ANALYSIS OF PULL AND PUSH FACTORS OF FOREIGN PORTFOLIO INVESTMENT FLOWS IN ASEAN-4

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Abstract: Globalization has a positive impact on emerging countries with the free movement of capital between countries. However, globalization is also accompanied by the problem of capital flow reversals that are risky for emerging countries that have more volatile capital flows than developed countries. The component of capital flow that more volatile and riskier for capital flow reversals is foreign portfolio investment (FPI). Therefore, this study aims to examine the pull and push factors affecting FPI to ASEAN-4 countries. This study uses the dynamic panel data analysis method with the Fixed Effect Model (FEM). The results of this study indicate that push factors can better explain the flow of portfolio investment. Push factors have a significant effect on FPI, namely US GDP growth, VIX, and Fed Fund Rate. While all pull factors consisting of ASEAN-4 GDP growth, MSCI ASEAN-4 index, ASEAN-4 interest rates, and ASEAN-4 Credit Default Swap are not significant to FPI. This study also proves that the FPI is affected by the shock from one previous period. This is indicated by the significant effect of lag FPI on FPI.

Keywords: Foreign Portfolio Investment, ASEAN-4, Pull Factors, Push Factors

1. INTRODUCTION

Globalization has had many impacts on the economic, political, social, cultural, and technological fields. Obadan (2006) states that economic globalization is at the heart of the globalization process. Obadan adds that economic globalization is a process of change into greater economic integration through trade, financial flows, exchange of technology and information, and movement

of labor. One of the real impacts of globalization can be seen through the increasing integration of financial markets which is characterized by increasing capital flows in emerging countries. Economic integration provides more impactful benefits for emerging countries that have relatively insufficient capital. According to Owo (2013) in Oke *et al.* (2020), one of the characteristics of emerging countries is the low savings rate so that emerging countries do not have sufficient capital for their development. With economic integration, especially financial integration, emerging countries can obtain foreign capital flows to fulfill the capital gap needed for economic development.

Koepke (2015) explains that capital flows can be obtained from foreign direct investment (FDI), foreign portfolio investment (FPI), and other investments that include bank loans. In the 1980s to 1990s, direct investment flows have been the largest source of foreign funds compared to other sources. This is because direct investment is viewed as a safe source of funding and a stabilizing factor in the financial system of the recipient country (Humanicki *et al.*, 2013). Recently, portfolio investment has become a common investment in various countries around the world (Ahmad *et al.*, 2015). Humanicki *et al.* (2013) stated that along with the development of financial markets in emerging countries, and the opening of these countries to foreign investors, the composition of capital inflows shifted towards an increase in foreign portfolio investment.

Globalization that causes economic integration and increases capital flows does bring benefits, especially for Emerging countries. However, globalization also poses risks, namely the problem of capital flow reversals. Emerging countries are more sensitive to capital reversals because capital flows to emerging countries are more volatile than developed countries (Pagliari & Hannan, 2017). Capital reversals are also very vulnerable to causing financial crises in emerging countries. Obadan (2006) stated that capital reversal was a factor that accelerated financial crises, for example in Latin America and East Asia in the 1990s. The most volatile and risky component of capital flows is portfolio investment. Pagliari & Hannan (2017) stated that portfolio and other investment flows are two to four times more volatile than direct investment. Direct investment showed a stable pattern during the period after 2000 (Korap, 2010).

Calvo, Leiderman and Reinhart (1993) and Fernandez-Arias (1996) introduced a theoretical framework based on empirical analysis of factors affecting capital flows. The framework divides the factors affecting capital flows into pull factors and push factors (Koepke, 2015). According to Kang & Kim

(2019), pull factors are domestic factors that can attract funds from world financial markets to domestic financial markets, such as domestic interest rates, GDP growth rates, institutional quality, and stage of economic development. Meanwhile, push factors are factors in the global financial market that influence capital inflows to other countries, such as interest rates and GDP growth in developed countries, as well as global risk levels. In other words, pull factors are related to the attractiveness of a particular country that can attract funds to that country, while push factors are related to factors from the world economy that encourage capital to other countries (Oke *et al.*, 2020). Koepke (2015) found that pull factors and push factors can be divided into several other driving determinants. The pull factors consist of domestic economic output growth determinants, asset return indicators, and country risk indicators. Meanwhile, the push factors consist of global risk aversion determinants, interest rates of developed economies, and economic output growth of developed countries.

Based on the explanation above, this research wants to prove the discovery of pull factors and push factors for portfolio investment flows by Robin Koepke in 2015. In this study, the author uses pull factor variables, namely ASEAN-4 GDP growth, ASEAN-4 MSCI index, ASEAN-4 interest rates, and ASEAN-4 credit default swaps. While the driving factors used are US GDP growth, US interest rates or Fed Fund Rate and US monetary policy expectations as indicated by changes in Fed Fund Futures, and the CBOE Volatility Index or VIX. The author takes a sample of four emerging countries that have a large economic influence in ASEAN or ASEAN-4, namely Indonesia, Malaysia, Thailand, and the Philippines. The four countries are also included in the list of emerging countries in Asia in 2023 based on Morgan Stanley Capital International. The author uses monthly data samples from January 2019 to June 2023. The purpose of selecting samples in that time span is because within that span, there is a period of the Covid-19 pandemic. The World Health Organization (WHO) declared Covid-19 a pandemic on March 11, 2020 (Cucinotta & Vanelli, 2020) and revoked the pandemic status on May 5, 2023 (World Health Organization, 2023). By taking data samples in this range, the author wants to know the factors that affect foreign portfolio investment in ASEAN-4 during the Covid-19 pandemic.

2.   LITERATURE REVIEW

Research on the determinants of pull factors and push factors of portfolio investment flows has been conducted by many researchers before. Kang &

Kim (2019) stated that push factors are general factors in the world financial market that can affect capital inflows to countries other than domestic countries, for example GDP growth in developed countries, global risk factors, and commodity price indices. Meanwhile, pull factors are domestic factors that can attract capital from world financial markets to domestic financial markets, for example domestic interest rates, exchange rates, and the level of economic development. Koepke (2015) elaborated that the driving factors of capital flows, which include portfolio investment flows, include global risk aversion, developed country interest rates, and developed country output growth. Meanwhile, the pull factors include domestic output growth, asset return indicators, and country risk indicators. In his research, it was found that all indicators have a significant influence and proven through a survey of 40 empirical studies on capital flows to emerging countries. Global risk aversion and developed country interest rates are the factors that have a very strong influence and positive relationship on portfolio investment flows. Developed country output growth rate, domestic output growth and asset return indicators have a significant and positive influence, while country risk indicators have a negative and significant relationship with portfolio investment flows. The findings are in line with Kang & Kim (2019) research. They found that the driving factor that plays the biggest role is US interest rates in the Northern European country group. They also found that in the group of emerging economies which includes several Asian countries, Northern Europe, Latin America, and other countries from 1997 to 2015, push factors more significantly affect capital inflows than pull factors. This finding is in line with the research conducted by Korap (2010) on the Turkish economy which is an emerging economy. Korap found that push factors, namely US interest rates, industrial production index growth, and stock returns, played a dominant role in influencing portfolio investment flows in 1992-2009. Meanwhile, the dominant pull factor is domestic interest rates.

Another study on emerging countries conducted by Ahmed & Zlate (2013) stated that differences in growth rates and interest rates between emerging and developed countries, as well as world risk appetite are statistically and economically important determinants of capital inflows. They also found that after the world financial crisis in 2008-2009, the sensitivity of portfolio investment flows to policy rate differentials and global risk aversion increased. Recent research by Oke *et al.* (2020) also stated that domestic interest rates and interest rates of developed countries, namely the United States, as well

as domestic and US GDP growth have a significant influence on portfolio investment flows towards emerging countries in the long run. In addition, market capitalization, US gross savings, real exchange rate and US inflation also have a significant influence on portfolio investment flows. From their findings, domestic GDP growth and the US inflation rate are the most significant determinants affecting portfolio investment flows in the long run. Therefore, they recommend policy makers to commit to increasing GDP to attract foreign investors' capital.

On the African continent, Onuorah & Akujuobi (2013) found that from 1980 - 2010, macroeconomic variables namely interest rates, exchange rates and inflation had a significant and positive influence on portfolio investment flows. However, GDP and money supply had the opposite relationship with portfolio investment flows. In another country, South Africa, Bah & Giritli (2020) found different things. GDP per capita has a positive influence on long-term portfolio investment flows to South Africa. Other determinants such as real interest rates, real exchange rates, government spending, US Treasury Bill interest rates, and the industrial production index (IPI) also have significant long-run effects on portfolio investment flows.

In Indonesia itself, Nuryakin *et al.* (2016) conducted research on portfolio investment flows to Indonesia from October 2005 to July 2016 using the Structural Vector Autoregression (SVAR) method. The study showed that the determinants of push factors are more dominant than pull factors in explaining the flow of portfolio investment to Indonesia. This is in line with several previous studies on emerging countries. The driving factors in this study are regional stock market performance using the MSCI index which shows a positive relationship and the fed fund rate which is negatively related to portfolio investment flows. For pull factors, the domestic risk determinant, namely Credit Default Swap, is more dominant than the domestic rate of return, namely BI rate, in explaining portfolio investment flows towards Indonesia. Therefore, the researcher suggests for the relevant authorities to focus more on domestic risk than rate of return in controlling portfolio investment flows.

One year later, Raghavan *et al.* (2017) conducted research with the same method on Indonesia's neighboring country, Malaysia. The same thing obtained in this study is that push factors have a more dominant impact than pull factors. The most dominant push factors in order are global liquidity, global output, and global risk aversion (VIX). We also found that the impact of portfolio investment flows from financial shocks, which include the push factors of global

liquidity and VIX, as well as the pull factors of interest rates and equity prices, is faster than the world and domestic growth rates, and credit shocks.

Based on the above studies, the interest rate of developed countries, especially the United States, has a dominant influence on portfolio investment flows towards emerging countries. Koepke (2018) conducted research on the Fed's policy expectations on the Fed Fund Rate and found that the Fed's policy expectations have an asymmetric effect depending on the policy direction. Expectations of a looser Fed policy have a greater impact on portfolio investment flows towards emerging countries. Meanwhile, the expectation of an increase in the Fed Fund Rate will reduce flows towards emerging markets.

3.   METHODOLOGY AND VARIABLES

3.1.   Pull Factors

This study will examine the factors that influence portfolio investment flows consisting of pull factors namely ASEAN-4 GDP growth, ASEAN-4 MSCI index, ASEAN-4 interest rates, and ASEAN-4 credit default swaps.

   (1) ASEAN-4 GDP Growth: The GDP growth of a country shows the growth of the country's economic performance. So positive GDP growth will be an attraction for foreign investors to make portfolio investments in the country. Kang & Kim (2019) also stated that the GDP growth of emerging countries is a pull factor that has a positive effect on capital flows. Based on the theory and results of previous research on the effect of GDP growth on foreign portfolio investment, the hypothesis for this variable is:

   H1: ASEAN-4 GDP growth has a positive and significant effect on foreign portfolio investment.

   (2) ASEAN-4 MSCI Index: MSCI indices measure the performance of a pool of capital securities over time. An increase in the MSCI index indicates an increase in the price of capital securities so that there is a positive rate of return on these assets. In making portfolio investments, investors will expect a higher rate of return. Therefore, an increase in the MSCI index will increase investor portfolio investment. Based on the results of Koepke (2018) research on portfolio flows to emerging countries, the local stock market index using the MSCI index shows a strong and positive relationship with portfolio investment flows. Therefore, the hypothesis for this variable is:

   H2: MSCI ASEAN-4 Index has a positive and significant effect on foreign portfolio investment.

(3) ASEAN-4 Interest Rate: An interest rate is the promised rate of return in currency units over a period (Bodie *et al.*, 2014). Differences in interest rates between countries can affect capital flows from/to a country. The higher the interest rate of a country compared to other countries, the country offers a higher rate of return so that many investors will put their capital into the country. Empirical research using the SVAR method on the Turkish economy conducted by Korap (2010) found that the domestic real interest rate is the main pull factor of portfolio investment flows. Therefore, the hypothesis for this variable is:

H3: ASEAN-4 interest rates have a positive and significant effect on foreign portfolio investment.

(4) ASEAN-4 Credit Default Swaps: Credit default swaps are insurance against the possibility of bond or debt default. The higher the default risk, the higher the credit default swap. Therefore, credit default swaps can indicate a country's specific risk. Based on an empirical survey conducted by Koepke (2015), there is some evidence that country-specific risk has a negative relationship with capital and debt portfolio investment flows. Therefore, the hypothesis for this variable is:

H4: ASEAN-4 credit default swaps have a negative and significant effect on foreign portfolio investment.

3.2. Push Factors

This study will also examine push factors namely US GDP growth, US interest rates (Fed Fund Rate) and US monetary policy expectations as indicated by changes in Fed Fund Futures, as well as the CBOE Volatility Index or VIX.

(1) US GDP growth: Positive GDP growth indicates an increase in the income of the US population. GDP growth can be an indicator of global growth where according to Forbes & Warnock (2012) in Koepke (2015) stated that increased global growth is associated with an increased probability of a surge in capital inflows to emerging countries. This is due to the higher income that people can use to invest abroad such as emerging countries. Therefore, the hypothesis for this variable is:

H5: US GDP growth has a positive and significant effect on foreign portfolio investment.

(2) US interest rates (Fed Fund Rate): The US interest rate indicates the rate of return on US assets. Higher US interest rates can attract capital outflows

from other countries because the US offers higher returns. Oke *et al.* (2020) in their research on the pull and push factors of foreign portfolio investment to emerging countries showed that US interest rates have a negative relationship with FPI. Therefore, the hypothesis for this variable is:

H6: US interest rates have a negative and significant effect on investment portfolio investment.

(3) US monetary policy expectations: Fed fund futures are contracts that show the expectations of the United States interest rate policy. The higher the fed funds futures, the higher the expectation of US interest rates or the fed funds rate. Like US interest rates, an increase in US interest rate expectations or contractionary policy expectations will attract capital out of other countries. Expectations of tightening US monetary policy as indicated by an increase in fed fund futures have a negative influence on portfolio investment Koepke (2018) Therefore, the hypothesis for this variable is:

H7: Changes in fed fund futures have a negative and significant effect on foreign portfolio investment.

(4) CBOE Volatility Index (VIX): The VIX or CBOE Volatility Index shows investors' expectations of the upcoming 30-day volatility of the United States stock market. The higher the volatility, the higher the global stock market risk. Koepke (2015) states that one of the proxies commonly used to show global risk aversion is VIX. Global risk aversion has a negative and strong effect on capital and debt portfolio investment. Therefore, the hypothesis for this variable is:

H8: VIX has a negative and significant effect on foreign portfolio investment.

3.3. Methodology and Model Specification

This study uses secondary data sources with a period of January 2019 to June 2023 from ASEAN-4 countries namely Indonesia, Malaysia, Thailand, and the Philippines. The specification of the model to be estimated is the dynamic panel data model used to analyze the pull and push factors of ASEAN-4 foreign portfolio investment with the dynamic panel method is as follows:

$$FPI_{it} = \beta_{0i} + \beta_1 VIX_t + \beta_2 GDPAS_t + \beta_3 FFR_t + \beta_4 FFF_t + \beta_5 GDPG_{it} + \beta_6 MSCI_{it} + \beta_7 IR_{it} + \beta_8 CDS_{it} + \beta_9 FPI_{i,t-1} + \lambda_i + \varepsilon_{it}$$

$$(3.1)$$

In this model, *i* and *t* stand for cross-section unit and time series unit. The variable $FPI_{i,t}$ stands for foreign portfolio investment of ASEAN-4; $VIX_{,t}$ stands for CBOE Volatility Index; $GDPAS_{,t}$ stands for US GDP growth; $FFR_{,t}$ stands for

Fed Fund Rate; $FFF_{,t}$ stands for changes in Fed Fund Futures; $GDPG_{i,t}$ stands for ASEAN-4 GDP growth; $MSCI_{i,t}$ stands for ASEAN-4 MSCI index; $IR_{i,t}$ stands for ASEAN-4 interest rate; $CDS_{i,t}$ stands for ASEAN-4 Credit Default Swaps.

The data analysis method used in this research is the dynamic panel data method. This method was chosen because this research involves a cross section unit, namely four ASEAN-4 countries and a time series unit because it uses monthly data from January 2019 to June 2023, and foreign portfolio investment in the time series dimension is very likely to be correlated between times and has a dynamic nature.

Pooled OLS along with traditional individual-specific effect estimators such as random effect and fixed effect cannot handle the estimation of this dynamic panel model because it will produce biased estimators caused by endogeneity problems, except for panel data with long time series observations (Law, 2018).

Pooled Least Square (PLS)

From equation (3.1), it applies to $FPI_{i,t}$

$$FPI_{i,t-1} = \beta_{0i} + \beta_1 VIX_{t-1} + \beta_2 PDBAS_{t-1} + \beta_3 FFR_{t-1} + \beta_4 FFF_{t-1} + \beta_5 PDBG_{i,t-1} + \beta_6 MSCI_{i,t-1} +$$
$$\beta_7 IR_{i,t-1} + \beta_8 CDS_{i,t-1} + \beta_9 FPI_{i,t-2} + \lambda_i + \varepsilon_{i,t-1}$$

$$(3.2)$$

From equation (3.1), y_{it} is function of λ_i, thus in equation (3.2) $y_{i,t-1}$ also depends on λ_i. Therefore, $y_{i,t-1}$ will correlated with error term ($u_{it} = \lambda_i + \varepsilon_{it}$). Therefore, if PLS is used as an approach for estimating dynamic panel data models, endogeneity problems will arise which cause the OLS estimator to be biased and inconsistent.

Random Effect (GLS estimator)

The presence of endogeneity in the specification of equation (3.1), causes the random effect model (GLS) to be inappropriate for the dynamic panel data specification in specification (3.1). The REM estimator will be a biased estimator.

Fixed Effect Model (FEM)

Within group transformation in FEM is an estimation method other than least square dummy variable (LSDV). Within group transformation can overcome the weakness of LSDV approach. Within group transformation for dynamic panel data, with dependent variable y_{it}:

$$y_{it} - \overline{y}_i = \beta_1 - \overline{\beta}_1 + \beta_2(y_{i,t-1} - \overline{y}_{i-1}) + ...\beta_k(x_{kit} - \overline{x}_{ki}) + \lambda_i - \overline{\lambda}_i + (\varepsilon_{it} - \overline{\varepsilon}_{it})$$

$$(3.3)$$

The regressor on the right side of the equation above is $y_{i,t-1} - \bar{y}_{i-1}$ which $\bar{y}_{i-1} = \Sigma_{i=2}^{T} \frac{y_{i,t-1}}{T-1}$ will still correlated with $(\varepsilon_{it} - \bar{\varepsilon}_{it})$. Given $\bar{\varepsilon}_i = \frac{1}{T} \Sigma_{t=1}^{T} \varepsilon_{it}$, the correlation between the transformed error term and the transformed lagged dependent variable will be a function of 1/T. This means that the correlation (endogeneity) can be ignored when T (the number of time series observations) gets larger. Therefore, given that the time series observations in this study are large and exceed the cross-section dimension, the Fixed Effect Estimator estimation method will be used in estimating the dynamic panel data in this study (Law, 2018).

4. RESULTS

This study uses a dynamic panel analysis method with the Fixed Effect Model (FEM). The regression results of this study are as follows:

Tabel 1: Dynamic Panel Regression Result

Dependent Variable: FPI?
Method: Pooled Least Squares
Date: 01/01/24 Time: 23:42
Sample (adjusted): 2019M02 2023M05
Included observations: 40 after adjustments
Cross-sections included: 4
Total pool (balanced) observations: 160

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2687.163	1355.673	1.982162	0.0493
VIX	-79.72072	24.93755	-3.196815	0.0017
GDPAS	-85623.60	15055.58	-5.687166	0.0000
FFR	-429.8212	177.5527	-2.420808	0.0167
FFF	-815.0379	519.6802	-1.568345	0.1190
GDPG?	-5024.701	4306.165	-1.166862	0.2452
MSCI?	-31.06075	23.76692	-1.306890	0.1933
IR?	35942.81	29011.14	1.238931	0.2173
CDS?	0.263481	6.167174	0.042723	0.9660
FPI?(-1)	0.821696	0.049893	16.46918	0.0000
Fixed Effects (Cross)				
_IN--C	-1699.577			
_MY--C	2565.330			
_PH--C	-437.1059			
_TH--C	-428.6471			

		Effects Specification	
Cross-section fixed (dummy variables)			
R-squared	0.764596	Mean dependent var	-531.8536
Adjusted R-squared	0.745379	S.D. dependent var	3456.132
S.E. of regression	1743.963	Akaike info criterion	17.84347
Sum squared resid	4.47E+08	Schwarz criterion	18.09332
Log likelihood	-1414.477	Hannan-Quinn criter.	17.94493
F-statistic	39.78817	Durbin-Watson stat	1.389985
Prob(F-statistic)	0.000000		

Based on the regression results in Table 1, the R-squared result shows that 76.4596% of the variation of the dependent variable or FPI can be explained by the independent variables in the regression model. The regression results also show that the largest fixed effect estimator is Malaysia with a positive value while the other three countries are negative so that the intercept of Malaysia will be higher than the other countries and if each independent variable is the same for all countries, then Malaysia's FPI is the highest. The regression results in Table 4.1 show an F probability value (F-statistic) of 0.0000, smaller than alpha 0.05. The probability value proves that simultaneously, the independent variables of pull factors, push factors, and lag of the dependent variable affect the dependent variable of FPI in ASEAN-4.

The t test was conducted to analyze the effect between each independent variable consisting of pull and push factors on the dependent variable, namely the FPI by comparing the probability value or p-value with alpha 0.05 partially. The hypothesis test that will be tested in this study is the one-tailed hypothesis test. Based on the regression results in Table 1, the probability value of the four pull factors is greater than alpha 0.05. The probability of ASEAN-4 GDP growth is 0.1226, the probability of ASEAN-4 MSCI index is 0.09665, the probability of ASEAN-4 interest rate is 0.10865, and the probability of ASEAN-4 Credit Default Swap is 0.4830. Based on these probability results, it can be concluded that there is insufficient statistical evidence that ASEAN-4 GDP growth and ASEAN-4 MSCI index have a positive and significant effect on portfolio investment flows in ASEAN-4, and ASEAN-4 Credit Default Swap has a negative and significant effect on portfolio investment flows in ASEAN-4.

While the probability of the VIX driving factor, US GDP growth and the Fed Fund Rate is smaller than alpha 0.05, which is 0.00085, 0.0000 and

0.00835 respectively. However, the probability value of the Fed Fund Futures change is greater than alpha 0.05, which is 0.0595. Based on these results, it can be concluded that there is sufficient statistical evidence to state that US GDP growth has a significant but negative effect on foreign portfolio investment flows in ASEAN-4, and the CBOE Volatility index and Fed Fund Rate have a negative and significant effect on foreign portfolio investment flows in ASEAN-4. However, there is not enough evidence to suggest that changes in Fed Fund Futures have a negative and significant effect on foreign portfolio investment flows in ASEAN-4. Table 4.1 also shows that the probability value of lag FPI is 0.0000 or smaller than alpha 0.05. Therefore, it can be concluded that the lag of FPI has a significant effect on the flow of foreign portfolio investment in ASEAN-4 in a certain period.

5.   DISCUSSION

The regression results above are not fully in line with the research results of Koepke (2015). Koepke (2015) stated that based on a literature study of 40 empirical studies on pull and push factors of capital flows to emerging countries, there are pull factors for portfolio investment flows consisting of emerging country output growth, asset returns and country-specific risk. However, based on this study, the three determinants of pull factors do not have a significant effect on ASEAN-4 countries in the sample period of the study. For push factors, Koepke (2015) stated that push factors consist of developed countries' output growth, global risk aversion and developed countries' interest rates. In this study, the regression results also show results that are not in line with Koepke's research. The results of this study show that the output growth of developed countries does not have a positive but negative effect on foreign portfolio investment flows. Meanwhile, global risk aversion and developed country interest rates show the same results. Koepke (2018) conducted a study on the effect of the Fed's monetary policy expectations on portfolio investment flows to emerging countries. The results showed that Fed policy expectations with variable changes in Fed Fund Futures are statistically highly significant and economically important. This is not in line with the results of this study that the change in Fed Fund Futures is statistically insignificant.

Based on the regression results, push factors are better able to explain the dependent variable FPI, where three of the four push factors have a significant effect on FPI, while all pull factors are insignificant. This finding is in line with the results of research by Nuryakin *et al.* (2016) which stated that push

factors are more dominant than pull factors in explaining portfolio investment flows to Indonesia from October 2005 to July 2016 where in that span there was a global economic crisis in 2008. In the Turkish economy, Korap (2010) also found the same result that aggregate push factors have a greater impact on portfolio investment flows than pull factors. One of the push factors found in Korap's (2010) research is the real interest rate of the United States. On a broader scope of research, Kang & Kim (2019) research produces similar evidence that push factors have a greater impact on emerging countries in Asia (including ASEAN-4 countries) and Eastern Europe in 1997-2015. The VIX and US interest rate variables are important drivers in influencing capital flows.

In times of crisis, Fratzscher (2011) and Tanago *et al.* (2019) state that push factors are the main drivers of capital flows. Fratzscher (2011) and Tanago *et al.* (2019) conducted research on the pull and push factors of capital flows during the 2007-2009 global financial crisis. Both studies found the same result that push factors are the main variables affecting capital flows. Tanago *et al.* (2019) stated that the dominant push factors are global interest rates and global risk appetite. In addition, these two studies also found that the influence of push factors will decline after the crisis and pull factors will be dominant. Both studies can explain why the push factors in this study are more significant and can explain the dependent variable of foreign portfolio investment flows.

In crisis conditions, a high VIX indicates high global risk, causing a decrease in capital inflows to emerging countries and an increase in capital flows to developed countries. This situation is in line with the flight-to-safety phenomenon which is the main driver of capital flows during a crisis (Fratzscher, 2011). Flight-to-safety is a situation where there is an increased desire to hold safe assets over risky assets (Baele *et al.*, 2013). High levels of volatility during a crisis indicate that market conditions are very risky. During this period, investors will avoid risky instruments such as capital and debt instruments that are in portfolio investments and divert them to safe haven assets, such as gold. Or investors will shift their capital to more stable and economically mature countries, such as developed countries. Bodie *et al.* (2014) state that emerging countries are generally riskier than developed countries, especially in terms of return volatility. This can explain why push factors are more able to explain the flow of foreign portfolio investment in the research sample period dominated by the Covid-19 pandemic period than pull factors, where investors shift their focus to safe investments such as to developed countries rather than on domestic factors that can attract capital to emerging countries. The difference in investor

focus can also be the reason why Fed policy expectations with variable changes in Fed Fund Futures do not significantly affect foreign portfolio investment flows. Investors are more focused on the desire to hold safe assets and focus on global factors at the time such as market uncertainty rather than expectations of the upcoming Fed policy.

The results of this study indicate that US GDP growth significantly affects foreign portfolio investment flows. However, the relationship obtained is not in line with the conceptual hypothesis tested and is also different from the results of Koepke's (2015) research which states that US GDP growth has a positive effect on FPI. Table 1 shows that US GDP growth does not have a positive effect, but a negative one. GDP growth shows the performance of an economy. Under crisis/bearish market conditions, related to the flight-to-safety phenomenon, strong economic performance from developed countries will encourage investors to increasingly choose to put their capital into developed countries.

The effect of developed country interest rates on the results of this study shows results that are consistent with the literature discussed in the previous section. The higher interest rates in developed countries indicate that the higher the return on assets earned by investors if they invest in these developed countries. Of course, this encourages capital outflow from emerging countries to developed countries. Kang & Kim (2019) stated that interest rates of emerging countries in Asia, including ASEAN-4 countries, are relatively lower so that the difference in interest rates between these countries and the United States is relatively small so that capital flows tend to be more sensitive to changes in world interest rates. The results of Kang & Kim (2019) can add to the explanation of why portfolio investment flows are significantly affected by the Fed Fund Rate and not significantly by ASEAN-4 domestic interest rates in this study.

In the dynamic panel model, the lag effect of the dependent variable shows that portfolio investment in the current period is significantly influenced by portfolio investment one period earlier. This finding shows that a shock that affects the FPI in one period, the impact will still be felt in subsequent periods so that the FPI in one period is significantly related to the FPI in the next period. Thus, this is an empirical finding that provides validity for the use of dynamic panel models in this study. The significance of lag FPI in this study also shows the behavior described by Larry Harris (2003) that investors mostly measure past performance to predict future performance. Therefore, previous

investment trends are likely to influence current investment decisions. In addition, this significant influence can also explain the herding phenomenon in investment. Herding is the process by which investors imitate each other's behavior or base their decisions on the actions of others. During the Covid-19 pandemic, there is economic uncertainty and investment risk increases, encouraging rational investors to protect their portfolios and other investors will follow and imitate these actions (Abdul Jabbar Sadewo & Cahyaningdyah, 2022). Chang *et al.* (2020) in Abdul Jabbar Sadewo & Cahyaningdyah (2022) stated that in depressed market conditions or in bearish conditions, investors tend to follow market consensus. It is proven by the results of this research that in unstable market conditions during the Covid-19 pandemic, the flow of foreign portfolio investment is strongly influenced by foreign portfolio investment in the previous period.

6.   CONCLUSION

Based on the results of research that has been conducted on the pull factors and drivers of foreign portfolio investment flows in ASEAN-4 using the dynamic panel method, it can be concluded that all pull factors consisting of ASEAN-4 GDP growth, ASEAN-4 MSCI index, ASEAN-4 interest rates, and ASEAN-4 Credit Default Swap have no significant effect. While the push factor is the dominant factor explaining the flow of foreign portfolio investment in ASEAN-4 in the sample period dominated by the Covid-19 pandemic period. The CBOE Volatility Index (VIX) has a negative and significant effect, US GDP growth has a significant but negative effect, and the US interest rate or Fed Fund Rate has a negative and significant effect. However, the other driving factor tested, namely the Fed's monetary policy expectations, is not significant. The lag of the dependent variable FPI has a positive and significant effect on the dependent variable. The R-squared generated from this model is 0.764596. The R-squared result shows that 76.4596% of the variation in the dependent variable or FPI can be explained by the independent variables in the regression model.

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