Impact of Fiscal and Monetary Policy Interactions on Stock Market: Evidence from Pakistan

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CERTIFICATE

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DEDICATION

Dedicated to my family, especially to my father Altaf Hussain Abbasi (late), my mother Naseem Akhter, my sister Noshina Altaf, my brother Yasir Hasnain and my best friend Bisma Shoukat. . . .

ABSTRACT

This study highlights the interaction among fiscal and monetary policy and the impact of this interaction on stock market of Pakistan. The study investigates the level of interaction between fiscal and monetary policy and from this it suggests there is minimum degree of coordination as 34% of interaction exist. This study practices structural vector autoregressive(SVAR) on quarterly data of macroeconomic variables and stock prices from stock market during the specified time period of 1998Q12017Q2. The empirical findings conclude that policy variables are having positive and highly significant impression on stock prices. These results are consistent with the fiscal exclusion model where fiscal policy variable is excluded to check the importance of fiscal policy in the model. The study recommends the improvement of interaction among macroeconomic institutions and their impact on stock market to boost up economy of Pakistan.

Keywords: Fiscal policy, Monetary policy, Stock market, SVAR, Pakistan

“Allah does not charge a soul except [with that within] its capacity. It will have [the consequence of] what [good] it has gained, and it will bear [the consequence of] what [evil] it has earned. "Our Lord, do not impose blame upon us if we have forgotten or erred. Our Lord, and lay not upon us a burden like that which You laid upon those before us. Our Lord, and burden us not with that which we have no ability to bear. And pardon us; and forgive us; and have mercy upon us. You are our protector, so give us victory over the disbelieving people."

Surah Al Bakara[2:286]

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Komal Abbasi

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LIST OF ABBREVIATION

FP	Fiscal Policy
MP	Monetary Policy
SVAR	Structural Vector Autoregressive
VAR	Vector Autoregressive

CHAPTER 1

INTRODUCTION

1.1 Introduction

The stock market performs a dynamic role in economic development. It plays a medium of financial mobilization of resources between borrowers and lenders in various sectors of the economy. It is also consider as an indicator that reflects general financial climate of state. For example, in growing economies the output are raising and most of the firms are experiencing profitability. This higher profitability enables the company's to pay higher dividends to shareholders and encourage buying and raising the stock market Thanh et al. (2017) . As stock market is the reflection of economic conditions, therefore, it is very responsive to change in macroeconomic activities. One way to observe the change in economic conditions is through its macroeconomic policies, these are, monetary and fiscal policies.

Fiscal policy (FP) relates to government revenues and expenditures. With the use of FP, the government applies taxes and expenditure tools to adjust the aggregate demand of the country Anyanwu (1997). FP affects stock market in many ways, it depends on the type of FP attitude. For example, a decrease in state spending and increase in taxation will not boost the progress in economic situation it would decline the output, consumption and investment and also it would not provide a helpful economic condition for firms to raise, stockholder attitude may reduce, consequently falling equity market yields. Similarly, if finance ministry adopt expansionary fiscal strategy it would not only increase the growth but also increase the investor's assurance within the equity market, hence growing its earnings.

In contrast, from the help of monetary policy (MP), state bank adjusts amount of money in the country by changing the interest rate. On account of New-Keynesian theory prices are being sticky in short run ,therefore, state bank regulates the actual interest rate and its effects both existing and anticipated future interest rate, which influences the timing of investment decisions. Therefore, MP directly influences the share prices by the discount rate channel and indirectly through its influence on the determinants of dividends and the stock returns premium by influencing the degree of uncertainty faced by agents Hasan et al. (2009). Gali and Gertler (2007), Bjornland and Jacobsen (2008), Bjornland and Leitemo (2009), Castelnuovo and Nistico (2010), furthermore, Kurov (2010) uphold that equity market prices are focus on future predictions and carry related information the future expectations. In regard to MP fluctuations critically impact these predictions. Thus, probably there is a great interconnection between equity prices and MP construction.

By expanding FP, it boost the economic development and stock market, whereas, contractionary FP discourage the economic growth. Likewise, low rate of interest under MP encourage growth of economy and high reaching interest rate discourage the growth of economy and stock return. The net effect of both monetary and FP is depending upon the interaction of these strategies.

When one contractionary (expansionary) policy are followed by another expansionary (contractionary) then both policies performed as substitutes. In example, when FP makers decreases expenditure or increases taxes, at that time the MP makers responds this by dropping the rate of policy and same is repeated inversely. These twin policies perform as strategic complements, where an contractionary

(expansionary) strategy of one regulatory is encountered by contractionary (expansionary) policy of other (Jansen et al., 2008).

When both authorities are self-sustaining in this case the problem of interaction arises as in the policies react as substitutes or complements. But when the objectives of one regulatory are act as subservient to the other, at that time other institution leads the policy construction and there no existence of interaction for investigation would arise. Similarly, fiscal and MP interrelate only to the degree of influencing the desired goal (Lawal et al., 2017).

Against this background, the purpose of the study is evaluation of impact on fiscal and monetary policies tools on equity market of Pakistan and also to see the interaction of these two policies and this study will make recommendations for stockholders and regulators of policy based on conclusions of this study.

1.2 Research Gap

Although the study related to fiscal and monetary policies interactions and their influence on stock prices has been well documented in the literature with respect to different world markets, for example Hu et al. (2018), Handoyo (2015), Thanh et al. (2017) etc. , but in case of Pakistan as per my knowledge there is not such a single study that has been attempted to work out the effect of twin policies on stock prices of Pakistan. The most of the work regard to this topic is focused either on the effect of macroeconomic indicators volatility resulting to stock market, or causal relationships among the macroeconomic indicators and stock returns, however, the literature is silent about interactions of monetary and FP and their influence on the stock prices. In Pakistan effect of fiscal and MP regarding to stock market returns has been separately patterned. In the light of this literature gap, the study will fill this gap.

1.3 Research Objectives

The key subject discuss in this study is to evaluate the combine interaction among monetary and FP and stock prices relationship in Pakistan, which may be essential for investors in selection of their portfolios, as well as for policy-makers and regulatory bodies in determining the exact policy measurements that might affect the national economic situation. In the light of previous discussion, the study is aimed to

1. Recognize the effect of fiscal and MP upon stock market prices.

2. Provide evidence about monetary and FP interactions and also their combine shocks to stock market.

1.4 Significance of the Study

The study related to the impact of fiscal and MP on stock market is important for the case of Pakistan which execute the inflation driving background because of latent contradictory aims among fiscal and MP will drive to a tactically critical interaction between both policy tools. The interaction occur as these two policies have inference to output and inflation. Fiscal system is very conscious about output, and monetary establishments highlight on monitoring inflation. Beneath the light of economic theory, symbol of budget shortfall is anticipated to become positive, that means as greater the budget shortfalls will cause the higher rate of interest. In these circumstances, State Bank wishes to alleviate the economic condition from stagflation and high pricing issue. Consequently, many observed studies which try to analyze the effect about both fiscal and MP pay more attention on output and prices relative to stock price.

The significance related to the study has two folds: First, we find out the contemporaneous relationship between all variables including government

expenditures as a measure of FP impact variable, prices and GDP as a measure of macroeconomic impact variables and money supply (M2) and rate of interest as an indicator of MP and the prices of stock market, and for this purpose we will apply structural vector autoregressive(SVAR) model. Second, we investigate the impulse responses related to fiscal and MP upon other shocks. The results of both fiscal and MP interactions and their effect on stock market prices are important to investors of equity market and same regarding to policy making authorities of country. To the best of my knowledge, literature is silent in case of Pakistan about policies interactions and their influence on the stock market prices. In this study we put effort to address either these are positive or negative impression of policy interactions on the prices of stock market. This study is direct at the heart of applications and can serve as a guide for practitioners and policy heads, so, that they could investigate the results and report the findings for implication.

1.5 Organization Of Study

The study plan is designed as Chapter 2 will go through theoretical framework of the study and the review of literature, Chapter 3 is related to the data and methodology of this study, Chapter 4 debates the empirical outcomes of this study, Chapter 5 holds the concluding observations of the study and finally the aggregation of references of all papers, which are used in this study.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This section takes into account the review of theoretical and empirical literature concerning the impact of both fiscal and monetary policies on the stock market. This section is further segregated into three sub-sections. The section 2.2 covers the literature reviewed related to the impact of monetary policy on stock market. Section 2.3 presents the literature of studies related to the impact of fiscal policy on stock market. The section 2.4 reviews the studies on the effects left on the stock market as a result of interaction between both monetary and fiscal policies.

2.2 Theory Related to Monetary Policy and Stock Market

The stock market returns affected by financial sector of economy as examined by Mishkin (2001); Lacoveillo (2005); Bernanke and Kuttner, (2005); Agnello and Souse (2011) and found significant association between monetary policy and stock market. The effect of monetary policy on stock market returns are seen by five channels these are (i) interest rate channel (ii) credit channel (iii) wealth effect channel (iv) exchange rate channel (v) monetary channel.

(i) **Interest rate Channel:** It is also termed as the traditional Keynesian hypothesis tracing the transmission mechanism of interest rate. It states that variations in interest rates will affect the corporate cost of capital which will change their price of stock. This suggests that higher interest rates leads to a fall in stock prices.

(ii) **Credit Channel:** Another transmission channel associated with the indirect effect of interest rate is credit channel. It states that by changing interest rates, the

monetary authorities exercises control on investment level of the economy. Under this hypothesis, fluctuations in corporate investment alters the market value of firms which in turn is influenced by the present values of its future cash flows. Therefore, increased corporate investment activity is likely to induce higher future cash flows, thus improving the firm's equity values and also stock prices of these firms.

(iii) **Wealth Effect Channel:** It is another transmission channel via which monetary authorities affect the stock market performance. It again relies on the role of interest rate in affecting stock worth of firms.

(iv) **Exchange Rate Channel:** It explains that raising the interest rate leads to an appreciation of the domestic exchange rate, which results into increased imports and lower exports. In line with this hypothesis, such rise in interest rate gravely hinders the export market share, this leads to a decrease in production base which ultimately lower the stock prices.

(v) **Monetary Channel:** It explains the Tobin's Q theory (1966) of investment. According to which rise in interest rate lowers the stock worth. Assuming the market has two assets, this reduction leads to reallocation of funds from stock market to bond market. This induces further decrease in stock prices.

In recent years, the association between financial markets and the monetary policy has been of keen interest for researchers. According to them the predictability of stock markets is substantially affected by the decisions of monetary authorities (Fama and French, 1989; Jensen and Johnson, 1995; Patelis, 1997). A significant positive impact of expansionary monetary policy on stock returns was reported by Thorbecke (1997) and Conover et al. (1999). On a similar note, Ehrmann and Fratzscher (2004), Rigobon and Sack (2003) and Sousa (2010) reported a significant negative effect of contractionary monetary policy on stock market performance.

The interlinkage between monetary variables and equity prices has also been investigated in great depth (Nelson, 1976; Jaffe and Mandelker, 1976; Fama and Schwert, 1977; Chan, Chen and Hsieh, 1985; Chen, Roll and Ross, 1986; Burnmeister and Wall, 1986; Burmeister and MacElroy, 1988; Chang and Pinegar, 1990; Defina, 1991; Kryzanowski and Zhang, 1992; Chen and Jordan, 1993; Sauer, 1994; Rahman, Coggin and Lee,1998). Researches such as Kryzanowski and Zhang (1992), Sauer (1994), and Mukherjee and Naka (1995) investigated the association between equity markets and exchange rate fluctuations while Burmeister and MacElroy (1988) explored linkage between equity returns and interest rate. Moreover, link between equity markets and money supply is also a well-researched area (Friedman and Schwartz, 1963; Kraft and Kraft, 1977; Nozar and Taylor, 1988; Mukherjee and Naka,1995).

In case of Pakistan, Husain and Mehmood(1999) attempts to examine the causal relationship of money supply and stock prices in Pakistan economy. Hassan and Javed (2009) explored the working of equity markets in emerging markets. They identified and then quantified the association between equity markets and monetary variables. Ahmad and Rehman (2010) considered Pakistan in their study and observed the link between stock return, interest rate and exchange rates in case of its economy. The results show that both the change in interest rate and change in exchange rate has a significant impact on stock returns over the sample period. Qayyum and Anwar (2011), explains the connection among the stock market and monetary policy of Pakistan. This indicate that slight deviations of the monetary policy has strong impact on the movement of the equity market.

Nisa and Nishat (2012) explore two types of factors effecting stock market, these are internal factors, and external factors. The results show that equity market balance.

From the above discussion, we find that from expansionary measures of monetary variables having a favorable effect on stock market. Contractionary measures taken by monetary authorities have negative affect on stock market. Interest rate transmission through exchange rate also positively affect the stock market.

2.3 Theory Related to Fiscal Policy and Stock Market

The fiscal policy impact on the stock market is witnessed by Chowdhury (1994); Darrat, (1988); as fiscal policy impacts stock market returns through three ways (i) Keynesian positive effect (ii) Classical crowding out effect, and (iii) Ricardian neutrality effect.

Keynesian Positive Effect: According to Keynesian theory (1935) the role of fiscal policy is to stabilize the economy and support the aggregate demand. For example, during the period of boom the fiscal policy act contrary cyclical by imposing more taxes and reducing spending and vice versa in the period of recession. Therefore, it is believed that the effect of fiscal policy on stock market is positive.

Classical Crowding Out Effect: Classical theory work contrary to Keynesian theory and state that fiscal policy has a negative impact on both economy and stock market. According to Classical theory, expansionary fiscal policy (higher spending and lower tax rates to boost the economic activity) ultimately increase the interest rate. High interest rate affect the accessibility to debt financing mechanism and crowd out private investment and reduce the stock prices.

(iii) Ricardian Neutrality Effect: This Hypothesis takes a mid-point view as it explains that fiscal policy has no impact on the behavior of both the real and financial sectors. It explains that public borrowing will be counter balance by private saving of rational households, therefore, fiscal policy can have neutral impact on aggregate demand.

The debate of investigation about fiscal policy effects on stock market started about 30 years ago (Blanchard, 1981; Shah, 1984; Tobin, 1969) but there is no emphasis on empirical findings. Equity market under general equilibrium plays a vital role in any economy in allocating funds to the most productive sector of the economy. In developed countries it is recognized that to ensure these economic activities stock markets have or should have significant link to the overall economy (Baumol 1965). In general, this linkage of stock market and economy is of two types. The first type explains the Stock market as the leading indicator of the economic activity in the country (Moore 1975, Pierce 1983). The second type of relationship is hypothesized through the possible impact of stock market. Meanwhile, some studies suggest that budget deficits have no relevance, which means that, they agree with what with the assumption (Boothe & Reid, 1989; Evans, 1987a,b), on the other hand, some pieces of work have the opposite results (Darrat, 1986; Frenkel & Razin, 1986; Zahid, 1988).

Researchers have examined the effect that fiscal policy has on the stock market in relation to fiscal expenditure and tax policy. Laopodis and Sawhney (2002) taking into account fiscal expenditure, studied the nexus between US fiscal policy and stock returns and came to a conclusion that there exists a negative relation between fiscal deficits and stock markets, the effect is said to stay for a number of months. Mountford and Uhlig (2009) by allowing limitations on the impulse response function

concluded that any variations in fiscal policy, particularly an increase in fiscal expenditure instantly leaves an adverse effect on stock prices. Ardagna (2009) found a positive link between declines in fiscal expenditure and rise in stock prices. Considering policies related to taxes, Waldenstrom (2002) created models to observe the fluctuations in the rates of tax and stock markets. It was concluded that fluctuations in stock market are linked to tax rate volatility but has no link with the tax rates.

In order to examine the effect that fluctuations in different tax policies had on stock markets, Arin, et al. (2009) made use of the data from monetary market for America, Germany, and Japan in order to construct a semi-structural VAR model and justify that labor taxes is negative correlated with output and stock returns. Second thing to consider was that stock market was greatly affected by indirect taxes than the labor taxes. Afonso and Sousa (2011, 2012) studies the effect of income and expenditure policies on stock prices and came to a conclusion that any variation in government expenditure is negatively related to stocks, whereas a variation in government revenue is weakly but positively related to stock prices.

Nishat and Saghir(1991) investigates the fundamental relationship between stock market and macroeconomic activity in case of Pakistan and their results show stock market in Pakistan appears to be informationally efficient with respect to real activity. Nishat et al. (2004) analyze the long-term relationship between the KSE and certain relevant macroeconomic factors by employing a vector error correction model (VECM) in a system of five equations to investigate the presence of cointegration among these factors.

Concluding this debate, the findings show that in long run fiscal variables have a minimum but positive impact on stock market returns. Fiscal policy variable capture by tax negatively effect on stock market but government expenditures have positive impact on stock market. Fiscal deficits and stock market negatively correlated.

2.4 Theory Related to Fiscal and Monetary Policy Interactions

There is an extensive debate on the subject of interaction and harmonization that exists between both monetary and fiscal policies. The discussion on the issue of fiscal and monetary policy interaction and coordination is not limited to the interaction of these policies within frontiers. But considerable literature is available that covers the interaction of policies among different nation. Unfortunately the available literature on fiscal and monetary policy interaction is available widely for the developed countries and this topic pay lesser attention for unknown reasons in developing countries and Pakistan is no exception.

There exists an interaction between Fiscal and monetary policies and other macroeconomic policies. The most important thing is the federal government budget that plays a crucial role in the relationship between treasury and central bank. Government budget constraint plays a central and an important role in connecting fiscal policy with monetary policy. The effectiveness of monetary policy significantly depends on the behavior of fiscal authority. Similarly the usefulness of fiscal policy considerably depends on the formulation and execution of monetary policy.

There are many areas where fiscal and monetary policy interacts. Nordhaus et al (1994) find that economy may diverge sharply from the preferred outcome if fiscal-monetary games turn into fiscal-monetary wars. According to their study lack of

harmonization among fiscal and monetary authority results in high inflation, excessive budget deficit and higher interest rate. Absence of coordination between the two important public entities leads to the discouragement of private investment that ultimately deters growth as private investments crowds out. Woodford (1996) reveals that a certain type of fiscal instability, namely variation in the present value of current and future primary government budgets, necessarily results in price level instability. Aggregate demand plays a central role that brings changes in the price level and ultimately affects the level of inflation in the economy.

Literature unveils another interesting aspect of the fiscal and monetary policy interaction like the strategic substitutability and complementarities of these policies. Von et al (2001) find out that interdependence between the two authorities is asymmetric. Expansionary fiscal policy stance is accompanied by tight monetary policy. This asymmetry allows monetary policy to provide room to the treasury to relax its arms by increasing expenditures or exercise tax cut. On the other hand, research of Melitz (1997, 2000) and Wyplosz (1999) generally supports the dictum that two policies are strategic substitutes. Dixit and Lambertini (2000, 2001) investigate the degree of interdependence between treasury and the monetary authority. They develop a model in which monetary authority has partial control over inflation and the price level is also directly affected by the decision of the fiscal branch.

Buti et al (2001) recommend that interdependence between monetary and fiscal policy should not be interpreted in terms of conflict or cooperation. The degree of interdependence between fiscal and monetary policy largely depends on different demand and supply shocks in the economy. For example, in case of supply shocks,

fiscal and monetary authorities respond in a very conflicting manner. For instance, when adverse supply shock hits the economy, fiscal authority adopts an expansionary fiscal policy in order to stimulate business activities and to spur economic growth. We know that prices also rise in the presence of adverse supply shocks. In this situation, the central banks adopt contractionary monetary policy in order to have the inflationary pressure in an economy. This implies that greater cooperation is required between fiscal and monetary authorities in order to minimize the cost associated with adverse supply shocks.

There exists another dimension in case of both monetary and fiscal policies, which is the speed with which each of the policies respond. The time involved in monetary policy response is considerably less than fiscal policy. The active and timely response of monetary policy is important in order to increase the optimality of both fiscal and monetary policy. Kuttner and Posen (2002) highlights lags as the potential problems associated with the failure of strategic interaction and harmonization between fiscal and monetary authority. They examine the issue and finds that fiscal policy involves long inside lags which make it less attractive for stabilization. On the other hand, the decision as well as implementation lags for monetary policy are usually short compare to fiscal policy. Benigno and Benigno (2004) find that treasury is normally discretionary in nature while monetary authority follows rules in the course of tracking down their respective objectives.

Moses and Nicola (2009) disclose that indiscipline fiscal policy could jeopardize monetary stability. Bahar (2009) investigates the issue of fiscal and monetary policy coordination and explores that fiscal authority uses different sources

of financing in order to bridge the fiscal gap. He concludes that sources of financing deficits are as much critical for monetary policy as the size of budget deficit itself.

Harmonization among both monetary and fiscal authorities in this aspect is not only imperative but inevitable in order to reduce the negative spillovers created by the political business cycles. Coordination failure between fiscal and monetary authority make it difficult to assess the impact and know the causes of frequent changes in economic policies. Keeping in perspective the implications of treasury for the central banks, the importance of simultaneous investigation of fiscal and monetary authority interaction and coordination increases because it is very difficult to observe and isolate the changes generated by either authority.

This section describes the review of theoretical and empirical literature regarding the impact of FP and MP on of stock market. This section is further divided into three sub-sections. The section 2.2 contains the review of literature related to the impact of MP on stock market. Section 2.3 presents the literature of studies related to the impact of FP on stock market. The section 2.4 reviews the studies on how the interaction of MP and FP effect the stock market.

Equity market demonstrates the economic situation of a country through its movements along the changings in economic policies. As narrated by Galbraith in (1995) " the equity market is reflecting the underlying situation related to economy". Therefore, "stock markets responds according to facts" Liya Wang,(2010) .

Chen et al. (1986), there is no satisfying argument found in literature that the relation between financial markets and the macro-economy is solely in on track. However, stock prices are generally thought out as reacting to external forces (even yet they may have a response on the other variables). It is seeming that all economic

variables are endogenous to some extent. Only environmental forces, such as flood, earthquakes, and same like that, are actually exogenous to the world economy.

Chatziantoniou (2013), explains the both policy interactions and movements of stock market together. Muscatelli and Tirelli,(2005) and Zoli, (2005) examines the policies interaction through (i) influence of fiscal inter-temporal budget restriction on state bank policy and (ii) stimulus of FP to monetary variables, as given inflation, policy and rate of exchange.

Besides estimating effect of MP and FP on stock market individually, empirical researches have been done by many researchers, to determine how stock market is affected by the combination of these policies . Researchers find out not only the interaction between MP and FP in explaining the activities of stock market but also the changes in stock market connected with the changes in both macroeconomics policies.

New approaches are provided queries about Southeast Asian countries, to analyze the response of stock market and focused more on the workability of the researches. Handoyo et al.(2013) in general, evaluated stock prices response and mining, agricultural , financial sector indexes and manufacture and in particular to macroeconomics policies shock. Overall, MP shock is positively affect the stock market and negative policy response to FP. For the case of Malaysia, by using VECM (vector error correction) model, the researchers found the relationship between macroeconomics policies and stock market performance. They concluded MP and FP play a critical role in Malaysia stock market. Nevertheless, MP affected stock index faster than FP did.

Chatziantoniou et al.(2013) studied the impact of fiscal and monetary policy on the performance of the stock market in case of different countries like, Germany, U.K and U.S, via direct or indirect mechanism. There exist evidences that explain the importance of interaction between monetary and fiscal policies in order to explain developments in the stock market. Considering this conduct of both the policies and the impact they have on the stock prices, it is very essential to allow interaction between them while checking their impact on the stock prices. Both, Afonso and Sousa (2011) and Aarle et al.(2003) shed light on the how essential it is to integrate fiscal and monetary policy investigation into a single framework where the interactions and effects of both can be examined.

In case of literature in Pakistan, Khan (2014) studies the impact of macroeconomic variables on the stock market index of Pakistan this study includes the Correlation and OLS analysis technique to check out impact regarding to macroeconomic variables with stock market it is an event study to see effect of 2007 crisis on the economy, therefore, uses the data from July 2007 to June 2009. The findings related to the taxes has strong negative influence on the stock prices of Pakistan. The government expenditures also had very strong positive association with the stock market of Pakistan.

2.5 Conclusion and Contribution of the Study

In the light of above mentioned studies that examine the effect of policies on stock market globally , we come up with the conclusion that the existing literature belongs to the policy interaction and the stock market impact. It splits the studies into three different types some studies found the effect of fiscal and MP on stock market. On the other hand, few studies belongs only to the interaction of interaction of twin policies.

Moreover, the above few studies have discuss the macroeconomic variables impact on stock market. this study is going to contribute in existing literature by examining the asymmetric effects of exchange rate on output and stock price for Pakistan. Moreover, the similar analysis is conducted on the sectoral level by using the recently developed technique NARDL by (Shin et al., 2014).

CHAPTER 3

METHODOLOGY AND DATA DESCRIPTION

3.1 Introduction

The following chapter of the study consists of construction and description of variables that are being used in this study. Firstly, it will discuss the construction of variables and their description. Secondly, it will describe the methodology of this study and it will go through functional form of model. Thirdly, variables and their sources are described in a table.

3.2 Structural Vector Autoregressive Model

The key objective of this study is to explore the dynamic association among fiscal and MP and stock market functioning by implementing structural vector autoregressive (SVAR) model proposed by Sims (1980). We consider the following variables for the analysis, output (y_t), consumer price index (p_t), government expenditures (g_t) as measure of FP, money supply M2 (m_t), interest rate (3-months T-bill rate) (m_t) as MP measure and stock market demonstrated by its prices (sm_t). We include output (Y_t) and CPI (P_t), in the model for the purpose of identifying the complete fluctuating pattern of these policies under study and their impulse responses.

In estimation, we will emphasize on identifying only the monetary and fiscal policies shock and we do not aim to identify all structural shock. Our estimation will follow the step by step the methodology developed by Lei Hu, Junying Han & Qiang Zhang (2018). The P-order SVAR model is represented in the general form as

$$\boldsymbol{\Gamma_0 Y_t = \delta + \Gamma_1 Y_{t-1} + \Gamma_2 Y_{t-2} + \ldots\ldots + \Gamma_p Y_{t-p} + \mu_t} \qquad \textbf{(3.1)}$$

where Y_t = (y_t, p_t, g_t, m_t, i_t, sm_t), such as, a 6 × 1 vector of endogenous variables. δ

denotes constant terms vector of 6×1 dimension, represents order of lags, Γ_0 characterizes 6×6 dimension simultaneous matrix, $\Gamma_1, \Gamma_2, \ldots, \Gamma_p$ are 6×6 matrix consisting on coefficient of lag matrix u_t denotes 6×1 vector of structural stochastic disturbances and contained no covariance. The variance covariance matrix of u_t is u_p by □.

Multiply both sides of equation 3.1 with Γ_0^{-1} to get the reduced VAR system correspondingly, as

$$\boldsymbol{Y_t = c + \Phi_1 Y_{t-1} + \Phi_2 Y_{t-2} + \ldots\ldots + \Phi_p Y_{t-p}} + \varepsilon_t \qquad \textbf{(3.2)}$$

where $\Phi_k = \Gamma_0^{-1} \Gamma_k$, $c = \Gamma_0^{-1} \delta$, $\varepsilon_t = \Gamma_0^{-1} u_t$, and $\Omega\varepsilon = E(\varepsilon_t \varepsilon_t') = \Gamma_0^{-1} \Omega_u (\Gamma_0^{-1})'$. The stochastic disturbances have to be attained through employing restrictions to Γ_0. These restrictions in our estimation model can be explained, such as

3.3 Restriction on Output

Output may not be simultaneously imprinted from some other variable (Kim and Roubini, 2000). On the other hand, may be all other variables contemporaneously influenced from output.

3.4 Restriction on Prices

Prices react only to an output shock contemporaneously (Kim and Roubini, 2000; Bjornland, 2008).

3.5 Restriction on Government Expenditure

These monetary and fiscal policies variables respond contemporaneously to output and shocks from prices (Kim and Roubini, 2000; Afonso and Sousa, 2011).

3.6 Restriction on Money Supply

Government expenditure shock may also contemporaneously affect MP because of interaction among twin policies give feedback to shocks of output and price (Wyplosz, 1999; Melitz, 2000).

3.7 Restriction on Rate of Interest

Interest rates show contemporaneous effect given through shock of government expenditure (i. e. we tolerate the contemporaneous effects of crowing out), shocks by money supply (Kim and Roubini, 2000; Van Aarle et al., 2003; Sims and Zha, 2006a,b; Elbourne, 2008) and for effect of shock by stock market prices (Bjornland and Leitemo, 2009).

3.8 Restriction on Stock Prices

Lastly, stock market prices show contemporaneous effect from all variables under study (Bjornland, 2008). The short-term restrictions are imposed on the specified variables under discussion to see the contemporaneous relationship between them, these restrictions can be illustrated as

$$\begin{bmatrix} u_{1,t}^{y} \\ u_{1,t}^{ps} \\ u_{1,t}^{gs} \\ u_{1,t}^{mss} \\ u_{1,t}^{is} \\ u_{1,t}^{sms} \end{bmatrix} = \begin{bmatrix} a(1) & 0 & 0 & 0 & 0 & 0 \\ a(2) & a(3) & 0 & 0 & 0 & 0 \\ a(4) & a(5) & a(6) & 0 & 0 & 0 \\ a(7) & a(8) & a(9) & a(10) & 0 & 0 \\ a(11) & a(12) & a(13) & a(14) & a(15) & 0 \\ a(16) & a(17) & a(18) & a(19) & a(20) & a(21) \end{bmatrix} \text{x} \begin{bmatrix} \varepsilon_{1,t}^{y} \\ \varepsilon_{1,t}^{CPI} \\ \varepsilon_{1,t}^{gex} \\ \varepsilon_{1,t}^{M2} \\ \varepsilon_{1,t}^{i} \\ \varepsilon_{1,t}^{sm} \end{bmatrix}$$

In this matrix system, **y** represents income shock, **ps** denotes price shock, **gs** denotes government expenditure shock, **mss** characterizes money supply shock, **is** denotes rate of interest shock, and **sms** represents stock market prices shock.

The coefficient α_{ij} specifies how variable j contemporaneously effect on variable i. The sum of zero restriction with respect to coefficient is 15, therefore our model is exactly identified as per condition 36-6=30/2=15 restrictions.

3.9 Fiscal Exclusion Model

This uses the same identification structure which will estimate the SVAR model expressed in equation 3.1 and equation 3.2, although by omitting the variable of government expenditure (fiscal-exclusion model). The drive behind this part is to authenticate the assimilation of FP in equation 3.1 and 3.2 (basic model) provide important contribution to understand the stock market performance. Hereafter, the restrictions employed are as following

$$\begin{bmatrix} \boldsymbol{u_{1,t}^{y}} \\ \boldsymbol{u_{1,t}^{ps}} \\ \boldsymbol{u_{1,t}^{mss}} \\ \boldsymbol{u_{1,t}^{irs}} \\ \boldsymbol{u_{1,t}^{sms}} \end{bmatrix} = \begin{bmatrix} \boldsymbol{a(1)} & \boldsymbol{0} & \boldsymbol{0} & \boldsymbol{0} & \boldsymbol{0} \\ \boldsymbol{a(2)} & \boldsymbol{a(3)} & \boldsymbol{0} & \boldsymbol{0} & \boldsymbol{0} \\ \boldsymbol{a(7)} & \boldsymbol{a(8)} & \boldsymbol{a(10)} & \boldsymbol{0} & \boldsymbol{0} \\ \boldsymbol{a(11)} & \boldsymbol{a(12)} & \boldsymbol{a(14)} & \boldsymbol{a(15)} & \boldsymbol{0} \\ \boldsymbol{a(16)} & \boldsymbol{a(17)} & \boldsymbol{a(19)} & \boldsymbol{a(20)} & \boldsymbol{a(21)} \end{bmatrix} \mathbf{x} \begin{bmatrix} \varepsilon_{1,t}^{y} \\ \varepsilon_{1,t}^{CPI} \\ \varepsilon_{1,t}^{M2} \\ \varepsilon_{1,t}^{i} \\ \varepsilon_{1,t}^{stock} \end{bmatrix}$$

Concentrating the associations among m_t, i_t and we can be capable to make some significant descriptions and then relate with the conclusions of the basic model, that include FP variable.

3.10 Impulse Responses

This section represents shocks from y_t, p_t, g_t, m_t, i_t and sm_t. Therefore, in this we discuss first of all, the responses of impulse functions of FP toward various shocks, secondly the responses of impulse functions of the MP from related shocks and third one is about stock market performance to other shocks.

3.11 Preliminary Requirements for the Structure of SVAR

Preliminary requirement for the structure of structural vector autoregressive model is the appropriate selection of lags which will ensure that model is free from serial correlation and heteroskedasticity problem. Different criterion are available for lag selection, such as, Log L, LR, FPE, AIC, SC and HQ. These will be used in this study for the selection of optimal lag length.

3.12 Variable Selection and Data Sources

To investigate the dynamic effect of fiscal and MP interactions on stock market this study uses quarterly data from 1998 to 2017. It contains three types of variable sets, first set is govt. expenditures, as proxy variable for FP stance. Second set of variables are M2 (money supply) and I (3-months T-bill rate) in place of interest rate instrument, as proxy for MP stance. Third type of variable set includes stock market prices, as proxy for stock market stance.

It is remarkable to note that no argument in the literature exist with respect to the usage of the most suitable means of identification of FP performance for example, expenditure, taxes or budget deficit, (Afonso and Sousa, 2011). Additionally, Fatas and Mihov (2001) practice deviations in expenditure to see fluctuations in FP. In this, two advantages with implication of government expenditure besides of budget deficit or revenues. First, many models use diverse economic changes resulting to variation in fiscal expenditure, whereas impact of revenue deviations are qualitatively same (Fatas and Mihov, 2001). For this purpose government expenditure is use by this study for detection in FP changes.

All variables are expressed in natural log form except interest rate. The detail description of all variables with data sources are provided in above Table 3.1.

Table 3.1: Data Description and Sources

Variable	Symbol	Definition	Source
Output	y_t	GDP is the monetary value of all the finished goods and services produced within a country's borders in a specific time period.	Quarterly data series from 1998 to 2010 are obtained from Hanif et al. (2013). Remaining quarterly series from 2011 to onward obtained by multiplying shares of data set from 1998 to 2010.
Consumer price index	p_t	It is a sustained increase in the general price level in an economy. Inflation means an increase in the cost of living as the price of goods and services rise.	International Financial statistics (IFS).
Money Supply (M2)	m_t	M2 is representation of money supply that contains M1 coupled with near money. Wherever M1 consists of cash plus check deposits, whereas near money denotes to saving deposits, securities of money market, time deposits and mutual funds.	International Financial statistics (IFS).
Rate of interest	i_t	The rate of interest is the quantity charge for use of assets expressed as a percentage of the principal.	3-months T-bills rate data obtain from International Financial Statistics (IFS).
Government Expenditures	g_{ex}	Government expenditure comprises all government investment, spending, and transfer payments.	Data series from 1998 to 2010 obtain from Hanif et al. (2013). Remaining data series obtain from annual data multiply with shares of data series from 1998 to 2010.
Stock Market prices	sm_t	The stock price is defined as the present price of stock's share which is traded in the market.	Stock prices are obtained from Karachi Stock Market (khistocks).

CHAPTER 4

INTERACTION OF FISCAL AND MONETARY POLICY IN CASE OF PAKISTAN

4.1 Theory of Monetary and FP Interactions

The debate regarding to both fiscal and MP interaction starts when the two institutes work independently, not less than functionally. When actions of any one institute reliant to the functions or obligations of other institute, then interactions are certainly recognized. The common observation in case of developing economy like Pakistan, state bank is submissive of fiscal institutions. In the framework of organizational system it may be valid, though, the real implementation of monetary authorities it can be self-regulating of fiscal compulsions. Arby and Hanif (2010) established the independence of fiscal and MP during the time span of 1965-2009. This study follows the methodology of Arby and Hanif (2010) to measure the monetary and FP interaction over the quarterly data from 1999-2017. Accordingly, four scenarios are made

a) High growth and high inflation (Positive, Positive)

b) High growth and low inflation (positive, Negative)

c) Low growth and high inflation (Negative, Positive)

d) Low growth and low inflation (Negative, Negative)

Table 4.1 a: Policy Shocks Matrix

GDP Growth	Inflation	
	Positive	Negative
Positive	PP	PN
Negative	NP	NN

The economic performance instruments used in this study is indicated by GDP growth and inflation. However, policy response essentially emphasis on the shock regarding to inflation and GDP. The matrix presented in Table 4.1a shows four possible mixtures of shocks related to GDP growth and inflation, in this negative and positive shocks are denoted by N and P respectively. Accordingly, PP shows shocks related to both GDP and inflation are positive, PN represents positive shock related to GDP growth and negative shock related to inflation, then accordingly. These shocks show an interacting manner which can be seen in the matrix of policy responses Table 4.1b.

Table 4.1 b Matrix of Policy Responses

Fiscal Policy	**Monetary Policy**	
	Contractionary	Expansionary
Contractionary	CC	CE
Expansionary	EC	EE

When both GDP growth and inflation are given positive shocks, at that time besides tight MP have to be used to control inflation as well as FP require to also trail down or have not to be expansionary. This describe the policy mixture as CC, and here it is consider as policy interaction. Alternatively, when GDP and inflation both are curbed through negative shocks at that point both fiscal and MP have to be expansionary as in their behavior in situation of interaction. Above-mentioned interaction of policy is represented by EE in Table 4.1 b. First box has been built on the base of quarterly data of GDP growth and inflation of Pakistan for the time span of 1999Q1 to 2017Q4. The shock given to GDP is fluctuations of GDP from its mean and shock given to inflation is demonstrated by variation among noticed degree of inflation threshold as Mubarik (2005) conducted for Pakistan.

The fiscal and MP attitude are demonstrated by change in government expenditure and variation in T-bill rate respectively. An expansionary behavior represents a positive variation and a contractionary behavior as negative change.

Every cell of macroeconomic situation matrix and matrix of policy response comprises the group of those particular years which represents the mixtures of policy attitude and shocks shall be noted. The interaction level (ρ) is now identified as following

$\rho = \omega/\sigma$

$\omega = n(PP \cap CC)+n(PN \cap CE)+n(NP \cap EC)+n(NN \cap EE)$

σ = sum of quarters included in this study

There would exist seamless interaction when the four quadrants of matrix in macroeconomic situation and matrix representing policy responses are constant (or similarly $\rho=1$) and in case of $\rho=0$ there exist no interaction. Especially, this meaning of interaction is a type of revealed interaction which may or may not be result of appropriate debate between the two authorities.

4.2 Empirical Evidence of Policies Coordination

Specified the individuality among the fiscal and MP indicators employed in the study, level of discovered interaction is restrained to the fraction identified in equation that is built under the observed evidence about macroeconomic indicator and matrices of policy response. As, exhibit from the cells of Table 4.2a and Table 4.2b denote a group of years that represent mixtures of economic shocks and fluctuations detected in indicators of policy response. Table 4.2a, shows the cell in upper-left presents the years where GDP growth was higher than comparing mean (3.7 percent) where

inflation was above the degree of threshold calculated through the work of Mubarik (2005) in case of Pakistan as (9 percent).

Table 4.2 a: Matrix of Macroeconomic Indicator

GDP Growth (Mean Deviation)	Inflation (Threshold Deviation)	
	Positive	**Negative**
Positive	2005;1,2005;2,2009;2,2010;3,20i0;3,2011;1,2012;2,2013;4,	1999;2,1999;4,2000;2,2000;3,2002;2,2003;1,2003;2,2003;4,2004;1,2004;2,2004;3,2004;4,2005;3,2005;4,2006;1,2006;2,2006;3,2006;4,2007;1,2007;2,2007;3,2007;4,2013;1,2013;2,2013;3,2014;2,2014;3,2014;4,2016;1,2016;2,2016;3,2016;4,2017;1,2017;2,2017;3, 2017;4
Negative	2008;1,2008;2,2008;3,2008;4,2009;1,2009;3,2009;4,2010;1,2010;2,2010;4,2011;2,2011;3,2011;4,2012;1	1999;1,1999;3,2000;1,2000;4,2001;1,2001;2,2001;3,2001;4,2002;1,2002;3,2002;4,2012;3,2012;4,2014;1,2015;1,2015;2,2015;3,2015;4,

The cell of lower-left in matrix illustrate the years where GDP growth was under exemplary mean and inflation stood above than threshold. Likewise, in Table 4.2b, the upper-left portion of matrix displays the years where the figure of both fiscal and MP measures reduced presenting contractionary attitude of both policies. The lower-left portion express the years where the number of FP measure enlarged whereas the MP measure reduced.

Table 4.2b: Policy Response Matrix

Fiscal Policy	Monetary Policy	
	Contractionary	Expansionary
Contractionary	2004;3,2005;2,2006;3,2006;4,2007;2, 2008;3,2008;4,2009;1,2009;2,	2000;4,2001;1,2001;2,2001;3,2004;2, 2005;1,2005;3,2005;4,2006;1,2006;2, 2007;1,2007;3,2007;4,2008;1,2008;2, 2009;3,2010;3,2010;4,2011;1,2011;2, 2011;3,2013;4,2014;1,2014;2,2014;3, 2017;2,2017;3,2017;4
Expansionary	1999;2,2000;2,2000;3,2002;1,2003;2, 2004;1,2012;1,2012;2,2012;3,2012;4, 2016;1,2016;2,2016;3,2016;4,	1999;1,1999;3,1999;4,2000;1,2001;4, 2002;2,2002;3,2002;4,2003;1,2003;4, 2009;4,2010;1,2010;2,2011;4,2013;1, 2013;2,2013;3,2014;4,2015;1,2015;2, 2015;3,2015;4,2017;1,

From the allocation of quarters as specified by tables 3.2a and 3.2b, level of interaction among the fiscal and MP restrictive on the given economic situation can be determine such as follows

$n(PP \cap CC)/n(PP) = 2/8 = 0.25$

$n(PN \cap CE)/n(PN) = 13/36 = 0.36$

$n(NP \cap EC)/n(NP) = 1/14 = 0.07$

$n(NN \cap EE)/n(NN) = 10/18 = 0.55$

$\rho = 0.34$

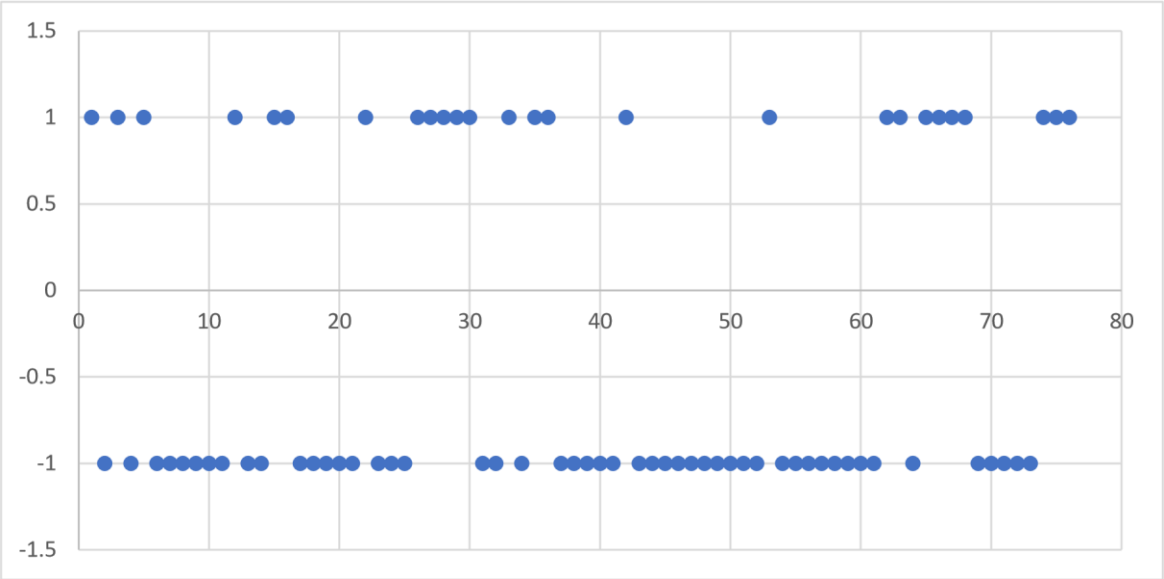


Figure 4.1: Years of Interaction and Non Interaction

The findings show the level of fiscal and MP interaction which is discovered from the fluctuations of policy measures restricted on shocks of economy have simply figure out as 0.34 during the specified time span.

Based on this information we have developed a dummy variable 'DCOR' such that

i) Expected policy reaction is equal to actual policy situation, then

DCOR =+1

ii) Expected policy reaction is not equal to actual policy situation, then

DCOR = -1

so,

(DCOR= +1) = years of coordination between fiscal and MP

(DCOR= -1) = years of no coordination between fiscal and MP

The DCOR dummy will be used as an exogenous variable in VAR to analyze the impact of monetary and FP interaction on output, prices, government expenditure, money supply, rate of interest and stock prices. As we observed there exist very low coordination i.e. 34% between the two policies, therefore, we may found insignificant impact of DCOR on the macroeconomic variables under analysis.

CHAPTER 5

RESULT AND DISCUSSION

5.1 Introduction

In this chapter, we briefly discuss the empirical results of SVAR model which is employed in this study to examine the impact of fiscal and MP interactions on stock market based on the methodological framework discussed in the chapter 3. Now this chapter have the subsequent sections to provide the results.

5.2 Preliminary Tests

Before moving towards the SVAR model, this study put preliminary tests and the results are evaluated in subsequent sections.

5.2.1 Descriptive Statistics of Data

The time series data have been taken on stock market prices and macroeconomic variables. The Table 5.1 depicts the statistical description of all variables. It is noted that all variables are log transformed except the rate of interest.

Table 5 .1: Descriptive Analysis

Statistics	**y**	**ρ**	**g**	**m**	**I**	**sm**
Mean	3.123	4.367	12.189	15.429	8.623	9.064
Median	3.151	4.355	12.004	15.546	8.980	9.221
Maximum	3.514	5.073	13.399	16.721	13.634	10.782
Minimum	2.618	3.707	10.995	14.033	1.213	6.960
Std. Dev.	0.226	0.483	0.767	0.854	3.230	1.116
Skewness	-0.301	0.081	0.174	-0.174	-0.501	-0.387
Kurtosis	2.056	1.410	1.472	1.693	2.619	2.135
Jarque-Bera	3.971	8.089	7.771	5.795	3.641	4.271
Probability	0.137	0.017	0.020	0.055	0.161	0.118

The median of subsequent variables respectively as; output 3.151 , prices 4.355 , Government expenditure 12.004 , money supply 15.546 , interest rate 8.980 , stock prices 9.221 shows the central location of the data.

However, the range of the data is the difference among minimum and maximum figures. Similarly, the Skewness of GDP, money supply , interest rate and stock returns is -0.301 , -0.174, -0.501 and -0.387 respectively, which shows negative Skewness. Whereas, the Skewness of inflation and government expenditure is 0.081 and 0.174 respectively, presenting positive Skewness. On the other hand side, the kurtosis of GDP, inflation, government expenditure, money supply, interest rate which shows the kurtosis is platykurtic because of lower value with respect to three.

Whereas, Jarque-Bera probability value for GDP and interest rate is less than 5%, thus the null is rejected that indicate the dataset is not normally distributed. But probability values for inflation, govt expenditure money supply are greater than 5% that shows the following variables are normally distributed.

5.2.2 Order of Integration

There might be fluctuations and trend in the dataset, for this reason we initiate model by estimating the unit root of the variables. Whether we do our analysis on stationarity or non-stationarity in VAR we follow the argument of Sims (1980) and Sims, Stock and Watson (1990), they "recommend contrary to differencing despite the fact that variables hold unit root. They claimed such as the objective of analyzing VAR is to identify the inter linkages between the variables, not to evaluate the parameter of estimates.

The key point contrary to differencing is such as it "throws away" data regarding to the co movements in data (like the chance of cointegrating connections). In the same way , it is reasoned as not to change the style of data. In VAR model, a trend variable has been well approached by the unit root with drift. Though, common opinion about the formulation of variable evaluated by VAR can be impression the real data-generating procedure. Mostly it is true if the goal is to evaluate the structural model."

The ADF is applied to check the non-stationarity in time series data. It is left tail test as the null hypothesis under ADF is $H_{o;}\ \ \delta = 0$, that is the time series data is non stationary and alternative hypothesis is $H_o;\ \delta < 0$ i. e. , series under consideration is stationary. The ADF test results are reported in Table 5.2 indicate that all variables are nonstationary at level but stationary at 1st difference.

Table 5.2: ADF Test Results

At level of series				
Variable	**Deterministic part**	**Lag(s)**	**t calculated**	**Decision**
ln y	C	6	-1.07	I(1)
ln *p*	C	3	-0.147	I(1)
$\boldsymbol{I}$	C	1	-2.652	I(1)
ln $\boldsymbol{g_{ex}}$	C	3	-0.348	I(1)
ln *m*	C	3	-0.511	I(1)
ln *sm*	C	1	-1.038	I(1)
At 1st difference of series				
Variable	**Deterministic part**	**Lag(s)**	**t calculated**	**Decision**
$\boldsymbol{y_t}$	C	4	-3.007*	I(0)
$\boldsymbol{p_t}$	C	2	-2.691 **	I(0)
$\boldsymbol{i_t}$	C	0	-5.910*	I(0)
$\boldsymbol{m_t}$	C	3	-3.597 **	I(0)

g_{ex}	C	2	-8.227*	I(0)
sm_t	C	0	-8.616*	I(0)

Note: The critical values found for ADF through Mackinnon (1996). Asterisks (*) illustrates the level of significance at 5% , (**) shows this significance level at 10% and Lags are chosen by AIC.

5.2.3 Lag Selection Criteria

There are many criteria to the determine optimal lags of VAR. In order to select the optimal lag length we have employed six different criterion such as Log L, LR, FPE, AIC, SC, and HQ. The results are reported in Table 5.3.

Table 5.3 Lag Selection Criterion

Lag	Log L	LR	FPE	AIC	SC	HQ
0	-92.810	NA	7.12e-07	2.87	3.248	3.02
1	468.34	999.32	4.04e-13	-11.51	-10.01*	-10.91
2	539.41	114.87	1.58e-13	-12.47	-9.84	-11.42
3	609.26	101.42	6.62e-14	-13.40	-9.63	-11.90
4	674.26	83.69	3.34e-14	-14.19	-9.30	-12.24
5	734.28	67.43*	2.08e-14*	-14.85*	-8.83	-12.45*
6	760.93	25.55	3.62e-14	-14.60	-7.44	-11.75
7	795.11	27.15	6.01e-14	-14.55	-6.26	-11.25

Optimal lag length on the basis of above LR, FPE, HQ and AIC lag selection criterion of each variable in VAR is 5 lags and through these lags the present study will estimate the VAR and SVAR model along with impulse response functions.

5.3 Estimation of VAR

The model of VAR is assessed with five optimal lag length, and the coefficients of estimated model of VAR are displayed in the **Appendix**. It is inter related to work

that DCOR (Coordination between fiscal and MP) has insignificant impact on all variables under analysis.

5.4 Estimation of SVAR

The model of SVAR is used to find out the contemporaneous relationship by imposing several restrictions.

5.4.1 Impact of Fiscal and MP Variables on Stock Market

Table 5.4: Contemporaneous Relationship among Variables

Estimator	Direction	C	S. E	z-Statistic	P
a1	y-y	-0.0264	0.047	-0.567	0.5707
a2	p-y	0.829	0.794	1.045	0.2961
a3	p-p	-0.564	0.134	-4.198	0.0000
a4	g-y	-7.741	3.421	-2.262	0.0236
a5	g-p	-1.150	0.590	-1.949	0.0513
a6	g-g	0.819	1.961	0.418	0.6758
a7	m-y	0.422	0.329	1.281	0.2002
a8	m-p	-25.168	7.635	-3.296	0.0010
a9	m-g	-2.831	1.363	-2.077	0.0378
a10	m-m	-0.032	0.019	-1.677	0.0935
a11	i-y	0.205	0.452	0.452	0.6512
a12	i-p	-0.283	0.076	-3.741	0.0002
a13	i-g	5.882	2.647	2.221	0.0263
a14	i-m	0.613	0.456	1.343	0.1791
a15	i-i	0.081	0.019	4.207	0.0000
a16	sm-y	0.023	0.002	12.247	0.0000
a17	sm-p	0.009	0.001	12.247	0.0000
a18	sm-g	0.155	0.013	12.247	0.0000
a19	sm-m	0.026	0.002	12.247	0.0000
a20	sm-i	0.597	0.048	12.247	0.0000
a21	sm-sm	0.099	0.008	12.247	0.0000

The relationship as well as the degree of significance between the SVAR coefficients might be expressed related to equation that is set up through the short run method of restrictions. Although, findings and association between them are debating below in the equations form that can be seen in Table 4.6. The below equations (5.1) - (5.6) is describing the results of SVAR model and also effect of policies on stock market. The concept behind gross domestic product (Y) at order first is that it should not contemporaneously respond through the fluctuations of various variable in system, yet with the help of equation describing just its effect on each other.

$$\mathbf{Y = 0.022}\varepsilon_{yt} \qquad \mathbf{(5.1)}$$

The own effect of GDP is positive and significant and exhibit as 0.022 percent in above equation.

$$\mathbf{P = -0.02647}\ \varepsilon_{yt} \mathbf{+0.0914}\ \varepsilon_{cpi} \qquad \mathbf{(5.2)}$$

Prices effect negatively to GDP, when prices of a country increases then purchasing power deceases and transmit a negative effect on output, as results depicts that there is negative relationship between both variables, one unit rise in y_t decreases p_t by 0.026 percent and its own effect is positive and significant.

$$\mathbf{G = 0.\ 8299}\varepsilon_{yt} \mathbf{+0.8199}\varepsilon_{cpi}\mathbf{+0.155}\varepsilon_{gex} \qquad \mathbf{(5.3)}$$

The relationship between y_t and g_t is positive as rise in g_t shows growth in output, our results depicts that one unit increase in y_t increase g_t 0.829 units. Government expenditure and price positively related to each other and increase in prices increase government expenditure 0.81 percent. The own effect of government expenditure is 0.155 units.

$$\mathbf{M = -0.563}\varepsilon_{yt}\mathbf{+0.421}\varepsilon_{cpi}\mathbf{-0.032}\varepsilon_{gex}\mathbf{+0.026}\ \varepsilon_{m2} \qquad \mathbf{(5.4)}$$

Results show that money supply has negative relationship on y_t and one unit rise in

y_t decreases m_t by 0.563. m_t impact on p_t is positive and significant and an one unit increase in p_t increases m_t 0.421 units. , coefficient a9 illustrate that fiscal and MP reveal a noticeable negative contemporaneous relationship. Chatziantoniou (2013) and Hu (2018) find the similar results when analyzing effect of UK policies on stock market and china's stock market respectively. Money supply impact on itself is always positive and significant.

$$\mathbf{I= -7.74\varepsilon_{yt}-25.16\varepsilon_{cpi}+0.204\varepsilon_{gex}+5.88\varepsilon_{m2}+0.597\varepsilon_{it}} \quad \mathbf{(5.5)}$$

The association between y_t and i_t is negative , one percent increase y_t in decrease i_t 7.74 percent. p_t negatively affect i_t and one unit increase in p_t decrease i_t 25.16 unit. g_t and i_t corelate positively, one unit increase in government expenditure increase interest rate 0.204 unit. The impact of m_t on i_t is positive and increased by 5.88 unit. The own effect of i_t is also positive and significant.

$$\mathbf{S= -1.15\varepsilon_{yt}-2.831\varepsilon_{cpi}-0.282\varepsilon_{gex}+0.6129\varepsilon_{m2}+0.081\varepsilon_{it}+0.099\varepsilon_{st}} \quad \mathbf{(5.6)}$$

The coefficients a16, a17, a18, a19 and a20 demonstrate that y_t, p_t, g_t, m_t, i_t, sm_t shocks all are having highly significant contemporaneous association with sm_t performance. Consequently, contemporaneous relation among y_t shocks and sm_t is negative showing by 1.15 units. The impact of p_t shocks to sm_t is positive and p_t decrease sm_t prices by 2.831 unit. g_t and sm_t prices negatively relate to each other and it decrease stock prices by 0.282 unit. The impact of m_t and i_t shocks to sm_t is also positive and increase stock prices 0.612 and 0.081 unit respectively. The own effect of sm_t is always positive and significant.

5.4.2 Impulse Response Functions

Shocks display by 1–6 in Figure 5.1 are respectively shocks from y_t, p_t, g_t, m_t, i_t, sm_t. Hence, the first row displays the impulse functions of y_t to other shocks, second

row represents the responses functions of p_t to other shocks, third row denotes government expenditure to other shocks, fourth line shows the impulse functions of m_t to other shocks, the fifth line characterizes impulse responses of i_t to other functions and sixth row represents that of sm_t performance to other shocks.

Impulse Response Functions of Stock Market Prices with Various Shocks

Pakistan FP and MP have a notable effect on prices of stock market. First, positive fiscal shocks provide the stock market a situation for better performance. Second, a positive m_t shock originate an growth in the stock market prices. Third, negative i_t shock can originate a decrease in stock market prices, the declining influence on the stimulus persists throughout specified sample period.

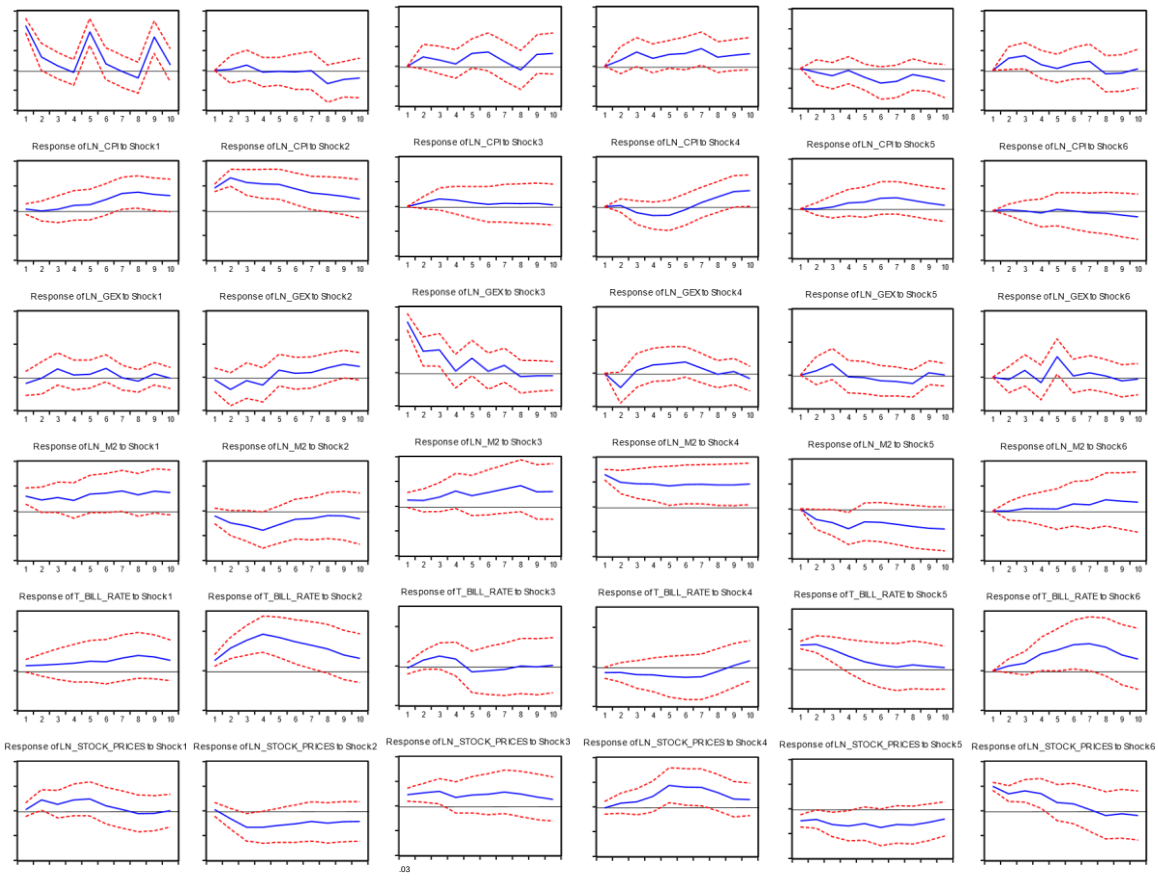


Figure 5.1: Impulse responses of all variable shocks to others and stock market performance

y_t, p_t, g_t, m_t, i_t, sm_t shocks shows the Shocks of 1-6.

The negative response of sm_t to i_t is depicted in this graph. The aim for the finding is that equity markets feedback to the MP diverges reliant to the degree of economic growth. When economy is declining, stockholders sight economic scenario negatively, so regardless of relatively expansionary quantity of money, even stock prices can continuously decrease. As the stock market holds negative feedback from "good news".

Though, during the sample period of study, Pakistan was not capable over rate of interest autonomy, saliently, changes in rate of interest were influenced through the political and financial goals of monetary system. Furthermore, investor prospects about policy modification may also affect influence on policy execution. At time expansionary policy is announced, stock markets have already set up for this variation, so at the time when rate of interest is attain, policy would not be disclose any notable impact on stock prices.

5.4.3 FP Impulse Responses to other Shocks

First, impact of y_t shocks on policy variable is increasing. In starting of second period, this impact shifts to decline till fourth period and then it turns positive till eighth period. Secondly, the impact of p_t shocks on government expenditure is increasing, but level of this impact is too small. The positive feedback of fiscal variable to output and prices recommends that in the period of our specified model FP shows pro-cyclical manner.

That outcome is steady with the observations by Yan and Liu (2015) and Hu et al. (2018).

5.4.4 Monetary Policy Responses to Other Shocks

Starting with the impact of output shock to MP shows decreasing trend, and the level of this impact rise gradually. Secondly, the effect of prices to MP is positive but the level is very small.

5.4.5 Money Supply Responses to Other Shocks

Initially, money supply possess positive response on GDP shock and declining response to price shock which turns increasing after sixth period and lasts till the tenth period.

Generally, impulse response has an image of the relationship exist between any of two variables, and indicating method regarding to the simultaneous relationship between various variables, empirical findings illustrate that Pakistan's fiscal and MP have an explicit impact on functioning equity market in the country and , additionally, the collaboration between them is imperative to understand the development of country's stock market.

5.5 Importance of FP in Basic Model?

At present, study of the effect of monetary variables to stock market is ample, although very few of these investigates fiscal and monetary interaction to disclose the collaboration which is, either the association between these has some remarkable impact on development of stock market. In that, we estimate our original model without the FP variable. To compare these contemporaneous relationship and impulse response functions to be discussed prior to empirical findings. In conclusion, we obtain results of independency of both policies and MP effect in determining stock market fluctuations as excluded FP.

5.5.1 Fiscal Exclusion Model

The short-run restrictions employed in the model are analogous to the previous one discussed in basic model, by neglecting the variable of government expenditure.

5.5.2 Contemporaneous Relationship between Variables (Fiscal Exclusion Model)

Coefficients c(13) and c(14) show that after the removal of FP variable, money supply and shocks of rate of interest which are prominent simultaneous relationship to performance of stock market in previously estimated model is also consistent in this re estimated model.

Table 5.5: Contemporaneous Relationship among Variables (Fiscal Exclusion Model)

Estimator	Direction	C	S.E	z-Statistic	P
a1	y-y	-0.015	0.047	-0.314	0.7539
a2	p-y	-0.404	0.145	-2.797	0.0052
a3	p-p	-5.880	3.988	-1.475	0.1403
a4	m-y	-0.863	0.604	-1.430	0.1527
a5	m-p	0.423	0.355	1.191	0.2335
a6	m-m	-32.473	9.406	-3.452	0.0006
a7	i-y	-2.822	1.511	-1.867	0.0618
a8	i-p	5.128	3.028	1.693	0.0903
a9	i-m	0.332	0.460	0.722	0.4702
a10	i-i	0.061	0.017	3.558	0.0004
a11	sm-y	0.022	0.002	12.247	0.0000
a12	sm-p	0.009	0.001	12.247	0.0000
a13	sm-m	0.028	0.002	12.247	0.0000
a14	sm-i	0.734	0.059	12.247	0.0000
a15	sm-sm	0.109	0.009	12.247	0.0000

The below equations (5.7) - (5.11) is describing the results of SVAR for the impact of policy variables (with exclusion of fiscal indicator) and on stock market.

$$\mathbf{Y = 0.022\ \varepsilon_{yt}} \qquad \mathbf{(5.7)}$$

The own effect of GDP is positive and significant and exhibit as 0.022 percent in above equation such as in case of fiscal inclusion model.

$$\mathbf{P = -0.014\ \varepsilon_{yt} + 0.009\ \varepsilon_{cpi}} \qquad \mathbf{(5.8)}$$

Prices effect negatively to GDP, when prices of a country increases then purchasing power deceases and transmit a negative effect on output, as results depicts that there is negative relationship between both variables, one degree rise in y_t decrease p_t from 0.014 percent and its own effect is positive and significant. In this values may slightly differ but direction of effect remains same.

$$\mathbf{M = -0.404\varepsilon_{yt} + 0.423\varepsilon_{cpi} + 0.028\ \varepsilon_{m2}} \qquad \mathbf{(5.9)}$$

Results show that money supply has negative relationship on GDP and one degree rise in GDP decreases money supply by 0.404 units. Money supply impact on price is positive and significant and one unit increase in price increase money supply 0.423 units. Money supply impact on itself is always positive and significant.

$$\mathbf{I = -5.88\varepsilon_{yt} - 32.473\varepsilon_{cpi} + 5.128\varepsilon_{m2} + 0.734\varepsilon_{it}} \qquad \mathbf{(5.10)}$$

There is negative association between GDP and interest rate, one percent increase in GDP decrease interest 5.88 percent. Price negatively affect interest rate and one unit increase in price decrease interest rate 32.473 unit. The impact of m_t on i_t is positive and increased by 5.128 unit. The own effect of interest rate is also positive and significant.

$$\mathbf{S = -0.863\varepsilon_{yt} - 2.822\varepsilon_{cpi} + 0.332\varepsilon_{m2} + 0.061\varepsilon_{it} + 0.109\varepsilon_{st}} \qquad \mathbf{(5.11)}$$

Stock market relate negatively to GDP and decrease by 0.863 unit. The impact of price on stock market is also negative and price decrease stock market prices by 2.822 unit. m_t and i_t cause positive influence on stock prices and increase stock prices 0.332 and 0.061 unit respectively. The own effect of stock market is always positive and significant. The coefficients a11 and a12 shows the relationship among GDP and price shocks with stock market persist negative and highly significant. Therefore, either the FP variable included or excluded, MP variable shock has positive contemporaneous relationship to stock market prices.

From the evaluation of the contemporaneous results of basic model which comprises FP illustrate the MP shock has positive contemporaneous relationship with stock prices, because m_t and i_t both are significant and positively linked to stock prices. So, we conclude that are our results are consistent with or without inclusion of FP variable, as, there is no impact of FP exclusion from the model. This indicates the response function of stock market with MP which does not influenced by fiscal variable, and interaction among fiscal and MP perform no explicit impact with stock prices.

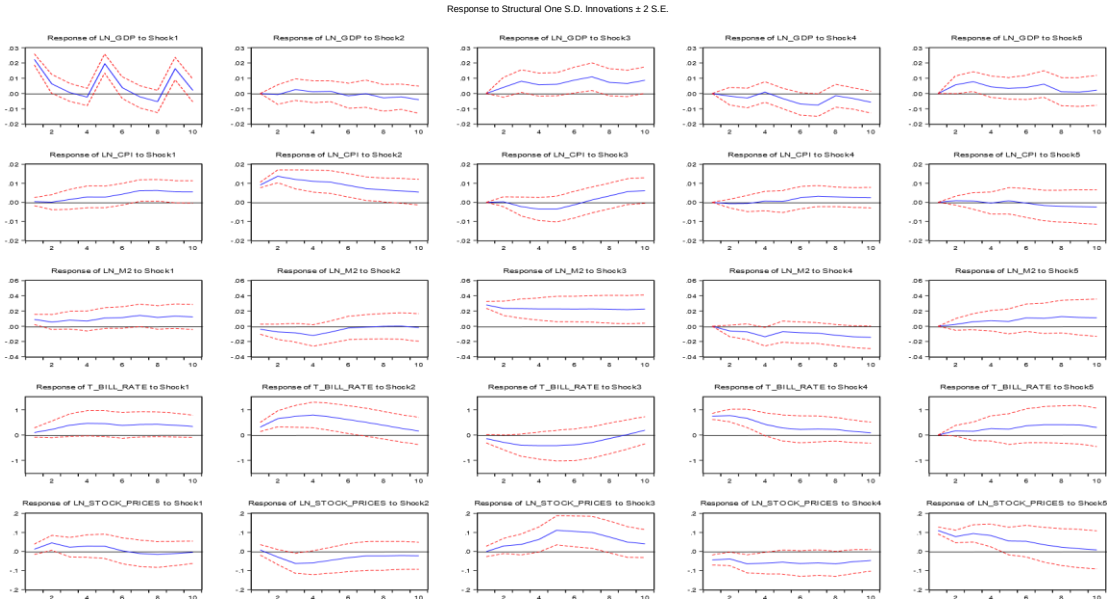


Figure 5.2: Responses of all variable shocks to other and to performance of stock market

y_t, p_t, g_t, m_t, i_t, sm_t shocks shows the Shocks of 1-5.

5.5.3 Response functions of Stock Market with Other Shocks

In this section, we compare impulse responses of fiscal exclusion model with the Fiscal inclusion model. With respect to MP variable, interest rate shows declining impact as it shows in previous model. Money supply response to stock market performance is also in rising trend.

Macroeconomic variables like GDP shows a positive shock first although the positive stimulus only lasts for a comparatively short time span which shifts to negative after sixth period but the level of declining trend is small. Price reaction to stock market shock is declining over the sample period but after the sixth the degree of response is low.

5.5.4 Monetary Policy Response with Other shocks

As Related to the impulse response functions with the involvement of FP variable, the fluctuations related to income shock constantly has a positive influence on monetary side, and level of response is high with respect to FP variable inclusion. The p_t response to i_t is still positive but degree of responsiveness is lower in fiscal exclusion model. The degree of stock market shock also change in this model which is lower than previous one but still increasing. According to our results from fiscal exclusion model we conclude that the feedback of monetary variable on stock prices is not triggered through fiscal variable.

5.5.5 Impulse Response of Money Supply with Other Shocks

Linking to impulse response functions with inclusion of variable of FP is, the alterations are the feedback to money supply from GDP shock is increasing but the degree of responsiveness is decreased in this model. With inclusion of FP, there is negative response shown by price shock therefore, the level turns slightly negligible after sixth period.

These two impressions demonstrate the FP shock induce no fluctuations to the track and degree of effect among the sample variables. For influence of monetary shocks to stock market is not affected from fiscal shocks. As we exchange exclusion of government expenditure with interest rate in the model, to check the impact of FP variable working without MP variable as impact for stock market performance to get conclusion of our results, they show corresponding impact.

5.6 Comparison of Coefficients

The comparison of both (Fiscal inclusion model and Fiscal exclusion) models are given below

Fiscal Inclusion Model

Table 5.6: Contemporaneous Relationship among Stock Market and other Variables

Estimator	Direction	C	S. E	z-Statistic	P
a16	sm-y	0.023	0.002	12.247	0.0000
a17	sm-p	0.009	0.001	12.247	0.0000
a18	sm-g	0.155	0.013	12.247	0.0000
a19	sm-m	0.026	0.002	12.247	0.0000
a20	sm-i	0.597	0.048	12.247	0.0000
a21	sm-sm	0.099	0.008	12.247	0.0000

Fiscal Exclusion model

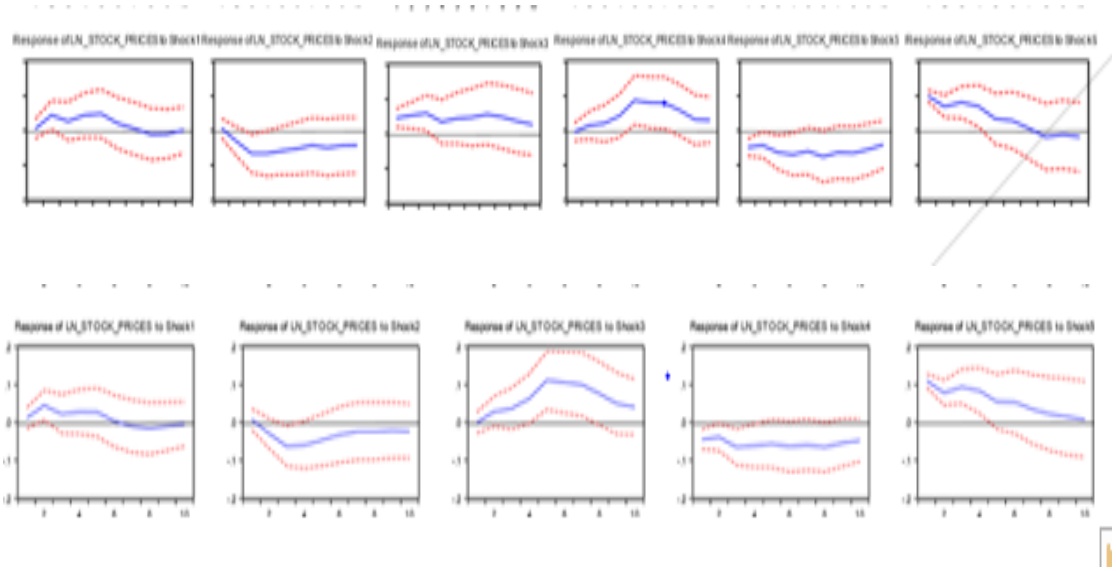
Table 5.7: Contemporaneous Relationship among Stock Market and other Variables

Estimator	Direction	C	S.E	z-Statistic	P
a11	sm-y	0.022	0.002	12.247	0.0000
a12	sm-p	0.009	0.001	12.247	0.0000
a13	sm-m	0.028	0.002	12.247	0.0000
a14	sm-i	0.734	0.059	12.247	0.0000
a15	sm-sm	0.109	0.009	12.247	0.0000

From above comparison of coefficients values show that in both models all variables have a positive and strong impact on stock market. The p-value of coefficients represented in both models depicts highly significant relationship exist between them.

5.7 Comparison of Impulse Responses

Comparison of impulse responses of both Fiscal inclusion and Fiscal Exclusion model is given below



CHAPTER 6

CONCLUSION AND POLICY IMPLICATIONS

6.1 Conclusion

The study analyzes the interaction of fiscal and monetary policies and its impact on stock market of Pakistan and to explain whether or not the macroeconomic fluctuations in the country is associated with the degree of variations in stock prices. This study uses data of stock market and main economic policy variables and employs SVAR to investigate the twin policies variables impact on equity market. This analysis hypothesized as fluctuations in equity market is associated with the interacting influence of macroeconomic policies that illustrates the economic situation of a country. This hypothesis has been examined by using a three-step procedure.

First, we construct an interacting dummy of fiscal and MP variables to check the level of interaction between policies. Second, we employed structural Vector Autoregressive(SVAR) model to examine the impact of policies proxy variables on stock market over the period 1998-2017, then we also analyzed the impulse responses of these variables on stock market. We discussed whether these policy variables influence the stock market over time.

Third, we construct a FP exclusion model for the purpose of inspecting FP importance in stock market working and macroeconomic environment. For this purpose, we use natural log series of important variables regarding to economic policies and equity prices in the model and estimate through structural VAR. SVAR results reveal that in which manner policy variables influence stock market and their strength over time. The coefficients estimated are enquiringly essential for the recognition of the simultaneous connection among main policy variables and stock

prices respectively. At the same time, difference with previous researches is that the variables are having positive and highly significant impression on stock prices. Equivalent results are reported in case of fiscal exclusion model.

Finally, using the evaluated SVAR, we produce the response of impulse functions for estimation of the effects of fiscal and MP shocks on stock market. Keeping in view, the results of impulse functions of stock market shock to government expenditure and interest rate is more responsive than to other variables.

In fact the results indicate that all of the variables are significantly related to stock markets over the selected time period. We conclude from our results that there has been no significant impact of twin policies interaction on stock prices, as the fiscal exclusion model shows that there is no variations seen in the results they are consistent with the results of fiscal inclusion model.

Last but not least it is concluded that as there are many existing studies which conclude that there is no remarkable coordination between fiscal and MP in case of Pakistan but there is no existing evidence on impact of policies interaction on stock market of Pakistan, so this study has been providing an evidence about the interaction of policies impact on stock market of our country.

6.2 Policy Implications

The empirical results of this study have important implications for the conduct of economic policy regarding the role that macroeconomic policies and stock market can play in Pakistan. As evident from the results, impact of policies in Pakistan has positive significance with the stock market of the country. By implementing favorable measures that can boost development of stock market, policy makers can develop strategies that can boost the role that economic policies and stock market can play in

economic development of the country. As evident from the results of the study that influence of policies on performance of the Pakistan's stock market has a consistent trend and progress has been made towards improving the regulatory framework, which is expected to increase stock market performance with regard to economic growth.

Nevertheless, it's a challenging task that needs necessary attention of policy makers to promote interaction of fiscal and monetary policies role in development of stock market.

With the existence of a positive relationship between stock market development and economic condition , it is relevant to suggest that there should be given a sustainable plan that can improve the production of both public and private sectors. In spite of that, as MP reflection on stock market is affected by FP. The development process of stock markets remarkably interlinked with collaboration of monetary and FP. These results are harmonious with persistent circumstances of Pakistan.

In Pakistan, fiscal and MP are not fully autonomous, and their transmittal way is not entirely segregated. They imply several political and economic constrictions and involvements as well as their joint effect and impressions on state of economy. It is not suitable to segregate the effect of any policy on stock market. Consequently, when investigating a related study of policies of economy , it is obligatory to consider interaction between both policies simultaneously.

This study targets impact of policies interaction on stock market in Pakistan for a period of 1998-2017. The research can be elaborated by increasing the time period of the variables or by changing number of variables in the study. For future,

the point of view of this study can be extend by changing the number of countries or domain on the basis of their geographical association or by determining influence of economic variables on stock market of Pakistan with respect to Islamic countries.

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APPENDIX

Vector Autoregression Estimates
Date: 07/16/19 Time: 17:36
Sample (adjusted): 1999Q2 2017Q4
Included observations: 75 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	LN_GDP	LN_CPI	LN_GEX	LN_M2	T_BILL_RATE	LN_STOCK_PRICES
LN_GDP(-1)	0.210131	-0.045994	1.191279	0.124466	-0.897398	1.742264
	(0.16691)	(0.06761)	(1.15583)	(0.21662)	(5.03189)	(0.88705)
	[1.25894]	[-0.68025]	[1.03067]	[0.57459]	[-0.17834]	[1.96410]
LN_GDP(-2)	-0.257508	0.112741	-0.072085	0.128492	1.367391	-0.812915
	(0.09886)	(0.04005)	(0.68456)	(0.12829)	(2.98021)	(0.52537)
	[-2.60489]	[2.81534]	[-0.10530]	[1.00154]	[0.45882]	[-1.54732]
LN_GDP(-3)	-0.185282	-0.011157	-0.018966	0.049340	-4.279709	0.662046
	(0.09410)	(0.03812)	(0.65165)	(0.12213)	(2.83694)	(0.50011)
	[-1.96892]	[-0.29267]	[-0.02911]	[0.40400]	[-1.50856]	[1.32379]
LN_GDP(-4)	0.735350	0.040149	0.188572	0.181992	-0.516466	0.461644
	(0.09369)	(0.03795)	(0.64881)	(0.12160)	(2.82460)	(0.49794)
	[7.84844]	[1.05781]	[0.29064]	[1.49669]	[-0.18285]	[0.92711]
LN_GDP(-5)	-0.454406	0.086929	-0.708961	-0.009717	-1.221789	-1.960265
	(0.14576)	(0.05905)	(1.00935)	(0.18916)	(4.39418)	(0.77463)
	[-3.11754]	[1.47224]	[-0.70239]	[-0.05137]	[-0.27805]	[-2.53057]
LN_CPI(-1)	0.035913	1.462619	-4.719820	-0.368072	31.44872	-3.171039
	(0.37221)	(0.15078)	(2.57751)	(0.48306)	(11.2211)	(1.97813)
	[0.09649]	[9.70042]	[-1.83116]	[-0.76196]	[2.80264]	[-1.60305]
LN_CPI(-2)	0.555453	-0.889353	5.219516	0.663039	-16.25948	1.713213
	(0.62799)	(0.25439)	(4.34873)	(0.81501)	(18.9321)	(3.33747)
	[0.88449]	[-3.49600]	[1.20024]	[0.81354]	[-0.85883]	[0.51333]
LN_CPI(-3)	-0.626686	0.615884	-3.165796	-0.078537	11.54982	2.028393
	(0.66574)	(0.26968)	(4.61016)	(0.86400)	(20.0702)	(3.53810)
	[-0.94133]	[2.28372]	[-0.68670]	[-0.09090]	[0.57547]	[0.57330]
LN_CPI(-4)	0.569326	-0.544409	5.037481	0.893622	-33.38090	2.070010
	(0.64564)	(0.26154)	(4.47092)	(0.83791)	(19.4640)	(3.43124)
	[0.88181]	[-2.08155]	[1.12672]	[1.06649]	[-1.71500]	[0.60328]
LN_CPI(-5)	-0.527730	0.222164	-1.997342	-0.909307	13.92924	-2.914132
	(0.37760)	(0.15296)	(2.61483)	(0.49005)	(11.3836)	(2.00677)
	[-1.39759]	[1.45241]	[-0.76385]	[-1.85554]	[1.22363]	[-1.45215]
LN_GEX(-1)	0.008984	0.007985	0.497491	0.001765	0.964523	0.112153
	(0.01958)	(0.00793)	(0.13562)	(0.02542)	(0.59040)	(0.10408)
	[0.45872]	[1.00651]	[3.66838]	[0.06943]	[1.63367]	[1.07757]
LN_GEX(-2)	-0.026425	0.007277	0.163121	0.028472	-0.468702	-0.007427
	(0.02015)	(0.00816)	(0.13955)	(0.02615)	(0.60755)	(0.10710)
	[-1.31123]	[0.89133]	[1.16887]	[1.08863]	[-0.77147]	[-0.06934]

LN_GEX(-3)	-0.010534	-0.011333	-0.190815	0.033600	-1.975085	-0.087613
	(0.01918)	(0.00777)	(0.13283)	(0.02489)	(0.57829)	(0.10194)
	[-0.54917]	[-1.45843]	[-1.43648]	[1.34970]	[-3.41538]	[-0.85941]
LN_GEX(-4)	0.028166	-0.000573	0.217035	-0.041581	-1.392443	0.141200
	(0.01920)	(0.00778)	(0.13297)	(0.02492)	(0.57889)	(0.10205)
	[1.46681]	[-0.07370]	[1.63218]	[-1.66854]	[-2.40537]	[1.38363]
LN_GEX(-5)	-0.010201	0.008392	-0.198635	-0.042915	1.278725	-0.103235
	(0.02289)	(0.00927)	(0.15848)	(0.02970)	(0.68992)	(0.12162)
	[-0.44576]	[0.90528]	[-1.25341]	[-1.44495]	[1.85344]	[-0.84881]
LN_M2(-1)	0.141169	0.016648	-1.586285	0.677637	1.230052	0.582512
	(0.13590)	(0.05505)	(0.94109)	(0.17637)	(4.09703)	(0.72225)
	[1.03877]	[0.30241]	[-1.68558]	[3.84208]	[0.30023]	[0.80652]
LN_M2(-2)	0.137658	-0.106669	2.591549	0.170430	-3.499512	-0.143518
	(0.14714)	(0.05960)	(1.01890)	(0.19095)	(4.43576)	(0.78196)
	[0.93558]	[-1.78964]	[2.54348]	[0.89252]	[-0.78893]	[-0.18354]
LN_M2(-3)	-0.141209	0.086002	-1.000839	-0.083010	2.708339	-0.299543
	(0.15603)	(0.06320)	(1.08046)	(0.20249)	(4.70377)	(0.82921)
	[-0.90503]	[1.36069]	[-0.92630]	[-0.40994]	[0.57578]	[-0.36124]
LN_M2(-4)	0.178428	-0.062616	0.719077	0.088049	-6.495020	1.186000
	(0.15624)	(0.06329)	(1.08192)	(0.20276)	(4.71009)	(0.83033)
	[1.14203]	[-0.98936]	[0.66463]	[0.43424]	[-1.37896]	[1.42836]
LN_M2(-5)	-0.117703	0.112766	-0.449980	-0.157903	1.574131	-0.921580
	(0.12077)	(0.04892)	(0.83628)	(0.15673)	(3.64074)	(0.64181)
	[-0.97464]	[2.30506]	[-0.53807]	[-1.00748]	[0.43237]	[-1.43590]
T_BILL_RATE(-1)	0.001711	2.36E-06	0.016596	-0.014395	1.132219	-0.014105
	(0.00515)	(0.00209)	(0.03565)	(0.00668)	(0.15521)	(0.02736)
	[0.33232]	[0.00113]	[0.46549]	[-2.15440]	[7.29459]	[-0.51551]
T_BILL_RATE(-2)	0.000288	0.001161	0.021408	0.008741	-0.299573	-0.011119
	(0.00605)	(0.00245)	(0.04191)	(0.00785)	(0.18245)	(0.03216)
	[0.04755]	[0.47363]	[0.51083]	[1.11293]	[-1.64196]	[-0.34570]
T_BILL_RATE(-3)	0.006229	-0.001580	-0.085765	-0.007460	0.046730	0.004347
	(0.00606)	(0.00245)	(0.04196)	(0.00786)	(0.18268)	(0.03220)
	[1.02791]	[-0.64380]	[-2.04388]	[-0.94864]	[0.25580]	[0.13497]
T_BILL_RATE(-4)	-0.006120	0.001216	0.098341	0.013883	0.067628	0.012652
	(0.00587)	(0.00238)	(0.04063)	(0.00761)	(0.17687)	(0.03118)
	[-1.04311]	[0.51183]	[2.42052]	[1.82325]	[0.38236]	[0.40576]
T_BILL_RATE(-5)	-0.002161	-0.000548	-0.041300	-0.003931	0.021683	-0.006799
	(0.00438)	(0.00178)	(0.03036)	(0.00569)	(0.13216)	(0.02330)
	[-0.49294]	[-0.30872]	[-1.36049]	[-0.69089]	[0.16407]	[-0.29184]
LN_STOCK_PRICES(-1)	0.061531	0.003399	-0.074343	-0.000677	1.236386	0.697841
	(0.02871)	(0.01163)	(0.19879)	(0.03726)	(0.86544)	(0.15256)
	[2.14340]	[0.29227]	[-0.37397]	[-0.01818]	[1.42863]	[4.57407]

LN_STOCK_PRICES(-2)	0.016964	-0.005757	0.220127	0.031210	-0.374129	0.251517
	(0.03440)	(0.01393)	(0.23818)	(0.04464)	(1.03692)	(0.18280)
	[0.49322]	[-0.41321]	[0.92419]	[0.69917]	[-0.36081]	[1.37595]
LN_STOCK_PRICES(-3)	-0.043021	-0.008534	-0.481804	-0.018398	1.610753	-0.120249
	(0.03124)	(0.01265)	(0.21632)	(0.04054)	(0.94175)	(0.16602)
	[-1.37719]	[-0.67436]	[-2.22726]	[-0.45382]	[1.71038]	[-0.72431]
LN_STOCK_PRICES(-4)	-0.004382	0.017204	0.787909	0.020235	-0.203753	-0.261201
	(0.03533)	(0.01431)	(0.24469)	(0.04586)	(1.06524)	(0.18779)
	[-0.12401]	[1.20196]	[3.22007]	[0.44127]	[-0.19128]	[-1.39095]
LN_STOCK_PRICES(-5)	-0.005118	-0.026254	-0.593871	0.037971	0.199378	0.174540
	(0.02702)	(0.01094)	(0.18707)	(0.03506)	(0.81442)	(0.14357)
	[-0.18946]	[-2.39910]	[-3.17451]	[1.08303]	[0.24481]	[1.21570]
C	-0.248145	-0.639954	-0.112755	2.011828	50.75195	-3.583205
	(0.70670)	(0.28627)	(4.89375)	(0.91715)	(21.3048)	(3.75575)
	[-0.35113]	[-2.23545]	[-0.02304]	[2.19357]	[2.38218]	[-0.95406]
DCOR_1_ANNUAL	0.000684	-0.003937	-0.013394	-0.004743	-0.133343	0.034093
	(0.00802)	(0.00325)	(0.05556)	(0.01041)	(0.24189)	(0.04264)
	[0.08531]	[-1.21133]	[-0.24107]	[-0.45546]	[-0.55127]	[0.79953]
R-squared	0.994070	0.999789	0.975500	0.999298	0.973957	0.993012
Adj. R-squared	0.989795	0.999637	0.957837	0.998791	0.955183	0.987974
Sum sq. resids	0.022022	0.003614	1.056035	0.037092	20.01476	0.621996
S.E. equation	0.022631	0.009167	0.156713	0.029370	0.682246	0.120271
F-statistic	232.5379	6570.702	55.22855	1973.386	51.87558	197.1049
Log likelihood	198.5745	266.3481	53.44085	179.0242	-56.88221	73.29120
Akaike AIC	-4.441986	-6.249283	-0.571756	-3.920644	2.370192	-1.101099
Schwarz SC	-3.453191	-5.260488	0.417039	-2.931849	3.358987	-0.112304
Mean dependent	3.127950	4.376337	12.20303	15.44820	8.573398	9.092373
S.D. dependent	0.224026	0.481019	0.763200	0.844747	3.222682	1.096721

Determinant resid covariance (dof adj.)	2.50E-15
Determinant resid covariance	8.87E-17
Log likelihood	747.5379
Akaike information criterion	-14.81434
Schwarz criterion	-8.881573