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

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

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Abstract

This study highlights the interaction among fiscal and monetary policy and its impact on stock market of Pakistan. This study found that there is minimum degree of coordination i.e., 34% between fiscal and monetary policy. This study employs structural vector autoregressive (SVAR) model on macroeconomic variables and stock prices, over the time period of 1998Q1 to 2017Q2. The empirical results of the study conclude that policy variables are having positive and highly significant impact on stock prices. These results are consistent with the fiscal exclusion model. The study recommends the enhancement in the 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
JEL: E44, E52, E62, E63, G19

Introduction

Stock market performs a dynamic role in economic development of a country. It plays a medium of financial mobilization of resources between borrowers and lenders in various sectors of the economy. It is also an indicator of financial climate of the state. For example, in growing economies the overall output is increasing and most of the firms are experiencing profitability. This higher profitability enables the companiess to pay higher dividends to shareholders that encourages buying and raising the stock prices (Thanh et al., 2017). As stock market is the reflection of economic conditions of the economy, therefore, it is very responsive to the changes in macroeconomic activities. One way to observe the change in economic conditions of the countryis by observing its macroeconomic policies, these are, monetary and fiscal policies.

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

In contrast, with 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 sticky in short run, therefore, state bank regulates the actual interest rate and it affects both existing and anticipated future interest rate, which in turn influences the timing of investment decisions. Therefore, monetary Policy directly influences the share prices with the help of 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 & Gertler, 2007; Bjornland & Jacobsen, 2008; Bjornland & Leitemo, 2009; Castelnuovo & Nistico, 2010) furthermore, Kurov (2010) uphold that equity market prices are ed on future predictions and carry related information about future expectations. In return the monetary policy fluctuations critically impact these predictions. Thus, probably there is a great interconnection between equity prices and monetary policy's structure.

The expansionary fiscal policy boosts the economic development and stock market, whereas, contractionary fiscal policy discourages the economic growth. Likewise, low rate of interest under monetary policy encourages growth of economy and high reaching interest rate discourages the growth of economy and stock return. The net effect of both monetary and fiscal policy depends upon the interaction of these strategies.

When one contractionary (expansionary) policy is followed by another expansionary (contractionary) then both policies serve as alternatives. Forexample, when fiscal policy makers decrease expenditure or increasetaxes, at that time the monetary policy makers should respond to this by dropping the rate of interest and same is repeated inversely. These twin policies perform as strategic complements, whereas, contractionary (expansionary) strategy of one regulatory body is encountered by contractionary (expansionary) policy of the other (Jansen et al., 2008).

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

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; Jusoh et al., 2015; Thanh et al., 2017) etc., but in case of Pakistan as per my knowledge there is no such a single study that attempts to explore the effect of twin policies on stock prices of Pakistan. The most of the work related to this topic is focused either on the effect of macroeconomic indicators volatility resulting on stock market, or causal relationships among the macroeconomic indicators and stock returns, however, the literature is silent about interactions of monetary and Fiscal Policy and their influence on the stock prices. In Pakistan effect of fiscal and MP regarding to stock market returns has been separately patterned. Keeping in view the literature gap, this study tries to fill this gap.

The key subject discussed 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.

Against this background, the purpose of the paper is to evaluate the impact of fiscal and monetary policies tools on equity market of Pakistan and also to see the interaction of these two policies.

Following the introduction, the rest of the study is designed as section 2 will go through the review of literature, section 3 is related to the data and methodology of this study, section 4 describes the theory of monetary and fiscal policy interaction, section 5 debates the empirical outcomes of this study, at last section 6 holds the concluding observations of the study.

Literature Review

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. Considerable literature is available that covers the interaction of policies among different nations. Unfortunately the literature on fiscal and monetary policy interaction is available widely for the developed countries and this topic pay lesser attention (for unknown reasons) on the developing countries and Pakistan is no exception.

Literature Related to Fiscal and Monetary Policy Interactions

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 the monetary policy. The effectiveness of monetary policy significantly depends on the behavior of fiscal authorities. 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 authorities result 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. Rotemberg and 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 Hagen et al. (2001) finds 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; Wyplosz, 1999) generally supports the dictum that two policies are strategic substitutes of one another. Dixit and Lambertini (2000) investigates the degree of interdependence between treasury and the monetary authorities. 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.

Brunila et al. (2001) recommends 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 the 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 the fiscal policy's repose time. 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 out 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 as compared 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. Obinyeluaku and Viegi (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 is.

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 makes it difficult to assess the impact and know the causes of frequent changes in economic policies. Keeping in view 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 each authority.

Literature Related to Fiscal and Monetary Interactions with Stock Market

Equity market demonstrates the economic situation of a country through its movements along the changes in economic policies. As narrated by Galbraith in (1995) " the equity market is reflecting the underlying situation related to economy". Therefore, "stock markets respond according to facts" 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 on track. However, stock prices are generally thought out as reacting to the external forces (even yet they may respond to the other variables). It is clear 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 both the policy interactions and movements of stock market together. (Muscatelli & Tirelli, 2005; 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, at given inflation, policy and rate of exchange. Besides estimating the impact of MP and FP on stock market individually, empirical research has been performed by many researchers, to determine how stock market is affected by the combination of these policies. Researchers not only explore that the interaction between MP and FP in explaining the activities of stock market but also try to find out the changes in stock markets that are connected with the changes in both macroeconomic policies.

Handoyo et al. (2013) in general, evaluated stock prices' response to the macroeconomic policy shocks, in case of mining, agricultural, manufacturing and financial sector in particular. Overall, MP shock positively impacts 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 Malaysian 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 & Sousa, 2011, Van Aarle et al., 2003) shed light on importance of integration between fiscal and monetary policy investigation using 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 of macroeconomic variables on stock market using event study approach. The study explores the impact of 2007 crisis on the economy, therefore, uses the data from July 2007 to June 2009. The findings suggest that taxes have strong negative influence on the stock prices of Pakistan. The government expenditures also had very strong positive association with the stock market of Pakistan.

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 belonging to the policy interaction and the impact on stock market is quite limited. It splits the studies into three different types. Some studies found the effect of fiscal and MP on stock market and very few studies belong to the interaction of twin policies. Moreover, the above few studies have discussed the macroeconomic variables' impact on stock market. This study is going to contribute a lot to the existing literature for the case of Pakistan by providing the evidence about monetary and FP interactions and also their combine shocks to stock market.

Methodology

The key objective of this study is to explore the dynamic association among fiscal and monetary policy 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 fiscal policy, money supply M2 (m_t), interest rate (3-months T-bill rate) (m_t) as monetary policy 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 (Hu et al., 2018). The P-order SVAR model is represented in the general form as

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

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 Ω.

Multiply both sides of equation 3.1 with $_0^{-1}$ to get the reduced VAR system correspondingly, as

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

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 $_0$. These restrictions in our estimation model can be explained, as

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.

Restriction on Prices

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

Restriction on Government Expenditure

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

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).

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 & Roubini, 2000; Van Aarle et al., 2003; Sims & Zha, 2006a, 2006b; Elbourne, 2008) and for effect of shock by stock market prices (Bjornland & Leitemo, 2009).

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.

Fiscal Exclusion Model

The study 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.

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.

Variable Selection and Data Sources

To investigate the dynamic effect of fiscal and monetary policy 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 fiscal policy 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. Quarterly data on government expenditure and GDP from 1998 to 2010 are obtain from (Hanif et al., 2013). Remaining data series are generated by multiplying the average quarterly share (obtained from quarterly data series from 1998 2010) to the annual figures. Stock prices are obtained from Karachi Stock Market (khistocks) and remaining data is collected from IFS.

It is remarkable to note that no argument in the literature exists with respect to the usage of the most suitable means of identification of fiscal policy performance for example, expenditure, taxes or budget deficit, (Afonso & Sousa, 2011). Additionally, Fatas and Mihov (2001) practice deviations in expenditure to see fluctuations in fiscal policy. Many models use diverse economic changes resulting to variation in fiscal expenditure, whereas impact of revenue deviations is qualitatively same (Fatas & Mihov, 2001). For this purpose government expenditure is used by this study for the detection of fiscal policy changes. All variables are expressed in natural log form except interest rate.

Theory of Monetary and Fiscal Policy Interactions

The debate regarding to both fiscal and monetary policy interaction starts when the two institutions work independently, not less than functionally. When actions of any one institute are reliant on the functions or obligations of the other institute, then interactions are certainly recognized. The common observation in case of developing economy like Pakistan is that the state bank is submissive to the fiscal institutions. In the framework of organizational system, it may be valid, though, the real implementation of monetary authorities can be self-regulating of fiscal compulsions. Arby and Hanif (2010) established the independence of fiscal and monetary policy during the time span of 1965-2009. The present study also follows the methodology of Arby and Hanif (2010) to measure the monetary and FP interaction using 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 1

Policy Shocks Matrix

GDP Growth	Inflation	
	Positive	Negative
Positive	PP	PN
Negative	NP	NN

The economic performance instruments used in this study are indicated by GDP growth and inflation. However, policy response essentially emphasize on the shocks related to inflation and GDP. The matrix presented in Table 1 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 2.

Table 2

Matrix of Policy Responses

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

When both GDP growth and inflation are subject to positive shocks, tight MP needs to be implemented in order to control inflation as well as FP also needs to trail down or have not to be expansionary. This describes the policy mixture as CC, and here it is considered as policy interaction. Alternatively, when GDP and inflation both are curbed through negative shocks at that point of time both fiscal and MP have to be expansionary in their behavior. Above-mentioned interaction of policies is represented by EE in Table 2. 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 made by Mubarik and Riazuddin (2005) for the case of Pakistan.

The fiscal and MP attitudes are demonstrated by changes in government expenditure and variation in T-bill rate respectively. An expansionary behavior represents a positive variation and a contractionary behavior is represented by a 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

$\rho = \omega/\sigma$
ω = n(PP∩CC)+n(PN∩CE)+n(NP∩EC)+n(NN∩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 ρ=1) and in case of ρ =0 there exist no interaction. Especially, this form of interaction is that of revealed interaction which may or may not be resultant of appropriate debate between the two authorities.

Empirical Evidence of Policies Coordination

Specifying the individuality among the fiscal and MP indicators employed in the study, level of discovered interaction is restrained to the fractions 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 3 and Table 4 denote a group of years that represent mixtures of economic shocks and fluctuations detected in indicators of policy response. Table 3, shows the cell in upper-left represents 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 and Riazuddin (2005) in case of Pakistan as (9 percent).

The cell of lower-left matrix illustrates the years where GDP growth was under exemplary mean and inflation stood above the threshold. Likewise, in Table 4, the upper-left portion of matrix displays the years where the figure of both fiscal and MP measures reduced presents contractionary attitude of both the policies. The lower-left portion indicates the years where the number of FP measures is enlarged whereas the MP measures are reduced.

Table 3

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,

Table 4

Policy Response Matrix

Fiscal Policy	Monetary Policy	
	Contractionary	Expansionary
Contractionary	2004:3,2005:2,20z06:3,2006:4,2007:2, 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,

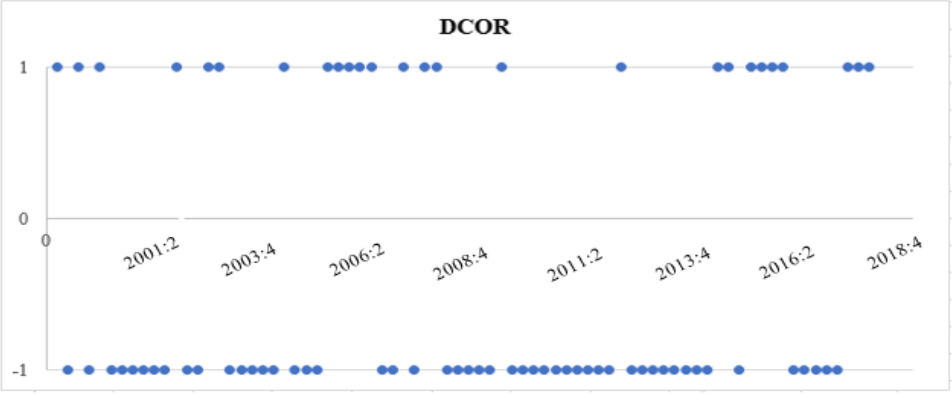
Fiscal Policy	Monetary Policy	
	Contractionary	Expansionary
Expansionary	1999:2,2000:2,2000:3,2002:1, 2003:2, 2004:1,2012:1,2012:2,2012:3, 2012:4, 2016:1,2016:2,2016:3,2016:4,	2017:2,2017:3,2017:4 1999:1,1999:3,1999:4,2000:1,2001:4, 2002:2,2002:3,2002:4,2003:1,2003:4, 2009:4,2010:1,2010:2,2011:4,2013:1, 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 and 4, 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 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 are simply figured 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 find insignificant impact of DCOR on the macroeconomic variables under analysis.

Estimations and Results

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.

Estimation of SVAR

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

Impact of Fiscal and MP Variables on Stock Market

Table 5

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 in the form of equation set up through the short run method of restrictions. Although, findings and association between them are discussed below in the equations form that can be seen in Table 5. The below equations (5.1) - (5.6) are describing the results of SVAR model and the impact of policies on stock market. The concept behind gross domestic product (Y) at order first is that it should not

contemporaneously respond to the fluctuations of various variable in system.

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

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

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

Prices negatively impact GDP, when price level in a country increases then purchasing power decreases 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.

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

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

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

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

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

The association between y_t and i_t is negative, one percent increase in y_t in results in decrease of i_t by 7.74 percent. p_t negatively affect and one unit increase in p_t decreases i_t by 25.16 unit. g_t and i_t corelate positively, one

unit increase in government expenditure increases interest rate by 0.204 unit.

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

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 as indicated by 1.15 units. The impact of p_t shocks on sm_t is positive and p_t decreases sm_t prices by 2.831 unit. g_t and sm_t prices negatively relate to each other and it decreases stock prices by 0.282 unit.

Impulse Response Functions

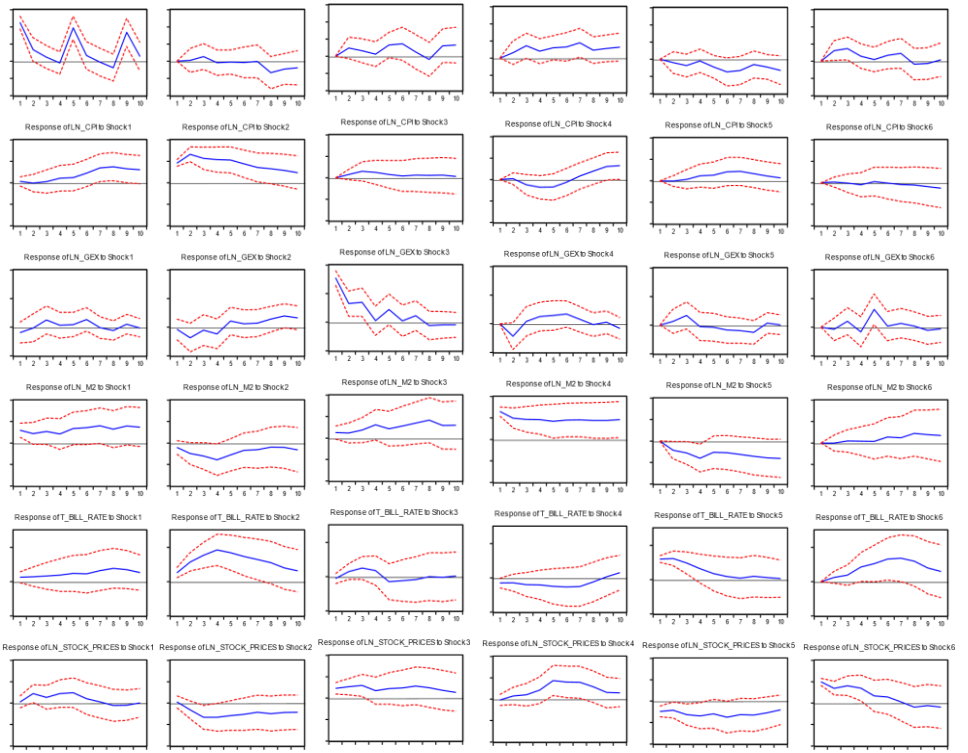
Shocks display by 1–6 in Figure 5.1 are respectively shocks from y_t, p_t, g_t, m_t, i_t, sm_t. Hence, the first row displays the impulse functions of y_t and other shocks, second row represents the responses functions of yt to other shocks, third row denotes impulse function of government expenditure 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's FP and MP have a notable effect on prices of stock market. First, positive fiscal shocks provide the stock market with a condition suitable for better performance. Second, a positive m_t shock originates 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 1

Impulse Responses of All Variable Shocks to Others and Stock Market Performance



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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 finding indicates that equity markets' response to the MP deviations is reliant on the degree of economic growth. When economy is declining, stockholders' sight economic scenario negatively, so regardless of relatively expansionary quantity of money, the stock prices can continuously decrease. As the stock market shows negative feedback to "good news".

Though, during the sample period of study, there was no rate of interest autonomy in Pakistan, salient 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 the final impact 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 implemented, policy remains unable to create any notable impact on stock prices.

Fiscal Policy Impulse Responses to other Shocks

Firstly, the impact of y_t shocks on policy variables is increasing. In the start 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 magnitude of this impact is too small. The positive feedback of fiscal variable to output and prices recommends that in the sample period FP shows pro-cyclical patterns. That outcome is steady with the observations of (Hu et al., 2018).

Monetary Policy Responses to Other Shocks

Starting the discussion with the impact of output shock on Monetary Policy, it shows decreasing trend, and the level of this impact increases gradually. Secondly, the effect of prices on MP is positive but the is very small.

Money Supply Responses to Other Shocks

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

Generally, impulse response is considered as an image of the relationship existing between any of the two variables, and it indicates 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.

Importance of FP in Basic Model?

At present, research on the impact of monetary variables to stock market is ample, although very few of these investigate fiscal and monetary

interaction to disclose the collaboration. In the following section we estimate our original model without the FP variable. To compare these contemporaneous relationship and impulse response functions are needed to be discussed prior to empirical findings. In conclusion, we obtain results of independency of both policies and impact of monetary policy on stock market fluctuations while excluding the fiscal policy (FP) variable.

Fiscal Exclusion Model

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

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 show prominent simultaneous relationship with performance of stock market. The results of previously estimated model are also consistent with the results of re estimated model.

Table 6

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

Estimator	Direction	C	S.E	z-Statistic	P
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) are describing the results of SVAR for the impact of policy variables (with exclusion of fiscal indicator) on stock market.

$$\mathbf{Y = 0.022}\ \varepsilon_{yt} \tag{5.7}$$

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

$$\mathbf{P = -0.014}\ \varepsilon_{yt} \mathbf{+0.009}\ \varepsilon_{cpi} \tag{5.8}$$

Prices have negative impact on GDP, when price level of a country increases then purchasing power decreases and transmit a negative impact on output, as results depict that there is negative association between both variables, one degree rise in y_t decreasse p_t by 0.014 percent and its own effect is positive and significant. In this analysis the values may differ slightly but direction of the relationship remains same.

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

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

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

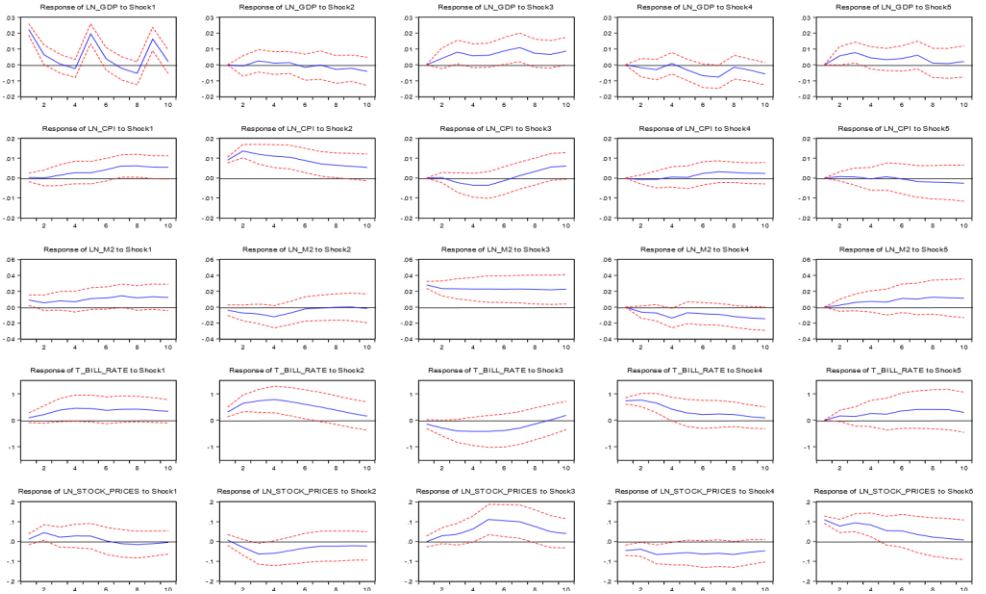
There is negative association between GDP and interest rate, one percent increase in GDP decreases interest rate by 5.88 percent. Price negatively impacts interest rate and one unit increase in price decreases the interest rate by 32.473 units. The impact of ε_{m2} on interest rate is positive having magnitude of 5.128 unit. The own effect of interest rate is also positive and significant.

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

Stock prices relates negatively to GDP with the magnitude of GDP coefficient of 0.863 unit. The impact of price level on stock market is also negative and price level decreases stock prices by 2.822 unit. m_t and i_t cause positive influence on stock prices and increase stock prices by 0.332 and 0.061 unit respectively. The own effect of stock market is positive and significant. The coefficients a11 and a12 show the relationship among GDP, price shocks, and stock market is persistently negative and highly significant. Therefore, whether the FP variable is included or excluded, MP variable shocks have positive contemporaneous relationship with stock prices.

Figure 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.

From the evaluation of the contemporaneous results of basic model which comprises FP it is observed that 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 is influenced by fiscal variable, and interaction among fiscal and MP create no explicit impact with stock prices.

Response to Structural One S.D. Innovations ± 2 S.E.

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, similar to the findings of previous model. Money supply response to stock market performance also indicates rising trend. Macroeconomic variables like GDP shows a positive shock firstly, although the positive stimulus only lasts for relatively short time span which turns to negative after sixth period but the lmagnitude of declining trend is very small. Price reaction to stock market shock is declining over the sample period but after the sixth period the degree of response is minimal.

Monetary Policy Response with Other shocks

In relation to the impulse response functions having FP variable, the fluctuations related to income shock constantly have a positive influence on monetary side, but the magnitude of response is high when FP variable is included in the analysis. inclusion. The response to i_t is still positive but degree of responsiveness is lower in fiscal exclusion model. The degree of stock market shock also changes in this model which is lower than previous one but still increasing. According to the results of fiscal exclusion model it is concluded that the response of monetary variable on stock prices is not triggered by fiscal variables.

Impulse Response of Money Supply with Other Shocks

Linking to impulse response functions with inclusion of variable FP, the response of money supply to GDP shock is increasing but the degree of responsiveness is decreased in this model. With inclusion of FP, the negative response is shown by price shock and its magnitude becomes

slightly negligible after sixth period. These two impressions demonstrate the FP shock induces no fluctuations to the direction and degree of impact among the sample variables. The influence of monetary shocks to stock market is not affected from fiscal shocks. When we replace government expenditure with interest rate in the model, to check the impact of FP variable working without MP variable, they show consistent impact.

Comparison of Coefficients

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

Fiscal Inclusion Model

Table 7

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 8

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

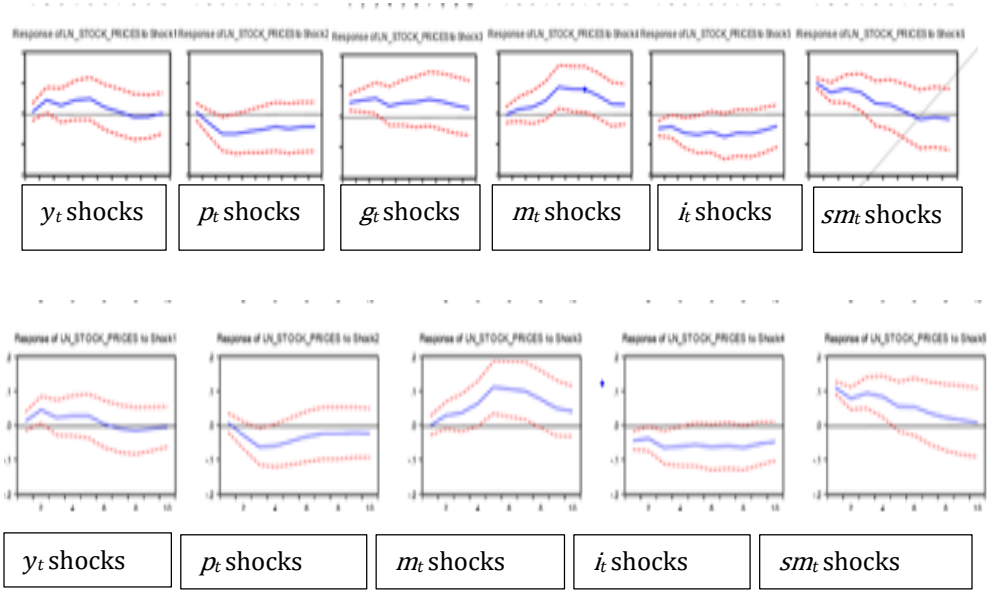
From above comparison of coefficients values it is indicated that in both models all variables have a positive and strong impact on stock market. The p-value of coefficients represented in both models depicts highly significant relationship exist between them.

Comparison of Impulse Responses

Comparison of impulse responses of both Fiscal inclusion and Fiscal Exclusion model is given in Figure 5.3. It is clearly evident that exclusion of FP induces 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.

Figure 3

Responses of All Variable Shocks to Stock Market



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

Conclusion

The results indicate that all of the variables are significantly related to stock markets over the selected time period. The results conclude that there has been no significant impact of twin policies interaction on stock prices,

as the fiscal exclusion model shows that no variations are seen in the results as they are consistent with the results of fiscal inclusion model.

Many existing studies 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 paper provides evidence about the interaction of policies' impact on stock market of our country.

In Pakistan, fiscal and MP are not fully autonomous, and their transmission mechanism is not entirely segregated. These policies imply several political and economic contractions and involvements as well as their joint impact and impressions on state of economy. It is not suitable to segregate the impact of any policy on stock market. Consequently, it is obligatory for Ministry of Finance and State Bank of Pakistan to consider interaction between both policies simultaneously as they are very conscious about output and inflation. Fiscal system is very careful about output, and monetary establishments usually focus on monitoring inflation. Nevertheless, it's a challenging task that needs necessary attention of policy makers to promote interaction of fiscal and monetary policies for the development of stock market.

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