

# Analysis\_of\_Portfolio\_Investment\_in\_Indonesia\_Macroeconomy.pdf

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## Analysis of Portfolio Investment in Indonesia Macroeconomy

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### Abstract

This research examines the cause of portfolio flows in Indonesia and the effect of portfolio flows to the Indonesian economy based on monetary policy approach. By analyzing the interactions among portfolio investment, global and domestic macroeconomy and financial variables by employing a structural vector autoregression model, this study finds: 1) that both global and domestic factors play the role in driving the portfolio flows in Indonesia; 2) the portfolio flows play the role in driving the domestic financial market by the order starts from asset prices, followed by exchange rate and lastly credit; 3) the portfolio flows play a role in driving the Indonesian economic growth. The percentage of the effect of portfolio is relatively large compared to the other variables, but in total, the percentage of portfolio flows in driving the economic growth is quite small. Nonetheless, the impulse response function result shows that the shock in portfolio flow can affect the economic growth.

**Key words:** Portfolio inflows, SVAR, Impulse Response Function, Forecast Error Variance Decomposition.

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## INTRODUCTION

Capital flow is an inevitable phenomenon as the impact of globalization. This implicating that events on the world is felt to the domestic economy. Since 1980, capital flows have been increasing and have been through several events, such as Asian Financial Crises (AFC) in 1998 and Global Financial Crises (GFC) in 2008. The size of capital flows can be counted by percentage to the GDP as table 1 below

**Table 1.** Indonesia Capital Flows Percentage

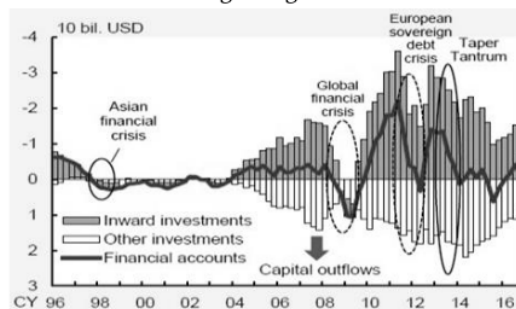
	Period Span			
	1980- 1989	1990- 1999	2000- 2007	2008- 2012
FDI	1.0	1.5	2.9	2.9
Portfolio Investment	1.2	2.3	4.2	1.4
Other Investment	2.7	1.9	5.0	0.4
Reserve	0.8	0.5	1.2	1.5
<b>Total</b>	<b>5.7</b>	<b>6.2</b>	<b>13.3</b>	<b>6.2</b>

Source: James, et al (2014), Warjiyo & Juhro (2016).

As Table 1 presents, world capital flows are increasing from 5.7% in 1980- 1989 to 6.2% in 1990-1999, then leaps to 13.3% in 2000-2007, and decreasing to 6.2% in 2008-2012. According to standard macroeconomic theory, the capital flows are requirements in order to maintain the monetary stability. In between, several events affecting the capital flows. Figure 1 furthermore presents the events of capital flows to emerging markets.

Th<sup>42</sup> several events lead a question on “what is th<sup>40</sup> determinants of capital flows to a country?” Calvo, Leiderman, & Reinhart (1996) and Fernandez-Arias (1997) discovers that capital flows <sup>3</sup>fluenced by two classified factors, called push factors and pull factors. Push factors include global economic conditions and pull factors include the domestic/ country specific economic

conditions that being a targeted as investment.



Source: Iwai, Konaka, Hisamitsu, and Nonoguchi (2017)

**Figure 1.** Capital Flows to Emerging Market Economies

<sup>9</sup> Portfolio flows is one of capital flows. Portfolio investment defined as “cross-border transaction and positions involving debt or equity securities, other than those included in direct investment or reserve assets” (IMF, 2009). The instruments of portfolio investments are bonds, debt securities to certain companies or entities and expressed in the form of national currencies. Furthermore, Koepke (2015) stated that portfolio investments can affect and be affected by the country money market condition. This statement in line with Baek (2006) that found the characteristic of portfolio investment is hot-money that is very volatile due to short-term characteristic and very depended on global sentiment. Furthermore, in Emerging market economies, portfolio investment can be seen through asset prices, exchange rate, and bank credit (Tillman (2013), Lane & McQuade (2014) and Rey (2015)).

This development of portfolio flows can be risky as if a massive portfolio investment can cause high volatility on exchange rate, over/undervalue of asset prices, and risk of bank cr<sup>41</sup>s. This several impacts causing a complexity on monetary policy in emerging market economies, as emerging economies laid their hands-on capital flows to growth. In sum, the development of portfolio flows is needed to be under surveillance in order to maintain monetary stability.

This research uses Indonesia as subject to study the effect of portfolio flow and it's cause to macroeconomy by using Structural Vector Autoregressive (SVAR). In detail, this research model will give insight to three issues: 1) What drives Indonesia's portfolio flows; 2) What is the impact of portfolio flows on domestic financial markets and the real economy; and 3) How important are domestic financial markets in the transmission of portfolio flows to the real economy.

The SVAR estimations are focusing on the net debt portfolio component of the financial account. Our interest arises from the uncertainty surrounding the effects of portfolio flows on economic growth.

Since the wave of financial liberalization in the early 1980s, EMs have experienced various episodes of large portfolio flows that brought benefits and risks to these economies. This section summarizes some relevant findings from literature and the narrative of global and International's portfolio flows from macro-finance literature. In order to know what are the effects of capital flow to a country, we need to understand the capital flow determinant theory.

Capital Flow Determinant is a thought born based on the results of neoclassical theory and investment portfolio theory in describing the driving factors of foreign capital flows. Understanding this theory is based on the question "What are the factors that drive the flow of foreign capital into a country?". These driving factors are then found to be derived from two factors, namely "external factors" from the recipient countries of capital flows and "internal factors" of recipient countries of capital flows (Calvo, Leiderman, & Reinhart, 1996), which are then classified as pull factors and push factors.

Furthermore, understanding of determinants of foreign capital flows continues to develop. In its development Koepke (2015) found that the flow of foreign

capital resembled the economic cycle in its trend. Furthermore, the pull factors include the global economy namely; global economic growth, foreign risk indicators, and foreign liquidity (interest rate) conditions, while driving factors include domestic economic growth, domestic risk indicators, domestic liquidity conditions, and other domestic macroeconomic indicators. (Koepke, 2015). In general, the relationship between foreign capital flows and the two factors can be stated in the Equation (1):

$$F_t = a + \beta X_t + \delta Y_t + \phi z_t \quad (1)$$

Where F = Capital Flows (FDI, PI, and OI),  $X_t$  = Vector of Push Factor,  $Y_t$  = Vector of Pull Factor, and  $z_t$  = other factors example, such as foreign exchange system, money market condition, and institutional situation.

By the time, the determinants of foreign capital flows continue to develop. In the 2000s research related to the flow of foreign capital much to discuss the specific composition of foreign capital flows (be it FDI, portfolio investment, or investment banks) and focused on a country or group of countries. Culha (2006) in a study entitled "A Structural VAR Analysis of the Determinants of Capital Flows into Turkey" uses the SVAR method with seven variables (foreign capital flow variables recorded on the Turkish trade balance, two variables as driving factors namely; US interest rates Treasury Bills and Industrial Production Index, and four variables as pull factors are: Turkey's real interest rates, Turkish trade balance, Turkish current account, and Turkish stock price index). In the monthly span of the period 1992 to 2005, Culha (2005) found that interest rates both US Treasury Bills and Turkish domestic interest rates had a significant effect on the flow of foreign capital into Turkey, with the opposite effect. On the one hand, shocks resulting from impulse response from US interest rates encourage increased inflows of foreign capital, but shocks in domestic interest rates cause foreign capital flows to decrease.

The research entitled "Portfolio Investment Flows to Asia and Latin America: Pull, Push or Market Sentiment?" (Baek, 2006). This study discusses using the fixed effect panel analysis in nine developing countries on two continents, namely five countries in Asia (Indonesia, Malaysia, the Philippines, Korea, and Thailand) and four countries in Latin America (Brazil, Argentina, Mexico, and Chile). With portfolio investment as the dependent variable and determinants of foreign capital flows as an independent variable (pull factor; United States interest rates, US stock prices, and US GDP and driving factors; inflation rates, GDP growth, real exchange rates, and financial balance) in the period 1989-2002 in the quarterly range it was found that the dominant driving factor in moving portfolio investment to developing countries and the driving factor of portfolio investment in developing countries in Asia was more important than Latin America.

Another study entitled "Determinants of FDI and Portfolio Flows to Developing Countries: A Panel Cointegration Analysis" (De Vita & Kyaw, 2008) discusses the specific flow of foreign capital in the form of FDI and portfolios. Using a sample of 32 developing countries in the world (Argentina, Bangladesh, Barbados, Belize, Botswana, Brazil, Chile, China, Colombia, Costa Rica, Cyprus, Guatemala, India, Indonesia, Israel, Korea, Malaysia, Morocco, Nigeria, Pakistan, Panama, Philippines, Senegal, Seychelles, Singapore, Switzerland, Thailand, Togo, Tunisia, Turkey, Uruguay and Venezuela) and the FMOLS Panel Cointegration method and four variables (amount of domestic money, domestic GDP growth, global GDP growth, and global interest rates) found that the flow of foreign capital FDI is more affected by output reflected through GDP, while portfolio investment tends to be more affected by monetary conditions, which in this study is

the amount of money and global interest rates.

Since the GFC event, previous research has paid much attention to the movement of foreign capital flows from different components and regions and developments before and after the crisis. Milesi-Ferretti & Tille (2011) in a study entitled "The Great Retrenchment: International Capital Flows during the Global Financial Crisis" examines with a sample of 75 countries, with a composition of 28 developed countries (AM) and 47 developing countries (EM) and divides the period before (2006Q1 - 2007Q2), during the crisis (2008Q4 - 2009Q1), and after the GFC crisis (2009Q2 - 2009Q4). Variables used include foreign capital flows based on forms (FDI, portfolio, and bank investment) based on percentages of GDP with the VIX index in describing risk behavior of investors and growth of GDP. Using the multivariate regression analysis method, this study found that: First, there were differences in trends where prior to the 2008 GFC crisis the global economy was more dominantly affecting the flow of portfolio investment into developing countries, but after the 2008 GFC crisis occurred, it was precisely the EM economy of the country. more attractive in the entry of portfolio investment flows. Second, the VIX index variable strongly describes the behavior of investors in taking risks on portfolio type investments. A relatively similar finding was also made in the research "Capital Flows, Push Versus Pull Factors and The Global Financial Crisis" (Fratzscher, 2011). This study uses a sample of 50 countries and the OLS method and found that the push factors that describe the global economy more dominantly affect the flow of foreign capital into developing countries in the period before the crisis of 2008/2009, after the crisis period capital flows tend to be more withdrawn by the financial condition of developing countries.



Research in deepening the relationship of risk variables that affect the flow of foreign capital can be found in a study entitled "Capital Flow Waves: Surges, Stops, Flight, and Retrenchment" (Forbes & Warnock, 2012). This study provides an overview of episodes experienced in the movement of foreign capital flows, namely surges and stops: conditions where capital inflows (capital inflow) have increased and decreased sharply and flight and retrenchment: conditions where capital outflows have increased and sharp decline. The results of this study reveal that the extreme episodes experienced by the flow of foreign capital of countries in the world are caused by external factors, namely risk factors.

Research entitled "What Drives Capital Flows to Emerging Markets? A Survey of the Empirical Literature" conducted by Koepke (2015). This study focuses on surveys related to the dichotomy of determinants of foreign capital flows (pull and pull factors) based on differences in economic growth proxied by GDP in the form of logarithms, differences in liquidity (global interest rates such as the Federal Funds Rate and domestic interest rates in developing countries, and risks between the economy global (as described by VIX) and domestic (banking institutional factors) This research found several things, among others: First, that determinants of foreign capital flows can be classified into two, namely structural determinants and cyclical determinants. The Table 2 describes the both determinants.

Second, that foreign capital flows have different responses to determinants of foreign capital flows, both pulling factors and driving factors and find portfolio investment to be strongly influenced by driving factors originating from the global economy. Table 3 illustrates the determinants and how they effecting by its relationship.

**Table 2.** Koepke's Capital Flow Determinants

	Push Factors	Pull Factors
<b>Cyclical</b>	Global risk aversion	Domestic output growth
	Mature economy interest rates	Asset return indicators
	Mature economy output growth	Country risk indicators
<b>Structural</b>	Rise of institutional investors	Quality of institutions
	Portfolio diversification	Capital account openness
	Information and communication technology	Government role in economy

**Table 3.** Determinants Effect on Portfolio

Type	Driver	Portfolio Equity	Portfolio Debt
Push	Global risk aversion	Strong Negative	Strong Negative
	Mature economy interest rates	Strong Negative	Strong Negative
	Mature economy output growth	Moderate Positive	Moderate Positive
Pull	Domestic output growth	Moderate Positive	Moderate Positive
	Asset return indicators	Moderate Positive	Moderate Positive
	Country risk indicators	Moderate Negative	Moderate Negative

Source: Koepke (2015)

Several things need to be noted based on the previous research described above. First, in line with Koepke (2015), it was found that the push factor in the form of economic growth, global interest rates, and global risk indicators. While the pull factor (pull factor) in the form of domestic economic growth, the benchmark interest rate, as well as domestic risk indicators. Second, the cyclical approach in determining the flow of foreign capital is more representative of the characteristics of portfolio investments that play a role in the financial market. This is due to differences in investors' motives in making foreign investments, where investors in portfolio investments tend to want short-term returns. Third, in a previous study that specifically discussed one country, the assumption was that countries with small open economies were used. With the implementation of these assumptions, the implication is that global factors affect the domestic economy but not vice versa due to the small influence of domestic variables to influence global variables.

To see the transmission of portfolio flows, we need to understand the transmissions of monetary economy. The MTKM (Monetary Policy Transmission Mechanism) theory originally referred to the role of money in the economy, which was first explained in the Quantity Theory of Money by Fischer in 1911. Warjiyo & Juhro (2016) explained, in subsequent developments along with advances in the financial sector other than banking and the increasingly integrated financial globalization, there are two category of channel that in total six channels of monetary policy transmission mechanisms that are often put forward in monetary economic theory. These channels include direct monetary channels, interest rate channels, exchange rate channels, asset price channels, credit channels, the balance sheet channel, and the expectation channel.

In a study entitled "Globalization, Macroeconomic Performance, and Monetary Policy" (Mishkin, 2009) states that increasing economic openness is important for capital flows in driving growth in developing countries. The premise is that access to international funds enables developing countries to increase domestic savings and achieve higher levels of capital accumulation, thereby accelerating growth through greater investment and / or consumption (Hwa, Raghavan, & Huey, 2017). But on the other hand, an increase in capital flows is followed by risks that threaten financial stability, which has the opposite effect on growth in EM countries (Rodrik & Subramanian, 2009).

Several previous studies examined the effect of foreign capital flows on the exchange rate. This research is based on the understanding of the monetary policy trilemma or 'the impossible trinity'. Koepke (2015) argues that countries that want to maintain monetary policy must make a floating exchange rate regime. In line with this, the view of the trilemma is born into a policy dilemma in which independent monetary policy is said to be possible if and only if the capital account is managed, regardless of the exchange rate regime adopted (Rey, 2015). Both of these literatures suggest that policies that regulate exchange rate movements will make exchange rates untenable and thus encourage speculative behavior and financial instability. However, research on this subject needs to be constantly updated, because the flow of foreign capital can give different behavior based on the components and conditions of the country's economy.

There are also previous studies discussing the effect of foreign capital flows on credit. This study is based on the finding that there is an influence of foreign capital inflows on domestic credit growth (Lane & McQuade, 2014). One of them is in a study entitled "The Effects of Capital Flows and Domestic Credit Portfolio on the Australian Economy" (Raghavan, Churchill, & Tian, 2014). This study uses the SVAR method and ten variables including; the Reserve Bank of

Australia's commodity price index (ICPRBA) to illustrate inflation expectations, United States GDP (USGDP) to describe global growth, the Federal Funds Rate (FFR) to describe global liquidity conditions, Australian GDP (GDP) to describe domestic growth, Australian GNE (GNE) illustrates aggregate demand, inflation (INF) describes relative prices because the policy framework prevailing in Australia is Inflation Targeting, Australian liquidity conditions (CASH) describes the policy response in Australia, the exchange rate (ETWI) describes the real exchange rate, the amount of lending (CREDIT), and portfolio investment flows (NETFLOWS) which are divided into debt portfolio (DEBT) and equity portfolio (EQUITY). By using the assumption of a small open economy,

Another strand of papers focusses on the impact of global liquidity and capital flows on asset prices and credit conditions in EMS using panel VAR models. Kim & Yang (2011) and Tillman (2013) find that higher portfolio flows boost asset prices and the exchange rate in emerging East Asian countries. Rhee & Yang (2014) show that a positive shock to global liquidity leads to larger portfolio flows, exchange rate appreciation and higher GDP growth, inflation and equity prices.

Finally, there is research that discusses the relationship between portfolio investment and macroeconomics as a whole. One of them is a study entitled "Macro-Financial Effects of Portfolio Flows: Malaysia Experience" (Hwa, Rasnippghavan, & Huey, 2017). This study uses the SVAR method and ten variables including; World Production Index (WPI) to describe global growth, Global Liquidity Index (GLI) to describe global liquidity conditions, VIX Index (VIX) to describe global risk indicators, Malaysia Industrial Production Index (IPI) to describe domestic growth, Malaysia Consumer Price Index (CPI) describes the

price level, short-term interest bank rate (IR) to describe domestic liquidity, portfolio investment flow (PF), the amount of lending (CR), the Kuala Lumpur Composite Index (KLCI) to describe the price of assets, and nominal effective exchange rate (ER). Using the assumption of a small open economy, this study found three things, that both global and domestic factors significantly influence portfolio investment, portfolio investment plays an important role in the Malaysian money market, and portfolio investment influences Malaysian output even with a small percentage.

It appears that the effects of capital flows on growth depend on how the flows are intermediated and channeled to productive economic activities. The evidence suggests that capital inflows can benefit growth, depending on factors such as the type of flows, state of financial market development and exchange rate regimes of the recipient country. The effects on GDP, stock prices and exchange rate are often larger and more persistent in emerging recipient economies compared to advanced economies.

Our study contributes to and extends the existing literature in several aspects. First, our VAR model exhibits small-open economy properties, by using exogeneity restrictions for the foreign variables. Second, the methodology allows us to conduct inference with relatively little structural assumptions, which is an advantage given the apparent lack of consensus and mixed existing empirical findings. Furthermore, our study focuses on short-term dynamics in the factors that drive portfolio flows and their transmission to the real economy, which is credit channel, asset price channel, and exchange rate channel.

Since around 2000, Indonesia have experienced several events that affects the portfolio inflows to Indonesia. From the Figure 3, we can see that the portfolio flows of Indonesia was fluctuating indicating a volatile movement. In 2008, portfolio flows reach the lowest because of the effect of GFC in 2008, and European Crises in



2011 caused Indonesian portfolio flows back to reaching the lowest point over the period.



Source: Bank Indonesia

**Figure 3.** Net Debt Portfolio Flows of Indonesia

From these several events, we can see that portfolio flows in Indonesia is very affected by external economy factors, which we will continue to give a deeper insight to the cause and the effect of Indonesia portfolio flows.

To answer the problems mentioned before, this study uses Structural Vector Autoregression (SVAR) to describes how both global and domestic factors affects portfolio flows and how portfolio flows impacts the Indonesian economics. For that purposes, this research includes ten variables. Three

variables describe the global economy. United States Gross Domestic Product (USGDP) captures the global economic growth, the Federal Funds Rate (FFR) captures the global liquidity, and volatility index (VIX) captures global investor's reaction and financial market uncertainty. Seven variables describe the Indonesian economy. Indonesian Gross Domestic Product (GDPINDO) captures the Indonesian economic growth, consumer's price index (CPI) captures the Indonesian price, 90 days Interest bank Rate (INTERBANK) captures the Indonesian liquidity, debt portfolio flows captures the portfolio inflows by foreign investor (DEBTPF), total bank credit (CREDIT) captures the loans outstanding of Indonesian banks, Indonesian Composite Index (IHSG) captures the Indonesian equity price level, and nominal effective exchange rate (EXRATE) captures the exchange rate. Furthermore, this information and data collected from several resources: St. Louis Fed Federal Economics and Research, International Monetary Funds, and Bank Indonesia reports. Except for FFR, INTERBANK, and DEBTPF, all variables transformed to natural logarithm. In short, the data used in this research is on the Table 4.

**Table 4.** The Research Data Summary

No	Variable/ Series	Description	Unit	Source
1	US America Gross Domestic Product (USGDP)	US Real Gross Domestic Product	Natural Logarithm	International Financial Statistics
2	The Federal Funds Rate (FFR)	US Federal Funds Rate	Percentage	St. Louis Fed Economic Research
3	VIX	VIX Index	Natural Logarithm	St. Louis Fed Economic Research
4	Indonesia Gross Domestic Product (GDPINDO)	Indonesia GDP Growth	Natural Logarithm	International Financial Statistics
5	Consumer Price Index (CPI)	Domestic Price Level	Natural Logarithm	International Financial Statistics

6	Interbank Rate (IR)	90 day rates and yields interbank rates	Percentage	St. Louis Fred Economic Research
7	Portfolio Investment (DEBTPF)	Debt Portfolio Investment	U.S Dollar	International Financial Statistics
8	Credit (CREDIT)	Bank credit distribution based on the type of use	Natural Logarithm	SEKI Bank Indonesia
9	Asset Price (IHSG)	Composite Stock Price Index	Natural Logarithm	SEKI Bank Indonesia
10	Exchange Rate (EXRATE)	Nominal Effective Exchange Rate	Natural Logarithm	St. Louis Fred Economic Research

Source: Primary data

## METHOD

The SVAR model used in this study was adopted from previous studies, namely the Hwa, Raghavan, & Huey (2017) models which are based on the models in the research of Cushman & Zha (1997) and Kim & Roubini (2000). The selection of this model is based on the similarity of research objects, where Malaysia has similar economic characteristics with Indonesia which adheres to the principle of small open economy and a floating exchange rate system. So, based on the previous explanation, the SVAR model that will be used in this study can be written with:

$$A_0 X_t = A(L)X_{t-1} + \dots + X_n X_{t-n} + B e_t \quad (2)$$

Where:  $X_t$  is a (10x1) variable matrices,  $A_0$  is a (10x10) contemporaneous relations between variables,  $A(L)$  is a polynomial matrix with  $L$  as the lag operator,  $B$  is non-zero matrix and,  $\varepsilon_t$  is a (10x1) multivariate white noise error with zero mean and a diagonal covariance matrix with  $\Sigma_\varepsilon$  contains the structural disturbances variance.

With the variable mentioned before, we can describe the variables into the SVAR system as:

$$X_t = [X_{1,t} \ X_{2,t}]' \quad (3)$$

Where  $X_1 = (\text{USGDP, FFR, VIX})$  as representation of global economy block and

$X_2 = (\text{GDPINDO, CPI, INTERBANK, DEBTPF, CREDIT, IHSG, EXRATE})$  as representation of Indonesian economy block.

The global block representing the world economy, where in this research we use United State of America economy as the benchmark, and the domestic block representing the Indonesian economy. The secondary data used for this research comes from several sources: International Financial Statistics from IMF, the Federal Reserve Economic Data from the FED, and Statistik Ekonomi dan Keuangan Indonesia from Bank Indonesia within the period of 2000-2018 and in monthly frequency.

In order to capture the foreign block exogeneity phenomenon, the contemporaneous and lagged values of Indonesian economy variables are restricted from entering the foreign equations. Hence, the  $A(L)$  is:

$$X_t = \begin{bmatrix} A_{11}(L) & 0 \\ A_{21}(L) & A_{22}(L) \end{bmatrix} \quad (4)$$

Restrictions used are based on assumptions in the Hwa, Raghavan, & Huey (2017) models. Thus, the SVAR model framework in this study can be stated as follows:

$$A_0 = \begin{bmatrix} eUSGDP \\ eFFR \\ eVIX \\ eGDPIndo \\ eCPI \\ eIR \\ ePF \\ eKREDIT \\ eIHSG \\ eNEER \end{bmatrix} = X_t \begin{bmatrix} uUSGDP \\ uFFR \\ uVIX \\ uGDPIndo \\ uCPI \\ uIR \\ uPF \\ uKREDIT \\ uIHSG \\ uNEER \end{bmatrix} \quad (5)$$

No further restrictions applied in the lag structure apart from the foreign block exogeneity restriction. To provide the structure of the model, restrictions applied in matrix  $A$  above can be presented as:

$$\begin{bmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ a_{2,1}^0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ a_{2,1}^0 & a_{2,2}^0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ a_{4,1}^0 & 0 & a_{4,3}^0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & a_{5,4}^0 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & a_{6,2}^0 & 0 & a_{6,4}^0 & a_{6,5}^0 & 1 & 0 & 0 & 0 & 0 \\ a_{7,1}^0 & a_{7,2}^0 & a_{7,3}^0 & a_{7,4}^0 & a_{7,5}^0 & a_{7,6}^0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & a_{8,4}^0 & a_{8,5}^0 & a_{8,6}^0 & a_{8,7}^0 & 1 & 0 & 0 \\ a_{9,1}^0 & a_{9,2}^0 & a_{9,3}^0 & a_{9,4}^0 & a_{9,5}^0 & a_{9,6}^0 & a_{9,7}^0 & a_{9,8}^0 & 1 & 0 \\ a_{10,1}^0 & a_{10,2}^0 & a_{10,3}^0 & a_{10,4}^0 & a_{10,5}^0 & a_{10,6}^0 & a_{10,7}^0 & a_{10,8}^0 & a_{10,9}^0 & 1 \end{bmatrix}$$

Since the domestic variables have a little-to- low impact to global economy, we can use restrictions that prevents the domestic variables affecting the global economy. The order of the SVAR model above represent the endogeneity order of each variable. The order from the matrix above represents: (1) The USGDP is ordered first with the expectation of global economy growth; (2) The FFR is ordered second before the VIX index in third order as uncertainty variable responds the liquidity conditions ( (Koepke, 2015) and (Rey, 2015)); (3) Among the domestic variables, the GDPINDO is ordered after the global economy variables. GDPINDO is assumed to respond to the USGDP as common small

open economy assumption and VIX as market uncertainty leads to shocks from market demand and output; (4) The CPI is ordered after the GDPINDO, as CPI shocks are based on shocks from output represented by GDPINDO and not contemporaneously react to shocks from foreign variables; (5) The INTERBANK is ordered after CPI, as INTERBANK assumed to respond the shocks from FFR, GDPINDO, and CPI; (6) The DEBTPF is ordered after the INTERBANK and assumed to respond the shocks from USGDP, FFR, VIX, GDPINDO, CPI, and INTERBANK; (7) The CREDIT is ordered after DEBTPF and assumed to respond the shocks generated from GDPINDO, CPI, INTERBANK, and DEBTPF; (8) The IHSG is ordered after CREDIT and assumed to respond the shocks from global variables and GDPINDO, CPI, INTERBANK, DEBTPF, and CREDIT; (9) And lastly is EXRATE ordered and assumed to respond all previous variable<sup>35</sup>

The use of the IRF (Impulse Response Function) method is intended to determine the impact of the shock of one standard deviation on one particular variable (endogenous) on other endogenous variables. In other words, the IRF method can track the dynamic response of each endogenous variable due to shock (shock) of one standard deviation of certain endogenous variables in the system of observed equations. Therefore, this method can see the effect of shock of certain endogenous variables which will directly affect the variable itself and so on other endogenous variables.

Forecast Error Variance Decomposition provides different methods of describing a dynamic system. This method is able to parse variations in one endogenous variable into shock components from<sup>36</sup> endogenous variables in SVAR. Forecast Error Variance Decomposition provides information about the importance of every<sup>38</sup> random change (random innovation) to the variables in SVAR. The results of variance decomposition indicate the strength of the Granger Causality relationship that might exist

between variables. In other words, if a variable explains a large portion of the forecast error variance from the other variables, then that indicates a strong Granger Causality relationship.

The FEVD analysis in this study is also important to explain and analyze the problem as follows: (1) How big is the impact of global economic shocks (United States GDP, Fed Funds Rate, and VIX Index) and shocks to domestic macroeconomic indicators (Indonesian GDP, consumer price index, IR bank interest rates, lending, composite stock price indexes, and nominal effective exchange rates) in explaining the development of portfolio investment inflows in Indonesia; (2) How big the impact of shocks from portfolio investment inflows on the condition of Indonesia's domestic money market; (3) How big is the impact of portfolio investment inflow shocks on domestic economic growth illustrated through Indonesian GDP.

## RESULTS AND DISCUSSION

The SVAR model used by this research is utilizing the small open economy assumption, with the model used is

$$Ae = B \quad (6)$$

Thus, by incorporation the model of small open economy assumption, the model used by this research would be:

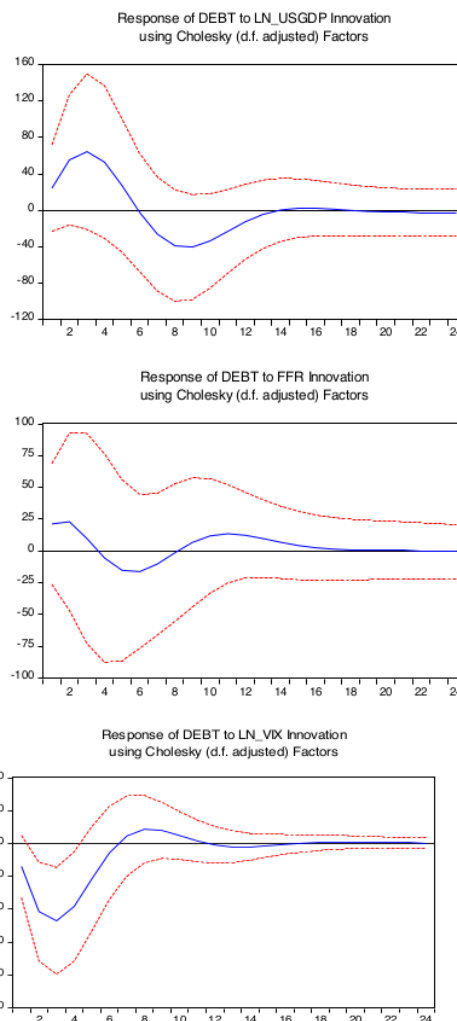
$$A_0X_t = A_1X_{t-1} + \dots + A_pX_{t-p} + \varepsilon_t \quad (7)$$

Where

$$X_t = [X_{1,t} \ X_{2,t}]' \quad (8)$$

As the variable of both global and domestic accordingly.

By far, this research suggests three results. First, we analyze how global and domestic variables play a role in portfolio inflows of Indonesia. As Figure 4 interpretation, global blocks can affect the Indonesian portfolio inflows.



Source: Primary data

**Figure 4.** Portfolio Inflows' Response

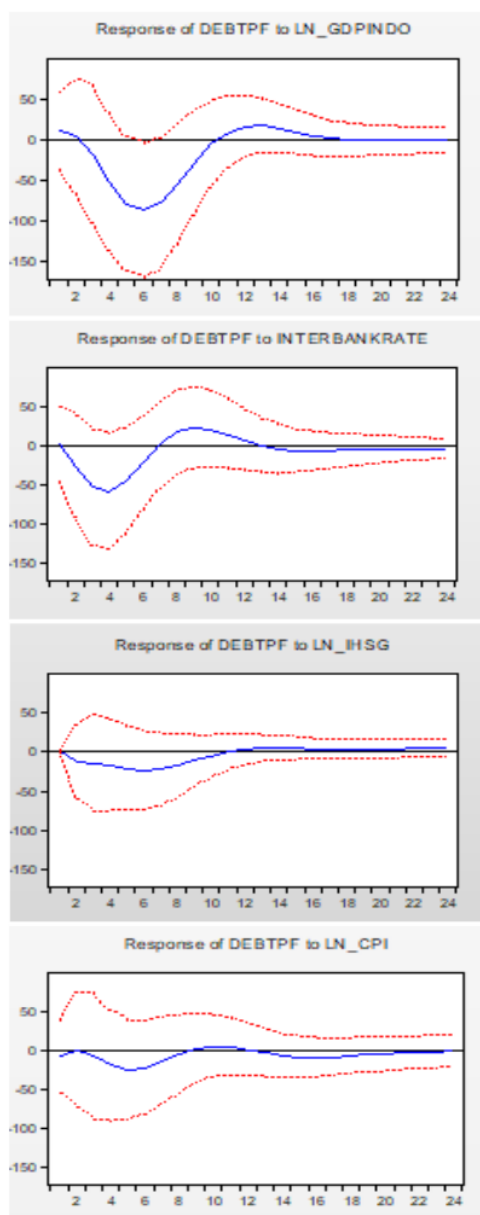
Figure 4 shows us: (1) that the shock from USGDP tends to increase the portfolio inflows where it reaches its peak at period 4 and normalize at period 13; (2) The shock from FFR tends to decrease the portfolio inflows where it reaches its lowest point at period 4 and normalize at period 14, and: (3) the shock from VIX tends to decrease the portfolio inflows where it reaches its lowest point at period 3 and normalize at period 8.

The result in Figure 4 is in line with theory and another previous research finding, that the global economy factors can affect the portfolio



flow of Indonesia. Furthermore, the effects of global economy factors to Indonesian portfolio flow is in line with previous research founding.

Next, Figure 5 presents how domestic blocks affecting the Indonesian portfolio inflows.



Source: Primary data

**Figure 5.** Portfolio Inflows' Response

The Figure 5 shows us: (1) The shock from GDPINDO tends to decrease the portfolio inflows where it reaches its lowest point at period 6 and normalize at period 13; (2) The shock from CPI tends to decrease the portfolio inflows where it reaches its lowest point at period 6 and normalize at period 8; (3) The shock from INTERBANK tends to decrease the portfolio inflows where it reaches its lowest point at period 8 and normalize at period 12; (4) The shock from CREDIT tends to increase the portfolio inflows where it reaches its lowest point at period 4 and normalize at period 12; (5) The shock from IHSG tends to decrease the portfolio inflows where it reaches its lowest point at period 5 and normalize at period 10, and; (6) The shock from EXRATE tends to decrease the portfolio inflows where it reaches its lowest point at period 4 and normalize at period 12.

Figure 4 and Figure 5 give insight that both global and domestic factors can affect the Indonesian portfolio inflows. Furthermore, Table 4 presents Forecast Error Variance Decomposition (FEVD) of portfolio inflows.

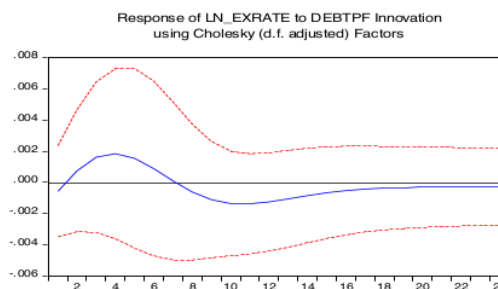
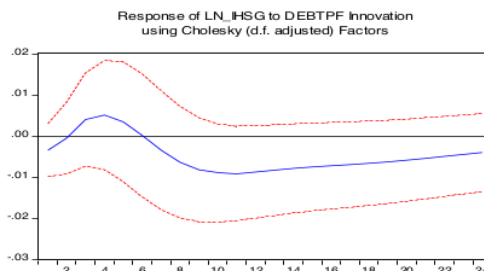
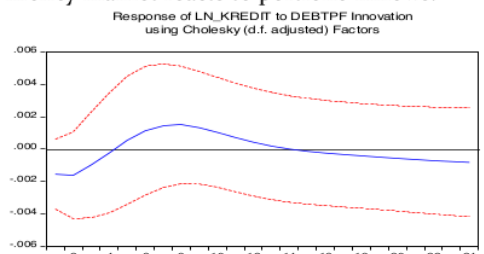
**Table 5.** FEVD Portfolio Inflows (%)

Period	6		12		18		24	
S.E.	0.012328		0.018414		0.021856		0.024307	
LN_USGDP	2.215040		3.058449		3.048950		3.051144	
FFR	0.313906	10,024526	0.400049	10,52071	0.428645	10,51646	0.428358	10,51088
LN_VIX	7.497558		7.062207		7.038864		7.031394	
LN_GDPINDO	3.316662		4.865649		4.946895		4.940700	
LN_CPI	0.307746		0.324545		0.374909		0.385966	
INTERBANKRATE	1.856006		1.974398		1.997034		2.010605	
DEBTPF	82.60238	7,37112	80.14906	9,33024	79.86820	9,61533	79.76941	9,7197
LN_KREDIT	1.324410		1.284500		1.352698		1.382566	
LN_IHSG	0.318558		0.463777		0.482876		0.502215	
LN_EXRATE	0.247734		0.417364		0.460928		0.497639	

Source: Primary data

Based on Table 4, we can conclude the impact percentage of global factors are bigger than the domestic factors or portfolio inflows is “pushed” by global factors in Indonesia, while the domestic factors “pulled” the portfolio inflows with smaller percentage but the percentage is increasing within the period.

**Second**, we analyze how the portfolio inflow affect the Indonesian money market, which is presented by CREDIT, IHSG, and EXRATE. Figure 6 presents how Indonesian money market reacts to portfolio inflows.



Source: Primary data

**Figure 6.** Money Market Response

The Figure 6 shows us that: (1) The shock from DEBTPF tends to increase the KREDIT where it reaches its peak at period 4 and normalize at period 8; (2) The shock from DEBTPF tends to increase the IHSG where it reaches its peak at period 4 and; (3) The shock from DEBTPF tends to increase the EXRATE (appreciate) where it reaches its peak at period 4.

Furthermore, Table 6, Table 7, and Table 8 present the FEVD of CREDIT, IHSG, and EXRATE by order.

Table 6. FEVD CREDIT (%)

Period	6		12		18		24	
S.E.	0.012328		0.018414		0.021856		0.024307	
LN_USGDP	1.605286		1.705807		2.271219		2.240182	
FFR	1.481336	8,61776	2.041162	7,82186	2.404043	7,90217	2.926726	7,78918
LN_VIX	5.531140		4.074900		3.226947		2.622269	
LN_GDPINDO	3.959836		5.125505		3.785111		3.599507	
LN_CPI	4.307106		4.908545		3.735190		4.629105	
INTERBANKRATE	1.634189		4.180121		9.333546		12.93423	
DEBTPF	0.615358	15,76188	0.685373	24,50933	0.506091	31,63904	0.462162	39,667322
LN_KREDIT	75.62037		67.66882		60.45959		52.54350	
LN_IHSG	1.235636		5.168868		8.903335		11.76500	
LN_EXRATE	4.009743		4.440893		5.374933		6.277320	

Source: Primary data

Table 7. FEVD IHSG (%)

Period	6		12		18		24	
S.E.	0.012328		0.018414		0.021856		0.024307	
LN_USGDP	14.35664	30,3068	10.25580		7.849464		6.721970	
FFR	0.593475	4	2.926518	22,23275	4.398550	21,29859	4.028357	18,52538
LN_VIX	15.35672		11.57296		9.050431		7.774860	
LN_GDPINDO	4.773763		11.99359		15.06750		16.86342	
LN_CPI	1.141273		5.949418		11.62474		17.33165	
INTERBANKRATE	17.08421		25.19301		24.68055		22.18169	
DEBTPF	0.367938	26,55335	1.351618	46,47861	1.819479	55,89011	1.878814	61,40433
LN_KREDIT	0.221463		0.140230		0.166137		0.229196	
LN_IHSG	43.13983		28.6258	8	22.81145		20.07050	
LN_EXRATE	2.964698		1.990958		2.531698		2.919552	

Source: Primary data

Table 8. FEVD EXRATE (%)

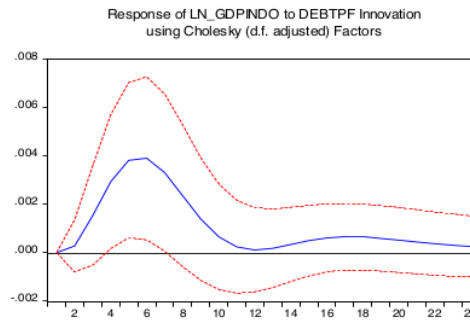
Period	6		12		18		24	
S.E.	0.012328		0.018414		0.021856		0.024307	
LN_USGDP	2.866357		3.051121		6.229424		9.440390	
FFR	6.137209	23,65485	4.860210	23,65485	5.501106	23,59192	6.844921	26,88402
LN_VIX	14.65128		13.92014		11.86139		10.59870	
LN_GDPINDO	1.041573		6.213020		7.262415		7.060695	
LN_CPI	5.625107		12.22499		16.15355		17.00499	
INTERBANKRATE	0.806102		0.820903		1.458224		1.855338	
DEBTPF	0.401385	32,69462	0.505826	42,78707	0.498258	46,51629	0.455809	46,11746
LN_KREDIT	9.746679		10.29876		10.23957		9.928258	
LN_IHSG	15.07376		12.72357		10.90427		9.812361	
LN_EXRATE	43.65055		35.38146		29.89180		26.99853	

Source: Primary data

Based on the Table 5, 6, and 7, the biggest percentage of Indonesian Money Market variables that affected by portfolio inflows by order is IHSG, CREDIT, and lastly the EXRATE.

Third, we analyze how the portfolio inflow affect the Indonesian growth, which is GDPINDO.

Based on Figure 7, a shock from portfolio inflows tends to increase the GDPINDO where it reaches its peak at period 6 and normalize at period 12. This result represents us clearly that the increase of portfolio flows can push the Indonesian economic growth. Furthermore, Table 9 presents the FEVD of GDPINDO.



Source: Primary data

Figure 7. GDPINDO Response

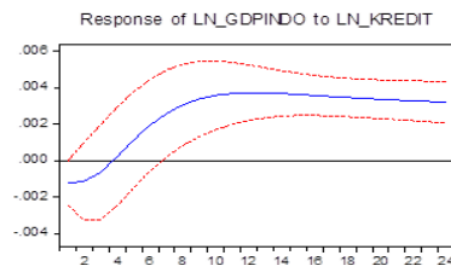
Table 9. FEVD GDP (%)

Period	6		12		18		24	
S.E.	0.012328		0.018414		0.021856		0.024307	
LN_USGDP	8.115091		10.20520		11.14088		12.53991	
FFR	1.586846	9.77495	1.378402	12.07542	1.252081	12.94748	1.197857	14.25029
LN_VIX	0.073008		0.491821		0.554516		0.512518	
LN_GDPINDO	79.14709		66.18945		60.61591		56.36829	
LN_CPI	1.522837		4.191791		4.898460		5.013174	
INTERBANKRATE	0.332476		0.378903		0.416975		0.879913	
DEBTPIF	4.817811	11.07798	5.414482	21.73514	5.015539	26.43661	4.714409	29.38143
LN_KREDIT	3.620322		10.18069		14.04161		16.17231	
LN_IHSG	0.079394		0.104866		0.203951		0.500312	
LN_EXRATE	0.705129		1.464393		1.860070		2.101308	

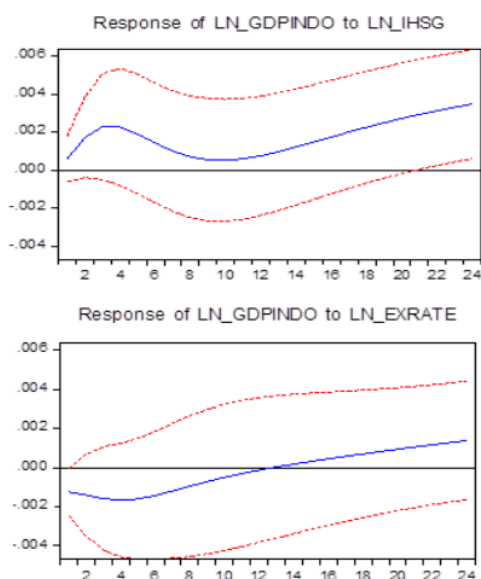
Source: Primary data

The portfolio inflows affecting the GDPINDO with the percentage 4.817811 at period 6, 5.414482 at period 12, 5.015539 at period 18, and 4.714409 at period 24.

In order to see the effects of portfolio flows to money market instruments, we also give insight on how money market performs in affecting the Indonesian growth. This result will be presented with Figure 8.







Source: Primary data

**Figure 8.** GDPINDO Response

Based on Figure 8, while the CREDIT and IHSG tend to increase GDPINDO, the EXRATE give a pressure that affecting in decreasing the GDPINDO. This founding represents the theory that with the increase of portfolio flow pushing the exchange rate and at the same time, the higher the exchange rate the lower the GDP, although the result is not as high as the IHSG and the KREDIT reacted to.

## CONCLUSION

This research is purposed for giving us an insight of the cause and effect of portfolio inflow. This research gives us three insight: first, both global variables and domestic variables play a role in affecting the Indonesian portfolio inflow. Furthermore, Indonesian portfolio inflow are pushed by global factors, while the domestic factors effect is growing within the period. Second, portfolio inflow plays a role in Indonesia money market, where the impact is felt in asset price, followed by bank outstanding, and

exchange rate. Third, portfolio inflow plays a role in Indonesian growth.

While this research suggest that portfolio inflows can increase the economic growth, the impact is relatively small. This positive effect of portfolio inflow on growth partially due to central bank intervention on money market. While Bank Indonesia as central bank do not apply the target of exchange rate, foreign exchange operations are conducted in order to maintain the volatility. In short, the exchange rate does not react strongly as the shock from portfolio inflows, which can pressure the growth.

As the portfolio inflows increasing within the period, the impact to Indonesian economy is relatively contained. This reflects the development of financial market followed by policies by the Bank Indonesia as authority. In short, while the portfolio inflow increases the volatility, the effects is remained manageable from monetary perspective.

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