

CHAPTER-5

**Summary of the Findings,
Limitations
and Scope of the Future
Study**

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5.1 Summary of Findings:

In general, macroeconomic variables capture the business cycles of an economy and reflect behaviour of the economy with or without any interaction with the world. On the other hand, stock market is considered by the scholars as ‘a mirror of the economy’ a la Galbraith (1954). Stock market deals with the ‘share of claims on firm’s assets’. It is a popular belief that, stock prices largely depend and fluctuate sharply to the changes in any economic, financial or political events and news. Scholars also argue that the prices of the individual shares change due to lots of shocks transmitted by several expected and unexpected financial, micro and macro-economic variables shaped by the economic policy measures. Again, the impacts of the variables in the formation of prices are not equal. The influence may be immediate or gradual in nature. Portfolio theory posits that the investors can diversify the risk save the systematic component of the risk. This systematic risk is argued to be the major source of investment risk as the unsystematic one is diversifiable, can be reduced if not completely. Hence, an extra reward, may be long-term in nature, is required to be ushered whenever the particular price of the share is influenced by the systematic financial or economic variables. Till date, conclusive answer about which events influence all the assets is not yet resolved. Chen, Roll and Ross (1986), are in the opinion that the comovements of asset prices suggest the presence of underlying exogenous influences, but which economic variables, if any, are responsible have not yet determined. Moreover, the influence or the relationship varies across the economies, specially in developing and underdeveloped economies (Wangbangpo and Sharma, 2002).

Behaviour of stock market in relatively less developed and developing economies is unclear (Kwon et al. 1997). Investigations in Indian context, the economy which is a good 'subject' of

study for various economic reasons and events, seem to have virtually escaped the proper and wide attention of researchers. There are few studies that rely on short horizon (Bilson, Brailsford and Hooper 2000; Pethe et al. 2000), some have applied questionable methodology (Pethe et al. 2000) while others have ignored the most dynamic and colourful period of Indian economy in course of their study (Darrat and Mukharjee, 1987; Naka et al. 2001).

In spite of the endless debate by the scholars from finance and economics, our knowledge about asset market behaviour is still unclear. The relation between stock markets and the macroeconomic variables is not entirely in one direction. According to the diversification argument of capital market theory, general economic state variables will influence the pricing of large stock market aggregates and the systematic variables that affect the economic activities and influence dividends are also expected to influence stock market returns (Chen, Roll and Ross, 1986). Hence, we know little about how our stock market responds to the changes in the macroeconomic variables and whether it behaves systematically or the change in the asset prices is driven by some other factors which are unrelated to fundamentals.

In sum, the theories fail to give a definite answer about 'what variables influence stock prices' and 'what are the directions of the influence, if any'. Do the changes in macroeconomic variables and stock price movements are inextricably entwined? Any answer, unlikely to change, is important in the sense that it may help individual or institutional fund managers to estimate, monitor and manage financial risk, price derivatives and find more clear solutions to the problem of optimal portfolio solution. From the policy planners, it may help to develop a better understanding of the potential macroeconomic determinants of systematic financial risk (Cochrane 1999; Dopke et al. 2006). A good number of researches suggest that the issue is important and warrants settlement for sound policy prescriptions and to feed the need of the investors.

Shift in the regimes in India attracted us to study the issue in depth and objectively considering a long time horizon. The objectives of the study, very specifically, are: i)to assess the relationship amongst the select macroeconomic variables and stock market, ii) to assess the influence, if any , of the past values of the sample macroeconomic variables on the future values of stock market, iii) to assess the future flexibility of the sample Indian macroeconomic variables and the stock market and iv) to analyse the results of integration , if any, amongst the stock market and select macro-variables in the pre-liberalization and post-liberalization period.This study framed five hypotheses on the basis of the objectives and attempted to attain the objectives by using some widely used but robust statistical and econometric tools on the data collected for 54 years (1966-2019) to assess the cross-regime relationship between the stock market and select macroeconomic variables.

In this empirical analysis, we have transformed all the time series data under our study taking natural logarithm and carried the entire process with log-level data. We studied the relationship dividing the entire time period under the scrutiny (1966-2019) in to three sub-periods-(i) January, 1966- April,1991 -the pre-liberalisation period, and under post liberalisation period- (ii) December,1995- November, 2009 (old) and (iii) December, 2009-December, 2019(recent). The stationarity tests for all the variables under all the three periods suggest that all the variables are significantly integrated to order one, i.e, I(1)) at at least five percent level of significance. With the I(1) time series process we assessed the relationship between the select macroeconomic variables and stock market based on the methodology suggested by Johansen and Juselius (1990, 1994).

In our six-variable system, in the pre liberalisation period, the deterministic term found to be present is Model-1, that is, there is ‘no data trend at level, and intercept with no trend’ is present in the cointegrating space of the variables and one cointegrating rank is found to be statistically significant in the cointegrating relationship. Under the post-liberalisation period the deterministic term found to be present is Model-2, that is, there is ‘a linear trend at level,

and intercept with no trend' is present in the cointegrating space of the variables. Two and three cointegrating rank is found to be statistically significant in the cointegrating relationships under the 'old' post-liberalisation period and 'recent' post-liberalisation period, respectively.

Results of the cointegration test show the presence of significant long-term stable relationship amongst the macroeconomic variables and stock market across the regimes. Stock market and index for industrial production are found to be significantly present in the core of the co-integration space across the periods. YTB in the pre and post liberalisation (recent) period and WPI only in the post liberalisation (old) period are found to be significantly present in the core of the co - integration space. There is no serial or autocorrelation found in this study for the respective periods. On the basis of the results of all the tests to study the stability of the system, we found the systems under all the periods are stable. According to the absolute figures, the speed of adjustment of the IIP and FX is more in the pre-liberalisation period, IIP, YLGB and SNX in old-post-liberalisation period and YTB and WPI in recent - post-liberalisation period. Levels of cointegrating relation of the select macroeconomic variables and stock market found in this study do not disappoint the policy planners as it is marked by ups and downs within a band around the critical levels of 95 percent with a tendency to integrate more in the recent period. All these findings reject the first and second null hypothesis and suggest strong long-term stable link between the stock market and select macroeconomic variables.

Results of the Granger causality test indicate that the past and current values of index of industrial production cannot influence the present and future values of stock market indices and vice versa in the pre liberalization period. But the condition found improved in the post liberalization era, IIP Granger causes SNX in the 'old' and SNX Granger causes IIP in the 'recent' post liberalization period. The significance of the bi-directional causality observed between FX and SNX has improved from 4 -7% to 1% save the old post liberalization period.

Like the IIP, the past and current values of WPI and YTB cannot Influence the present and future values of stock market indices and vice versa. But in the post liberalization period (Old), causality flows from SNX to WPI, YTB to SNX and WPI to SNX and SNX to YTB in the ‘recent’ post liberalization period. In the pre liberalisation period, the current and past values of YLGB be can influence the present and future values of stock prices and vice versa, but, in the post liberalization period, no connection has been found between YLGB and SNX. Taking the variables jointly, the pastand current values of all the variables can influence the present and the future values of SNX and vice versa in the post liberalization period, whereas the causality flows only from SNX to all only in the pre liberalisation period. The results clearly reject the third hypothesis that, “past values of none of the select Indian macroeconomic variables under the study influence the future values of stock market and vice versa.

In the pre liberalization period, we found only YLGB, IIP and WPI are efficiently transmitting their shocks to stock market, but, in the post liberalization period we found all macroeconomic variables are efficiently transmitting the shock to the stock market and vice versa.According to the results obtained in forecast error variance decomposition, stock market found to be flexible and more integrated in the initial phase of liberalization than the pre liberalization period. But, the stock market gradually turned more rigid and became almost unexplainable by the select macroeconomic variables in the ‘recent’ post liberalization period. Unlike stock market, FX turned to be more flexible in the post liberalization period giving more scope to select macroeconomic variables to integrate.All these findings reject the fourth null hypothesis that, all the select macroeconomic variables and Indian stock market would remain rigid over the future periods of time.

This study found some unique variations in the relation, causality and flexibility in the select variables and stock market in India. In brief, we found India remained as an import-oriented

country across the regimes, the very special feature of a typical developing economy but the variable foreign exchange rate (FX, represented by nominal rupee/dollar rate) , in the long term stable relationship, has lost its significance in the post-liberalisation period. Significance of whole sale price index gradually increased in the early stage of liberalisation but, again remained marginally insignificant in the recent phase of liberalisation. Unlike the pre-liberalisation period, the relation between long term government bond and stock market turned positive indicating the impacts of the shift in the policy measures which virtually supports the arguments of neo-liberalists that, higher interest rate (equilibrium) attracts more savings resulting more investment which allows investors to earn more return in the market.'Cross-asset contagion' effect (Johansson, 2010) cannot be denied as a huge rally in the stock prices, which is absent in pre-liberalisation period, may have attracted capital from other sectors including the long term government bonds. Thus, shift in funds and neglects of the bonds market by the investors may have reduced the prices of the bonds causing increase in yields resulting a positive movement with stock market. This may be one of the possible reasons for the positive relationship observed in the post liberalization period (both 'old' and 'recent' periods) in India.Results of the Granger causality test indicate that the past and current values of index of industrial production cannot influence the present and future values of stock market indices and vice versa in the pre liberalization period. But the condition found improved in the post liberalization era, IIP Granger causes SNX in the 'old' and SNX Granger causes IIP in the 'recent' post liberalization period. The significance of the bidirectional causality observed between FX and SNX has improved from 4 -7% to 1% save the old post liberalization period. Like the IIP, the past and current values of WPI and YTB cannot Influence the present and future values of stock market indices and vice versa. But in the post liberalization period (old), causality flows from SNX to WPI, YTB to SNX and WPI to SNX and SNX to YTB in the 'recent' post liberalization period. In the pre liberalisation period, the current and past values of YLGB can influence the present and future values of

stock prices and vice versa, but, in the post liberalization period, no connection has been found between YLGB and SNX. Taking the variables jointly, the old and present values of all the variables can influence the present and the future values of SNX and vice versa in the post liberalization period, whereas the causality flows only from SNX to all only in the pre liberalisation period. It is also found that, in the pre liberalization period, only YLGB, IIP and WPI are efficiently transmitting their shocks to stock market, but, in the post liberalization period we found all macroeconomic variables are efficiently transmitting the shock to the stock market and vice versa. Furthermore, according to the results obtained in forecast error variance decomposition, stock market found to be flexible and more integrated in the initial phase of liberalization than the pre liberalization period. But, the stock market gradually turned more rigid and became almost unexplainable by the select macroeconomic variables in the ‘recent’ post liberalization period. Unlike stock market, FX turned to be more flexible in the post liberalization period giving more scope to select macroeconomic variables to integrate.

Thus, we found a clear variation, better to say, improvement in the relationship, explaining power and influence of all select macroeconomic variables and stock market in the post liberalisation era and rejects the fifth null hypothesis of this study, which is, the link and relation between select macroeconomic variables and stock market would remain unchanged across the regimes in India.

5.2 Policy Implications:

In any economy, a clear idea about the economic activities driven by the policy prescriptions and reflected through macroeconomic variables to impact the markets of risk assets is very essential. Debate on whether the nature of relationship changes due to the status of the economy— developed, developing, emerging or underdeveloped, inter temporal variations in the same economy, which variable or set of variables has more capacity to explain the

behaviour of the risk asset markets etc. – the endless debate on the issue continues without converging to a particular objective decision. But the whole debates certainly enriched the literature and more and more scholars are attracted to the issue. This study also humbly try to examine the position taking monthly data of 54 years of Indian economy which already started to follow the prescriptions of free economy.

Results of the study show that the economy, at present (up to 31st December 2019), grossly moving in the right direction. In spite of that, the results suggest some policy measures that should be implemented by the Indian policy planners, below:

1. India still remained an import oriented country and the significance of the domestic foreign exchange market gradually diminished and at present is insignificant in the cointegration space. Hence, more effective attention should be given to help to regain it's position. Full capital account convertibility in true sense, abolishing some sort of less significant barriers for the free movement of capital across the domestic sectors and abroad, more effective measures to guide and monitor both foreign direct investment and foreign institutional investments, etc are to be considered seriously and resolved quickly.
2. Although the Reserve Bank of India is serious to control inflation, still the pocket-hoarding across the states and its impact on wholesale price index should be adequately taken care of, especially in the free regime.
3. In free regime, the positive relation between stock and the long term yield of the government bonds indicates the less trust of the investors on government bonds than equity instruments. If it is due to the undue pampering to claim less risk of stock market instruments unlike the perception of the investors in the pre liberalisation regime, by advertising (mostly by the mutual funds due to cut-throat competition) and influencing the minds of investors especially the retail investors working in the service sector, then adequate steps should be

taken by the government to stuck the balance between the markets. Monitor of the market should be more active to protect the interest of the investors.

4. A very interesting result comes out from the study when one finds that stock market influences the index of industrial production in the recent liberalization period. That indicates that the economy through stock market is allocating more funds to the industrial sector. India till an agricultural based and dominated country providing huge employment. Contribution of agriculture in GDP is gradually diminishing. Whether this is due to the mal-focussing and mal distribution of funds? The policy planners should take up the issue seriously.

5. According to the results of the variance decomposition analysis, stock market is found to be more rigid in the recent post liberalization period. More steps are warranted from the Indian policy planners so that all the macroeconomic variables can explain enough the stock market.

In sum, variations in the relationship or the direction of relationship observed by the study suggest a regular evaluation of the policies, changes if required should be done, so that, the policy planners can make the popular belief that each and every economic activities are reflected in the stock market – a reality.

5.3 Limitations and scope of the future study:

The results derived and observations made by the study should be accepted with caution due to the inevitable bias and technical limitations of statistical and econometric tools in this study. Refinements in the observations of empirical studies largely depend on the advancement of statistics and econometrics. In our study ,we have not used the modified information criteria in the selection of the optimum lag order of the VAR process, the cases of fractional integration (Wong, et al. 2005), if any, also not considered when testing the order of integration of the time series process and cointegration under the study. There is

enough scope to use alternative tools and techniques to improve the outcome of these type of studies and the matter is left to the future scholars.

In investigating the link and long run stable relationship, we assumed linear cointegrating relationship. Theoretically, the relation among the stock market and macroeconomic variables may well take the nonlinear form. This possibility is not investigated by this study and can be taken up for further research. The outcome of the study assuming nonlinear form may strongly support cointegration among the select variables or may reject it.

We have not used the tools to measure cointegration with multiple unknown break points and it is left for future study.

One of the primary objectives of our study is to investigate whether there is any cointegration between the stock market and macroeconomic variables or not, but to investigate the probable reasons for cointegration or no integration is beyond the purview of this study, hence, it is left for future studies.

We have used 'narrow base' but highly traded segment of the Bombay Stock Exchange that is BSE SENSEX 30. We welcome future studies considering broad base index from the Bombay Stock Exchange or the National Stock Exchange. Similar is the case with foreign exchange rates. Real rates in place of nominal rates, basket of currencies or more currencies in place of single currency rates (that is, rupee dollar), forward rate instead of spot rate can be used to study the relationship in future.

The unique movement in the levels of integration in the pre and early period of liberalisation observed is a good issue to research in depth in future.

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