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Research Article

Fiscal Shocks and Macroeconomic Variables in Indonesia

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Abstract: This study identifies the impact of fiscal policy shocks on macroeconomic variables in Indonesia. This study uses fiscal variables in the form of government consumption and other macroeconomic variables in the form of household consumption, portfolio investment, and the real exchange rate. The method used is to analyze the impulse response function of the VECM model estimated using quarterly data from 1990-2018. The results in this study are; Fiscal shocks are responded positively to household consumption and last for a long time (permanent response). Portfolio investment also responded positively but only until the second quarter, subsequently, investment responded negatively to fiscal shocks. Furthermore, fiscal shocks are responded negatively by the real exchange rate or the real exchange rate depreciates. Therefore, the results of this study become one of the empirical evidence of the effectiveness of fiscal policy in shaping the economy, especially to influence consumption, investment and the exchange rate.

Keywords: Government Expenditure, Real Effective Exchange Rate, Consumption of Household, Portofolio Investment, *Impluse Respond Function*, Vector Error Correction Model (VECM).

INTRODUCTION

Fiscal policy is a policy made by the government to direct the country's economy as it should. Boiciuc (2015) explains that in addition to being able to move the economy of a country, fiscal policy, in this case, government spending, is also considered the most effective policy in restoring a country's economy. According to Ravn, *et al*., (2012) this occurs because of the increased aggregate demand in the goods and services market.

This fiscal policy is not only carried out in countries in a system that adheres to a closed economy and an Ilori open economy (2019). In a closed economy, fiscal policy, for example (an increase in government spending) will increase economic growth, but this increase only increases potential economic growth, whereas in a closed economy it is assumed that there are no international transactions (Rakic, *et al*., 2012). In an open economy, the impact of fiscal policy is determined by the exchange rate system used by a country and explained by the Mundell Fleming model in basic macroeconomic theory. De Castro and Garrote (2015) explain the contents of the Mundell-Fleming model stating that expansive fiscal policy will drive

economic growth caused by increased demand for goods and services. This increase in demand causes the income level to also increase thereby making the demand for money increase. As a result of this incident, the nominal and real interest rates will rise so that it will trigger capital inflows into the country and make the exchange rate appreciate, on the other hand, it will worsen the condition of the trade balance. In recent years, the study of fiscal policy on closed economy has been very difficult to find, many researchers have focused their research on fiscal policy on open economy, and even specialized research on small open economy, including (Tervala, 2008); (Bouakez and Eyquem, 2015); (Kuncoro, 2015); (Chen and Liu, 2018).

Countries with small open economies such as Indonesia are classified as unique because their economic conditions are not only influenced by domestic policies but also from abroad. One of the policies that received special attention was fiscal policy. After the 1997/1998 crisis, Indonesia has focused on fiscal policy to rid the economy of the crisis. As a result of the 2008 global crisis, Indonesia was able to stand with the global crisis, at which time the Indonesian

government used a variety of fiscal stimulus to encourage economic activity with a total of 73.3 trillion rupiahs or 1.4 percent of GDP (Kuncoro, 2014).

Talking about the impact of fiscal policy, especially government spending on macroeconomic variables, this is still a debate because there are still differences in the results of empirical studies and a challenge for policymakers (Cakrani, *et al.*, 2013); (S. Kim, 2015). The main difference lies in the characteristics of the country, the methods used and also the type of fiscal policy made by the government (Munir and Riaz, 2019). When viewed from country characteristics, Miyamoto, *et al.*, (2019) in his research explained that expansive fiscal shocks in developing countries caused private consumption to increase and the real exchange rate to appreciate. Whereas for developed countries the opposite is true. In terms of methods, Di Giorgio, *et al.*, (2018) used two models, namely NOEM (New Open Economy Macroeconomic) and DSGE (Dynamic Stochastic General Equilibrium). The findings explain, using the NOEM model of expansive fiscal shocks causes the exchange rate to appreciate, while the DSGE model exposes the exchange rate to depreciate.

Related to the impact of government spending, the article will explain how the impact of government spending on household consumption, portfolio investment and the real exchange rate. These three variables are very important economic variables. Household consumption plays a very important role in the economy. The higher the consumption of the people the more goods and services produced. Household consumption expenditure accounts for the largest portion of aggregate expenditure, especially in developing countries (Rafiy, *et al.*, 2018). The results of Chen and Liu's research (2018) state that private consumption tends to increase when there is an expansive government spending shock even though the effect is not significant. A different matter is shown by (Kuncoro, 2018) which states that government spending will reduce the level of household consumption.

Besides government spending also affects investment, the resulting impact can be crowding out and crowding in that comes from Neoclassical and Keynesian views. P. Balcerzak and Rogalska (2014) explained that in the Neoclassical view the impact of expansive fiscal policy would result in crowding out, this was based on an increase in government spending on interest rates when interest rates increased, investment decreased and private consumption also decreased. Whereas from the Keynesian view it explains that the impact of expansive fiscal policy causes crowding in, this is based on an increase in people's welfare and the impact of interest rates on investment is very small (Omitogun, 2018).

Omitogun (2018) explains that in the short term the effects of government spending, especially in terms of capital spending have a negative and not significant effect on investment, while routine government spending has a positive influence on private investment in Nigeria. In the long-run capital expenditure for economic and social services has a negative but insignificant impact on investment, while capital expenditure in administration, transfers, and loans has a positive and significant impact on private investment.

This finding is in line with Omojolaibi, *et al.*, (2016) which states that government capital expenditure will cause crowding in. Therefore it can be concluded that the resulting impact depends on the type of government spending where the results are different from neoclassical theory. However, the two studies above are not in line with the findings obtained by (Dreger and Reimers, 2016).

Related to the impact of government spending on the exchange rate, it will increase demand for goods and services, in other words, aggregate demand increases. This increase in demand causes the demand for money to increase because it is assumed that an increase in the exogenous money supply, then the money market will raise interest rates to reach a balanced level. High-interest rates will make capital inflow so that the exchange rate appreciates. This statement is supported by (Beetsma, *et al.*, 2008); (Benetrix and Lane, 2013); (Cakrani, *et al.*, 2013); (Nwosa, 2017); (Chen and Liu, 2018). Whereas from the other side explains the shocks of the fiscal policy that would have the potential to cause the exchange rate to depreciate (Basu and Kollmann, 2011 (Enders, *et al.*, 2011); (Bouakez, *et al.*, 2014); (Bouakez and Eyquem, 2015); Kim, 2015).

Mariano, *et al.*, (2016) explained that the exchange rate is a very important role in international trade and also signifies the competitiveness of a country. Fluctuations in the real exchange rate are a source of external disturbances to the domestic economy, especially for developing countries because of their very strong links with developed countries as a means of payment.

RESEARCH METHODS
The scope of this study is to analyze the impact of government spending shocks on household consumption, portfolio investment and the real effective exchange rate in Indonesia. The model in this study is based on research conducted by H. Kim and Lee (2018) using the VAR (Vector Auto Regression) model. Sims (1980) explains that the VAR model is useful in terms of forecasting and also becomes an alternative policy for policymakers because they ignore the issue of exogenous. Christiano (2012) also states that the VAR model provides empirical input and becomes a solution

to a debate in economic theory. While Stock and Watson (2001) state that the use of the VAR model is suitable for looking at seeing fiscal policy shock to macroeconomic variables as explained by. This shock can be seen by using the impulse response function approach which is part of the VAR. However, because there are several assumptions of VAR that are not met, the model used is the VECM (Vector Error Correction Model).

The type of data used in this study is secondary data in a quarterly form from 1990 to 2018. The data used are from Bank Indonesia (for government consumption and household consumption), IMF (for portfolio investment) and Federal Reserve st. Louis (for effective real exchange rates).

The choice of household consumption is based on the condition of the Indonesian economy, where consumption is one of the biggest contributors to Indonesia's economic growth. The choice of portfolio investment variables is based on the short-term nature of the portfolio investment. According to Rashid and Khalid (2017) states that portfolio investment, in this case, Foreign Portfolio Investment is considered a way of increasing growth especially for developing

countries. FPI is considered as a source of funds for countries that have investment and domestic savings gaps, as well as increasing company liquidity and foreign exchange reserves. The selection of effective real exchange rates is based on the statement of Mariano, *et al.,* (2016) which explains that the exchange rate is a very important role in international trade and also signifies the competitiveness of a country. Fluctuations in the real exchange rate are a source of external disturbances to the domestic economy, especially for developing countries because of their very strong links with developed countries as a means of payment.

This study uses a Vector Error Correction model with four main variables, namely government expenditure, real exchange rate, household consumption, portfolio investment, and one dummy variable. The use of this dummy variable is because Indonesia experienced a crisis in 1998. At that time Indonesia's public debt reached 100 percent of GDP so that this greatly burdened the state budget. In contrast to 2008, although Indonesia had felt the effects of the crisis, in the fourth quarter the Indonesian economy continued to experience growth (Hill, 2012). Mathematically can be formulated as follows:

$$\Delta LGE_t = \beta_{LGE0} + \beta_{LGE1}\Delta LCHH_{t-1} + \beta_{LGE2}\Delta IP_{t-2} + \beta_{LGE3}\Delta REER_{t-3} - \lambda_{LGE}(LGE_{t-1} - \alpha_0 - \alpha_1 LCHH_{t-1} - \alpha_2 IP_{t-2} - \alpha_3 REER_{t-3} - \alpha_4 DS_{t-4}) + e_{tLGE} \dots\dots\dots (1)$$

$$\Delta LCHH_t = \beta_{LCHH0} + \beta_{LCHH1}\Delta LGE_{t-1} + \beta_{LCHH2}\Delta IP_{t-2} + \beta_{LCHH3}\Delta REER_{t-3} - \lambda_{LCHH}(LCHH_{t-1} - \alpha_0 - \alpha_1 LGE_{t-1} - \alpha_2 IP_{t-2} - \alpha_3 REER_{t-3} - \alpha_4 DS_{t-4}) + e_{tLGCHH} \dots\dots\dots (2)$$

$$\Delta IP_t = \beta_{IP0} + \beta_{IP1}\Delta LGE_{t-1} + \beta_{IP2}\Delta LCHH_{t-2} + \beta_{IP3}\Delta REER_{t-3} - \lambda_{IP}(IP_{t-1} - \alpha_0 - \alpha_1 LGE_{t-1} - \alpha_2 LCHH_{t-2} - \alpha_3 REER_{t-3} - \alpha_4 DS_{t-4}) + e_{tIP} \dots\dots\dots (3)$$

$$\Delta REER_t = \beta_{REER0} + \beta_{REER1}\Delta LGE_{t-1} + \beta_{REER2}\Delta LCHH_{t-2} + \beta_{RRER3}\Delta IP_{t-3} - \lambda_{REER}(REER_{t-1} - \alpha_0 - \alpha_1 LGE_{t-1} - \alpha_2 LCHH_{t-2} - \alpha_3 IP_{t-3} - \alpha_4 DS_{t-4}) + e_{tREER} \dots\dots\dots (4)$$

Dimana:
$REER_t$= Real Effective Exchange Rate
LGE_t= Log Government Expenditure
$LCHH_t$= Log Consumption of Household
IP_t= Portofolio Investment
$\lambda_{LGE; LCH; IP; REER}$ = Error Corection Parameter
DS_t= Dummy Structural

D =	1 (from Q1 1990 - Q4 1997)
	0 (from Q1 1998 - Q4 2018)

β_0, α_0 = Intercept (For Short Term and Long Term)
$\beta_1; \beta_2; \beta_3; \beta_4$= Regression Coefficient for the Short Term
$\alpha_1; \alpha_2; \alpha_3; \alpha_4$= Regression Coefficient for the Long Term
e_t= Error Term
t= Series
$_{1; 2; 3; 4}$= Number of Lagged

ESTIMATION AND RESULT
Stationary Results Test

The stationary test aims to analyze and prove whether each variable has a stable/normal/stationary pattern (I (0)) or not (I (1)). The stationary test in this study uses the Phillips-Perron test using individual intercepts and individual intercepts and trends. If all stationary variables are at level (I (0)), then the model used is Vector Auto Regression. However, if there is a difference in stationarity then it is continued with the stationarity test at different firs (I (1)) and the recommended model is the Vector Error Correction Model (VECM). Of course, before using the VECM model, it must first be tested for integration. The stationarity test results for each variable are explained in Table 1.

Table 1. Unit Root Test

Individual Intercept		
Variabel	Phillips-Perron Test	
	At Level (I(0))	Firs Diff (I(1))
GE	0,9609	0,0000
REER	0,0613	0,0000
CHH	0,9103	0,0000
IP	0,0000	0,0001
Individual Intercept and Trend		
Variabel	Phillips-Perron Test	
	At Level (I(0))	Firs Diff (I(1))
GE	0,1558	0,0000
REER	0,2057	0,0000
CHH	0,2901	0,0000
IP	0,0000	0,0001

Resources: Data Processing Result, 2018 (processed)

Lag Selection

There is a very important aspect of the VAR model, which is lag. The lag test serves to explain how long the influence of one variable on other variables. Also, the lag test will later provide information regarding the appropriate VAR model (Carrasco-gutierrez, *et al*., 2009). The lag value can be obtained through Akaike Information Criteria (AIC), Schwarz Information Criterion (SIC) and Hannan Quinn (Ozcicek and Mcmillin, 2001).

Table 2. Lag Optimum

Lag	AIC	SIC	HQ
0	24.16446	24.36429	24.24547
1	23.72541	24.32492	23.96844
2	23.83815	24.83734	24.24321
3	22.17971*	23.57857*	22.74679*
4	22.25716	24.05570	22.98627
5	22.36267	24.56088	23.25380
6	22.51904	25.11693	23.57219
7	22.64772	25.64528	23.86289
8	22.81003	26.20727	24.18722

Resources: Data Processing Result, 2018 (processed)

Based on Table 2, it appears that the optimal lag is lag 3. This is indicated by all the stars that are in lag 3 for each lag test.

Cointegration Test

Table 1 explains that not all stationary variables (I (0)). The variables that are not stationary in (I (0) are government expenditure, real effective exchange rate and household consumption while investment is a stationary portfolio in (I (0)). While in (I (1)) all variables are stationary. The analysis was continued using the Vector Error Correction Model (VECM).

The VECM model strongly emphasizes cointegration testing. According to Andrei and Andrei (2015), a cointegration test is used to see whether the estimated variables have a long-term, linear and stable relationship. Cointegration test results are described in Table 3.

Table. 3 Cointegration Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.323283	113.8450	47.85613	0.0000
At most 1 *	0.269743	70.49933	29.79707	0.0000
At most 2 *	0.214106	35.60546	15.49471	0.0000
At most 3 *	0.076732	8.861816	3.841466	0.0029
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.323283	43.34571	27.58434	0.0002
At most 1 *	0.269743	34.89387	21.13162	0.0003
At most 2 *	0.214106	26.74365	14.26460	0.0003
At most 3 *	0.076732	8.861816	3.841466	0.0029

Resources: Data Processing Result, 2018 (processed)

Table 3 shows that there is cointegration among all variables. It can be seen from each of the trace statistics and max-eigen statistical values from none to at most 3 are greater than the critical value of 0.05. These results state that reject H0 hypothesis which states the absence of cointegration and accepts alternative hypothesis H1. Based on the cointegration test results it can be stated that the model used is the Vector Error Correction Model (VECM).

DISCUSSION
Impluse Respond Function
Response of Household Consumption Due to Government Expenditure Shocks

Response to Cholesky One S.D. (d.f. adjusted) Innovations

Response of CRT to GE_STL
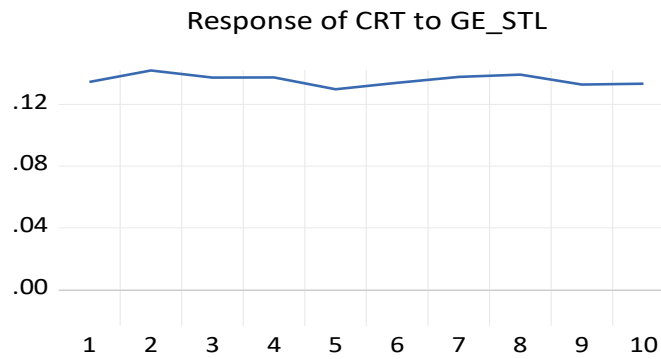
Resources: Data Processing Result, 2018 (processed)
Picture 1.Response of Household Consumption Due to Government Expenditure Shocks

Household consumption responded positively to overall government spending shocks. This was seen in the first quarter to the fourth quarter, although in the fifth quarter the household consumption response was negative. However, after that, it responded positively even though in the ninth quarter it was negative. This result is in accordance with the basic economic theory which states that an increase in government spending will create an increase in output, where an increase in output will cause an increase in income which in turn makes the consumption of society also increase.

Table 4. Percentage of Household Consumption Responses Due to Government Expenditure Shocks

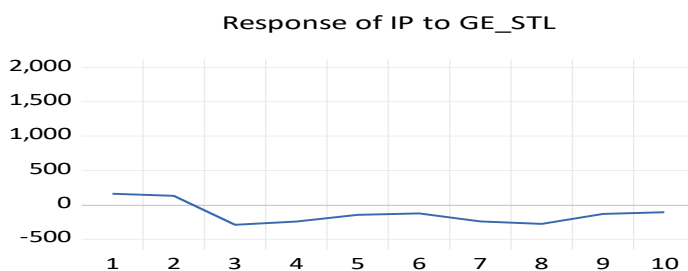| Response of CRT:	
Period	GE_STL
1	0.134562
2	0.142037
3	0.137342
4	0.137448
5	0.129856
6	0.133993
7	0.137786
8	0.139268
9	0.132900
10	0.133416

Resources: Data Processing Result, 2018 (processed)

Table 4 explains that a one percent increase in government spending caused household consumption to increase by 0.13 percent in the first quarter. This increase continued until the tenth quarter. Ravn, *et al.,* (2012); De Castro and Garrote (2015) documented that the expansion in government spending caused output and consumption to increase, as a result of increased income. Likewise with H. Kim and Lee (2018) who explained that after 2000, an increase in government spending caused private consumption in South Korea to increase. The results of Chen and Liu's research (2018) also mentioned that private consumption tends to increase when there is an expansive government spending shock even though the effect is not significant.

Response of Portofolio Investment Due to Government Expenditure Shocks

Response to Cholesky One S.D. (d.f. adjusted) Innovations

Response of IP to GE_STL

Resources: Data Processing Result, 2018 (processed)
Picture 2. Response of Portofolio Investment Due to Government Expenditure Shocks

The response of portfolio investment due to government shaking is in a positive direction for two quarters, meaning that the increase in portfolio investment is only short-term. But in the next quarter, the portfolio investment response due to government spending shocks was in a negative position or in other words the level of portfolio investment declined.

Table 5. Percentage Response of Portofolio Investment Due to Government Expenditure Shocks

Response of IP:	
Period	GE_STL
1	160.9246
2	130.9289
3	-290.0663
4	-242.1194
5	-144.1203
6	-124.5820
7	-241.5590
8	-277.4008
9	-131.5166
10	-107.5760

Resources: Data Processing Result, 2018 (processed)

If seen further from Table 5, an increase in government spending by one percent caused portfolio investment to increase by 160 percent in the first quarter. After the second quarter, the increase in government spending caused the direction of portfolio investment to turn negative. Boehm (2019) explained that the decline in investment occurred as a result of rising real interest rates. The increase in real interest rates is due to an increase in consumption as a result of rising incomes which creates inflation (Lewis and Winkler, 2015). This increase in interest rates is certainly beneficial for investors but on the other hand, becomes an additional burden or expense to those who need funds.

Response of Real Effective Exchange Rate Due to Government Expenditure Shocks

Response to Cholesky One S.D. (d.f. adjusted) Innovations

Response of REER to GE_STL

Resources: Data Processing Result, 2018 (processed)
Picture 3. Response of Real Effective Exchange Rate Due to Government Expenditure Shocks

When there is a shock of government spending, the real exchange rate responds negatively or in other words the real exchange rate depreciates starting from the first quarter to the tenth quarter. The results of the impulse response function are in accordance with the research proposed by Basu and Kollmann (2011); Enders, *et al.,* (2011) which states the impact of expansive fiscal policy causes the exchange rate to depreciate.

Table 6. Percentage Response of Real Effective Exchange Rate Due to Government Expenditure Shocks

Response of REER:	
Period	GE_STL
1	-0.278744
2	-0.754876
3	-0.819192
4	-1.018559
5	-1.014713
6	-0.963008
7	-0.898931
8	-0.806335
9	-0.849178
10	-0.895261

Resources: Data Processing Result, 2018 (processed)

Table 6 documents that, an increase in government spending by one percent caused the real effective exchange rate for Indonesia to depreciate by 0.27 percent. The biggest depreciation occurred in the fourth quarter which was 1.018 percent. According to S. Kim (2015) depreciation of the real exchange rate occurs in countries with low international mobility compared to countries with high international mobility. It was further explained that expansive government spending shocks caused a depreciating exchange rate to occur in a country that adopts a floating exchange rate system. The above statement is also supported by (H. Kim and Lee, 2018).

CONCLUSION
This Study Found That:
1. Household consumption responds positively to shocks in government spending or other words household consumption increases due to rising incomes. In economic theory, it is said that income is directly proportional to the level of consumption.
2. Portfolio investment responded positively to government spending shocks for two quarters. Furthermore, the direction changes to negative. This is based on the shock of government spending causing an increase in the level of income. This increase in income makes money demand increase so that the money market tries to maintain balance by raising the real interest rate. When real interest rates increase this makes the level of investment decreases because the costs to be incurred by those who need funds become more expensive.
3. The real exchange rate responds negatively to government spending shocks, or in other words, depreciates. This finding is different from the Mundell-Fleming theory which states that when expansionary fiscal policy causes the exchange rate to appreciate, assuming the adopted exchange rate is a free-floating exchange rate. This is because the country of Indonesia is a country with a low level of capital mobility and also the exchange rate system used in Indonesia is a free-floating exchange rate system.

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