONS

1. Do the key macroeconomic variables selected in this study have long-run equilibrium relationships with the stock market returns?
2. Does the volatility of these macroeconomic variables influence the stock market return volatility?
3. How does the stock market returns respond to the shock given to the macroeconomic variables?
4. Do the key macroeconomic variables have causal relationships during the sample period considered for the study? If so, what is the direction of the causality between the stock market returns and selected key macroeconomic variables?
5. Do the developed stock market returns share long run equilibrium relationship with the emerging stock market returns?

1.11 SOURCES OF DATA

The study is fully based on the secondary data. The data related to macroeconomic variables were collected from the website of Organization for Economic Co-operation and Development (OECD). The global variables used for the
study is collected UNCTAD (United Nations Conference on Trade and Development) statistics Data base. Stock market prices of chosen countries were collected from the Yahoo historical monthly prices and India’s Bombay Stock Exchange index were collected from BSE website. Data base of Reserve Bank of India, Home Ministry of Government of India, Ministry of Statistics and Programme Implementation were used to collect Industrial production index of India and Weighted average call money rate. Few unavailable data were collected from the national website of the country selected for the study.

1.12 SAMPLE SELECTION

The intention of the study is to examine the relationship between stock market returns and key macroeconomic variables. The researcher has used non-probability - purposive or judgment sampling method. The USA’s New York stock exchange and the UK’s London stock exchange are selected from developed markets whereas; China’s Shanghai stock exchange and India’s Bombay Stock exchange are selected from emerging stock markets. The international stock indices selected from the top stock exchanges in terms of market capitalization for the study are given in the following table 1.2.

<table>
<thead>
<tr>
<th>No</th>
<th>Country</th>
<th>Stock Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>USA</td>
<td>NYSE Composite Index</td>
</tr>
<tr>
<td>2</td>
<td>UK</td>
<td>FTSE 100</td>
</tr>
<tr>
<td>3</td>
<td>China</td>
<td>SSE Composite Index</td>
</tr>
<tr>
<td>4</td>
<td>India</td>
<td>SENSEX(Sensitive Index)</td>
</tr>
</tbody>
</table>

1.13 PERIOD OF THE STUDY

The data used in the study consists of monthly time series observations covering the period of April -1991 to December 2014.

1.14 TOOLS OF ANALYSIS

With the available data, the following tools have been applied to find out the linkage between key macroeconomic variables and stock market returns.
1.14.1 Jarque-Bera Test
In order to analyze the normality of the data, Jarque bera test is applied. It helps to find out whether the chosen macroeconomic variables and stock returns in the time series are normally distributed or not

1.14.2 Augmented Dickey Fuller Test
The Augmented Dickey fuller test is applied on the level data to transform the non-stationary into stationary data. This is the most popular and accepted model of stationary analysis.

1.14.3 Phillip Perron Test
In the ADF test, it is assumed that the error terms \( (U_t) \) are independent and have constant variances. Also, the lag length \( P \) in the regression equation is rather arbitrary. To overcome this problem, Phillips-Perron has been applied to transform the non-stationary series to stationary series.

1.14.4 Co-Integration Test
Co-integration test is applied to know whether there is any long run equilibrium relationship between key macroeconomic variables and stock returns. Two broad approaches were developed so as to test the presence of co-integration between two or more non-stationary series. The models are Enger and Granger (1987) and Johansen-Juselius(1988) co-integration tests.

1.14.5 Johansen- Juselius Multivariate Co-integration Test
In order to find out the co integration or long run relationship between stock market returns and selected macroeconomic variables, Johansen- Juselius test multivariate co integration test has been applied. Generally, it is assumed that most of the time series data are non- stationary but sometimes, linear combination of two or more series will become stationary. It means that the mean and variance will not be time -dependent. This method does not consider the variables as the dependent and independent variables but it considers the entire variables as endogenous variable.

1.14.6 Vector Error Correction Model
The VECM model is applied to find out the long run and short run causal relationship between dependent and independent variables. In the short run, there may
be disequilibrium between variables, but the proportion of the disequilibrium in the short run is corrected in the long run. The vector error correction model helps to find out the rate at which the disequilibrium between the variables are getting corrected.

1.14.7 Regression Analysis

It is a method for analyzing the association between dependent and one or more independent variables. In this analysis, the linear regression model has been applied to find out the linkage between stock market returns and macroeconomic variables.

1.14.8 Ljung Box Auto Correlation Test

The Ljung Box test is a type of statistical test of whether any of a group of autocorrelations of a time series is different from zero. This test is used to find the overall randomness based on a number of lags instead of testing randomness at each distinct lag.

1.14.9 Arch – Lagrange Multiplier Test - Heteroskedasticity Test

The ordinary least square method assumes homoskedasticity or equal error variance. If the assumptions go wrong, it is not wise to apply regression method to investigate the relationship among variables. Therefore, it is highly important to detect if the stock returns and key macroeconomic variables employed in the study are suffering from the issue of heteroskedasticity. In order to detect heteroskedasticity, ARCH Lagrange Multiplier test is utilized.

1.14.10 ARCH (1,1), GARCH(1,1)

Auto Regressive Conditional Heteroskedasticity is utilized to check if the stock returns and macroeconomic variables suffer from the problem of unequal variance. Heteroskedasticity means the variance of residuals are non constant over a period of time or non constant variance. There are two forms of Heteroskedasticity such as conditional and unconditional. Conditional Heteroskedasticity measures the non-constant variance when future periods of high and low volatility cannot be identified. But, unconditional heteroskedasticity can be used to measure future period of high and low volatility. Existence of heteroskedasticity is a major concern in the application of regression analysis as it robust the standard error. When the value of standard error goes up; the ‘t’statistics will come down. As there is an inverse
relationship exists between ‘t’statistics and ‘p’value, when the ‘t’ statistics go down, the value ‘p’ will go up. Ultimately, it shows that there is no significant relationship between variables. Therefore, the regression equation produces nonsense or spurious regression results. To overcome the problem of Heteroskedasticity, a new model named the Generalized Autoregressive Conditional Heteroskedasticity (ARCH effect) was developed by Bollerslev (1986) and this model measures the time-varying variance associated with the time series data. Hence, to capture the effect of the time-varying variance of selected international stock returns, the GARCH (1,1) model has been applied on the stock market returns and macroeconomic variables.

1.14.11 TGARCH (Threshold Generalized Autoregressive Conditional Heteroskedasticity)

In general, the GARCH model assumes that positive and negative error terms have a symmetric effect on the volatility of the stock market returns. But this assumption is often violated. In general, bad news creates more impact than the good news. Therefore, the TGARCH model has been applied to find out the leverage effects.

1.14.12 EGARCH (Exponential Generalised Autoregressive Conditional Heteroskedasticity)

To examine the asymmetry effect of stock market volatility, the EGARCH model has been selected and applied on the stock market returns and macroeconomic variables.

1.14.13 Akaike Information Criteria

AIC is the model selection criteria used to select the model that is best fit and to compare the models for forecasting purposes. AIC selects the model based on the value of AIC where it is smaller.

1.14.14 Pair Wise - Granger Causality Test

The application of causality was developed by Granger (1969) and Slim (1972) and applied in economics. The standard Granger causality test is used to forecast the changes of one variable by the lagged value of another variable. It means that lagged value of variable x is significantly explaining the latest value variable Y. It is resulted that Y is said to be granger caused by another variable
1.14.15 Impulse Response Function
An impulse response function traces the effect of one standard error shocks given to the significant variable influencing the stock market returns. The response of stock market returns for shocks given to the most significant variables is studied and examined with the help of impulse response function.

1.15 FRAMEWORK OF HYPOTHESIS
The objectives set forth are based on the following assumptions.

1.15.1 Stationarity Test
H0: There is no unit root in the time series data
H1: There is a unit root in the time series data

1.15.2 Co-Integration Test
H0: There is no co-integration between macroeconomic variables and stock market returns
H1: There is a co-integration between macroeconomic variables and stock market returns.

1.15.3 Auto Correlation Test
H0: There is no autocorrelation and partial autocorrelation in the time series data
H1: There is autocorrelation and partial autocorrelation in the time series data

1.15.4 Heteroskedasticity Test
H0: There is no ARCH effect or Homoskedasticity in the residuals.
H1: There is ARCH effect or Heteroskedasticity in the residuals.

1.15.5 ARCH/GARCH/Regression Model
H0: There is no relationship between macroeconomic variables and selected international stock market returns,
H1: There is a relationship between macroeconomic variables and selected international stock market returns.

1.16 SELECTION OF MACROECONOMIC VARIABLES
(Tangitprom.N, 2012) selected few macroeconomic variables based on some criteria such as variables concerning general economic conditions, variables involving
the interest rate and monetary policy, variables reflecting price levels and variables related to international activities. The same criteria are used to select macroeconomic variables along with the few global variables. The domestic variables such as Inflation and industrial production were selected to represent general economic conditions, interest rate and money supply were selected based on the monetary policy and the exchange rate are selected to represent the international economic activities. The global variables such as world stock market returns, world commodity prices and world oil prices are selected to represent the global variables. All the selected variables have been transformed and given in the following table 1.3.

TABLE 1.3
TRANSFORMATION OF VARIABLES

<table>
<thead>
<tr>
<th>Variables</th>
<th>Type of Variable</th>
<th>Symbol</th>
<th>Transformation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stock Returns</td>
<td>Dependent Variable</td>
<td>SMR</td>
<td>SMR = Ln SMR&lt;sub&gt;t&lt;/sub&gt; - Ln SMR&lt;sub&gt;t-1&lt;/sub&gt;</td>
</tr>
<tr>
<td>Inflation</td>
<td>Independent Variable</td>
<td>LIF</td>
<td>LIF = Ln IF&lt;sub&gt;t&lt;/sub&gt; - Ln IF&lt;sub&gt;t-1&lt;/sub&gt;</td>
</tr>
<tr>
<td>Interest rate</td>
<td>Independent Variable</td>
<td>LIR</td>
<td>LIR = Ln IR&lt;sub&gt;t&lt;/sub&gt; - Ln IR&lt;sub&gt;t-1&lt;/sub&gt;</td>
</tr>
<tr>
<td>Money Supply</td>
<td>Independent Variable</td>
<td>LMS</td>
<td>LMS = Ln M3&lt;sub&gt;t&lt;/sub&gt; - Ln M3&lt;sub&gt;t-1&lt;/sub&gt;</td>
</tr>
<tr>
<td>Exchange rate</td>
<td>Independent Variable</td>
<td>LER</td>
<td>LER = Ln ER&lt;sub&gt;t&lt;/sub&gt; - Ln ER&lt;sub&gt;t-1&lt;/sub&gt;</td>
</tr>
<tr>
<td>Industrial Production</td>
<td>Independent Variable</td>
<td>LIP</td>
<td>LIP = Ln IP&lt;sub&gt;t&lt;/sub&gt; - Ln IP&lt;sub&gt;t-1&lt;/sub&gt;</td>
</tr>
<tr>
<td>World Stock Return</td>
<td>Independent Variable</td>
<td>WSR</td>
<td>WSR = Ln WSR&lt;sub&gt;t&lt;/sub&gt; - Ln WSR&lt;sub&gt;t-1&lt;/sub&gt;</td>
</tr>
<tr>
<td>Commodity Prices</td>
<td>Independent Variable</td>
<td>LCP</td>
<td>LCP = Ln CPI&lt;sub&gt;t&lt;/sub&gt; - Ln CPI&lt;sub&gt;t-1&lt;/sub&gt;</td>
</tr>
<tr>
<td>Oil Prices</td>
<td>Independent Variable</td>
<td>LOP</td>
<td>LOP = Ln OPI&lt;sub&gt;t&lt;/sub&gt; - Ln OPI&lt;sub&gt;t-1&lt;/sub&gt;</td>
</tr>
</tbody>
</table>

1.17 STOCK MARKET RETURNS

The Arbitrage Pricing theory reveals that there is interdependence between macroeconomic factors and stock market returns. The empirical evidence from the previous research shows that there is a global integration among the financial markets after the emergence of liberalization and globalization in the world. Stock market returns depicts the pulse of the economic condition of an economy and the ups and downs of the stock price movements reveals the volatility of the market. Monthly average closing price of all stock indices had been taken and transformed in the log form to calculate the logarithmic returns using the following formula.

\[ \text{SMR} = \text{Ln SMR}<sub>t</sub> - \text{Ln SMR}<sub>t-1</sub> \]
1.18 INFLATION

A high inflation reduces the purchasing power of each unit of currency that spent to purchase goods and services and raises the disposable income than investment. Therefore, investment in stock market may considerably be reduced and inflation rate might influence the stock market returns negatively. As the result of increasing inflation, monetary authorities will try to increase the risk free rate to control over the rising inflation. Though, there is an ongoing debate on the impact of inflation on stock returns, the influence depends on various factors and different time period. Hence the inflation is an unpredictable factor. It has given contradictory results in various studies. Fama (1981) concluded that there is a positive relationship between inflation and stock returns, Mukherjee and Naga (1995) found there is negative relationship between stock returns and inflation. It is expected from the study that there is a negative relationship between stock returns and inflation. Consumer price index is a proxy used for inflation. The consumer price index considered for the study is given below.

\[ LIF = \ln IF_t - \ln IF_{t-1} \]

1.19 INTEREST RATE

Investors use interest rate as the barometer for earning profit or facing loss from investment in an efficient capital market. A rise or fall in interest rate influence the investment decision of the investors as they consider the interest is the minimum rate of return or the risk free rate of return expected from investment. An increase or decrease in interest rate obviously has a negative or positive impact on stock returns as investors motivated to change the portfolio structure in favor of or against the bonds. Therefore, there is an Inverse relationship exists between interest rate and stock market returns. Fifield, Power, Sinclair (2002) found that there is a significant relationship exists between stock market prices and interest rate, whereas, Monjurul Quadir (2012) found that there is insignificant relationship between stock market prices and interest rate. US and UK Treasury bill rate is used as proxy for interest rate, whereas, weighted average call money rate and Minimum discount rate are used for India and China respectively.

\[ LIR = \ln IR_t - \ln IR_{t-1} \]
1.20 MONEY SUPPLY (M3)

Money supply represented by M3 is the broad money supply index including money with public, demand deposit of banks and demand deposit of Apex bank. The downturn of stock market price is substantially influenced by the liquidity of money supply. A high liquidity of money supply strengthens the stock market price of an economy. On the other hand, decrease in money supply tends to decreases the stock market returns. Fama (1981) documented that there is a negative relationship between inflation and stock market prices because of increasing money supply tends to increase the discount rate and lowers the stock market prices. On contrary to the result of Fama, Mukherjee & Naka (1995) found that there is a positive relationship between money supply and stock market returns as a result of increasing cash flows increases the investment in stock market. Therefore, it is expected from the study that there is a reciprocal relationship exists between money supply and stock market returns. The money supply has been transformed using the following formula.

\[ LMS = \ln M3_t - \ln M3_{t-1} \]

1.21 EXCHANGE RATE

Depreciation of domestic currency against foreign currencies creates a favorable pitch for the growth of an economy by attracting more portfolio investment from foreign investors and augmenting exports to foreign countries. Hence the capital flows from foreign countries would increase the stock returns and it creates a positive impact on stock market prices. On the other hand, Appreciation of domestic currency takes away the foreign capital flows and makes imports cheaper and it creates negative impact on stock market prices. Therefore the stock market prices are highly sensitive to the foreign exchange rate of a country and the impact of exchange rate and stock prices has conceived more importance in the literature. Okoli, Margaret Nnenna, found that there is a significant and positive impact on Nigeria stock market volatility. On contrary to Nnenna, Hasan Mohammed El-Nader1 & Ahmad Diab Alraimony(2012) found negative relationship between real exchange rate and Amman Stock market returns. The relationship between exchange rate and stock market prices produced conflicting results and the magnitude of relationship differs from country to country. The exchange rate used for the study are Indian Rupee (INR) against per US dollar ($), US dollar against per Pound Sterling (£) UK Pound
Sterling(£) against Per US dollar($) and Chinese Yen(¥) against Per US dollar($). The transformation of exchange rate is done using the following equation.

\[ \text{LER} = \ln \text{ER}_t - \ln \text{ER}_{t-1} \]

1.22 INDUSTRIAL PRODUCTION

Index of industrial production is a proxy used for real economic output of the economy. An increase in economic activity increases the profit of companies and in turn it raises the stock prices to go up. Chen et al, (1986) produced evidence that current stock prices are positively influenced to future level of economic activity. Therefore, increases in industrial production positively impact the stock prices and decreases in industrial production make an opposite effect on stock prices. It is expected from the study that there is a positive relationship exists between industrial production and Stock returns. Industrial production is transformed by using the following equation.

\[ \text{LIP} = \ln \text{IP}_t - \ln \text{IP}_{t-1} \]

1.23 WORLD STOCK MARKET RETURNS

The integration among the countries in the decade of 1990s became a major challenge for investors to understand the domestic stock market to the external shocks arising out of global equity markets volatility. The MSCI world index is used as a proxy to represent the global equity prices. This variable is included in the study to assess the impact of world stock market returns on domestic stock market returns. The following equation is applied to calculate world stock market returns.

\[ \text{WSR} = \ln \text{SR}_t - \ln \text{SR}_{t-1} \]

1.24 COMMODITY PRICE INDEX

Commodity prices plays an imperative role in explaining stock returns and an increase in commodity prices pushes the stock prices to go up. S.G.M. Fifield, D.M. Power, and C.D. Sinclair (2002) considered commodity price index as global factors explaining Emerging Stock Market returns. Buyuksahin et al. (2010) documented that commodity market and stock market move together in one direction at times of extreme events. The transformation of commodity price index is done using the following equation.

\[ \text{LCP} = \ln \text{LCP}_t - \ln \text{LCP}_{t-1} \]
1.25 OIL PRICE INDEX

As India is one of the oil importing country, the upward or downward movement in oil prices directly influences the stock returns. The oil price volatility tends to create uncertainty in the stock market and induce a decrease or an increase in share prices directly. Thus, an increase in oil prices induces the inflation of a country. The increasing inflation due to higher oil prices creates negative impact on the stock returns of a country. Vanita Tripathi and Ritika Seth (2014) documented that there is a negative relationship between oil prices and stock returns. The following equation is applied to transform oil price index.

\[
\text{LOP} = \ln \text{LOP}_1 - \ln \text{LOP}_{t-1}
\]

1.26 LIMITATIONS OF THE STUDY

1. The study is fully based on the secondary data that was published in various websites such as OECD, Yahoo finance, UNCTAD statistics and other national websites. The limitations of the financial statement published by the organization will also be applicable to this study.

2. Few key macroeconomic variables are selected based on the empirical evidence produced by the previous literature. The study has not considered other variables such as Crisis, war, tsunami, other natural calamities that make abrupt change in the stock market.

3. It is worth noting that Gross Domestic Product was not included in the analysis because monthly data for this variable were not available. Industrial production index has been used as a proxy to represent the real activity of the economy. Inclusion of this GDP would be a significant addition to future research to account for the impact of real activity and the services sector of the economy.

1.27 FRAMEWORK OF THE DISSERTATION

The dissertation is segregated into six chapters based on the information analyzed in each chapter.

CHAPTER I

Chapter one introduces the topic and includes the need and significance of the study. It gives background information about the problem, research methodology, and outline of the study.
CHAPTER II

It gives an overview about the previous literature done on the related topic and includes the references of the collection of literature that was used as a base for identifying the problem.

CHAPTER III

It explains the theoretical framework and subject matter of the research that is used as a support for the selection of the problem and facilitates to compare the analysis part with the theoretical part.

CHAPTER IV

The fourth chapter deals with the econometric tools and techniques applied and the empirical results of stationary and co-integration analysis. Moreover, the outcomes of the stationary test, co integration test and other statistical tools applied are compared with the framed hypothesis and interpreted in this chapter.

CHAPTER V

This chapter investigates the impact of macroeconomic aggregates on stock market returns using Regression, symmetric and Asymmetric GARCH Models such as ARCH/GARCH, TARCH, and E-GARCH. Model selection Criteria is used to select the model that is appropriate to explain the stock market returns using the chosen macroeconomic variables.

CHAPTER VI

Findings of the analysis are summarized in this chapter. Based on the findings of the study, empirical suggestions are given in the chapter. Furthermore, this chapter provides the conclusion of the study and scope for future research implication.
REFERENCES

