

# Simultaneity Analysis between Portfolio Investment and Macroeconomic Variables in Indonesia

Lia Nazliana Nasution<sup>1</sup>, Tiur Malasari Siregar<sup>2</sup>, Isfenti Sadalia<sup>3</sup>

<sup>1</sup>Department of Economic Development, Universitas Pembangunan Panca Budi,  
Jl. Jendral Gatot Subroto Km 4,5 Medan, Indonesia

<sup>2</sup>Department of Mathematics Education, Universitas Negeri Medan,  
Jl. Willem Iskandar Pasar V, Medan, Indonesia

<sup>3</sup>Department of Management, Universitas Sumatera Utara, Jl. Prof. T.M Hanafiah,  
SH, Kampus USU, Medan, Indonesia

Keywords: Portfolio Investment, ER, IR, Growth, Inflation.

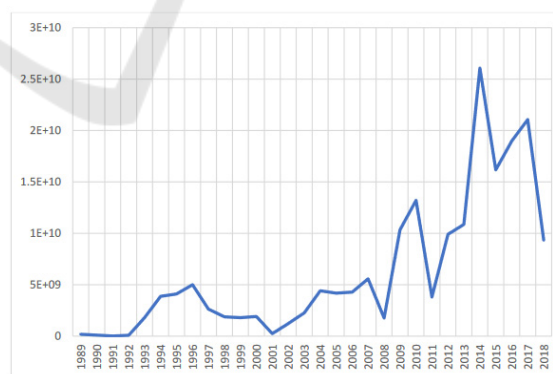
Abstract: Macroeconomic variables play an essential role in determining portfolio investment inflows in a country. If one macroeconomic variable changes, investors will react positively or negatively depending on whether the changes in the macroeconomic variables are positive or negative in the eyes of investors. The objective of this study analyzes the effect of macroeconomic variables on portfolio investment in Indonesia. Suspected economic variables are influential, namely the exchange rate (ER), interest rate (IR), inflation, and economic growth (growth) sourced from the World Bank. With a 30-year observation period from 1989 to 2018, and the method used simultaneous regression analysis, the findings show that ER, IR, and growth have a positive effect on demand for portfolio investment in Indonesia while inflation and portfolio investment has a significant negative impact on growth.

## 1 INTRODUCTION

Investment assets can be classified into broad assets, for example, stocks, bonds, commodities, real estate, and others. A collection of investment assets is called a portfolio investment. Portfolio investment can also be options, derivatives, and futures. Portfolio investment is an investment in the financial sector, which is classified as the highest risk and the highest rate of return. However, this high rate of return also allows for significant losses if not managed properly (Suhendra & Istikomah, 2016).

The high risk of portfolio investment is inseparable from general macroeconomic risks such as inflation, interest rates, exchange rates, etc. Even though company specific risks can be a risk for portfolio investment. Several previous studies have found that inflation, interest rates, economic growth, and exchange rates significantly affect portfolio investment in Indonesia (Suhendra & Istikomah, 2016). (Korap, 2010) Found that the behavior of portfolio inflows in Turkey was influenced by economic shocks. In India, exchange rates, interest rates, domestic capital market performance, and local

output growth are determinants of portfolio inflows (Garg & Dua, 2014).



Source: World Bank

Figure 1: Trends of Portfolio Investment in Indonesia, 1989 – 2018

Based on Figure 1 above, it can see that portfolio investment in Indonesia fluctuates annually by showing an overall increasing trend. The most substantial portfolio investment in 2014 is 26 billion USD. In 2018 portfolio investment has decreased

compared to 2017, from 21 billion USD to 9 billion USD. The fluctuating value is due to Indonesia still dependent on external financing sources from portfolio investment inflows (WorldBank, 2019).

Even though in 2018, Indonesia's portfolio investment decreased, but the Capital and Financial Transaction (TMF) balance has been surplus throughout 2018. One of the components forming the TMF balance sheet came from foreign portfolio investment inflows in the form of stocks, government bonds, corporate bonds, and other investments (cnbcindonesia, 2019). It means that foreign investor confidence in the Indonesian economy is still quite high. To maintain investor trust, stakeholders in Indonesia need to continue to provide the latest information on the Indonesian economy so that that portfolio investment can increase again in 2019.

From the description above, the influence of macroeconomic variables is quite considerable on portfolio investment in Indonesia. This study was conducted to see the effect of the economic shock factor seen from the exchange rate variable, the interest rate factor as the magnitude of the rate of return, and economic growth on portfolio investment in Indonesia simultaneously.

## 2 LITERATURE REVIEW

### 2.1 Portfolio Investment

Portfolio investment is an investment in securities that expects returns and is not free from possible risks. These securities are, for example, stocks, government bonds, corporate bonds, and other derivative products. The greater the expected rate of return, the higher the risk that will be faced.

Different from direct investment, portfolio investment expects a high return on target companies and can be involved with daily management. In purchasing portfolio investments, a tactical approach and strategy are needed that are mature in a short time.

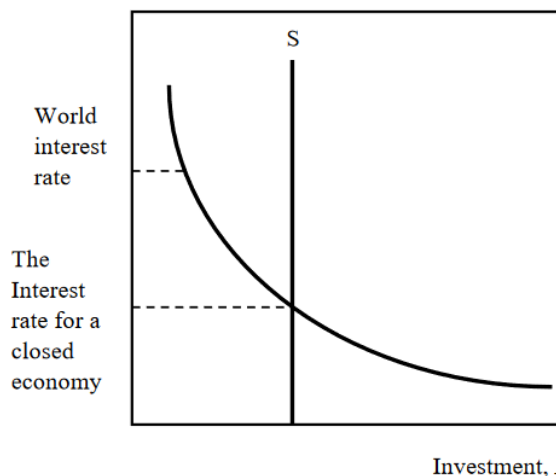
### 2.2 Investment Theory

The investment  $I$  is negatively related to the real interest rate  $r$ . Its functions are as follows:

$$I = I(r) \tag{1}$$

In a closed economy, the real interest rate adjusts to balance the value of the investment, i.e. the real interest rate is at the intersection of the investment curve. However, in a small open economy, the real interest rate is equal to the world real interest rate.

Real interest rate,  $r^*$



Source: (Mankiw, 2007)

Figure 2. Investment

### 2.3 Investment Allocation

It is an action in determining the investment weight or the proportion of risk-free asset financial instruments and risky asset financial instruments. Risk-free asset financial instruments can be interpreted as an investment instrument that is not likely to experience default payments and investment principals such as Bank Indonesia Certificates (SBI). While risky asset financial instruments are interpreted as financial instruments that contain the risk of not getting results or the principal of investment does not return, in part or whole, for example, stocks and bonds. In determining the weight of investment both at risk and at risk, investors will consider market conditions, the ongoing economic cycle at the time the investment will be decided.

### 2.4 Investment Risk

Portfolios can be interpreted as investments in various financial instruments that can be traded on the Stock Exchange or Money Market to spread the results of profits and possible risks. Financial instruments in question, for example, stocks, bonds, real estate, and other derivative products.

To reduce investment risk, investors must be familiar with the types of investment risks. The first type of risk is a systematic risk. Examples are the rise in inflation, interest rates, and destructive economic cycles. Systematic risk is more classified into macroeconomic variables. The second type of risk is the unsystematic risk. This risk only affects a particular stock or sector, for example, the existence

of government regulations regarding the ban on export or import of cement, which will affect the price of cement stocks or derivative products such as property.

## 2.5 Macroeconomic Factor

Macroeconomics is a factor that comes from outside the company but has a significant influence on the increase or decrease in investment demand both directly and indirectly. Some macroeconomic factors that can directly influence investor decisions are as follows:

- a) Interest rate
- b) Inflation rate
- c) Exchange rates
- d) Interest rates on foreign loans
- e) Economic conditions
- f) Tax regulations
- g) Economic cycle
- h) Circulation of money

## 2.6 Empirical Study

(Waqas, Hashmi, & Nazir, 2015) Investigated the relationship between macroeconomic factors and the volatility of foreign portfolio investment in South Asian countries, namely China, India, Pakistan, and Sri Lanka. Using monthly data from 2000 to 2012 because monthly data is ideal for measuring portfolio investment inflows. This study uses the GARCH model, with the findings showing that there is a significant relationship between macroeconomic factors and the volatility of foreign portfolio investment. Lower volatility in international portfolio flows is associated with high-interest rates, currency depreciation, foreign direct investment, lower inflation, and higher GDP growth rates than the host country. This shows that international portfolio investors focus on a stable macroeconomic environment in the country.

(Haider, Khan, & Abdulahi, 2016) Observe the impact of FPI determinants on the Chinese economy. The data used are Foreign Portfolio Investment (FPI), GDP, Foreign Direct Investment (FDI), foreign debt, and the population was taken from the world bank. GDP and external debt have a strong influence on FPI. Exchange rates and population indicate that these two variables have a significant impact on FPI.

(Garg & Dua, 2014) Analyzed the factors that influence the inflow of foreign portfolio investment to India. The results of the analysis show that lower exchange rate volatility and higher risk diversification opportunities are conducive to portfolio flows. However, higher returns on equity from other emerging markets hamper this flow.

Common determinants of portfolio flows are the performance of domestic equity, exchange rates, differences in interest rates, and local output growth. Disaggregated portfolio flow analysis shows that the determinants of FII are similar to aggregate portfolio flows, while ADR / GDR is only significantly affected by returns on domestic equity, exchange rates, local output growth, and foreign output growth.

(Suhendra & Istikomah, 2016) Examine the contribution of various macroeconomic variables that are suspected of being able to influence portfolio investment in Indonesia. Using multiple regression analysis, the results of the study indicate that an increase in inflation and economic growth will significantly increase portfolio investment, while a rise in interest rates and exchange rates will significantly reduce portfolio investment in Indonesia.

(Korap, 2010) identified determinants of capital flow based on portfolios for the Turkish economy. The method used by SVAR. The estimation results show that the 'push' factor based on external developments for the Turkish economy has a dominant role in explaining the behavior of portfolio flows. Furthermore, domestic real interest rates as one of the main 'pull' factors have been found in negative dynamic relationships with portfolio flows. This result is associated with that the progressive journey of portfolio flows should not be associated with the possibility of excessive returns from the real interest structure of the Turkish economy.

## 3 METHOD

To identify the effect of macroeconomic variables on portfolio investment in Indonesia, data for the period 1989 to 2018 were used. The macroeconomic variables studied were exchange rates, interest rates, and economic growth, sourced from the World Bank. The method used in this study is simultaneous regression analysis, with the equation model as follows:

$$\begin{aligned} \text{Portfolio Investment} &= a_0 + a_1ER + a_2IR + a_3\text{Growth} \\ \text{Growth} &= b_0 + b_1\text{Inflation} + b_2\text{Portfolio Investment} \end{aligned}$$

Where:

ER = Exchange Rate

IR = Interest Rate

Then identification of simultaneity is carried out, which aims to find out whether the equation is under conditions identified, exactly identified, or over-

identified. The identification of simultaneity in the equation of this study are as follows:

Table 1: Model Identification Test

Equations	M	K – M	G – 1	Decisions
<i>Portfolio Investment = a<sub>0</sub> + a<sub>1</sub>ER + a<sub>2</sub>IR + a<sub>3</sub>Growth</i>	4	1	= 1	Exactly
<i>Growth = b<sub>0</sub> + b<sub>1</sub>Inflation + b<sub>2</sub>Portfolio</i>	3	2	> 1	Over

From the table above, it can be seen that the first equation is exactly identified, while the second equation is over-identified. Thus it can be decided to solve this simultaneous model that has been built using the 2SLS method (Two-Stage Least Square). The classic assumption test used is the data normality test.

## 4 RESULTS AND DISCUSSION

### 4.1 Results of Simultaneous Regression Analysis

The results of system estimation equations with Two-Stage Least Square for endogenous portfolio investment variable are as follows:

Table 2: TSLS for Portfolio Investment Variable

Predetermine d	Coefficien t	Prob.	Other Paramete r
C	-6.02E+09	0.0528	R2 : 0.4682
ER	1219110.	0.0001	Prob F-stat : 0.00073
IR	67266884	0.7325	DW stat : 1.1
Growth	4.66E+08	0.2668	

Source: Eviews 10 result, 2019

The R-square value is 0.4682, which means that together, the ER, IR, and growth variables can explain the portfolio investment variable by 46.82%, and the remaining 53.18% is explained by other variables not included in the estimation model. The F-statistical probability value is 0.00073 < 0.05, so there is a significant effect simultaneously.

Partial interpretation:

- a) The ER variable has a significant positive effect on portfolio investment with a coefficient of 1219110. At a 95% confidence level. The coefficient is 1219110. It means that if the ER variable increases by 1%, it will increase portfolio investment by 1219110.% (ceteris paribus).
- b) The IR variable has a not significant positive effect on portfolio investment at a 95% confidence level.
- c) The economic growth variable has a positive and insignificant effect on portfolio investment at a 95% confidence level.

The results of system estimation equations with Two-Stage Least Square for endogenous economic growth variable are as follows:

Table 3: TSLS for Economic Growth Variable

Predetermine d	Coefficien t	Prob.	Other Paramete r
C	10.30556	0.0000	R2 : 0.80457
Inflation	-0.390347	0.0000	Prob F-stat : 0.000
Portfolio Investment	-2.61E-10	0.0014	DW stat : 1.249

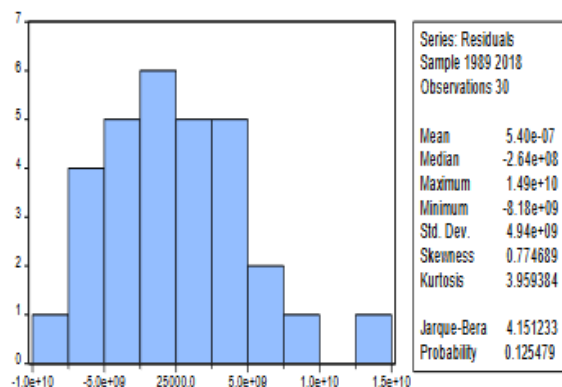
Source: Eviews 10 result, 2019

The R-square value is 0.80457, which means that together, the inflation and portfolio investment variables can explain economic growth of 80.457%, and the remaining 19.543% is explained by other variables not included in the estimation model. The F-statistic probability value is 0,000 < 0.05, so there is a significant effect simultaneously.

Partial interpretation:

- a) The inflation variable has a significant negative effect on economic growth with a coefficient of -0.3903 at a 95% confidence level. The coefficient of - 0.3903 means that if inflation increases by 1%, it will reduce economic growth by 0.3903% (ceteris paribus).
- b) The portfolio investment variable has a significant negative effect on economic growth with a coefficient of -2.61E-10 at a 95% confidence level. The coefficient of - 2.61E-10 means that if portfolio investment increases by 1%, it will reduce economic growth by 2.61E-10% (ceteris paribus).

## 4.2 Results of Normality Test



Source: Eviews 10 result, 2019

Figure 3: Jarque-Bera Normality Test

From the figure above, the Jarque-Bera value is 4.15123 with a probability of  $0.125479 > 0.05$  which means the data for all variables are normally distributed

## 4.3 Discussion of Portfolio Investment Simultaneity Analysis based on Macroeconomic Variables

From the findings above, the exchange rate has a positive and significant effect on portfolio investment in Indonesia during the observation period. This shows that the appreciation of the domestic exchange rate encourages portfolio investment flows received by Indonesia. These findings are consistent with the research conducted by (Garg & Dua, 2014), (Waqas, Hashmi, & Nazir, 2015), which found that the exchange rate has a positive effect on portfolio investment demand. But it is not consistent with the research conducted by (Haider, Khan, & Abdulahi, 2016), (Suhendra & Istikomah, 2016), which state that the exchange rate harms portfolio investment demand.

Variable interest rates have a positive but not significant effect on portfolio investment in Indonesia during the observation period. These findings are not consistent with the research conducted by (Garg & Dua, 2014), (Waqas, Hashmi, & Nazir, 2015), (Suhendra & Istikomah, 2016) which state that interest rates affect portfolio investment negatively.

The variable economic growth has a positive and not significant effect on portfolio investment in Indonesia during the observation period. These results indicate that increased economic growth has boosted portfolio investment. In line with previous studies conducted by (Garg & Dua, 2014), (Suhendra & Istikomah, 2016), (Winona & Nuzula, 2016), and

(Haider, Khan, & Abdulahi, 2016). However, there is no continuity between economic growth and portfolio investment demand, which is characterized by insignificant influence, by findings made by (Waqas, Hashmi, & Nazir, 2015), in Pakistan, the GDP growth rate has no continuity, and foreign investors are not interested in the country's GDP.

The subsequent findings of inflation have a negative and significant effect on economic growth in Indonesia during the observation period. When prices increase, people's purchasing power will decline, and the country's economic growth will be obstructed. But for the portfolio investment variable, it turns out that the results are negative and significant for economic growth. When portfolio investment increases, it will reduce economic growth. This finding is not consistent with the results of research conducted by (Winona & Nuzula, 2016), which states that portfolio investment affects economic growth positively and significantly.

## 5 CONCLUSION

Indonesia still has the opportunity to attract portfolio investment flows by maintaining macroeconomic indicator stability, such as strong economic growth, lower exchange rate movements, and price and interest rate stability. The economic shock factor does not significantly affect portfolio investment flow, which means that investor confidence is still tremendous enough for the Indonesian economy.

## REFERENCES

- cnbcindonesia. (2019, 02 09). [www.cnbcindonesia.com](http://www.cnbcindonesia.com). Retrieved from [www.cnbcindonesia.com](https://www.cnbcindonesia.com/market/20190209100114-17-54633/asing-betah-masuk-lewat-portofolio-ini-kata-bank-indonesia): <https://www.cnbcindonesia.com/market/20190209100114-17-54633/asing-betah-masuk-lewat-portofolio-ini-kata-bank-indonesia>
- Garg, R., & Dua, P. (2014). Foreign Portfolio Investment Flows to India: Determinants and Analysis. *World Development*, 59, 16-28. doi:<http://dx.doi.org/10.1016/j.worlddev.2014.01.030>
- Haider, M. A., Khan, M. A., & Abdulahi, E. (2016). Determinants of Foreign Portfolio Investment and Its Effects on China. *International Journal of Economics and Finance*, 8(12), 143-150. doi:10.5539/ijef.v8n12p143
- Korap, L. (2010). Identification of 'pull' & 'push' factors for the portfolio flows: SVAR evidence from the Turkish economy. *Doğuş Üniversitesi Dergisi*, 11(2), 223-232.
- Mankiw, N. G. (2007). *Makroekonomi* (Keenam ed.). Jakarta: Erlangga.

- Suhendra, I., & Istikomah, N. (2016). Faktor Penentu Investasi Portofolio di Indonesia. *Jurnal Riset Akuntansi Terpadu*, 9(2), 277-288.
- Waqas, Y., Hashmi, S. H., & Nazir, M. I. (2015). Macroeconomic factors and foreign portfolio investment volatility: A case of South Asian countries. *Future Business Journal*, 1, 65-74. doi:<http://dx.doi.org/10.1016/j.fbj.2015.11.0.02>
- Winona, A. A., & Nuzula, N. F. (2016). THE RELATIONSHIP BETWEEN FOREIGN PORTFOLIO INVESTMENT AND FOREIGN DIRECT INVESTMENT ON ECONOMIC GROWTH (Study at Indonesia Stock Exchange and Bank of Indonesia period 2006-2014). *Jurnal Administrasi Bisnis (JAB)*, 39(2), 44-49.
- WorldBank. (2019, 07 15). [www.worldbank.org](http://www.worldbank.org). Retrieved from [www.worldbank.org](http://www.worldbank.org): <https://data.worldbank.org>

