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by Rossanto Dwi Handoyo

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Impact of Monetary Policy and Fiscal Policy on Indonesian Stock Market

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This paper attempts to investigate the effect of fiscal and monetary policy on Indonesian Stock price as well as main sectors stock price such as agricultural, mining, manufacture, and financial sector indexes. We consider the world oil price as a foreign variable that will influence domestic economy as in regular small open economy model. In this paper, we employ the Monte Carlo algorithm to Near-SVAR models (if some of the VAR equations have regressors not included in the others). We find that there is a positive stock price response to monetary policy shock both aggregated and sectoral stock price. In term of interaction between fiscal policy shock and stock market, we find that all sectors respond negative relationship. From this empirical finding, fiscal policy crowd out private sector activity in market, thus, its effect will be impotent in economy. We also provide the evidence that not only both policies are able to influence the stock price individually, but also the interaction between monetary and fiscal policy is important in explaining stock market performance.

***Keywords**: monetary policy, fiscal policy, stock price, Monte Carlo SVAR model, impulses response*

***JEL Classification**: C32, E63, G12*

1. Introduction

Many empirical studies attempt to scrutinize both impact fiscal and monetary policies on output and inflation rather than stock price. The objective of our paper is to investigate the effect of fiscal and monetary policy on Indonesian Stock price. We use stock prices because they are the most responsive, while output and

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inflation are the sluggish ones due to many restrictions to various sort of adjustment costs in determining the quantities of most goods and services (Sims and Zha, 2006; Cheng and Jin, 2013). Several authors have discussed in detail the effect of monetary policy shock on stock market (e.g., Thorbecke, 1997; Bernanke and Kuttner, 2005; Cheng and Jin, 2013; Bouakez, et al., 2010; Laeven and Tong, 2012; Pirovano, 2012). Studies that attempt to test the impact of fiscal policy on stock market are also voluminous (e.g., Darrat, 1990; Laopodis, 2009; Afonso and Sousa, 2011 and 2012; Agnello and Sousa, 2012). On the other hand, the studies of incorporating the effect of fiscal and monetary policy on the stock market performance are not voluminous (e.g., Jansen, et. al., 2008; Chatziantoniou, 2013). Our study perhaps complements this literature gap.

The study of the effect of monetary and fiscal policy is important in case of Indonesia that implements the inflation targeting framework because of the potential conflicting objectives between fiscal and monetary policies will lead to a crucial strategic interaction between two policy instruments. The interaction arises as both monetary and fiscal policies have implication for the output gap and inflation. Fiscal authorities are more concern about output, otherwise the monetary authorities emphasize on controlling inflation. Under standard economic theory, the sign of the budget deficit is expected to be positive, which means that the larger the budget deficits will lead to larger the interest rate. Under these circumstances, the Central Bank needs to stabilize the economy from overheating and inflationary pressure. Meanwhile, many empirical studies that attempt to scrutinize the effect of impact fiscal and monetary policies focus more on output and inflation rather than stock price.

In the context of Indonesia, to our best knowledge, study relating to stock market response on both fiscal and monetary policy shocks is not well documented and sometimes only in individually rather than jointly (e.g., Praptiningsih, 2013). Meanwhile, studies relating to both the effect of monetary and fiscal policy analysis emphasized on those policies shocks on macroeconomic objective mainly on inflation and output not on stock market (e.g., Surjaningsih, et al., 2012; Hermawan and Munro, 2008). Our study perhaps fills this literature gap.

This paper also attempts to investigate the effect of monetary and fiscal policy on main sectors stock price index in Indonesian Stock market such as agricultural, mining, manufacture, and financial sectors indexes. We use only 4 main sectors in our analysis that represent three kinds of aggregated development sectors group namely primary, secondary and tertiary sectors. We use mining and agriculture sectors to represent the primary sector as well as the top stock price index. As a developing country, the contribution of these two sectors is still quite high to national output which are 12.7% and 7.67% in 2011, respectively (Indonesian Statistics Bureau, 2011). Meanwhile, the manufacture and financial sectors contribute 25.7% and 10.7% of total output, respectively. The last two sectors represent secondary and tertiary sectors as well as the medium and the low stock price sector index. This analysis is crucial in order to investigate the strength of such an association whether tend to varies extensively across sectors. Under these circumstances, sector stockholder will be affected by the change of the policies and then, in turn the firm's ability to finance the production level will vary across sectors due to different consumption (wealth effect) and investment pattern.

From the methodological perspective, we employ a near-SVAR model because some of the VAR equations have regressors not included in the others. This model provides an extension of the structural VAR approach, as it does not impose the same variables treated in all right-hand side of the equations of the reduced form model since we employ the world oil price as an exogenous variables and unaffected by any domestic variables. In the context of the present paper, the near-SVAR model is estimated using the method of seemingly unrelated regressions (SUR). SUR offers a robust statistical framework with the ability to give consistent and efficient estimates of the coefficients (Enders, 1995; Zaidi and Fisher, 2010; Piroli et al, 2012) particularly if the lag length is long because this erodes the degree of freedom. Numerous studies have attempted to improve the better SVAR methods by applying Bayesian analysis to obtain accurate infinite sample inferences from the posterior distribution (Sims and Zha, 1999; Wagonner and Zha, 2003). In this paper, we employ the Monte Carlo simulation method, particularly Gibbs Sampler, to our near SVAR model which has been proposed by Sims and Zha (1999), and developed extensively by Wagonner and Zha (2003).

This study is organized as follows. Section 2 explores the data used in the models. Section 3 mentions the methodological and model identification strategy. Section 4 reports the estimation results and discusses the empirical results. Section 5 concludes with the main findings and policy recommendations.

2. Data Description

As a small open economy, we employ the world oil price rather than output or commodity price as the foreign variables that affect Indonesian economy. The oil price data is crude oil or petroleum price in US$/barrel and taken from Dubai Fateh oil market. Our studies decompose variables into two blocks as a

standard form model of SVAR for small open Economy. The first block consists of one foreign variable that is world oil price. The reason why we use the world oil price is that regarding the fact that since 2003, Indonesia becomes net importer oil country and suffer from any increase of such shock in which the deficit of trade balance on oil become larger as the world oil price tend to rise for over the last decade. Hence, rising oil prices are bad for stock market of oil importing country such as Indonesia. Kim and Roubini (2000) use oil prices rather than commodity prices as a proxy for future inflation and the world economic variable. On the other hand, Zaidi et. al., (2011) use the world commodity prices for Malaysia cases due to the fact that Malaysia is oil producing country and the oil price in the domestic market is heavily regulated.

The second block contains the domestic variables consisting of: industrial production index (LY), Debt to GDP ratio (DYR), the inflation rate (INF, the growth rate of consumer price index/CPI), money market interest rate (R, 3 month SBI rate), real exchange rate (LXR, nominal exchange rate times the ratio of US CPI/Indonesian CPI), and stock price both in composite index (LSP) and sector price index (LAGR for agriculture, LMINE for mining, LFINE for banking and finance). We use Industrial production index to represent national output (we also use this indicator due to the data availability in monthly basis instead of national income that employed in quarterly basis), Debt to GDP ratio for the fiscal policy variables and 3 months SBI rate for monetary policy variable. For this purpose, we decompose the shock of domestic and foreign shock on stock price both composite index and sectors index into 5 models; model 1 for the composite index, model 2 (mining), model 3 (agriculture), model 4 (finance), and model 5 (manufacture industry). We use industrial production index rather than GDP that has been used in stock market studies, such as Binswanger (2000, 2001, 2004), and Mackowiak (2006). All variables (except the inflation rate, Debt to GDP ratio and interest rate) are transformed by taking natural logarithms. All variables are in real term (constant price at certain base year depending the published report or if not available, we calculated them ourselves with base year 2003, similar to BPS or Indonesian Statistic Agency base year) and seasonally adjusted using X11 multiplicative provided by Eviews6 and RATS. Our SVAR model is specified in levels rather than in the first difference following Zaidi et. al., (2011) since there is no theoretically foundation to impose cointegration restriction on VAR model.

We use monthly data from 2001.1 until 2011.12. We start our data from January in year 2001 is to avoid the turbulence 1998 economic Crisis and of course data treatment using structural break are no longer needed. Data are collected from various sources such as the Monthly Indonesian Economics and Financial Statistics produced by Bank Indonesia (www.bi.go.id), Economic Indicators of Indonesian Statistics Agency or BPS/Badan Pusat Statistik (www.bps.go.id), Indonesian Stock Exchange market (www.idx.co.id), Directorate General of Debt Management of treasury department (www.djpu.kemenkeu.go.id), our world oil price data taken from the website www.indexmundi.com. Some variables that are not available in monthly data, such as GDP and Debt (data from 2000 until 2008 are not provided on monthly but quarterly) are interpolated using cubic match. The detailed formula of cubic match last is available at EVIEWS 6 user's guide.

3. Methodology and Identification

We investigate the dynamic relationship among fiscal and monetary policies and the stock market performance using near SVAR framework. In estimation, we emphasized on identifying only the monetary and fiscal policies shock and we do not aim to identify all structural shock. Our estimations follow the step by the step the methodology developed by Wagonner and Zha (2003). In order to choose the optimal lag length for our SVAR model, the residual of each equation are examined for evidence of serial correlation using Akaike's Information Criterion (AIC) and Schwarz Bayesian Criterion (SBC).

Following Wagonner and Zha (2003), the structural VAR models typically take the form of

$$y_t'A = \sum_{t=1}^{p} y_{t-l}' A_l + z_t'D + \varepsilon_t', \quad \text{for } t = 1, \dots, T, \tag{1}$$

where A and A_l are 6×6 parameter matrices, D is an $h \times 6$ parameter matrix, y_t is an 6×1 column vector of endogenous variables at time t, z_t is an $h \times 1$ column vector of exogenous variables at time t, ε_t is an 7×1 column vector of structural disturbances at time t; p is the lag length, and T is the sample size. The parameters of individual equations in (1) correspond to the columns of A, A_l and D. The structural disturbances have a Gaussian distribution with

$$E(\varepsilon_t | y_1, \dots, y_{t-1}, z_1, \dots, z_T) = 0$$
$$E(\varepsilon_t \varepsilon_t' | y_1, \dots, y_{t-1}, z_1, \dots, z_T) = I. \tag{2}$$

The structural disturbances in (2) are normalized to have an identity covariance matrix. Right multiplying the structural form (1) by A^{-1}, the usual representation of a reduced-form VAR can be obtained with the reduced-form variance matrix being

$$\Omega = (AA')^{-1} \quad (3)$$

Equation (4) below indicates the set of restriction that are imposed on the contemporaneous parameters of the SVAR model of Indonesian Stock market. Our identification structures are more likely the upper triangular rather than the lower one. The coefficient β_{ij} indicates of how variable j contemporaneously influence on variable i. The coefficients on the diagonal are set to be unity, while the number of zero restriction on the coefficient is 23, hence the model is over-identified since exactly identified require 49-7=42/2=21 restrictions. If there are $(n^2 - n/2)$ additional restrictions, meaning that the the system is over-identified, hence χ^2 test of statistic need to be conducted. Following Zaidi and Karim (2012), χ^2 test of statistic is $\chi^2 = |\Sigma_e^R| - |\Sigma_e|$, where R (number of resctriction exceeding $(n^2 - n/2)$) degrees of freedom can be used to test the restricted system, $|\Sigma_e^R|$ is the restricted variance-covariance matrix, $|\Sigma_e|$ is the unrestricted variance-covariance matrix.

The short-run restrictions applied in this model are the following:

$$\begin{bmatrix} \varepsilon_{LSP} \\ \varepsilon_{LXR} \\ \varepsilon_{R} \\ \varepsilon_{INF} \\ \varepsilon_{DYR} \\ \varepsilon_{LY} \\ \varepsilon_{LOIL} \end{bmatrix} = \begin{bmatrix} 1 & A_{12} & A_{13} & A_{14} & A_{15} & A_{16} & A_{17} \\ A_{21} & 1 & A_{23} & A_{24} & 0 & A_{26} & A_{27} \\ 0 & A_{32} & 1 & A_{34} & 0 & 0 & A_{37} \\ 0 & 0 & 0 & 1 & 0 & A_{46} & A_{47} \\ 0 & 0 & 0 & 0 & 1 & A_{56} & A_{57} \\ 0 & 0 & 0 & 0 & 0 & 1 & A_{67} \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix} x \begin{bmatrix} e_{LSP} \\ e_{LXR} \\ e_{R} \\ e_{INF} \\ e_{DYR} \\ e_{LY} \\ e_{LOIL} \end{bmatrix} \quad (4)$$

where, industrial production index (LY), Debt to GDP ratio (DYR), the inflation rate (INF), money market interest rate or 3 month SBI rate (R), real exchange rate (LXR), and stock price both in composite index (LSP) and World oil price (LOIL). We put the foreign variables at the last ordering to adjust the equation in the SUR model that place the oil equation at the last. Consequently, our restriction structure is more likely upper triangular rather than the lower one. In addition, Waggoner and Zha (2003) state that for the methodological purpose, the Gibbs sampler will produce independent draws of A matrix if the transformed form of A matrix is upper triangular after an appropriate reordering of equations and variables (for detailed discussion, see Waggoner and Zha, 2003).

We focus on examining the interaction between the macroeconomic policies and stock price. Our restrictions follow the previous studies that concern on macroeconomic modeling and stock market analysis. Below we provide the explanation of the model's restriction. Stock prices are contemporaneously influenced by all variables (Afonso and Sousa, 2011; Bouakez et al., 2010; Chatziantoniou et.al, 2013). Exchange rate is contemporaneously influenced by all variables except debt to GDP ratio (Kim and Roubini, 2000; Zaidi,et.al., 2011; Dungey and Fry, 2009). Monetary policy is also contemporaneously influenced by exchange rate. The interdependence between exchange rate and interest rate has been assumed because it helps to solve the exchange rate puzzle (Kim and Roubini, 2000; Zaidi et al., 2011). The foreign shock contemporaneously affects all domestic variables. Inflation reacts contemporaneously only to income shock and foreign shock (Bjornland and Leitemo, 2009; Kim and Roubini, 2000; Chatziantoniou et.al, 2013). Monetary policy tool is contemporaneously affected by inflation. However the national income cannot be contemporaneously influenced by any other domestic variables (Kim and Roubini, 2000). In contrast, it can contemporaneously influence all domestic variables.

We conduct inference from a Bayesian approach, as is common in the VAR literature (see Sims and Zha, 1998, 1999; Waggoner and Zha, 2003). We take draws from the posterior pdf of the parameters of the reduced-form VAR. This pdf is a product of an inverse-Wishart density for Ω and a Gaussian density for the equation's coefficients B(s) for all $s > 0$, conditional on Ω. In the past, researchers have used an importance sampler to approximate the posterior density function of A.

4. Result Estimation

To begin with, we start our estimation with determining optimal lag length using Akaike Information Criteria (AIC) and Schwartz Bayesian Criterion (SBC). According to the two tests (Table 1), our five model both composite index and 4 sector index recommend to employ two lag orders. By using 2 lag orders, our models are expected to have consistent and efficient coefficient since they do not consume degrees of freedom.

Table 1. *Optimal Lag Length*

Lags	AIC	SBC
1	-26.4542	-25.2818*
2	-26.8719*	-24.7688
3	-26.5634	-23.6441
4	-26.2624	-22.6743
5	-25.4871	-21.4222
6	-24.8955	-20.6076
7	-23.9693	-19.8012
8	-22.3896	-18.8150
9	-20.2409	-17.9369
10	-16.9447	-16.9192
11	-12.9457	-16.7851
12	-6.3145	-16.7159

*Note: * represents lag recommended by AIC or SBC*

Next, we develop our Seemingly Unrelated Regression (SUR) model to estimate our near-SVAR model. We treat world oil price as an exogenous variable against all equation and only be influenced by its own lag. Table 2 presents the estimates of the coefficients of A Matrix in equation (4). From the table, we find that all models produce the same sign on each coefficients, except coefficient (a_{17}) in model 5; (a_{23}) in model 4; (a_{26}) in model 2 and 3. The sign and the coefficient significancies across the models look similar. Unfortunately, many coefficients are insignificant. For the stock price variable, all coefficients are of expected sign except the real output which produce the negative sign (a_{16}). Stock price decreases contemporaneously with an increase in exchange rate, interest rate, real output, and oil price whereas the other variables such as inflation rate and fiscal policy rate move in the same direction. For the inflation variable, the estimation also indicates that inflation has significant contemporaneous relationship with monetary policy. Furthermore, the oil price has significant contemporaneous effect on interest rate and budget deficit. From this finding, the inflation and the oil price play an important role in determining the interest rate adjustment undertaken by the Central Bank. Meanwhile, these results imply that a change in oil price takes into account the fiscal policy.

Table 2. *SVAR Result – Contemporaneous Coefficient*

Variables	Coefficient	Model 1 (composite)	Model 2 (mining sector)	Model 3 (agriculture sector)	Model 4 (finance sector)	Model 5 (manufacture industry sector)
LSP	a_{12}	-7.507	-9.897	-7.628*	-9.284	-9.005
	a_{13}	-30.892	-39.932	-27.796	-36.921	-32.679
	a_{14}	1.473	2.292	0.862	0.021	0.011
	a_{15}	0.489	0.656	0.597*	0.639	0.604
	a_{16}	-0.076	-0.581	-0.479	-0.732	-0.678
	a_{17}	-0.069	-0.430	-0.383	-0.026	0.133
LXR	a_{21}	0.801*	0.567*	0.363*	0.731*	0.907*
	a_{23}	1.053	0.923	1.843	-0.303	2.347*
	a_{24}	0.801*	1.233*	0.298	0.014	0.004
	a_{26}	-0.039	0.054	0.057	-0.047	-0.089
	a_{27}	-0.116*	-0.247*	-0.163*	-0.107*	-0.052
R	a_{32}	-0.048*	-0.047*	-0.046*	-0.043*	-0.046*
	a_{34}	-0.201*	-0.199*	-0.195*	-0.001*	-0.002*
	a_{37}	0.007*	0.008*	0.008*	0.007*	0.008*
INF	a_{46}	0.022	0.018	0.020	2.314	2.901
	a_{47}	-0.002	-0.007	-0.003	-0.178	-0.073

DYR	a_{56}	0.438	0.134	0.212	0.188	0.458
	a_{57}	1.056*	1.025*	1.164*	1.044*	1.253*
LY	a_{67}	0.047	0.038	0.051	0.058	0.069
Diagnostic Test:						
χ^2 statistic test		3.999	4.370	3.767	3.403	5.103
p-value		0.135	0.112	0.152	0.182	0.077
Convergence in (iteration)		71	74	52	72	67

*Note: Sign * Indicates that the coefficients are statistically significant at the 10% level. Model 1-5 represent model for composite stock price index, mining, agriculture, finance and manufacture industrial sectors index, respectively.*

To test the over identifying restrictions on the SVAR model, we employ a chi-squared with 2 degrees of freedom provided by RATS program output. We find the value of chi-square test for model 1of 3.999 with the χ^2 value of 0.135. It means that the overidentifying restrictions cannot be rejected. All models perform the same result (except model 5) and based on our calculation all models also perform well since they converge below 100 iterations. Our identification strategy is also valid since our model generates the significant of the contemporaneous coefficients outside the upper triangular of A matrix ($a_{21}$and a_{32}) as seen in equation (4).

Figure 1 and 4 plot the impulse response function of macroeconomic (stock price, exchange rate, inflation and output) response to one standard deviation shocks in monetary policy and fiscal policy for the aggregated stock price (model 1). Figure 2 and 5 display the sectors stock price response to one standard deviation shocks in monetary policy and fiscal policy respectively. The solid line corresponds to the median response and we provide 68% posterior confidence intervals from near-SVAR model. The confidence bands are constructed by using a Monte-Carlo Gibbs sampling algorithm as developed further for SVAR model by Waggoner and Zha (2003) and calculated by taking the estimated coefficient in structural model to form the data generating process on 2,000 burns and 10,000 draws.

4.1. The Effect of Monetary Policy Shocks

As shown, in a response to the positive innovation in the central bank policy rate (tightening monetary policy shock), Composite Stock price (figure 1) rise initially and then fall until reaches the peak in 16 months. This finding is in line with the work of Praptiningsih (2013) and Handoyo et al., (2014). These delayed responses of stock prices imply that stock prices adjust sluggishly to a monetary policy shock. The falling of stock price initially is to earn the higher discount factor which reduces the present value of expected future earnings of firms. Theoretically, a rise in interest rate is predicted to have a negative effect on the stock market. This sluggish response may be due to investing in the Indonesian stock market has grown significantly since the last two decades and become an interesting option for the investor to expand their business for both local and foreign investors regardless the policy undertaken by the central bank in the short horizon although in medium and long horizon stock price will fall.

From the perspective of the sectoral stock price, similar response patterns exist in all models (see figure 2) except model 4 (Finance and banking sector). The positive initial responses of both composite and sectoral stock prices are short-lived. The different response between the sectoral and the composite stock prices is in the period of initial response. Composite stock prices responds positively to the monetary policy shocks in month 5 and then negatively after that. Meanwhile, the mining, agriculture and manufacture industry responds positively in 3, 2, and 4 month, respectively. These findings reveal that the strength of the correlation between the monetary policy and the stock prices does not vary across sectors. The sector stockholder will be affected by the change in monetary policy. There are several reasons why initially they respond positively to monetary policy shock. First of all, this may be due to the probability of the asset price bubble increase for the last two decades regardless the policy actions conducted by monetary authority. In short run, Investors expect that as long as the future business prospect still profitable and the government perform the economy well, the demand for the asset still high. Secondly, this finding confirms that monetary policy is not effective for the Bank Indonesia (Indonesian Central bank) to intervene the Stock market. This is because the rapid development in financial market is not only affected by the monetary policy but also by the liberalization policy and reform in the financial sector that has been done so far.

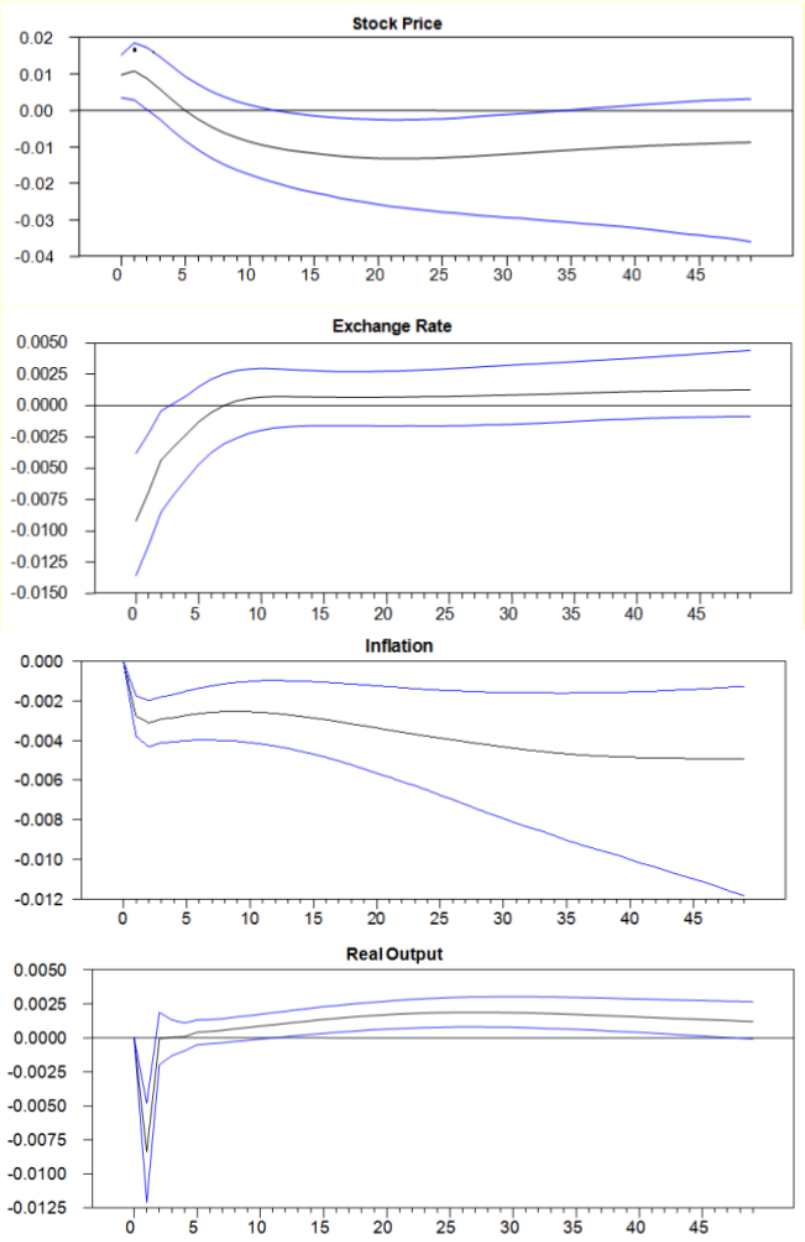


Figure 1. *Impulse Response to Monetary Policy Shock for Model 1 (Composite Stock Price Index)*

With so many studies on investigating in monetary policy shocks, the model has an appropriate behavior of the components of the model to domestic interest rate. The Impulse response functions for a domestic interest rate shock shown in Figure 1 reveals that many problems associated with identification of interest rate effects in a small open economy SVAR models are not present in the model. A rise in domestic interest rate generates a decline in domestic output and the real exchange rate (REER) appreciates. As the consequences of a decline in domestic output and the appreciation of the exchange rate, inflation rate falls. The inflation rate falls immediately after the increase in the domestic interest rate, the peak decline occurs 38 months after the shock. From this finding, the output puzzle, prize puzzle and the exchange rate puzzle do not exist in our model.

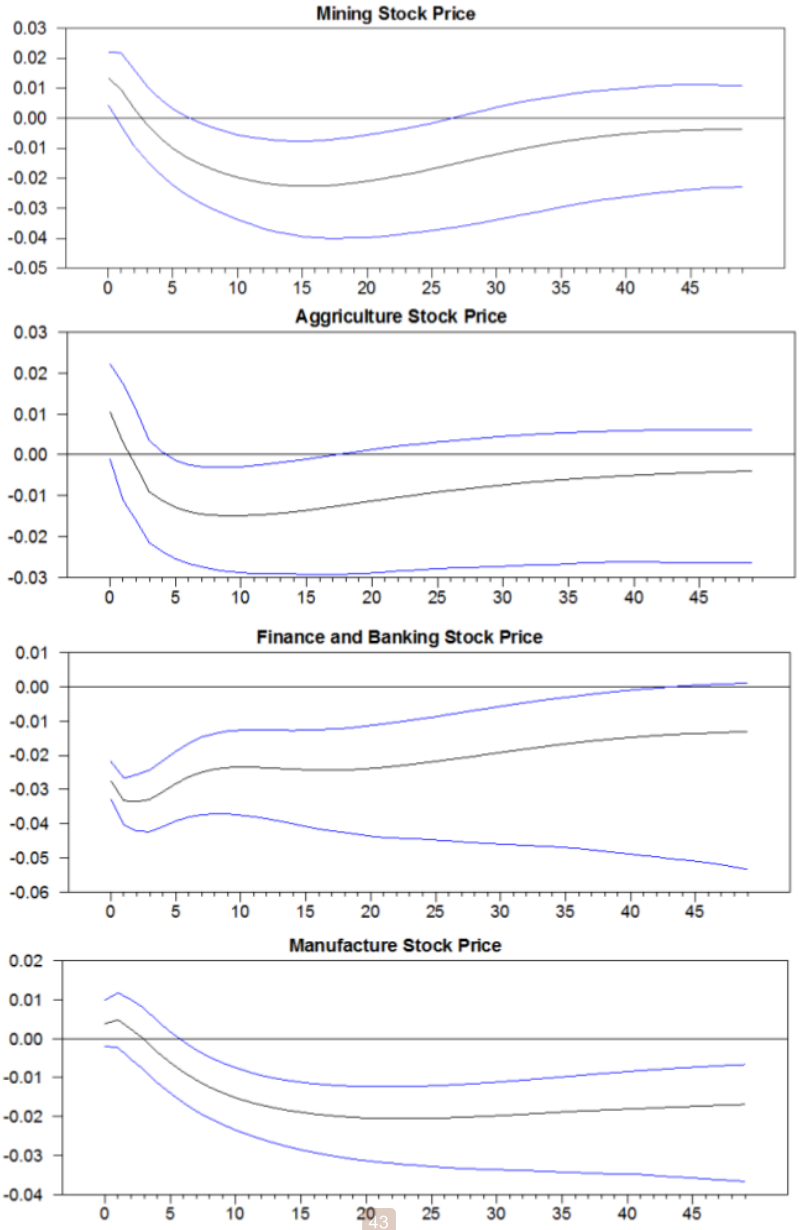


Figure 2. *Sector Stock Price Responses to Monetary Policy Shock*

In figure 3, our model also produces the responses the innovations of composite stock price. In response to a rise in stock price, the income increase immediately. This income response is consistent with a Tobin's q effect. The increase in income in turn will lead to create higher investment demand by firms and a wealth effect will lead to higher consumption demand by household.

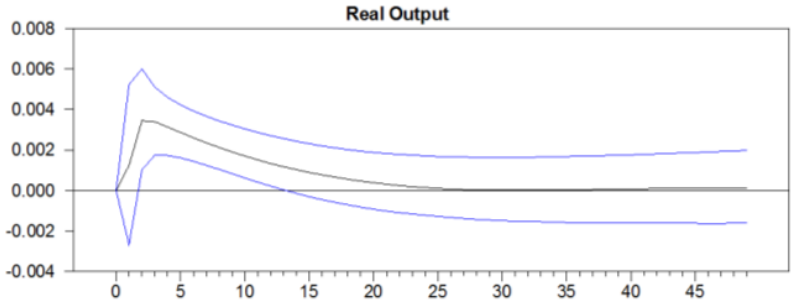
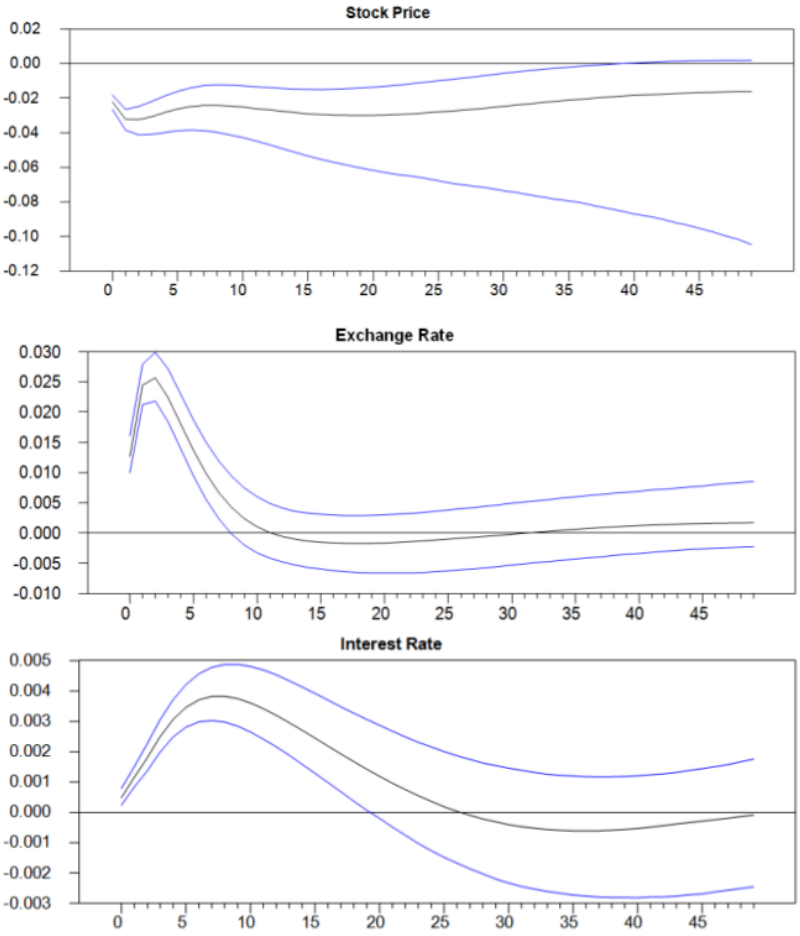
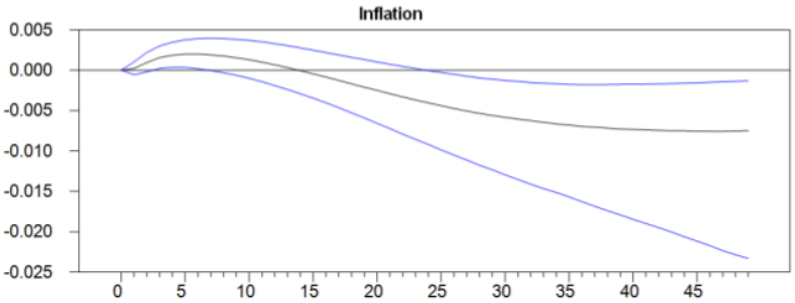


Figure 3. *Real Output Responses to Stock Price Shock*

4.2. The Effect of Fiscal Policy Shocks

In contrast to monetary policy shock, the stock market's response to one standard deviation increase in fiscal policy is similar since all models perform the similar pattern of initially response which all falls both composite stock price (see figure 4) and sectors stock price (figure 5). Looking at the reaction of stock price both composite and its sectors, the fiscal shock has a negative impact but it is less persistent. This finding is in line with the findings of Darrat (1990), Agnella and Sousa (2012), Afonso and Sousa (2011) which stated that there is a negative response of stock prices to fiscal policy shocks.





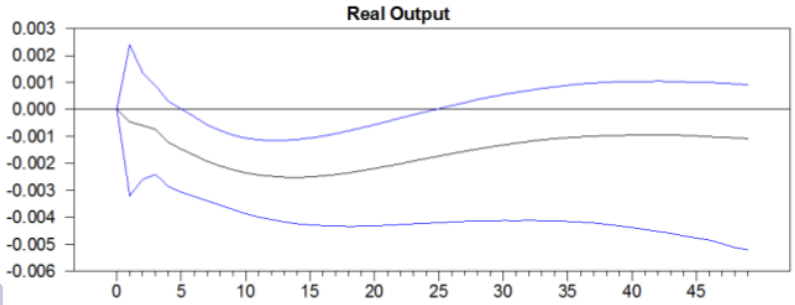
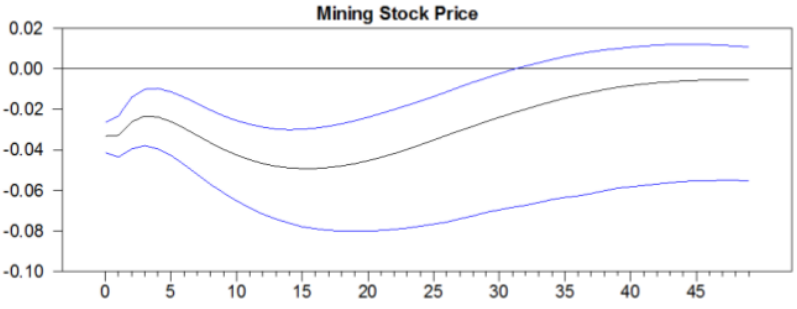
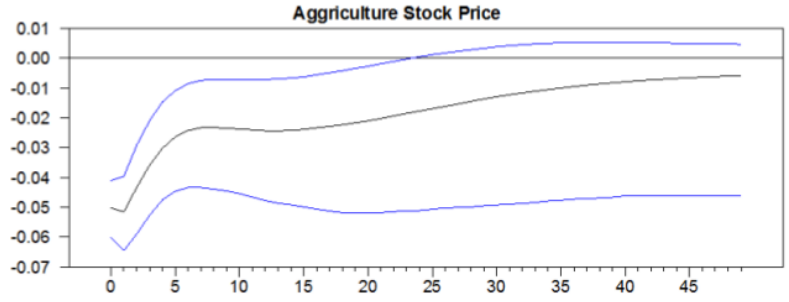


Figure 4. *Impulse Response to Fiscal Policy Shock for Model 1 (Composite Stock Price Index)*

In figure 4, the effect of fiscal policy shock on output is negative and this is in line with the study of Afonso and Sousa (2011), who also find a negative effect of government budget deficit on GDP. With reference to inflation, we have evidenced that they react positively to fiscal policy shock. This finding is also in line with the work of Perotti (2005).





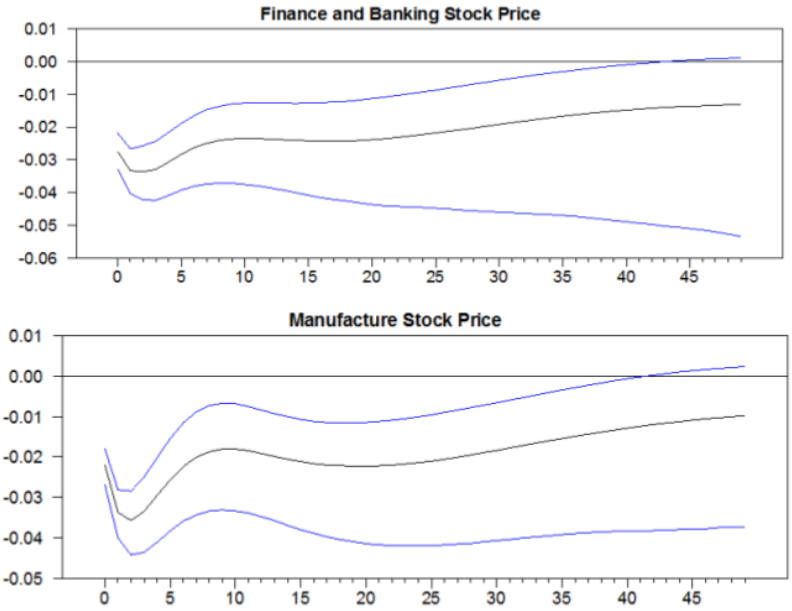


Figure 5. *Sectors Stock Price Response to Fiscal Policy Shock*

Response of interest rate seems to react positively to a fiscal shock. This reaction of the interest rate to fiscal policy is in the direction with the crowding out hypothesis. From this empirical finding, fiscal policy crowd out private sector activity in market, thus, its effect will be impotent in economy. This is in line with the work of Gale and Orszag (2003), Afonso and Sousa (2011) and Handoyo et al., (2014) who argue that there are two important reasons for why budget deficits may raise interest rates. Firstly, public deficits reduce aggregate savings when private savings do not increase by the same amount and there are no compensating foreign capital inflows. Secondly, deficits increase the stock of government debt. Furthermore, the effect of government budget deficits on long-term interest rates and emphasizes the "crowding-out" hypothesis, whereby fiscal policy can negatively influence investment expenditures. After the fiscal shock occurs, the rise in the interest rates makes the stock market a less attractive place for the allocation of savings. As a consequence, share prices immediately fall. However, as the shock erodes, stock prices start recovering in anticipation of the expansionary effects of fiscal policy on output. We provide this evidence to prove that not only both policies are able to influence the stock price individually, but also the interaction between monetary and fiscal policy is important in explaining stock market performance. Below we will provide the model that excludes the fiscal variable to analyze the importance of both policies in affecting the stock market performance.

4.3. Does the Fiscal Policy Variable Matter?

Although our main focus of study is the SVAR model described in the previous sections, it is interesting to verify the importance of the fiscal policy variable in the previous model. In addition, this can add a significant value to the understanding of the stock market behavior. Hence, the short run restrictions are as follows.

$$\begin{bmatrix} \varepsilon_{LSP} \\ \varepsilon_{LXR} \\ \varepsilon_{R} \\ \varepsilon_{INF} \\ \varepsilon_{LY} \\ \varepsilon_{LOIL} \end{bmatrix} = \begin{bmatrix} 1 & A_{12} & A_{13} & A_{14} & A_{15} & A_{16} \\ A_{21} & 1 & A_{23} & A_{24} & A_{25} & A_{26} \\ 0 & A_{32} & 1 & A_{34} & 0 & A_{36} \\ 0 & 0 & 0 & 1 & A_{45} & A_{46} \\ 0 & 0 & 0 & 0 & 1 & A_{56} \\ 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix} x \begin{bmatrix} e_{LSP} \\ e_{LXR} \\ e_{R} \\ e_{INF} \\ e_{LY} \\ e_{LOIL} \end{bmatrix} \quad (5)$$

Focusing on the responses of all variables to monetary policy shocks, we expect important findings compare to our original model's findings which take into account the fiscal policy instrument. In the absence

of fiscal policy instrument (see fig. 6), interest rates do not seem to have the significant impact on stock market development and our study is in line with the study of Chatziantoniou, et al., (2013). Furthermore, contrary to the fiscal inclusion model, the fiscal exclusion model experiences the exchange rate puzzle. Comparing these results with the original model, we are able to suggest that the fiscal exclusion variables does not provide a better representation of the Indonesian stock market model. Hence, the incorporation of the fiscal policy variable has added to the insight value in determining the stock market behavior.

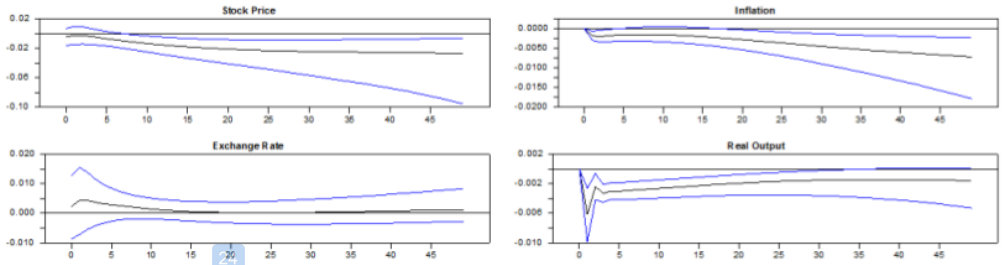


Figure 6. *Impulse Responses to Monetary policy Shocks for Fiscal Exclusion Model.*

5. Summary and Policy Recommendation

Our main conclusion is that the stock market responds positively to monetary policy shock on the short horizon although in medium and long horizon stock price will respond negatively. These delayed responses of stock prices suggest that stock prices adjust sluggishly to a monetary policy shock. From this empirical finding, it seems ineffective for the Bank Indonesia to intervene in the stock market on the short run. The monetary policy seems effective to influence the stock prices only on the Banking and finance sectors as suggested in the study. The change in stock market is not only affected by the monetary policy but also by the liberalization policy in the financial sector such as abolition of foreign exchange control, investment policies consistent with global economic development, free flow of foreign exchange, the development of technology in communications and trading systems, the introduction of innovative financial product, information availability, implementation of international accounting standard and the relaxation of foreign ownership. This generally supports the role of financial system in improving the economy. Continuing this liberalization policy in the future would seem beneficial for the economy as a whole.

In term of interaction between fiscal policy shock and stock market, we find that all sectors respond homogeneously in a negative relationship. From this empirical finding, fiscal policy crowd out private sector activity in market, thus, its effect will be impotent in economy. The ineffectiveness of fiscal policy on stimulating the economy can be due to the fact that most of the government spending (30%-40%) is used to pay the interest and the principal of debt rather than to finance the public investment which take less than 10% of government spending. Hence, it is important for the government to increase its expenditure for the public goods, in particular for the infrastructure sector. This policy perhaps will improve the macroeconomic performance and the investors' confidence and eventually will increase the stock price.

In this study, we also prove that not only both monetary and fiscal policy are able to influence the stock price individually, but also the interaction between two policies is important in explaining stock market performance. Due to different focused objectives between the fiscal and monetary authorities under the inflation targeting framework, the coordination between two authorities are needed. In the absence of coordination, the government may fail to attain the objective of stable and non-inflationary economic growth.

As in other time series modeling, this study also has some limitations. First of all, this study covers the sample period from January 2001 to avoid the effect of 1998 economic crisis. Nevertheless, the sample period still covers the period of global financial crisis of 2008. Then there exists a structural break and one should treat it carefully and we do not take into account the structural break. Secondly, in developing the model of Indonesian stock market, the oil price is the only variable that represents the foreign variable. Many studies have taken into account other foreign variables such as world commodity price, US monetary policy, US output, US inflation and world energy price in constructing the stock market model in particular.

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