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The Role of Monetary Policy for Supporting Foreign Direct Investment Inflows in Indonesia (Evidence from 2000.1-2019.1)

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This research explored the condition of foreign direct investment in Indonesia. The contribution is still relatively low to the growth rate of the Indonesian economy. With the Taylor Rule model, the analysis of monetary policy was done to decide the choice of policy which one was the right one relating to increasing the role of foreign investment. Based on impulse response and variance decomposition analysis, we found that the fluctuation of interest rate has the most influence on foreign investment besides inflation rate, exchange rate, and FDI itself. Such that, the interest rule which decides the targeted interest rate as the final target policy, is the most favourable policy that supports the role of Foreign Direct Investment in Indonesia.

Key words: *Foreign Direct Investment, Monetary Policy, Interest Rate Targeting*

Introduction

Strong economic growth is a prerequisite for the successful progress of a country, especially in a developing country. The economic goal of a country can be measured by Gross Domestic Product (GDP) as a proxy from economic growth to increase social welfare. GDP also measures national income level of a country by calculating goods and services that are yielded in a country annually, as shown in Figure 1.

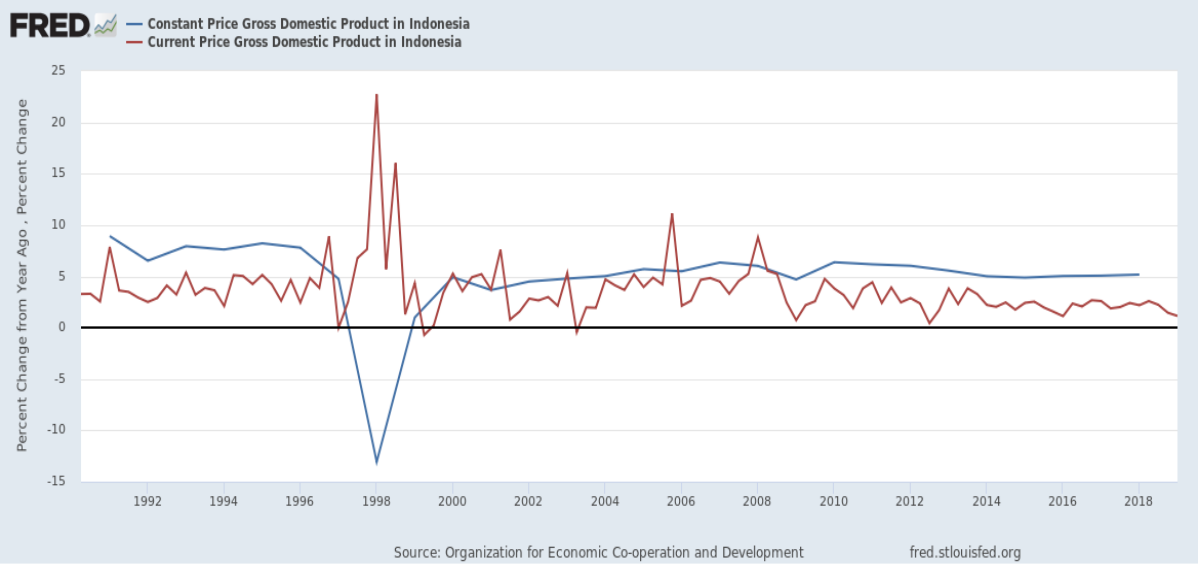


Figure 1. Percent Change in GDP Current Price (Constanst Price 1990-2019)

Inflation is used to differentiate nominal and real GDP, exchange rate and interest rate. The up and down inflation rate in Indonesia, as seen in Figure 2, had the lowest economic condition in 1998, with 838% from the previous year, due to the impact of the crisis in mid-1997. One sense of this is the inflation rate that caused declining rupiahs exchange rate on the US dollar directly related economic size.

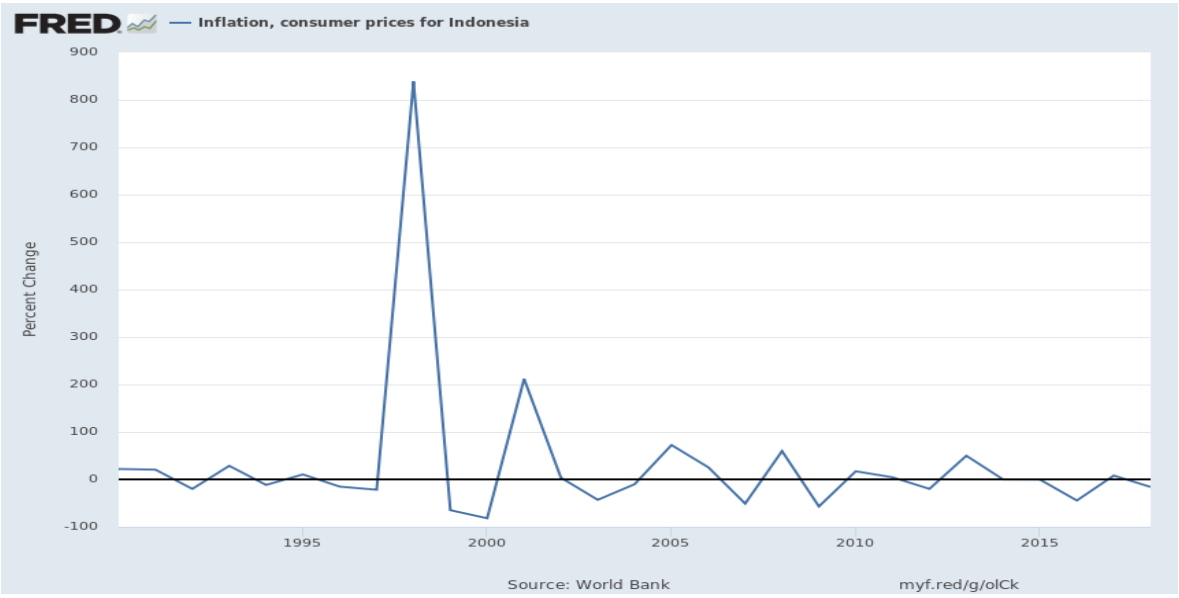


Figure 2. Percent Change in Inflation (*Constant Price* 1990-2019)

Economic growth is a centralised focus in every country. One of the most common economic growth factors is foreign investments, that can enhance the capital quality of capital and human resources (Rischard, 2007; Todaro & Smith, 2011). Enriching human resources by investments can be done by new inventions, innovations, and technology improvement.

Creating enough investment for economic augmentation is one of the core tactics for development take-off (Robison, 2009; Rostow, 1959).

Indonesia has aimed for FDI since the 1980's for several reasons, such as natural resources, low-cost labor, and vast society are potentially market value (Winters, 1996). Nonetheless, this critical role does not go with the real condition of FDI in Indonesia. As shown in Figure 3, the ratio FDI on GDP is relatively low quarterly.

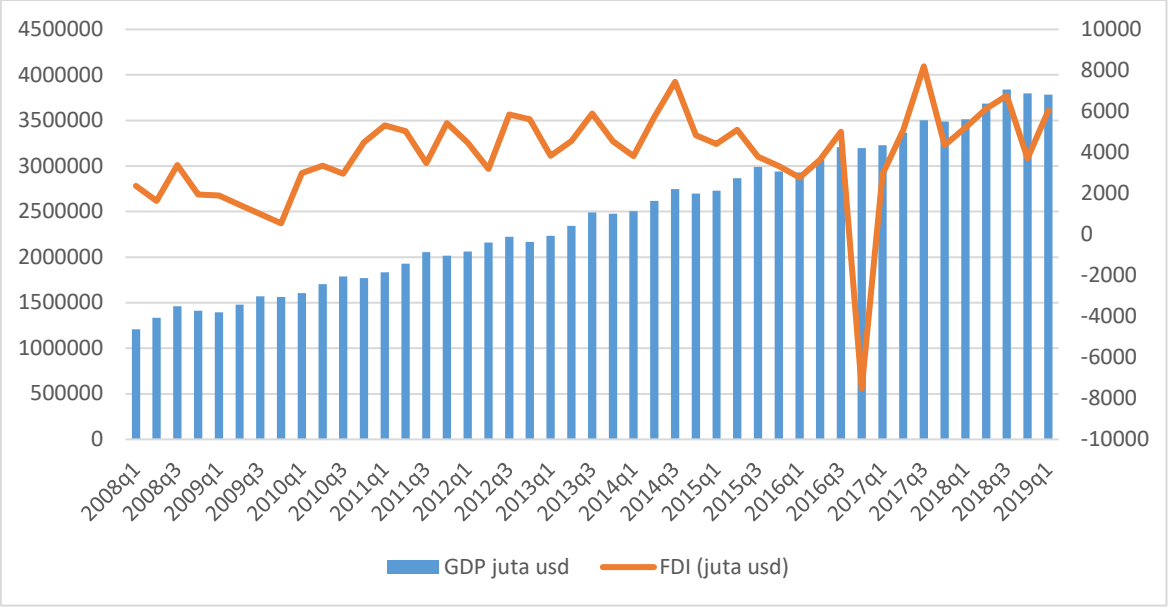


Figure 3. FDI and Real GDP in Indonesia from 2008.1 to 2019.1

Figure 3 shows that a rise in real GDP does not follow by an increase in FDI, although FDI is fluctuating. Todaro & Smith (2011) said FDI, as part of the investment, should contribute to economic growth extensively. Consequently, a low ratio of FDI on GDP is a big obstacle for the government; considering that FDI should take part in the development capital form for obtaining economic growth targets. Underlying economic conditions is one factor that is considered by a foreign investor. Inflation targeting get more attention from policymakers because (i) increasing inflation work and output, (ii) correcting inflation estimation trough higher capability of inflation expecting, (iii) excluding the possibility of having a policy that deviates from obtaining relatively low and stable inflation. Since August 1997, the exchange rate minimum bar eliminated. Hence inflation targeting has put a news anchor in monetary policy in Indonesia.

Literature Review

Effects of Monetary Policy on Economic Balance

Monetary policy is an effort to control or direct the macroeconomy to the desired condition (which is better), by regulating the money supply. According to Anwar & Nguyen (2018) using VAR analysis, found that monetary shocks tend to have a strong influence on the real sector economy of Vietnam. To increase the money supply, the policy put into place must be expansive. At the same time, contractionary monetary policy is carried out by reducing the money supply or known as *tight money policy* (Manurung & Rahardja, 2002). Some background framework of implementing stabilisation policy efforts to influence policy variables can be made by using rules that take into account the existence of permanent feedback in the relationship between economic variables. According to Ball (1997) & Svensson (1997), the generic version of the Taylor Rule can be derived based on the step of optimisation by the central bank by taking into account the backward-looking Phillips Curve and the dynamic IS curve from the demand side.

Taylor Rule Model for Inflation Targeting

The emergence of the first Taylor Rule model was in 1993, when setting the nominal interest rate Taylor recommended to the US central bank. A rule was established where the development of interest rates reflects the response of output development and inflation. Although there are pros and cons of applying the Taylor Rule in monetary policy, most European countries still adopt this policy to improve the economy (Taylor, 1993).

In the Taylor Rule model, that are three things that need to be first observed, for the monetary policy instrument to be used in the bank interest rate. One, The policy will be indirectly indicated efficient by the Taylor Rule by looking at the output coefficient and inflation. Two, the final target is inflation. Three, the other target is national income. Taylor forms a model of interest rate behaviour towards inflation and output for the United States. The model is;

$$it = 0.04 + 1.5 (pt - 0.02) + 0.5 (Yt - \hat{y}t) \dots (1)$$

Where
it = US interest rate target
pt = inflation rate (measured by the GDP deflator)
Yt = log real GDP
Ŷt = log potential output

Based on Taylor (1999), the function of aggregate demand in the Indonesian economy follows a reduced equation form:

$$Yt - y * t = - (IP) \dots (2)$$

Where
y is the actual GDP or output as a reflection of aggregate demand
y * is Potential GDP or output as a reflection of aggregate supply
t is is the interest rate
p is aggregate inflation.

The above equation states that the actual output difference and its potential will be affected by real interest rates. If real interest rates increase, the output gap will increase. The reflection of the costs (inflation) that must be borne by the economy if you want a higher growth rate is used by the Philips curve that describes the trade-off between output and inflation.

$$Pt + 1 = p * + \theta (Yt - Yt *) + (\varepsilon t + 1 + c) \dots (3)$$

Where
Pt + 1 is aggregate inflation (headline inflation) in the future
p * inflation expectations
e + 1 is a surprise from the short supply side
c is a policy shock.

The Philips curve added that εt + 1 is a surprise from the short supply side so that in the long run, it is worth 0 (*white noise*). This supply-side surprise has the sign t + 1, meaning that the monetary authority has absolutely no kind of shock information that will occur in the coming period. C is a constant surprise policy (one-*time policy shocks*) that comes from adjusting prices for goods controlled by the government. The increase in inflation originating from the government has the authority to control prices directly and regulate the high price level. Feridhanusetyawan's (2011) attempted to explain that survey research can explain the increase in foreign exchange reserves in 2011, which can be used to reduce the inflation rate. Nguyen, Sun, & Anwar (2017) investigated the dynamics that occur between GDP, foreign direct investment (FDI), international trade, inflation, and state investment and found the impact on the short-term GDP on FDI more significant than the impact of FDI on GDP.

Foreign Direct Investment

The importance of FDI in the economy of a country can be seen through an open economy model that starts with the equality of identity as follows:

$$Y = C + I + G + (XM) \dots (4)$$
$$Y = C + S + T \dots (5)$$

So, if equation (4) and (5) are substituted to be:

$$C + S + T = C + I + G + (XM)$$
$$S + T = I + G + (XM)$$
$$(SI) + (TG) = (XM) \ldots (6)$$

FDI, according to Krugman & Obstfeld (2003), is an international capital flow in which a company in a country establishes or expands a company's branch in another country. Ersoy & Erol (2016) examined the effects of the EU crisis on FDI Inflows using GMM. While McCulloch in Froot (1993) states that two economic problems that affect FDI are exchange rates and trade barriers, Mcculloch argued that if exchange rate fluctuations are large and unpredictable, multinational companies benefit through domestic companies because of their ability to shift marginal production and sales in response to changes in exchange rates. Using data from 1980 to 2012, they found that for Greece, Italy, Ireland, Portugal, and Spain (GIIPS), the economic openness of these countries positively affected FDI inflows. However, the impact is not comparable to backing up the impact of the European financial crisis.

Effects of Monetary Policy on FDI

The Mundell-Fleming model, which is an open economy, is widely used to analyse the effectiveness of macroeconomic policies on high capital mobility. As a simplification, this model assumes 1) rigid prices in the goods market, 2) perfect capital mobility, 3) perfect substitution between domestic and foreign bonds, 4) interest rates of other countries are exogenous (small country assumptions), and 5) expectations static ones. Assumptions 2 and 3 indicate uncovered occurrence interest parity (Kwan, 1998). The Mundell-Fleming Transmission Model Mechanism can be seen in Figure 4.

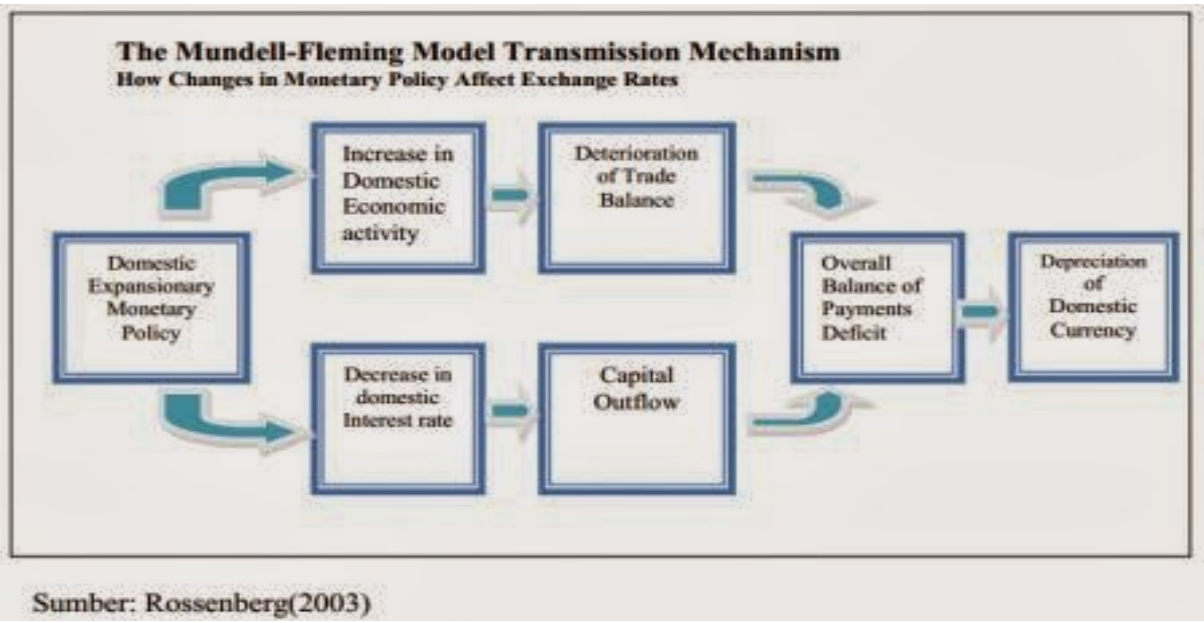


Figure 4. The Mundell-Fleming Transmission Model Mechanism

In the Mundell-Fleming model, the level of capital mobility plays a vital role in determining the exchange rate reaction to changes in monetary policy, as shown in figure 5.

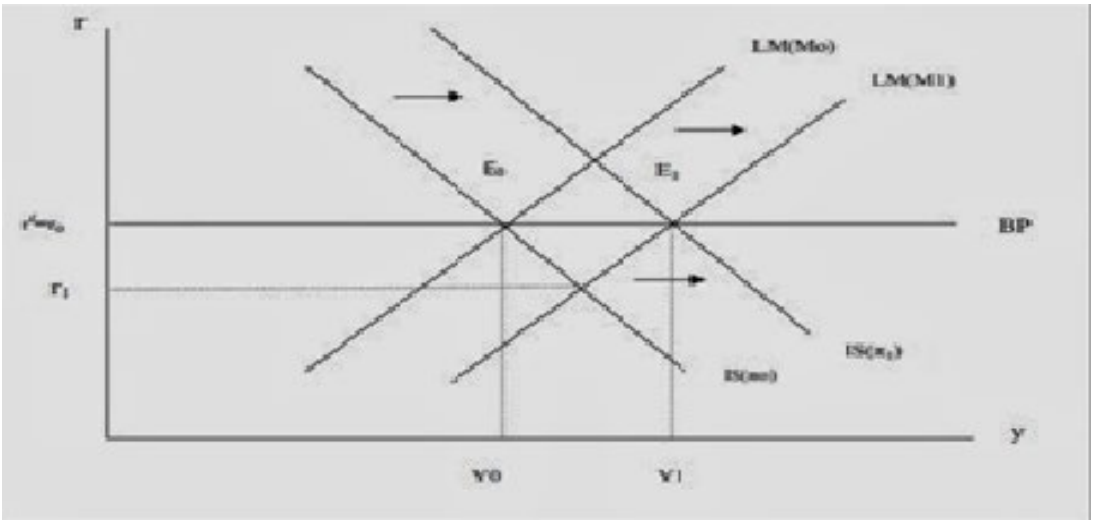


Figure 5. Mundell-Fleming Model (Froyen & Perez, 1990)

The more sensitive the flow of capital to changes in interest rates, the higher the response of capital flows to a decrease in interest rates. The higher the moving capital mobility, the greater the currency depreciation will occur as a reaction to monetary expansion (Rosenberg, 2003). Under the free foreign exchange regime (perfect capital mobility), in a free-floating exchange rate system, monetary policy will be more effective.

According to Krugman & Obsfelt (2003), fluctuations in exchange rates as a reaction to the expansion of fiscal policy will depend on how sensitive capital flows are to changes in interest rates. If capital mobility is high, the effect of capital flows from abroad causes a decline in trade, and also the value of the domestic currency will experience appreciation.

Interest Rates Effects on FDI

Interest Rates connects income and capital. The definition of interest rate is as a percentage of the premium paid on money on one day if money is still in hand within a year later (Siddiqui & Aumeboonsuke, 2014). The loss of the opportunity to obtain interest is calculated as the cost of capital. For the entrepreneur, it is not the interest rate in the nominal sense, but the real sense, namely the nominal interest rate reduced by inflation. Mathematically this can be formulated as follows:

$$\text{real} = r_{nom} - \pi \quad \ldots (7)$$

Where π = inflation rate. Some theoretical models are introduced in developing interest rate policies to control inflation. One of the policies is to implement the Taylor Rule that regulates interest rates carried out by the Central Bank. The Taylor Rule model is obtained from a combination of IS curves with the Phillips curve related to inflation (Taylor, 2001).

Exchange Rates Effects on FDI

Exchange rate movements are influenced by fundamental and nonfundamental factors. Fundamental factors include economic growth, inflation rate, and the development of import-export. The monetary approach states that changes in the money supply are determinant of exchange rate movements (Rosenberg, 2003). Although the monetary approach is generally regarded as a flawed theory because it ignores other relevant explanatory variables. Fei et al., (2019) developed the best winter-time asset allocation strategy of a multinational company, which invests in foreign markets under exchange rate risk.

Inflation Effects on FDI

Neo Keynesian flow has a high interest in inflation in the economic study model. This is because it is essential to perfect the model developed and provide a new perspective on the implementation of macroeconomic policies. However, the next question arises: what are the implications of inflation in the overall economic study? The answer to this question is has been attempted to be explained by a mathematical model. (Froyen & Perez, 1990). Mundel uses Fisher's law about the constancy of the real interest rate as the basis of the analysis, namely:

$$r = i - p \quad (8)$$

In this model, if inflation (p) increases, the nominal interest rate (i) will increase one by one to maintain that real interest rates remain (r). Mundell proves that using the IS-LM model that the fisher law is invalid (Froyen & Perez, 1990). The argument put forward by Mundell is nominal interest rates are determined by inflation expectations and real interest rates, i = r + pe. This assumed that, there are only two assets, money and equity, where r is the real return from equity. Keynes's theory of liquidity preference, says that money demand is inversely proportional to the rate of return of alternative assets, namely L (r, Y), in balance:

$$L (r, Y) \quad (9)$$

If the money supply increases, the interest rate will decrease. From this relationship, a locus of the money market balance is derived, as seen in the MM curve in Figure 6. The MM curve influenced by inflation expectations. If inflation expectations rise, then for a certain level of money supply, level real interest rate, r = i - pe, goes down, and this will shift the MM curve down. Therefore, the locus YY balance (on a particular output level) Air-positive slope, as seen in Figure 6.

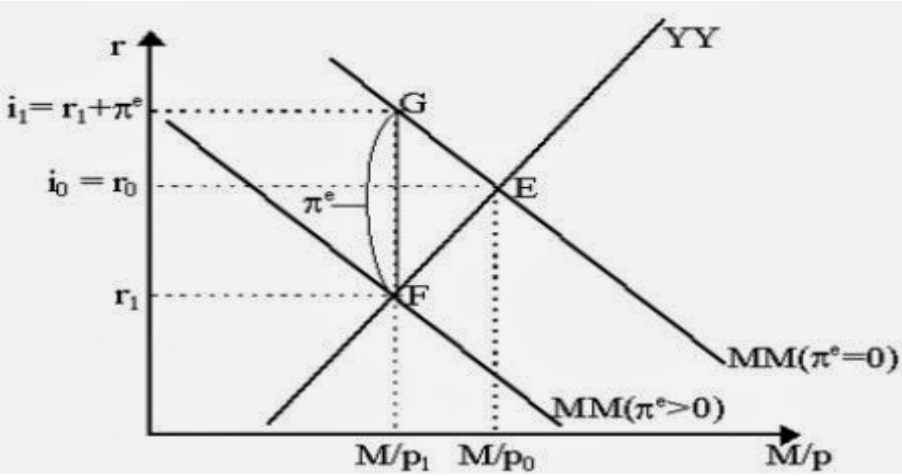


Figure 6. Mundell's Inflation-Interest Rates Model

From the description above, the point to be conveyed by Mundell is that inflation (more precisely inflation expectations) will influence on the real sector by influencing economic actors to shift their portfolio from money to capital.

Monetary Policy Strategic Framework

The strategic framework of monetary policy is the determinant of the ultimate goals of monetary policy and strategies for achieving them. In this regard, as explained, monetary

policy is more related to economic growth and inflation. Some of these monetary policy strategies include (i) exchange rate targeting monetary exchange targeting (ii) monetary targeting monetary scale targeting', (iii) inflation targeting 'inflation targeting, and (iv) implicitly but not explicit anchor 'monetary policy strategy without a clear anchor.

Methods

We included a four-variable VAR on this research to show which variable from the exchange rate, interest rate, and inflation have fast response trough FD, and which has the highest effect on FDI fluctuation. VAR has n-equation and n-variable of a linear model that is explained by its lag and added by n-1 lag of another variable. This simple framework brings ease of use and interpretation. The optimum lag was taken from the least value of AIC, SIC (Schwart Information Criterion), and Hannam-Quinn Information Criteria (Widarjono, 2017).

Result and Discussion

Var Estimation

a) Stationarity test

Time series data requires a stationarity test to avoid spurious regression. This test was done for all variables, CPI, INTR, FDI, dan KURS. The result has shown in Table 1.

Table 1. Stationarity test results on level order

No	Variable	ADF Statistics	Critical Value			Prob	Order of
			1%	5%	10%		
1	CPI	0.100852	-3.51905	-2.90014	-2.58741	0.9638	I(0)
2	INTR	-2.39504	-3.52031	-2.90067	-2.58769	0.1466	I(0)
3	FDI	-4.19578	-3.51905	-2.90014	-2.58741	0.0013	I(0)
4	KURS	-1.01977	-3.51905	-2.90014	-2.58741	0.7425	I(0)

Source: self-proceed

Table 1 shows all critical values, with the ADF of all variables being significant except CPI. This concludes that the series is not stationary, so we proceed with the first difference that has stationer series as in Table 2.

Table 2. Stationarity test result on the first difference

No	Variable	Adf Statistics	Critical Value			Prob	Order of integration
			1%	5%	10%		
1	CPI	-8.74513	-3.52031	-2.90067	-2.58769	0.0000	I(1)

2	BI RATES	-4.15192	-3.52031	-2.90067	-2.58769	0.0015	I(1)
3	FDI	-8.98339	-3.52289	-2.90178	-2.58828	0.0000	I(1)
4	KURS	-8.69377	-3.52031	-2.90067	-2.58769	0.0000	I(1)

Source: self-proceed

Table 2 shows that, on the first difference, all variables are significant at α 1%, 5% dan 10%. Hence, it concludes that all the data is stationer.

b) Granger Causality Test

Granger causality test represents a correlation among variables and which variables affect each other. The correlation between FDI, BI Rates, CPI, and Exchange rate is shown in Appendix 1. The result of the correlation confirms that only interest rates and CPI affect each other significantly. FDI does not affect CPI, but the other way around; so, does FDI on the interest rate and interest rates on the exchange rate in 10% α. However, both the exchange rate on FDI and exchange rate on CPI do not alter each other.

c) Unrestricted VAR Estimation

Using quarterly lag fourth, as the result of lag length criteria (Appendix 2) to create the best VAR estimation (Appendix 3). This quarterly lag result is used to find out impulse response because of shock on the exchange rate, interest rate, and inflation. Based on the VAR estimation, FDI does affect by all variables interest rate, CPI, and exchange rate from the earlier periods.

d) Impulse Response on DLogFDI

There was an increase of the seventh Period, which fell again in the eighth period, then fluctuated in the ninth to 16 period followed by a stable period in the seventeenth period onwards. The decomposition of FDI shows that in addition to being influenced by the movement of the FDI itself to 40%, the first FDI movement was also influenced by a 43.5% interest rate, a 10.68% exchange rate, and 5.68% inflation during the observation period. Secondly, inflation decomposition could have explained by the movement of the inflation value itself 44.9%, then interest rate 32.4%, FDI 16.97, and Exchange rate 5.58%. The third interest rate could have explained by the interest rate movement Own 54.06%, FDI 24.08%, inflation 16.7%, and by exchange rate movements of 5.1%. The last exchange rate decomposition could have been due to the exchange rate movement of 73.88%, Interest rate 14.28%, FDI 10.51, and inflation 1.34%.

Based on the Impulse response function Analysis (Appendix 5), shocks at the interest rate will first respond positively, but then the response decreases with a return to the position

Stable. These results can be explained by the external parties making investments in Indonesia as the size of interest rates are still high among ASEAN countries. In addition to increasing the flow of incoming capital in the form of stocks (Kabundi & Nadal De Simone (2011), the rate of reference interest adjusted through monetary policy will increase the value of investment into the country of Indonesia (Aizenman, 2005).

On the other hand, labor productivity Ketteni & Kottaridi (2019), cheap labor wage, mastery of Le & Tran-Nam (2018) and readiness of human resources according to the view of Thangavelu & Narjoko (2014), Indonesia must have prepared to face the investment of foreign countries Today that has entered the era of the digital Industry 4.0. The human resources in Indonesia must have maximised through the existing vocational education so that it can attract foreign investors to come and make the business effort in Indonesia (Gunby, Jin, & Robert Reed, 2017).

Conclusion

The data analysis and discussion in this paper results in three conclusions. First, applying interest rate, FDI movement itself, and exchange rate as the final target of monetary policy is maintainable as the variance decomposition result that inflation has the most effect on FDI fluctuation. Second, monetary policy contributes more on FDI inflow in the long term because monetary indicators need more time lag (fourth lag) to reach equilibrium. Third, shock on Interest rate gets a fast response by FDI than exchange rate and interest rate and FDI it self-explains more on its fluctuation.

REFERENCES

Aizenman, J. (2005). Opposition to FDI and financial shocks. *Journal of Development Economics, 77*(2), 467–476. https://doi.org/10.1016/j.jdeveco.2004.04.004.

Anwar, S., & Nguyen, L. P. (2018). Channels of monetary policy transmission in Vietnam. *Journal of Policy Modeling, 40*(4), 709–729. https://doi.org/10.1016/j.jpolmod.2018.02.004

Ball, L. (1997). Efficient rules for monetary policy. *International finance*, *2*(1), 63-83. https://doi.org/10.3386/w5952

Clarida, R., Gali, J., & Gertler, M. (2000). Monetary policy rules and macroeconomic stability: evidence and some theory. *The Quarterly journal of economics*, *115*(1), 147-180. https://doi.org/10.1162/003355300554692

Ersoy, M., & Erol, K. O. (2016). The impact of the Euro-zone crisis on foreign direct investment inflows in the EU-15. *Global Business and Economics Review, 18*(2), 216–226. https://doi.org/10.1504/gber.2016.075531

Fei, C., Fei, W., Rui, Y., & Yan, L. (2019). International investment with exchange rate risk. *Asia-Pacific Journal of Accounting & Economics,* 1-17. https://doi.org/10.1080/16081625.2019.1569539

Froyen, R.T., & Perez, S.J. (1990). *Macroeconomics: Theories and policies*, (No. 339 F7 2005). Macmillan.

Froot, K. A. (1993). Introduction to" Foreign Direct Investment". In *Foreign Direct Investment* (pp. 1-12). University of Chicago Press. https://doi.org/10.7208/chicago/9780226266220.001.0001

Feridhanusetyawan, T. (2011). Survey of recent developments. *Bulletin of Indonesian Economic Studies, 33*(2), 3–39. https://doi.org/10.1080/00074919712331337105

Gunby, P., Jin, Y., & Reed, W. R. (2017). Did FDI cause Chinese economic growth? A meta-analysis. *World Development*, *90*, 242-255. https://doi.org/10.1016/j.worlddev.2016.10.001

Kabundi, A., & Nadal De Simone, F. (2011). France in the global economy: A structural approximate dynamic factor model analysis. *Empirical Economics, 41*. https://doi.org/10.1007/s00181-010-0383-6

Krugman & Obstfeld. (2003). *International Economics, Theory, and Policy. Sixth Edition*. Boston

Kwan, C.H. (1998). *Coping with Capital Inflow in East Asia*. Tokyo.

Ketteni, E., & Kottaridi, C. (2019). The impact of regulations on the FDI-growth nexus within the institution-based view: A nonlinear specification with varying coefficients. *International Business Review, 28*(3), 415–427. https://doi.org/10.1016/j.ibusrev.2018.11.001

Le, T. H., & Tran-Nam, B. (2018). Relative costs and FDI: Why did Vietnam forge so far ahead?. *Economic Analysis and Policy, 59*, 1–13. https://doi.org/10.1016/j.eap.2018.02.004

Manurung & Rahardja. (2002). *Introduction to Economics*. Jakarta: University of Indonesia LPFE.

Nguyen, D. T. H., Sun, S., & Anwar, S. (2017). A long-run and short-run analysis of the macroeconomic interrelationships in Vietnam. *Economic Analysis and Policy, 54*, 15–25. https://doi.org/10.1016/j.eap.2017.01.006

Rischard, J. F. (2007). The Knowledge-Based Economy: Worldwide Trends and New Ideas. *Presentation at the Dubai School of Government*, *26*.

Robison, R. (2009). *Indonesia: The rise of capital*. Equinox Publishing.

Rostow, W. W. (1959). The Stages of Economic Growth. *The economic history review*, *12* (1), 1-16. https://doi.org/10.1111/j.1468-0289.1959.tb01829.x

Rosenberg, M. (2003). *Exchange rate determination: models and strategies for exchange rate forecasting*. McGraw Hill Professional.

Siddiqui, H. A. A., & Aumeboonsuke, V. (2014). Role of interest rate in attracting the FDI: Study on ASEAN 5 economy. *International Journal of Technical Research and Applications*, *2*(3), 59-70.

Svensson, L. E. (1997). Inflation forecast targeting: Implementing and monitoring inflation targets. *European economic review*, *41*(6), 1111-1146. https://doi.org/10.1016/S0014-2921(96)00055-4

Taylor, J. B. (1993). Discretion versus Policy Rules in Practice. *Carnegie-Rochester Conferences Series on Public Policy*, 39. https://doi.org/10.1016/0167-2231(93)90009-L

Taylor, J. B. (1999). *Monetary Policy Rules, NBER Conference Report*. Chicago: The University of Chicago Press. https://doi.org/10.7208/chicago/9780226791265.001.0001

Taylor, J. B. (2001). The Role of Exchange Rate in the Monetary Policy Rules. *The American Economic Review*. https://doi.org/10.1257/aer.91.2.263

Todaro, M. P., & Smith, S. C. (2011). *Economic Development 11 ed*. Addison-Wesley, Pearson, ISBN, 10, 1-13.

Thangavelu, S. M., & Narjoko, D. (2014). Human capital, FTAs, and foreign direct investment flows into ASEAN. *Journal of Asian Economics, 35*(8), 65–76. https://doi.org/10.1016/j.asieco.2014.11.002

Winters, J. A (1996). *Power in Motion: Capital Mobility and the Indonesian state*. Cornell University Press.

Widarjono, A. (2017). *Ekonometrika Pengantar dan Aplikasinya, 337 Cetakan Ketiga*. Yogyakarta: UPP STIM YKPN.

Appendix 1

Granger Causality Test Result

Null Hypothesis:	Obs	F-Statistic	Prob.
FDI does not Granger Cause CPI	75	1.98333	0.1453
CPI does not Granger Cause FDI		6.38255	0.0028
INTR does not Granger Cause CPI	75	4.92865	0.0099
CPI does not Granger Cause INTR		5.91417	0.0042
KURS does not Granger Cause CPI	75	0.40366	0.6694
CPI does not Granger Cause KURS		2.01360	0.1412
INTR does not Granger Cause FDI	75	6.27756	0.0031
FDI does not Granger Cause INTR		1.11135	0.3349
KURS does not Granger Cause FDI	75	0.60132	0.5509
FDI does not Granger Cause KURS		1.79039	0.1745
KURS does not Granger Cause INTR	75	1.94350	0.1509
INTR does not Granger Cause KURS		2.70090	0.0741

Source: self proceed

Appendix 2

Choosing Optimum Lag

VAR Lag Order Selection Criteria

Endogenous variables: DLOGCPI DLOGFDI DLOGINTR DLOGKURS

Exogenous variables: C

Date: 07/18/19 Time: 14:59

Sample: 2000Q1 2019Q1

Included observations: 48

Lag	LogL	LR	FPE	AIC	SC	HQ
0	241.7348	NA	5.86e-10	-9.905615	-9.749681*	-9.846687*
1	257.9666	29.08210	5.82e-10*	-9.915276	-9.135609	-9.620639
2	272.1309	23.01702	6.38e-10	-9.838789	-8.435388	-9.308442
3	286.1946	20.50952	7.18e-10	-9.758109	-7.730974	-8.992052
4	307.6816	27.75407	6.15e-10	-	-7.335867	-8.984968

		*		9.986735*		
5	319.2456	13.00946	8.38e-10	-9.801900	-6.527298	-8.564423

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Appendix 3

Unstructured Var Estimates at first different with Lag Length Criteria 4

Vector Autoregression Estimates
Date: 07/18/19 Time: 15:02
Sample (adjusted): 2005Q2 2019Q1
Included observations: 50 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	DLOGCPI	DLOGFDI	DLOGINTR	DLOGKURS
DLOGCPI(-1)	-0.120110	-3.681973	-0.959725	-0.227658
	(0.16616)	(5.26136)	(0.84656)	(0.62920)
	[-0.72287]	[-0.69981]	[-1.13367]	[-0.36182]
DLOGCPI(-2)	-0.011576	-5.031386	-0.634066	0.440769
	(0.17302)	(5.47865)	(0.88153)	(0.65518)
	[-0.06690]	[-0.91836]	[-0.71928]	[0.67274]
DLOGCPI(-3)	0.212154	-1.388997	0.563478	-0.040018
	(0.16931)	(5.36112)	(0.86262)	(0.64113)
	[1.25306]	[-0.25909]	[0.65322]	[-0.06242]
DLOGCPI(-4)	0.225589	6.833373	-2.081940	-0.164154
	(0.18756)	(5.93922)	(0.95563)	(0.71026)
	[1.20273]	[1.15055]	[-2.17860]	[-0.23112]
DLOGFDI(-1)	0.000260	-0.367828	0.037740	0.020780
	(0.00490)	(0.15515)	(0.02496)	(0.01855)
	[0.05313]	[-2.37081]	[1.51180]	[1.12000]

DLOGFDI(-2)	0.017527	-0.123489	0.053124	-0.015162
	(0.00499)	(0.15790)	(0.02541)	(0.01888)
	[3.51472]	[-0.78207]	[2.09096]	[-0.80295]
DLOGFDI(-3)	0.010008	0.148671	0.055293	-0.006653
	(0.00535)	(0.16935)	(0.02725)	(0.02025)
	[1.87140]	[0.87791]	[2.02921]	[-0.32851]
DLOGFDI(-4)	0.010772	0.343275	0.073676	0.010744
	(0.00506)	(0.16009)	(0.02576)	(0.01914)
	[2.13071]	[2.14427]	[2.86022]	[0.56121]
DLOGINTR(-1)	0.054274	-0.618347	0.450068	0.167175
	(0.03757)	(1.18974)	(0.19143)	(0.14228)
	[1.44450]	[-0.51973]	[2.35106]	[1.17498]
DLOGINTR(-2)	-0.005820	-0.451453	0.217975	-0.174636
	(0.04033)	(1.27695)	(0.20546)	(0.15271)
	[-0.14433]	[-0.35354]	[1.06089]	[-1.14359]
DLOGINTR(-3)	-0.061028	1.580313	-0.582129	0.101221
	(0.04048)	(1.28180)	(0.20624)	(0.15329)
	[-1.50760]	[1.23289]	[-2.82252]	[0.66033]
DLOGINTR(-4)	0.005034	-3.120667	0.375007	-0.036428
	(0.04581)	(1.45055)	(0.23340)	(0.17347)
	[0.10988]	[-2.15137]	[1.60673]	[-0.21000]
DLOGKURS(-1)	-0.041656	0.610449	-0.066677	0.286458
	(0.04696)	(1.48706)	(0.23927)	(0.17783)
	[-0.88702]	[0.41051]	[-0.27867]	[1.61081]
DLOGKURS(-2)	0.011205	-1.885968	0.035388	-0.281137
	(0.04732)	(1.49846)	(0.24111)	(0.17920)
	[0.23679]	[-1.25860]	[0.14677]	[-1.56886]
DLOGKURS(-3)	-0.030772	-3.653283	0.213139	0.112429
	(0.04650)	(1.47243)	(0.23692)	(0.17609)
	[-0.66175]	[-2.48112]	[0.89963]	[0.63849]

DLOGKURS(-4)	0.015277	1.295027	0.011689	-0.102659
	(0.04689)	(1.48490)	(0.23892)	(0.17758)
	[0.32577]	[0.87213]	[0.04892]	[-0.57811]
C	0.008896	0.101339	0.036975	0.006625
	(0.00603)	(0.19085)	(0.03071)	(0.02282)
	[1.47600]	[0.53100]	[1.20410]	[0.29026]
R-squared	0.460988	0.452121	0.611695	0.292059
Adj. R-squared	0.199649	0.186482	0.423426	-0.051186
Sum sq. resids	0.006017	6.033153	0.156195	0.086283
S.E. equation	0.013503	0.427578	0.068798	0.051133
F-statistic	1.763945	1.702015	3.249045	0.850877
Log likelihood	154.6823	-18.07810	73.26983	88.10686
Akaike AIC	-5.507292	1.403124	-2.250793	-2.844274
Schwarz SC	-4.857204	2.053212	-1.600705	-2.194187
Mean dependent	0.015387	0.038200	-0.001052	0.007009
S.D. dependent	0.015094	0.474058	0.090604	0.049873

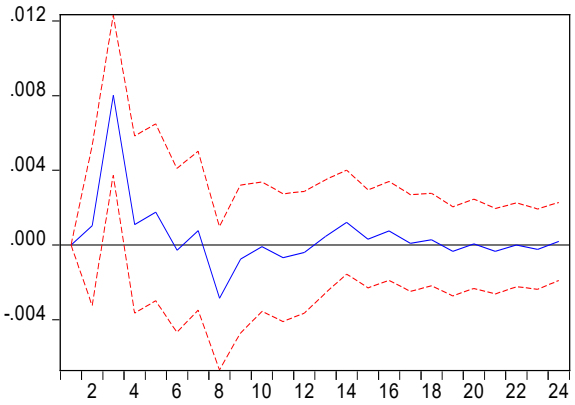
Determinant resid covariance (dof adj.)	3.11E-10
Determinant resid covariance	5.89E-11
Log-likelihood	305.0720
Akaike information criterion	-9.482878
Schwarz criterion	-6.882527
Number of coefficients	68

Appendix 4

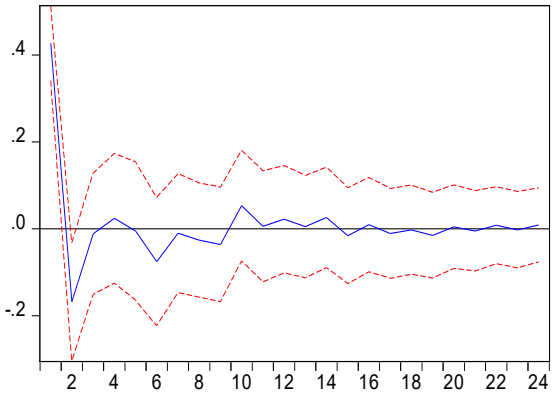
Impulse Response Function in **24 quarters due** to **shock**

Response to Cholesky One S.D. (d.f. adjusted) Innovations ± 2 S.E.

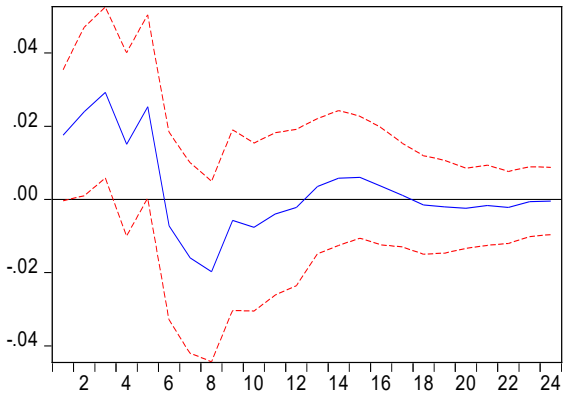
Response of DLOGCPI to DLOGFDI



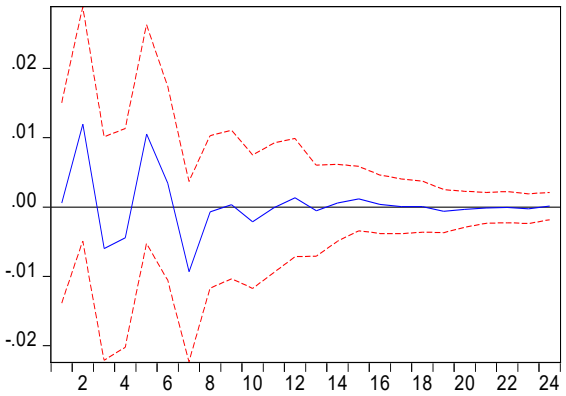
Response of DLOGFDI to DLOGFDI



Response of DLOGINTR to DLOGFDI



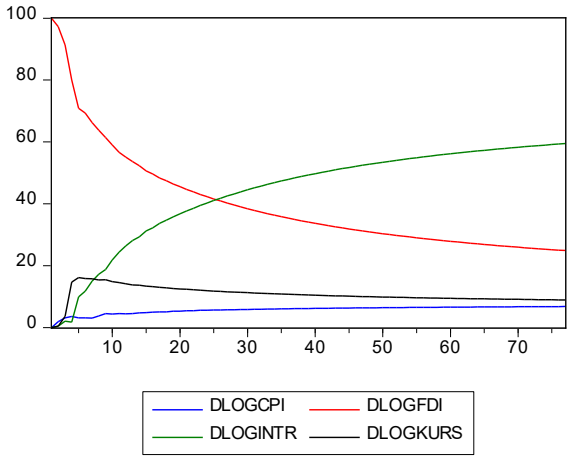
Response of DLOGKURS to DLOGFDI



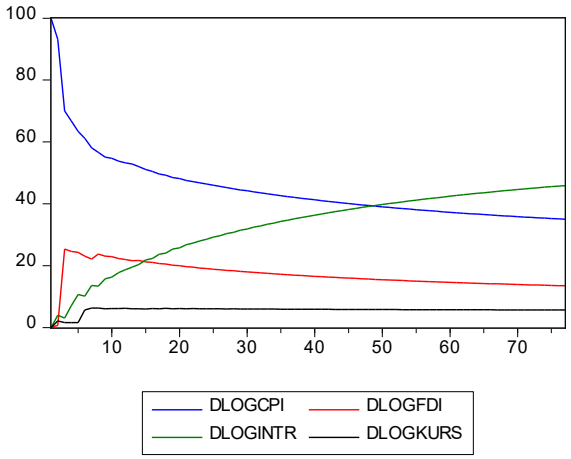
Appendix 5

Variance Decomposition using Cholesky (d.f. adjusted) Factors

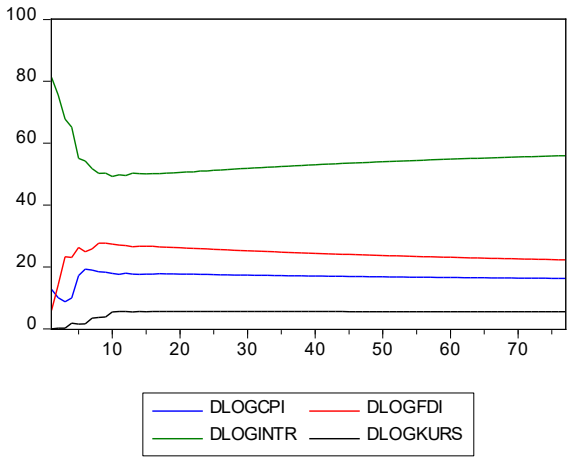
Variance Decomposition of DLOGFDI



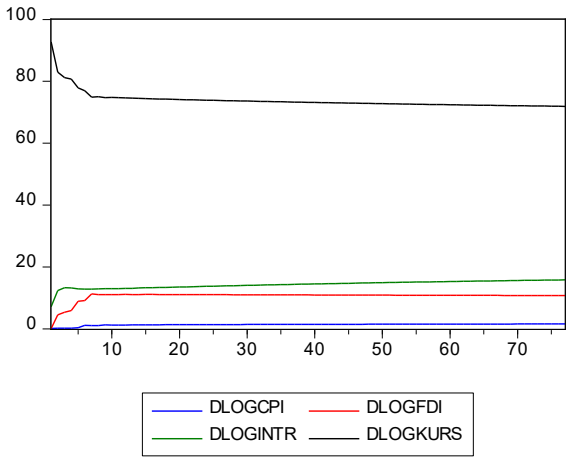
Variance Decomposition of DLOGCPI



Variance Decomposition of DLOGINTR



Variance Decomposition of DLOGKURS



Variance Decomposition function of DLogFDI Table:

Variance Decomposition of DLOGFDI:					
Period	S.E.	DLOGCPI	DLOGFDI	DLOGINTR	DLOGKURS
1	0.427578	0.098882	99.90112	0.000000	0.000000
2	0.464946	1.668790	97.49641	0.416850	0.417953
3	0.480013	2.883760	91.52861	2.005869	3.581759
4	0.513291	3.331856	80.26631	1.756055	14.64578
5	0.545680	2.954376	71.03032	9.889499	16.12580
6	0.558988	2.934049	69.50122	11.75155	15.81318
7	0.571962	2.873327	66.41505	14.99178	15.71985
8	0.583911	3.536389	63.92261	17.19214	15.34887
9	0.597063	4.354407	61.50576	18.72113	15.41870
10	0.613029	4.253516	59.09647	21.82519	14.82483
11	0.625715	4.378554	56.73233	24.40111	14.48801
12	0.635208	4.359170	55.16859	26.37556	14.09668
13	0.643638	4.415864	53.73866	28.11564	13.72984
14	0.652739	4.630649	52.40983	29.27060	13.68892
15	0.664161	4.749916	50.67993	31.24406	13.32610
16	0.671050	4.910710	49.66595	32.18822	13.23512
17	0.680060	4.980872	48.38354	33.69092	12.94467
18	0.686472	5.034745	47.48503	34.67109	12.80914
19	0.694643	5.257981	46.42081	35.74448	12.57673
20	0.701306	5.263354	45.54736	36.73642	12.45287
21	0.708523	5.402691	44.62868	37.64735	12.32128
22	0.714998	5.429897	43.83689	38.56060	12.17261
23	0.721621	5.522871	43.03700	39.41672	12.02341
24	0.727986	5.562048	42.30228	40.21906	11.91661
25	0.734469	5.619579	41.56006	41.04760	11.77276
26	0.740364	5.671665	40.91151	41.73648	11.68035
27	0.746799	5.712045	40.21417	42.52852	11.54527
28	0.752494	5.756855	39.61301	43.17158	11.45855
29	0.758661	5.806326	38.98006	43.87871	11.33491
30	0.764208	5.834268	38.41976	44.49665	11.24932
31	0.770095	5.888180	37.84230	45.12562	11.14390
32	0.775545	5.913446	37.31773	45.71292	11.05591

33	0.781148	5.961777	36.78985	46.28491	10.96347
34	0.786484	5.987635	36.29883	46.83208	10.88145
35	0.791851	6.029074	35.81280	47.36427	10.79386
36	0.797005	6.057896	35.35790	47.86519	10.71901
37	0.802210	6.091791	34.90477	48.36618	10.63726
38	0.807175	6.121814	34.48257	48.82710	10.56852
39	0.812213	6.152676	34.06095	49.29467	10.49171
40	0.817012	6.179759	33.66677	49.72587	10.42760
41	0.821877	6.210032	33.27436	50.15877	10.35684
42	0.826530	6.234252	32.90520	50.56509	10.29546
43	0.831221	6.263220	32.53956	50.96634	10.23088
44	0.835745	6.285582	32.19267	51.34938	10.17236
45	0.840268	6.312614	31.85131	51.72368	10.11240
46	0.844661	6.334051	31.52529	52.08339	10.05727
47	0.849036	6.358552	31.20518	52.43516	10.00111
48	0.853294	6.379603	30.89879	52.77229	9.949316
49	0.857533	6.401887	30.59788	53.10381	9.896418
50	0.861662	6.422089	30.30943	53.42070	9.847786
51	0.865771	6.442944	30.02616	53.73294	9.797955
52	0.869775	6.461952	29.75411	54.03197	9.751964
53	0.873759	6.481716	29.48713	54.32593	9.705218
54	0.877647	6.499550	29.23007	54.60885	9.661523
55	0.881508	6.518306	28.97816	54.88593	9.617607
56	0.885285	6.535141	28.73491	55.15383	9.576115
57	0.889028	6.552819	28.49683	55.41564	9.534714
58	0.892697	6.568892	28.26646	55.66930	9.495345
59	0.896330	6.585463	28.04106	55.91729	9.456187
60	0.899894	6.600856	27.82267	56.15761	9.418858
61	0.903421	6.616447	27.60899	56.39283	9.381733
62	0.906883	6.631133	27.40173	56.62083	9.346300
63	0.910309	6.645889	27.19893	56.84410	9.311088
64	0.913673	6.659858	27.00200	57.06076	9.277382
65	0.917001	6.673881	26.80932	57.27283	9.243973
66	0.920272	6.687159	26.62199	57.47898	9.211866
67	0.923505	6.700501	26.43874	57.68063	9.180134
68	0.926686	6.713151	26.26038	57.87694	9.149527
69	0.929829	6.725832	26.08591	58.06892	9.119343
70	0.932922	6.737917	25.91594	58.25599	9.090156
71	0.935977	6.749971	25.74965	58.43898	9.061401
72	0.938986	6.761528	25.58754	58.61738	9.033555

73	0.941957	6.773001	25.42890	58.79196	9.006131
74	0.944884	6.784052	25.27415	58.96226	8.979541
75	0.947775	6.794994	25.12269	59.12895	8.953366
76	0.950623	6.805559	24.97484	59.29165	8.927950
77	0.953436	6.816012	24.83010	59.45093	8.902950