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Stock market response to fiscal and monetary policy interaction: Evidence from Nepal

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Abstract

Fiscal Policy (FP) and Monetary Policy (MP) are the two most important macroeconomic policies for the sustainable economic growth of the country. Both FP and MP influence the real economy, and the stock markets are an important channel to transmit such effects. This study examines the relationship between FP, MP and stock markets' performance using the Structural Vector Auto-Regressive (SVAR) methodology. The variables have been grouped into two blocks as the standard form models of SVAR for a small economy. FP shocks are measured by government expenditure, whereas interest rate, inflation and money supply are the variables to measure the MP shocks. The findings of the study shows that GDP has a positive and inflation has a negative effect on the stock markets, while government spending has almost no effect on the stock markets of Nepal. The money supply has a positive effect on the stock markets, while the interest rate shock measured by the change in 91 days Treasury bill rate shows a negative contemporaneous effect on the stock markets.

Keyword: Fiscal Policy, Monetary Policy, Policy Interaction, Stock Markets, SVAR
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BACKGROUND

The stock markets play a vital role in the economy by providing a venue for companies to raise capital through the sale of shares, stocks, and other securities. This capital can be used to finance business expansion, research and development, and other investments that promote economic growth (Antonios, 2010). The performance of the stock markets is closely tied to a company's financial health, which depends on the strength or weakness of the economy, and the true value of its stock should reflect expected cash flow or dividends. These dividends should, in turn, reflect real economic activity as reflected in real output or industrial production. Therefore, the overall development of the economy is closely connected to the performance of the stock markets and is a key factor in economic growth. The development of the stock markets contributes to economic growth through many channels (Pradhan, 2018; Yartey, 2008).

Fiscal policy (FP) explains how revenue is generated and how it is redistributed back to the public through the ministries and other government channels for various purposes. The policy also shows whether the government has adopted an expansionary or contractionary fiscal stance. An expansionary policy supports activities such as an increase in public debt that would increase production, decrease unemployment and reduce tax, whereas the contractionary FP supports activities that increase tax, decrease public debt, decrease production and so on. Through the FP, the ruling party makes various changes in the law in a Westminster parliamentary system which affect the operation of the private sector. According to Pástor and Veronesi (2012) the government sets the rules of the game through this policy. The changes in the rules occur in the form of levying tax, providing subsidies, environmental policies and regulations, providing a level playing field, and so on. According to Tobin's theory of general equilibrium, the stock markets play an important role in intermediation between the real and financial sectors of the economy.

The central bank or the monetary authority around the world operates monetary policy (MP) with the objective to control the money supply in the economy to stabilise the macroeconomic indicators for economic prosperity. The MP innovations by the monetary authority affect the stock markets through various channels such as interest rate channel, credit channel, exchange rate channel, assets channel (wealth effect) and Tobin's Q theory (Chatziantoniou et al., 2013; Lawal et al., 2018). According to Mishkin (2001), the stock markets not only provide policy feedback to the monetary authority

but also play an important role in the transmission mechanism of the MP.

FP and MP are the two most important macroeconomic policies for sustainable economic growth of the country. MP and FP are most often interrelated as both drive the economy to a higher trajectory. Ineffectiveness of either policy may prompt either the government or the central bank for an intermediate review of their policy. The features of both FP and MP are transmitted to the stock markets. Small changes in the policy have the potential to lead to disruptions of the financial markets, which have a linkage to the entire economy and eventually create systemic risk. In practice, the government and the central bank cannot go against each other in policy formulation; this mutual coordination between the formulation of MP and FP may create considerable challenges as there exist various dynamic interactions in the policy mix. In such circumstances, the desired outcome from the policy activities may be hazy with the existence of feedback loops. The empirical analysis of such interaction is important for the policymaker in the decision-making process. Chatziantoniou et al. (2013) also suggest that the effect of economic policy on the financial markets should be viewed in tandem rather than in isolation.

In the context of Nepal, no empirical study has yet examined the response of the stock markets to the interaction between MP and FP; whenever such analysis has been attempted, the policies have been examined individually. Despite various studies on the nexus of MP, FP and the stock markets, the interaction effect of these policies has often been neglected. Ergo, this research attempts to answer the question whether there is an intertemporal relationship between FP, MP and the stock markets in Nepal.

In recent years, the breadth and depth of the Nepalese capital markets are increasing as the stock markets' capitalisation has nearly reached the level of GDP of the country. With the increase in the size of the market, the higher level of inefficiency creates an uneven playing field, formation of unprecedented events, creation of bubbles and crashes, so it is essential to examine the transmission mechanism of MP and FP to the stock markets. The results of this study will facilitate policymakers in the formation of consistent policy. Also, the study will provide evidence on the interaction effect of MP and FP in the context of Nepal, which has been neglected by the existing literature in the field of financial economics in Nepal. The results will also add a reference point for future literature in the context of developing economies.

LITERATURE REVIEW

The academic underpinning of conducting a study to analyse the effect of FP on the stock markets or asset pricing was set by Blanchard (1981), Shah (1984), and Tobin (1969). Tobin (1969) lays the theoretical foundation to analyse the effect of FP on the asset market, which focuses on the effect on interest rates and the confidence effect of long-run sustainability of the budgetary position. The study further explained how both budget deficits and monetary growth can have significant impacts on stock returns. According to Blanchard (1981), the stock markets and increases in output are both effects of a change in policy, not one causing the other. They are not mutually exclusive or have a one-directional cause-effect relationship. According to Shah (1984), in the short term, the stock markets' prices of capital may experience sudden changes as a result of the implementation of money-financed expansionary fiscal policies.

FP and Stock Markets

The effect of FP on economic activities has been in continuous debate for an extended period. There are basically three ways of defining the impact of FP on economic activities: the classical approach, the Ricardian approach, and the Keynesian approach (Foresti & Napolitano, 2017). The theoretical concept of the Keynesian model views that an appropriately timed deficit has beneficial consequences through the stimulation of both consumption and national income. The classical model argues that expansionary FP adopted by the government causes an increase in interest rates. In other words, if the government wants economic resources to be fully employed, that also increases consumption and decreases saving. In those circumstances, the interest rate increases and such increases in interest rates demotivate private investment decisions, which results in the crowding-out effect in the economy. The Ricardian model argues that private saving from rational households offsets public borrowing, so there will be no impact on aggregate demand (Mankiw, 2000). The stock markets can react positively, negatively, or inconsequentially depending upon the approach adopted in FP. The stock markets are supposed to react positively in the Keynesian approach, negatively in the classical approach, and inconsequentially in the Ricardian approach (Chatziantoniou et al., 2013).

The initial study of Tobin (1969) analyses the impact of FP on stock markets returns and initiated the discussion on the bilateral linkage between the real economy and the financial sector. The study provided important evidence

on how the commodity and labour markets are affected by FP, which has an impact on the financial asset markets through the influence on income, prices, and wages. Darrat (1988) investigates the empirical relation between stock returns and FP. The results of the study show that changes in the stance of FP play an important role in determining stock returns.

Foresti and Napolitano (2017) investigates the effect of FP on stock markets indices in the 11 members of the Eurozone. Based on evidence of non-neutrality, the results of the study show that the stock markets are influenced by FP. More specifically, the stock markets will either go up (or down) with the decrease (or increase) in the public deficit. The study also suggests that the financial and debt crises channelled through stock markets downturns can be avoided through FP.

Chatziantoniou et al. (2013) employs the structural VAR model to conduct a study to investigate the effect of FP, MP, and their interaction. A similar kind of study was conducted by Mbanga and Darrat (2016), where the researcher investigated whether MP and FP influence the performance of stocks in the US. The researcher identified the presence of a potential long-run relationship of FP with stock prices, but not with MP. The study shows that information from FP has an effect in the short run and long run on the real economy, and the stock markets are an important channel to transmit such effects.

Pástor and Veronesi (2012) demonstrate that heightened government policy uncertainty generally leads to large, negative stock markets reactions to policy announcements, assuming that anticipated policy changes yield only modest positive returns due to prior market pricing.

Akitoby and Stratmann (2008) examine whether the financial markets are affected by the composition of fiscal adjustment. The researchers identified that the interaction of a fiscal variable with political institutions affects the financial markets. Information through FP, such as lowering current spending, the composition of spending, spreads, and investment, also affects the financial markets.

Akitoby and Stratmann (2008) introduced FP into an empirical model of spreads to examine the linkage between fiscal adjustment and the financial markets. The study shows that financial markets are affected by the interaction of fiscal variables with political institutions. However, private investment

does not react significantly to large fiscal adjustments in the study conducted in OECD countries (Alesina et al., 2002).

MP and Stock Markets

Through MP, the central bank attempts to control the circulation of money in the economy. According to the information hypothesis, whenever investors receive new information, the information is absorbed in the stock price (Mahajan & Singh, 2008). On the basis of the information hypothesis, changes in MP are also absorbed by the stock markets. The various innovations adopted through MP affect the stock markets through various channels (Holm et al., 2021; Prukumpai & Sethapramote, 2019). Recent literature suggests that economic development can be reflected by changes in equity price movements, so the monetary authority considers subsequent developments in the equity markets while formulating MP (Chatziantoniou et al., 2013). The transmission mechanism of the interest rate channel under traditional Keynesian theory views that a rise in interest rates increases the cost of capital and this lowers the present value of firms' future cash flows and ultimately reduces stock prices (Lawal et al., 2018). Suhaibu et al. (2017) examine the impact of MP of selected 12 African nations on the stock markets and observed that the transmission of MP to the stock markets is directed through the interest rate channel. Similar results for the transmission of MP through the interest rate channel have been observed by Ippolito et al. (2018), Papadamou et al. (2014), and Vo and Nguyen (2017).

The next transmission mechanism of MP in an open economy is the exchange rate channel. Under the exchange rate channel, there is the 'flow-oriented model', which argues that interest rates positively influence the exchange rate, and the 'stock-oriented model', which argues that stock prices are negatively influenced by the exchange rate (Ali et al., 2014). Mishra and Montiel (2013) observe that the transmission mechanism of MP through the exchange rate channel is weak or even non-existent in developing and closed economies. The other channel of transmission of MP is the asset price channel, and there are two further sub-channels under the asset price channel: the wealth effect channel and Tobin's Q theory (Tobin, 1969). Modigliani's life-cycle model, expectation theory, and quantity theory are other theories on the monetary transmission mechanism.

Almutair (2015) examines the connection between money supply and stock prices in the Saudi Stock Exchange, using data from 1985 to 2013. The study used cointegration analysis, Granger causality testing, and an error correction

model to draw conclusions. The findings indicate that stock prices have a long-term influence on money supply and there is a positive correlation between money supply and stock prices in the Saudi Stock Exchange over the long term.

Empirical Evidence on the Interaction of FP and MP

In the field of fiscal and monetary economics, various studies (Büyükbaşaran et al., 2020; Dungey & Fry, 2009; Gerba & Hauzenberger, 2013; Muscatelli et al., 2004) show that FP and MP are interdependent, with shifts in one often prompting adjustments in the other. Evidence highlights channels such as the impact of fiscal expansion on inflation expectations and interest rates, and the influence of MP on government borrowing costs and fiscal balances. Key areas of interaction include aggregate demand management, inflation control, debt sustainability, exchange rate dynamics, and coordinated responses to economic crises. According to Reade (2011), in the US, FP tends to take the lead while MP follows, meaning that FP actions are typically accompanied by relaxed MP.

The success of MP is greatly influenced by the actions of fiscal authorities, and the effectiveness of FP is greatly influenced by the implementation and execution of MP (Hina & Abbasi, 2021). The interaction between FP and MP has implications for inflation and the output gap. The interaction of FP and MP can occur in the following ways:

- Both policies have a co-movement effect and the policies can be complementary or substitutable to each other, and
- Both policies move in the opposite direction and the policies are conflicting or competing with each other.

Nordhaus et al. (1994) found that when FP and MP are not coordinated, it can lead to negative outcomes for the economy, such as high inflation, large budget deficits, and high interest rates. This lack of harmony can also discourage private investment, which can hinder economic growth. Büyükbaşaran et al. (2020) explain the dynamics between fiscal and MP, as they are complementary in response to demand and supply shocks, whereas they are substitutes in nature when the shocks are created by each policy itself.

There are few studies which examine stock markets responses to the interaction of monetary and fiscal policies, as most existing literature on policy interaction focuses primarily on their complementarity or substitutability.

Afonso and Sousa (2011), Chatziantoniou et al. (2013), Hu et al. (2018), Lawal et al. (2018), and Prukumpai and Sethapramote (2019) present that the interaction of FP and MP is crucial to explain the financial markets. Taleb Tawfiq and Tahtamouni (2018) examine the impact of MP and FP on stock returns in the Amman stock exchange and found a positive impact of inflation on stock returns in the period of 2006 to 2016. A long-run cointegration relationship was also observed between the MP and FP variables.

Chatziantoniou et al. (2013) find evidence that both fiscal and MPs affect the stock markets by using the structural VAR model. The study also suggests that the interaction between the policies is important in the elucidation of the financial markets. Haga (2015) has sheds new light on the relationship between MP and FP. The research suggests that there is a negative relationship between the independence of central banks and the size of political business cycles. This conclusion is based on the analysis of the level of independence and coordination between these policies. In other words, a central bank that lacks independence may have a limited ability to respond to an expansionary FP and may take on a passive role in MP.

Afonso et al. (2019) find that FP and MP are substitutable, with the central bank playing a more active role, particularly when debt levels are high. This finding was an extension of the traditional Taylor rule model, which Krisanova et al. (2005) modify to incorporate FP and policy coordination analysis. The objective was to illustrate the role of FP in providing feedback on debt and helping the monetary authority manage inflation. The interactions between MP and FP are often examined in three ways: first, non-cooperation; second, partial cooperation; and last, benevolent policies. Krisanova et al. (2005) indicate that if the authorities act benevolently and cooperate, the monetary authority shoulders the entire burden of stabilisation. The policies of fiscal and monetary authorities are pursued with their own specific objectives, which can at times conflict depending on economic conditions and priorities. This interaction has an impact on the macroeconomic effects of each policy. Thus, the interaction between MP and FP is critical in comprehending and managing macroeconomic policies (Tavakolian & Taherpoor, 2022).

Chiang (2020) examines the impact of US Monetary Policy Uncertainty (MPU) and Fiscal Policy Uncertainty (FPU) on global stock markets prices. The results show that both MPU and FPU have significant negative impacts on stock returns in G7 markets. The study (Chiang, 2020) finds that both

US MPU and FPU have significant negative impacts on stock returns in G7 markets. Although the evidence derived from changes in FPU is weaker than that for MPU, the evidence still supports the negative relationship between higher uncertainty of US FP and stock return performance. This relationship is not only present in the US market but also transmitted to global markets.

In the context of Nepal, Shrestha (2020) does not find evidence on the transmission mechanism of MP through the asset price channel, and the study suggests examining the transmission mechanism of MP through other channels such as the credit channel and the interest rate channel. Several studies (Bhatta & Mishra, 2021; Devkota & Dhungana, 2019; Phuyal, 2016) have shown that various macroeconomic variables can explain the movement of the Nepalese stock markets. Changes in policies affecting macroeconomic variables such as inflation, interest rates, exchange rates, tax policy, money supply, and remittance can affect the movement of the stock markets. This study is an extension of Dhungana (2023), which examined the impact of fiscal balance, money supply, and interest rates on the stock markets performance of Nepal.

RESEARCH METHODOLOGY

The deductive approach has been used in this study. A Structural VAR model is employed to investigate the effects of FP and MP shocks on stock markets performance. The time series data of the variables have been collected using secondary sources. For the reliability of the data, they have been collected only through government agencies such as the Central Bureau of Statistics (CBS), the Ministry of Finance (MoF), the NRB, the SEBON, and the Stock Exchange. The quarterly data of the variables are collected, since various scholars also argue that high-frequency data provide robust results. The sampling period of the study includes 2004(Q3) to 2022(Q4). The total length of the study is 74 quarters, which covers a period of 18 and a half years. From the year 2002/03, the NRB formally started to formulate MP in Nepal. However, the CBS started calculating quarterly GDP from the year 2004 only, so the study period has been limited to 2004 to 2022. The statistical software EViews has been used to process the data.

Explanation of Variables

This study examines the dynamic relationship between FP and MP and stock markets performance using the SVAR methodology framework. The variables have been grouped into two blocks as the standard form models of SVAR

for a small economy. The first block is one foreign variable, global oil price (OIL); in this study, the global oil price has been employed rather than output or commodity price as the foreign variable (Handoyo et al., 2015; Kim & Roubini, 2000; Olamide et al., 2022; Thanh et al., 2017). The proxy used to create the OIL series is the quarter-ending price of Brent crude oil. The reason for using the global oil price is that the highest portion of imports of the Nepalese economy includes oil, and the economy suffers from rises in the global oil price. Such shocks also increase the deficit in the trade balance of the nation. A positive external shock is expected to have a negative contemporaneous effect on stock prices.

The second block of variables is the domestic variables; there are two further sub-blocks of variables. The first is the FP variables, and the second is the MP variables. According to Afonso and Sousa (2011), FP shocks can be measured by government expenditure (GOVX). In Nepal, government expenditure rather than tax variation is used as the FP mechanism. Regarding the money supply variable, broad money supply (M2) has been taken, which has been suggested by Cai et al. (2022) and Hu et al. (2018). In the context of Nepal, compared to other monetary variables, M2 has higher explanatory power (Shrestha, 2020). The 91-day treasury bill rate measures the policy-induced interest rate (INT). Inflation (INF) is measured by the Consumer Price Index (CPI), which is compiled on a monthly basis by the NRB. The CPI base is adjusted several times by the NRB; therefore, necessary adjustments are made whenever such base changes are included in the data series for this study. Dhakal (2022) observes a significant impact of MP intervention on the GDP of Nepal, so real GDP (GDP) has also been used as a domestic variable affecting the stock markets. The all-share price index from the NEPSE is used to represent the real output and financial markets.

Econometric Model

SVAR is a type of econometric model that is used to analyse the relationships among different variables in an economy. It is often used in financial economics to study the interactions among financial variables, such as interest rates, exchange rates, and asset prices. SVAR is first introduced by Sims (1980) and is subsequently developed and refined by many other researchers in the fields of economics and finance. The model suggested by Blanchard and Perotti (2002), Chatziantoniou et al. (2013), Dungey and Fry (2009), and Kim and Roubini (2000). The model is also used by various other scholars, such as Ali et al. (2014), Ali Ahmed and Wadud (2011), Bjørnland and Leitemo (2009), Boiciuc (2015), Büyükbaşaran et al. (2020), Elbourne (2008), Hina

and Abbasi (2021), Hu et al. (2017), Kozak and Sosyura (2015), Mumtaz and Theodoridis (2020), and Prukumpai and Sethapramote (2019).

The general form of the SVAR model can be written as;

$$\Psi_0 Y_t = \delta + \sum_{i=1}^{p} \Psi_i Y_{t-1} + \varepsilon_t \tag{1}$$

Where; δ represents the 7X1 constant term. Y_t = [OIL, GDP, INF, GOVX, M2, INT, NEPSE] that is 7X1 order endogenous variable vector. Ψ_0 represent the 7X1 contemporaneous matrix, Ψ_t is the 7X7 autoregressive matrix. i represents the lag order. The ε is the stochastic error term, called impulses or innovations or shocks in the language of VAR. It is also termed the structural disturbance vector with zero covariance. The covariance matrix for structural disturbance can be presented in the following form;

$$E[\varepsilon, \varepsilon_t^{'}] = D = [\sigma_1^2, \sigma_2^2, \sigma_3^2, \sigma_4^2, \sigma_5^2, \sigma_6^2, \sigma_7^2] \tag{2}$$

In order to, estimate the SVAR model, the reduced form was determined by multiplying both sides of the equation (1) with Ψ_t^{-1}

$$Y_t = \zeta + \sum_{i=1}^{p} B_t Y_{t-1} + e_t \tag{3}$$

Where, $\zeta = \Psi_t^{-1}\delta, B_t = \Psi_t^{-1}$ and $e_t = \Psi_t^{-1}\varepsilon_0$ The reduced form has a covariance matrix of the form,

$$E[e_t e_t^{'}] = \Psi_t^{-1} D \Psi_{t-1}$$

Structural disturbance can be identified by imposing certain restrictions on Ψ_0. The long-term restriction imposed in the model can be expressed in the following matrix;

$$\begin{Bmatrix} u_{1,t}^{es} \\ u_{1,t}^{is} \\ u_{1,t}^{ps} \\ u_{1,t}^{gxs} \\ u_{1,t}^{mss} \\ u_{1,t}^{irs} \\ u_{1,t}^{sms} \end{Bmatrix} = \begin{Bmatrix} \alpha_{11} & 0 & 0 & 0 & 0 & 0 & 0 \\ \alpha_{21} & \alpha_{22} & 0 & 0 & 0 & 0 & 0 \\ \alpha_{31} & \alpha_{32} & \alpha_{33} & 0 & 0 & 0 & 0 \\ \alpha_{41} & \alpha_{42} & \alpha_{43} & \alpha_{44} & 0 & 0 & 0 \\ \alpha_{51} & \alpha_{52} & \alpha_{53} & \alpha_{54} & \alpha_{55} & 0 & 0 \\ \alpha_{61} & \alpha_{62} & \alpha_{63} & \alpha_{64} & \alpha_{65} & \alpha_{66} & 0 \\ \alpha_{71} & \alpha_{72} & \alpha_{73} & \alpha_{74} & \alpha_{75} & \alpha_{76} & \alpha_{77} \end{Bmatrix} X \begin{Bmatrix} \varepsilon_{1,t}^{OIL} \\ \varepsilon_{1,t}^{GDP} \\ \varepsilon_{1,t}^{INF} \\ \varepsilon_{1,t}^{GOVX} \\ \varepsilon_{1,t}^{M2} \\ \varepsilon_{1,t}^{INT} \\ \varepsilon_{1,t}^{NEPSE} \end{Bmatrix} \tag{4}$$

In this matrix, es is the external shock, is is the income shock, ps is the price shock, gxs is the government expenditure shock, mss is the money supply shock, irs is the interest rate shock, sms is the stock markets shock. The coefficient specifies how the variable j contemporaneously effect variable i. The element 0 in the matrix denotes that there are no expected contemporaneous responses from a specific shock. The coefficient α_{ij} indicates how variable j contemporaneously influences variable i. The coefficients in the diagonal are set to be unity, and the zero restriction on the coefficient is 21. The model is neither over-identified nor under-identified. This was Sims (1980) original proposal and is sometimes called a recursive identification scheme.

RESULTS

Descriptive Statistics

Table 1 shows the descriptive statistics of the independent and dependent variables. For descriptive statistics purposes, the data has been presented in label form without any transformation. The quarterly GDP has been measured in million rupees (Nepalese currency). Similarly, GOVX has been measured in million rupees. The money supply has been measured in terms of M2 and is presented in million rupees. INF has been measured by the CPI, which is monthly calculated by the central bank of Nepal. INT has been measured by the 91 days treasury bill rate. The descriptive statistics presented in Table 1 also suggest that the $p-$value of the Jarque Bera statistics for GOVX, GOVR, INT and M2 is below all conventional statistical significance levels, implying that the null hypothesis of the normal distribution of GOVX, GOV R, INT and M2 can be rejected. Similarly, the $p-$value of the Jarque Bera statistics for GDP and INF is above the conventional statistical significance levels, implying that the null hypothesis of the normal distribution of GDP and INF cannot be rejected.

Table 1: Descriptive Statistics

Table 1 presents the descriptive statistics of the variables employed in this study to analyse the dynamic relationship between FP, MP, and stock markets performance in Nepal using SVAR framework. The dataset includes one foreign variable — OIL — and domestic variables grouped into FP and MP blocks. The domestic variables include GOVX, M2, INT, INF, GDP, and the NEPSE all-share price index as a proxy for stock markets performance. The statistics provided include the mean, median, maximum, minimum, standard deviation, skewness, kurtosis, Jarque-Bera test statistics, and corresponding p-values, based on quarterly observations. These statistics offer an overview of the distributional properties and normality of the variables used in the SVAR model.

	OIL	GDP	INF	GOVX	M2	INT	NEPSE
Mean	75.14	175941.90	92.69	660866.80	1981323.00	3.33	1003.17
Median	68.04	169658.00	92.70	420810.40	1411204.00	2.69	917.49
Maximum	120.92	251833.10	155.60	2675169.00	5705068.00	10.89	2843.00
Minimum	31.17	119261.00	42.60	62359.80	281327.20	0.02	233.99
Std. Dev.	24.66	39036.30	34.48	612234.80	1651434.00	2.82	664.31
Skewness	0.39	0.36	0.12	1.43	0.87	1.00	1.01
Kurtosis	1.93	1.96	1.71	4.50	2.53	3.16	3.37
Jarque-Bera	5.41	4.85	5.28	32.22	10.02	12.32	13.10
Probability	0.0668	0.0883	0.0712	0.0000	0.0067	0.0021	0.0014
Obs.	74	73	74	74	74	74	74

Stationary Test

Two different methods have been used to examine the stationarity of all variables; first, Augmented Dickey Fuller (ADF) Test and Second, the Phillip Perron (PP) test. The result of the test statistics of both ADF and PP shows that the $p-$value of the variables is below the conventional statistical significance level ($< 5\%$), implying that the null hypothesis of the series is not stationary and cannot be accepted. The data are stationary in the transformed form, so no further transformation is required to proceed with the SVAR model. The result of the stationary test is presented in Table 2.

Table 2: Stationary Test of the variables

Table 2 presents the results of unit root tests applied to each variable included in the SVAR model to determine their stationarity properties. The Augmented Dickey-Fuller test and the Phillips-Perron test were employed to check for the presence of unit roots in the time series data.

	Augmented Dickey-Fuller Test		Phillip-Perron test	
	t-statistics	Probability	t-statistics	Probability
OIL	-6.0416	0.0000	-5.7991	0.0000
GDP	-7.1422	0.0000	-25.847	0.0001
GOVX	-3.5513	0.0096	-13.9842	0.0000
M2	-8.4296	0.0000	-9.7798	0.0000
INT	-8.4487	0.0000	-17.5644	0.0000
INF	-4.3101	0.0001	-12.401	0.0000
NEPSE	-5.434	0.0000	-5.449	0.0000

VAR Lag Order Selection

The selection of appropriate lags in the VAR model has been done by using, the Akaike Information Criterion (AIC), Schwarz Information Criterion (SIC) and Hannan-Quinn Information Criterion (HQIC) have been used. The AIC suggested a VAR model of five lag lengths, whereas the SIC and HQIC both suggested two lag lengths. Hacker and Hatemi-J (2008) suggest SIC has the ability to present the most appropriate lag length in VAR model, this study has adopted SIC for lag order selection. The result of the lag length selection is presented in Table 3.

Table 3: Lag Order Selection

Table 3 reports the results of the lag length selection process for the VAR model using three widely accepted information criteria: the Akaike Information Criterion (AIC), the Schwarz Information Criterion (SC), and the Hannan-Quinn Information Criterion (HQ). These criteria help determine the optimal number of lags to include in the VAR framework to ensure model adequacy while avoiding overfitting.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-447.7251	NA	0.001852	13.57388	13.80422	13.66503
1	-346.0437	179.0806	0.000387	12.00130	13.84403	12.73048
2	-231.6541	177.5600	5.76e-05	10.04938	13.50449*	11.41657*
3	-166.9697	86.88954	4.08e-05	9.581184	14.64869	11.58641
4	-101.7678	73.96033*	3.23e-05*	9.097546	15.77744	11.74079
5	-46.47327	51.16806	4.22e-05	8.909650*	17.20193	12.19092

Contemporaneous Coefficient

Table 4 presents the estimated contemporaneous coefficient. The discussion of the result is focused on the effect on the Nepalese stock markets. The coefficient α_{54} shows that MP and FP exhibit a negative contemporaneous relation, a similar result was observe by Chatziantoniou et al. (2013) and Hu et al. (2018). The next variable GDP also has contemporaneous relation with NEPSE, the relation is positive in direction and is significant at a five percent significance level. The result also shows that the INF has negative contemporaneous relation, money supply (M2) has positive contemporaneous relation, whereas the last MP variable INT has negative contemporaneous relation with NEPSE. Furthermore, an interrelationship between MP and FP is not significant as evidenced by the negative but non-significant coefficient of α_{64}. A similar, negative but non-significant coefficient result was observe by Chatziantoniou et al. (2013) in the case of Germany. Additionally, the coefficient of the SVAR regression shows that the OIL is contemporaneously affected by its own price. The OIL also has contemporaneous relation with GDP, INF, GOVX, M2 and NEPSE. The impulse response function (IRF) is presented in Figures 1 and 2. The detail IRF (cummulative and non–cummulative) is available in the appendix of the study.

Table 4: Contemporaneous Coefficients

Table 4 presents the estimated contemporaneous relationships among the variables included in the SVAR model, with a particular focus on their immediate impact on the Nepalese stock markets (NEPSE index). The coefficients reveal how shocks to FP, MP, and macroeconomic variables such as GDP, INF, INT, M2, and OIL influence the stock markets contemporaneously.

	Coefficient	Std. Error	z-Statistic	Prob.
α_{11}	13.01394***	1.099879	11.83216	0.0000
α_{21}	0.005602	0.002955	1.895927	0.0580
α_{31}	-0.004930**	0.001884	-2.617247	0.0089
α_{41}	0.019583**	0.007339	2.668329	0.0076
α_{51}	-0.004369	0.002623	-1.665753	0.0958
α_{61}	0.246279	0.174299	1.412963	0.1577
α_{71}	54.47069	28.95545	1.881190	0.0599
α_{22}	0.024403***	0.002062	11.83216	0.0000
α_{32}	-0.00017	0.001837	-0.092339	0.9264
α_{42}	0.015470*	0.007030	2.200686	0.0278
α_{52}	0.003228	0.002582	1.249903	0.2113
α_{62}	-0.191407	0.172294	-1.110933	0.2666
α_{72}	68.91004**	27.98761	2.462163	0.0138
α_{33}	0.015369***	0.001299	11.83216	0.0000
α_{43}	-0.00352	0.006901	-0.510095	0.6100
α_{53}	0.004489	0.002540	1.767719	0.0771
α_{63}	0.041633	0.171497	0.242760	0.8082
α_{73}	-101.9877***	25.98252	-3.925241	0.0001
α_{44}	0.057680***	0.004875	11.83216	0.0000
α_{54}	-0.001418	0.002508	-0.565461	0.5718
α_{64}	-0.150013	0.170992	-0.877314	0.3803
α_{74}	-43.50142	24.23382	-1.79507	0.0726

(Continued on next page)

	Coefficient	Std. Error	z-Statistic	Prob.
α_{55}	0.020962***	0.001772	11.83216	0.0000
α_{65}	-0.344137*	0.168022	-2.048162	0.0405
α_{75}	95.59722***	22.54959	4.239422	0.0000
α_{66}	1.384554***	0.117016	11.83216	0.0000
α_{76}	-43.63426*	20.72696	-2.105193	0.0353
α_{77}	170.6473***	14.42233	11.83216	0.0000

*(***, **, * denote the result is significant at 0.1%, 1%, and 5%.)*

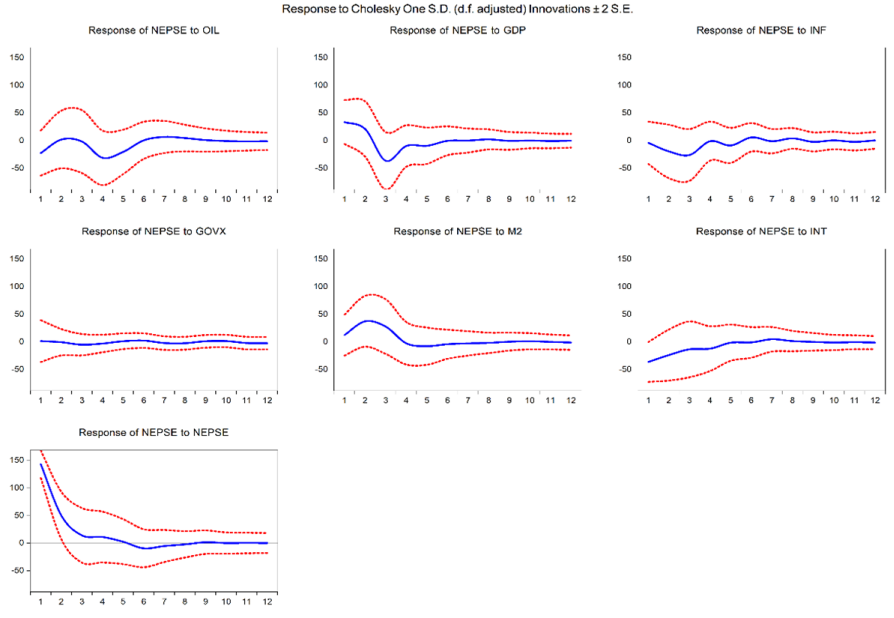

Figure 1: Contemporaneous effect of variables on NEPSE Index (non-accumulated)

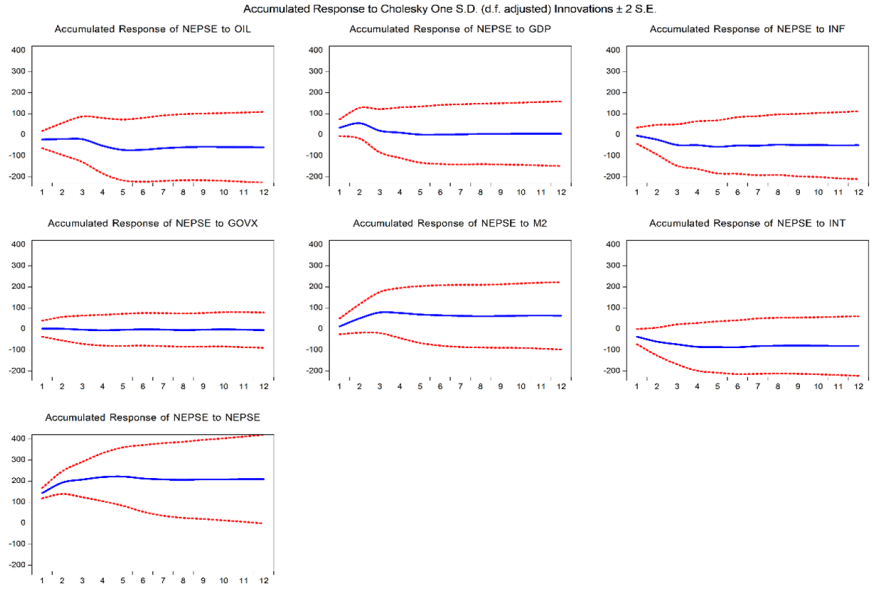

Figure 2: Contemporaneous effect of variables on NEPSE Index (accumulated)

FINDINGS AND DISCUSSION

Changes (innovations) in GOVX cause almost no changes in the stock markets. The magnitude of the 12-quarter cumulative IRF shows that the volatility return of the NEPSE index is less than five percent (negative). This result also implies that a standard deviation shock to the stock markets shock may enhance stock volatility by below five percent in 12 quarters. The result aligns with Taleb Tawfiq and Tahtamouni (2018), who observe no meaningful relation between FP and stock returns, and Chatziantoniou et al. (2013), who observe no direct relation of FP with stock markets performance.

The result of INT with GOVX should exhibit a positive contemporaneous relation for the existence of a crowding-out effect. The IRF presented in the appendix shows that INT is almost neutral with GOVX. Also, higher interest rates make it more expensive for private individuals and businesses to borrow, which reduces their expenditure and investment. Therefore, the crowding-out hypothesis argues that government expenditure can reduce the amount of resources available to the private sector and may have a negative effect on economic growth in the long run. The result of GDP with GOVX should exhibit a negative contemporaneous relation for the existence of the

crowding-out effect from this perspective, which, however, is not the case. Thus, the finding indicates that the crowding-out effect does not exist in the Nepalese economy. Prukumpai and Sethapramote (2019) also observe no evidence of a crowding-out effect in the case of Thailand.

The findings indicate that the impact of monetary policy on the behaviour of the stock markets occurs directly through the interest rate channel. The response of stock prices is asymmetric, depending on the direction of changes in the interest rate. The result shows that stock prices are affected by expected changes in interest rates. Moreover, MP has stronger effects on both real output and stock prices than FP. The result aligns with the finding of Prukumpai and Sethapramote (2019). In Nepal, inflation is measured by the CPI, which the central bank constructs. There exists some degree of conflict, since the central bank itself is responsible for controlling inflation. This study's results show that the PS cannot effectively capture the contemporaneous effect of INF on other variables.

This study shows that Nepal adopts a pro-cyclical FP with small magnitude rather than a counter-cyclical FP. In Nepal, political instability often affects government spending and tax planning. Also, motivated by the political business cycle, the government reduces certain taxes regardless of the economic scenario. Koirala (2015) also observes a mild pro-cyclical FP in the period 2011–2013, whereas Nasreen and Anwar (2019) observe pro-cyclical MP in Nepal.

There is consensus in macroeconomics regarding the long-term impact of monetary policy on pricing: prices should eventually decline after a contraction. The price puzzle refers to the phenomenon where changes in monetary policy by a central bank have unexpected and temporary effects on the levels of inflation and output in the short run, contrary to what traditional economic models predict (Castelnuovo & Surico, 2010; Rusnak et al., 2013). The results of this study suggest the existence of price puzzles in the Nepalese economy. The coefficient α_{63} shows that INT has a positive contemporaneous relation with INF. However, the contemporaneous coefficient is not significant at the conventional significance level (calculated p-value = 0.8082). The IRF presented in the appendix also shows (check: accumulated response of INF to INT in appendix) that a positive innovation in the interest rate increases inflation. These findings challenge traditional theories of monetary economics. One possible explanation for the price puzzle is that the relationship between interest rates and inflation is not as straightforward as assumed in traditional

economic models.

Finally, the ES measured by the global oil price has a negative contemporaneous effect on the stock markets. A positive innovation in the oil price decreases the NEPSE index. It is also observed that a positive ES increases government expenditure and the interest rate. However, a positive ES decreases the money supply in the economy. The results align with Asiri (2022) and Cunado and Gracia (2014), who establish a negative relationship between oil prices and the stock index.

CONCLUSION

The study examines the effects of FP and MP on the stock markets of Nepal using quarterly data from 2004(Q3) to 2022(Q4). This study adopts the SVAR model to conduct the econometric analysis. The main finding is that Nepal's stock markets are influenced by monetary dominance rather than fiscal dominance. When MP reacts to FP, it does so in a way that demonstrates rigorous adherence to the policy goals or principles that it establishes for itself. Tight FP through government revenue is balanced by loose MP via lower interest rates and increased money supply. However, such a scenario is not observed through government expenditure.

The findings of the study can be summarised in following seven points. First, the GXS has almost no effect on the stock markets of Nepal. Second, the IS has a positive effect on the stock markets; however, the effect lasts only up to three quarters. Third, the PS has a negative effect on the stock markets. Fourth, the MSS has a positive effect on the stock markets of Nepal; however, the effect lasts up to four quarters only. Fifth, the IRS shows that the it has a negative contemporaneous effect on the stock markets of Nepal. Sixth, the SMS has a positive contemporaneous effect on the NEPSE index. Last, the ES, measured by the oil price, has a negative contemporaneous effect on the Nepalese stock markets.

The additional conclusions that can be drawn from the study are: first, there is no evidence of a crowding-out effect either through the interest rate channel or through the stock markets. Second, FP transmits to the stock markets through the interest rate channel in Nepal. Last, the IRF shows that the impact of various macroeconomic shocks on the stock markets lasts only up to four quarters.

Policy Implications

The findings of this study highlight several important implications for policymakers in Nepal. Given the limited and short-lived impact of FP on the stock markets and the more significant influence of MP through the interest rate and money supply channels, it is evident that MP plays a dominant role in steering market expectations and economic behaviour. Policymakers should, therefore, enhance the credibility and transparency of monetary policy, particularly in managing inflation and interest rates, to strengthen investor confidence and market stability. The absence of a crowding-out effect suggests that current levels of government spending do not displace private investment, providing room for strategic fiscal interventions aimed at long-term growth without adverse effects on private sector activity. However, the observed pro-cyclicality of both FP and MP calls for a more counter-cyclical approach to stabilise the economy over the business cycle. Furthermore, the presence of a price puzzle underscores the need for an improved inflation-targeting framework and a reconsideration of the CPI basket composition to better reflect the consumption patterns of the population. Lastly, given the sensitivity of the NEPSE index to external shocks such as oil prices, coordinated policy responses that integrate fiscal, monetary, and external sector policies are necessary to shield the economy from global volatility.

Limitations of the Study and Future Research Avenues

The study uses the global oil price as the only external variable. Since the Nepalese economy is heavily influenced by Indian MP and Indian inflation through the INR-NPR currency peg dynamics, excluding such regional influences could generate omitted variable bias in the study. Oil price shocks capture only one type of external shock and may not represent all global macroeconomic fluctuations.

This study applies the Blanchard and Perotti (2002) model for the restrictions of the SVAR model. On this basis, future scholars can apply different restrictions in similar studies. Future studies can also use other methods, such as instrumental variables. Studies can also examine the impact of FP and MP interaction on the real estate markets, the housing markets, or the automobile markets.

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Appendix 1

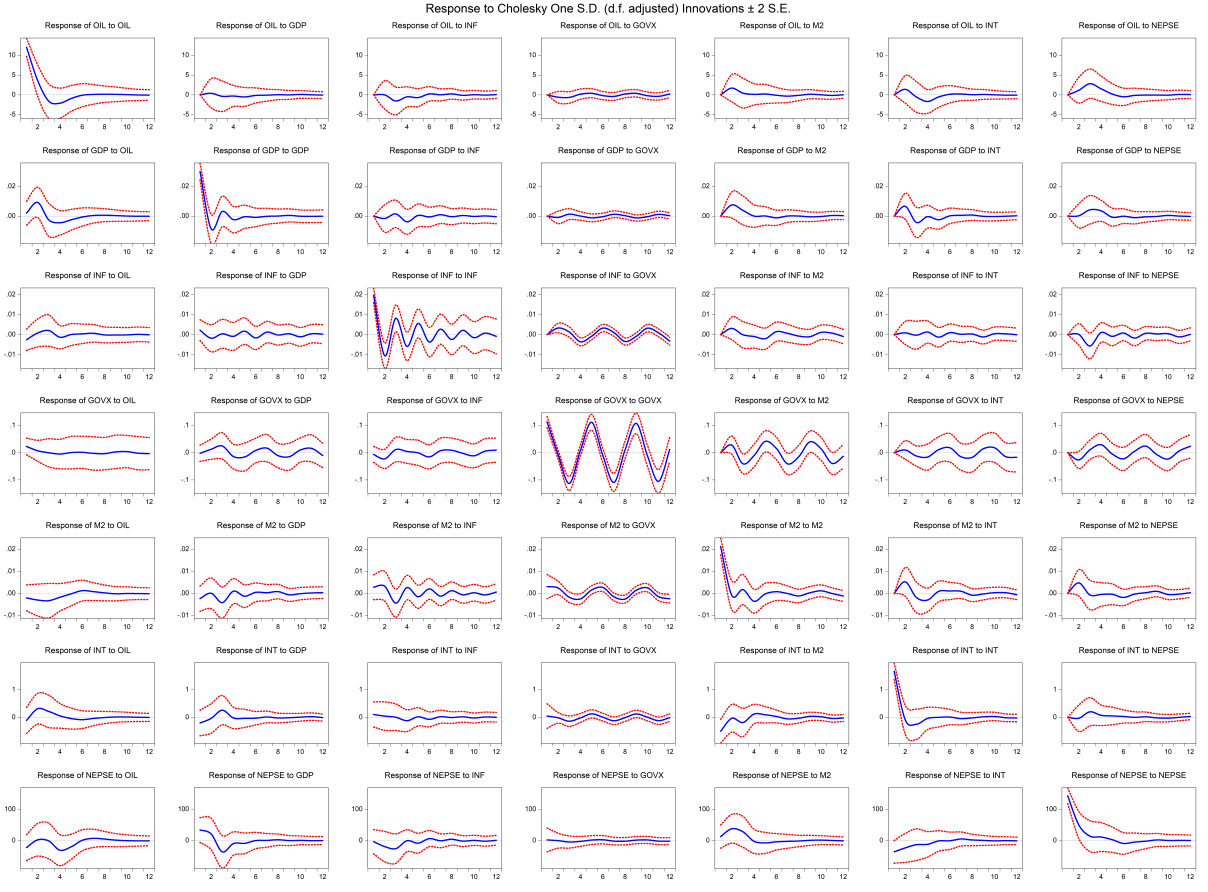

Figure 3: Impulse response functions (non-accumulated)

Appendix 2

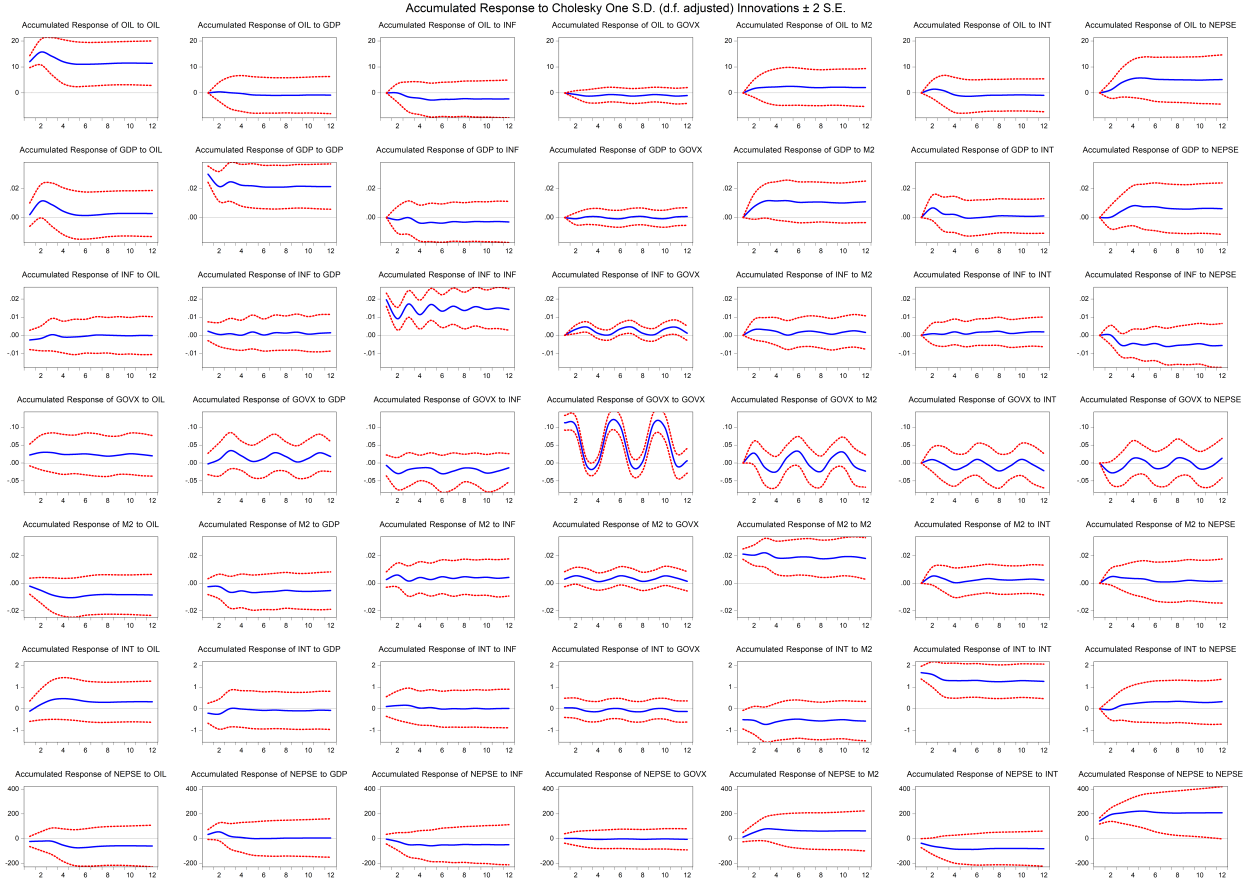

Figure 4: Impulse response functions (accumulated)