

THE DYNAMICS OF CAPITAL FLOW AND PROCYCLICALITY OF FINANCIAL STABILITY SYSTEM IN ASEAN+3

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Abstract

The purpose of this study is to analyze the dynamics of the influence of capital flows and credit growth on macroeconomic stability in ASEAN + 3 countries. The analysis method used is panel vector error correction model during 2003-2014 and number of ASEAN member countries that are Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam, and added three countries namely China, Korea, and Japan. The variable used is Gross Domestic Product (GDP) annual percentage growth rate at market prices based on constant 2010 U.S. dollar, inflation annual consumer price in percentage, real effective exchange rate, net foreign direct investment (BOP in current US \$), net portfolio investment (BOP in current US \$), domestic credit provided by financial sector (% of GDP), central bank policy rate and discount rate. Sources of data were obtained from the World Bank and the International Monetary Fund. The analysis shows that capital inflows in the form of portfolio investments have an impact on economic growth in ASEAN + 3 countries compared to net foreign direct investment (FDI). This is because some ASEAN + 3 countries have a negative net FDI compared to net portfolio investment. The occurrence of friction in the credit market creates a pattern of procyclicality that is at the time of economic growth in the state of expansion or boom occurs high credit cycle without taking into account systemic risks and vice versa when the contraction or bust occurs credit crunch resulting in fluctuations in economic output.

Keywords: Capital Flow; Procyclicality; Monetary Policy; Macroprudential Policy

INTRODUCTION

1.1 Background

The phenomenon of the 2008 global financial crisis described as a "once-in-a-hit-century tsunami credit" has not only had an impact on global economic contraction since the great depression but also raises questions about the effectiveness of monetary policy in achieving stabilization inflation and output. The global financial crisis shows inadequate monetary policy in maintaining overall financial stability. The low volatility of inflation and output encourages low expectations of economic actors against risks, causing the financial system to become more vulnerable to crises.

According to [1], the occurrence of the crisis is caused by the policy of the central bank in keeping interest rates that are too low due to the low rate of inflation in the long period before the crisis without taking into account the risks in the banking and financial sectors in the monetary policy reaction function. The results of the same study show [2] and [3] that the case of "leaning against the wind" through the use of interest rate instruments in achieving price and output stabilization implies the onset of risks credit growth and asset prices. [4] study suggests that low-interest rates will increase business incentives in searching for assets with excessive income and high risk. While the [5] study shows when the economy is good, it causes the financial system to be more vulnerable due to excessive risk-taking. Monetary stability encourages speculative action by financial actors in seeking higher profits and increases leverage at low-interest rates and creates a moral hazard from market participants against macroeconomic risks [6]. This is due expectation of the upcoming economy that encourages the risk of excessive credit growth and creating asset price bubbles.

Responding to the phenomenon of financial system vulnerability required the existence of the prudential policy of financial system especially to overcome the cycle of boom and bust in credit and asset price [7][8]. The existence of friction in the credit market creates a pattern of procyclicality at the time of economic growth in the state of expansion or boom occurs high credit cycle without taking into account systemic risks and vice versa when the contraction or bust occurs credit crunch resulting in fluctuations in economic output. The results of studies with econometric techniques also show that credit growth is a strong predictor of the emergence of financial pressures in some countries [9]. Even the occurrence of a prolonged recession is closely related to the occurrence of the bust in credit and housing markets [10].

Procyclicality also occurs in the flow of foreign capital. At a time when a country's economy improves will affect investors' perceptions through the financial sector and create credit expansion [11]. However, when capital inflows are sufficiently massive and cannot be absorbed by the economy as a whole, it will have implications for the weakening of export competitiveness due to the tendency of exchange rate appreciation that transcends the fundamental condition and also supported by positive interest differential [12]. These conditions also lead to

asset price bubble, financial market vulnerability and increased inflationary pressures and complications in monetary management. Short-term foreign capital inflows such as portfolio investment are vulnerable to negative sentiments that trigger the massive and sudden reversal of capital and potentially put pressure on macroeconomic stability and the complexity of monetary policy.

Responding to the financial system vulnerability and the occurrence of financial sector stability with the flow of capital and credit growth, this study aims to analyze the dynamics of capital flows and credit growth to macroeconomic stability in ASEAN + 3 countries. The section structure in this paper includes several things that are about the second part of the theoretical review and previous empirical studies. The third part is the model specification and the analytical method. The fourth section presents the results of the analysis of the dynamics of capital flows and financial stability in ASEAN + 3. At the end of this paper presents the conclusions and policy implications.

Theoretical Background

The integration amongs countries with no boundaries provides space for each country in the mobility of capital flows either in the flow of capital in and out and follow the phase of boom and bust economy. At a time when the economy is in good condition, the capital inflows are quite massive and vice versa when the economy is in bad condition there is a reversal of capital outflow and often trigger a financial crisis. The vulnerability of foreign capital flows to macroeconomic stability is due to the proliferation pattern of capital flows in accordance with the economic conjuncture.

The flow of foreign capital into a country, including emerging countries, implies an increase in aggregate demand which is also accompanied by inflation risks and high credit growth followed by rising asset prices resulting in vulnerability in the financial sector. On the one side, foreign capital inflow indicate market confidence in a country's economic fundamentals and become a source of investment financing, increasing the intensity of trading activities and accelerating the development of financial markets. On the other side, capital inflows create vulnerabilities due to the diversification of risks and, if they occur in large quantities, can lead to exchange rate appreciation that is detrimental to export competitiveness and lead to the emergence of risky asset systemic risk especially to the financial sector.

The management of capital inflows to systemic risk is not enough with policy instruments through increased interest rates because the policy creates a dilemma in high aggregate demand and encourages more massive inflows of capital so that the value of the currency will appreciate. A prudential policy is required in the capital inflows, so the management of capital inflows can be categorized as part of the macroprudential policy.

According to [13], to mitigate the risk of financial stability associated with capital inflows can be classified into three things: capital transactions, exchange rate denominations and other prudential rules. Capital controls to restrict capital transactions enacted in the aggregate economy, the financial sector or industry for all capital flows or on such maturities as debt, capital, and short-term or medium-term direct investment. Foreign exchange (FX) for exchange rate denominations applies to financial institutions, especially banks related to foreign exchange asset investments. While for other prudential instruments such as maximum loan-to-value (LTV) ratio, domestic credit growth restriction, asset classification, dynamic loan-loss provision and counter-cyclical capital requirement.

Macroprudential policy responses related to inflows of capital are multifaceted in different countries. According to [14], some of the policy responses to capital inflows are first, if the exchange rate appreciates, that although appreciation may degrade export competitiveness, if the exchange rate is undervalued, the nominal exchange rate appreciates passively in response to capital inflows while when overvalued then the impact of appreciation on competitiveness. Second, the accumulation of foreign exchange reserves, if a country has a small foreign exchange reserve then inflows capital is very important to increase reserves owned by the central bank. The third is sterilization. If price stability becomes a focus then the money supply can be sterilized through open market operations and lower domestic credit.

Empirical Literature

[15], developed the DSGE model with the optimization of the banking sector on the role of capital flows, macro-financial and macroprudential policy in emerging Asia. The results of the study suggest that macroprudential policy is critical in reducing macroeconomic volatility and promoting wellbeing. [16] analyzes the implications of control capital by using the Tobin Tax on financial stability. The results show that the impact of capital controls vary greatly between market segments and in the foreign exchange market may decrease volatility. [17] pointed to a decrease in interest rates in advanced economies during the global financial crisis boosted capital flows to emerging market economies and responded to a policy of capital flows controls as a complement to conventional monetary policy instruments.

[11] analyzes the trade-offs and complementarities between monetary and macroprudential policies in mitigating the impact of financial shocks due to investor perceptions and productivity shocks due to capital inflows to the economy in an open economy model. The study results show macroprudential policy helps monetary policy in economic stabilization in the event of financial shocks. With an optimal simple rule by including macroprudential to improve welfare. Broad macroprudential is more effective than macroprudential capital control where the shift from foreign debt to domestic debt and affect the composition of debt of entrepreneurs versus total volume. The existence of financial shocks has a major impact on inflation and output on a fixed exchange rate system. While productivity shocks such as credit rose as inflation fell. There is a trade-off between the objectives of financial and macroeconomic stability when productivity shock occurs and in this case, the macroprudential policy does not improve welfare.

METHODS

Model Specification

Common models used in this study are:

$$\Delta z_t = \Gamma_1 \Delta z_{t-1} + \dots + \Gamma_{p-1} \Delta z_{t-p+1} + \Pi z_{t-p} + u_t$$

and, $\Gamma_i = -(I - A_1 - \dots - A_i)$, $i = 1, \dots, p-1$ dan $\Pi = -(I - A_1 - \dots - A_p) = \alpha\beta'$

α shows the speed adjustment matrix and β is the long-term coefficient matrix. Cointegration vector is the relation or interrelation of z_t variable that converges in the long run.

Data

The type of data used in this study is the secondary data panel is a combination of time series data and cross-section data during 2003-2014 and the number of ASEAN member countries: Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Singapore, Thailand, Vietnam and added three countries namely China, Korea, and Japan. So the total observation is 156.

The variable used is Gross Domestic Product (GDP) annual percentage growth rate at market prices based on constant 2010 U.S. dollar, inflation annual consumer price in percentage, real effective exchange rate, net foreign direct investment (BOP in current US \$), net portfolio investment (BOP in current US \$), domestic credit provided by financial sector (% of GDP), central bank policy rate and discount rate. Sources of data were obtained from the World Bank and the International Monetary Fund website.

Methodology

This research uses panel vector error correction model. The Vector Error Correction (VEC) model is the restored VAR used for non-stationary and cointegrated data. If the data is not stationary and VAR is estimated at the level without entering the cointegration restriction, then the parameters estimated in the VAR are consistent but the parameter estimation is inefficient because the information about cointegration is ignored (long-term relationship). An alternative solution is to use Vector Error Correction Model (VECM) which can generate more accurate and efficient parameter estimation.

The VEC has cointegration relations built into the specification so that it restricts the long-run behavior of the endogenous variables to converge to their cointegrating relationships while allowing for short-run adjustment dynamics. The cointegration term is known as the error correction term since the deviation from long-run equilibrium is corrected gradually through a series of partial short-run adjustments. Consider a two variable system with one cointegrating equation and no lagged difference terms.

VEC model adalah:

$$\Delta y_{1,t} = \alpha_1 (y_{2,t-1} - \beta y_{1,t-1}) + \varepsilon_{1,t}$$

$$\Delta y_{2,t} = \alpha_2 (y_{2,t-1} - \beta y_{1,t-1}) + \varepsilon_{2,t}$$

The right-hand side variable is the error correction term. In the long run equilibrium, this term is zero. The coefficient α measures the speed of adjustment of the set endogenous variable towards the equilibrium.

Determining lag lengths is a separate issue in VAR or VECM. A long lag reduces the degree of freedom, which implies the loss of required information and too short lags resulting in a misspecification model. In addition, the issue of lag length determination is also increasingly important as the correct lag selection results in Gaussian residuals (independent of autocorrelation and heteroscedasticity) [18][19][20].

The impulse response function can be derived from two types of VAR, ie VAR with variables in level and VECM by using the variable I (1) which has a cointegration relationship. Decreasing the impulse response function of VAR level and VECM requires representation of the shock in the model, with vector-moving average representation. To obtain an impulse response, a set of restriction identifiers must be entered. There are two approaches used to identify these surprises. First based on the contemporaneous effect of the shock, the second is based on the long-term restriction of the impact of the shock.

FINDINGS AND ARGUMENT

Stationarity Test and Cointegration

The unit root test is a stationarity test of data intended to observe whether a particular coefficient of the autoregressive model is estimated to have a value of one or not. The behavior of data from each variable can be seen in Table 1 which shows that not all stationary variables are to the same degree at the level, some variable which is stationary at I (0) is portfolio investment and domestic credit. Because not all variables have the same degree of integration then test the first degree of integration. Table 1 shows that all stationary variables in the first integration degree I (1).

Table 1. Unit Root and Integration Degree Using Levin, Lin and Chu Test

No.	Variable	I(0) Statistic Value	I(1) Statistic Value
1.	GDP growth	-0.544***	-8.236***
2.	Inflation	-4.444***	-9.925***
3.	Interest Rate	-2.643***	-10.278***
4.	Real Effective Exchange Rate	-1.493*	-6.912***
5.	Foreign Direct Investment	-1.552*	-3.381***
6.	Portfolio Investment	-0.848	-6.535***
7.	Domestic Credit	1.304	-4.652***

Notes: ***, **, * indicates significance at $\alpha = 1\%$, 5% and 10%

Source: Data Processed, 2017

After all stationary data at degree I (1), the vector error correction model is estimated and previously selected the optimal lag length and cointegration test. Selection of optimal lag length is important in VAR model especially to avoid serial correlation between error term with the endogenous variable in the model which can cause the estimator to be inconsistent. The longer the lag used will reduce the degree of freedom and the number of observations, whereas the too short lag will produce the wrong specification [18]. The long selection of lag is done by using the information criteria that is Schwarz Information Criterion. This study uses the maximum limit of lag which is taken into account is six. Based on the long lag selection test in Table 2 it is seen that the optimal lag for the VAR model based on Schwarz Information Criterion in order one, then the optimal lag chosen is lag one.

Table 2. Schwarz Information Criterion for Lag Optimal

Order	Schwarz Information Criterion (SIC)
0	140.169
1	130.798*
2	132.096
3	133.055
4	134.671
5	135.112
6	135.251

Source: Data Processed, 2017

Model specifications that assume a separation between endogenous and exogenous variables and the use of non-stationary data are still a question. The estimation results become spurious and the statistical inference becomes invalid because of the assumption of no exogenous variables as explanatory variables and no cointegration relation. The economic interpretation of cointegration can be interpreted, if two or more series are related to forming a long-term relationship, although not stationary but can move together and the differences between the series will become stationary [20].

Johansen's reduced rank test approach can be used to test the existence of cointegration relationships. The number of cointegration vector relationships indicates the number of long-term relationships in the system and to support theoretical predictions. Selection of cointegration linkages in the VAR modeling system can be done using the trace statistics and maximum eigenvalue criteria. By using lag (order) VAR (1) for Johansen Cointegration test results obtained there is one number of cointegration relationships.

Vector Error Correction Model (VECM)

After evaluating the cointegration model on the VAR modeling system, the model vector error correction model (VECM) is evaluated as shown in Figure 1 below. The generalized impulse response analysis illustrates the effect of shock on the endogenous variables contained in the model and to see the dynamic linkage between variables in the model referring to generalized rather than orthogonality. Based on Figure 1, the source of the shock from net foreign direct investment (FDI) is responded negatively by Gross Domestic Product (GDP) growth, indicating that an increase in FDI causes a decrease in GDP in ASEAN + 3 countries. The number of countries in ASEAN + 3 which have net foreign investment negative or there are capital outflows such as Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Myanmar, Thailand, and Vietnam. Different points are shown by China and Singapore which also have a negative net FDI trend, although both countries have a fairly high average economic growth. While for countries with positive net FDI value during the study period that is 2003-2014 is Korea, Malaysia, and Japan. Japan became the second country following Europe as an FDI contributor in ASEAN. Although FDI plays an important role in boosting economic growth, the issue of foreign ownership remains a constraint in some ASEAN countries. Thailand, Philippines and Malaysia countries with the most restrictive foreign ownership, while Cambodia and Singapore almost 100% give foreign ownership.

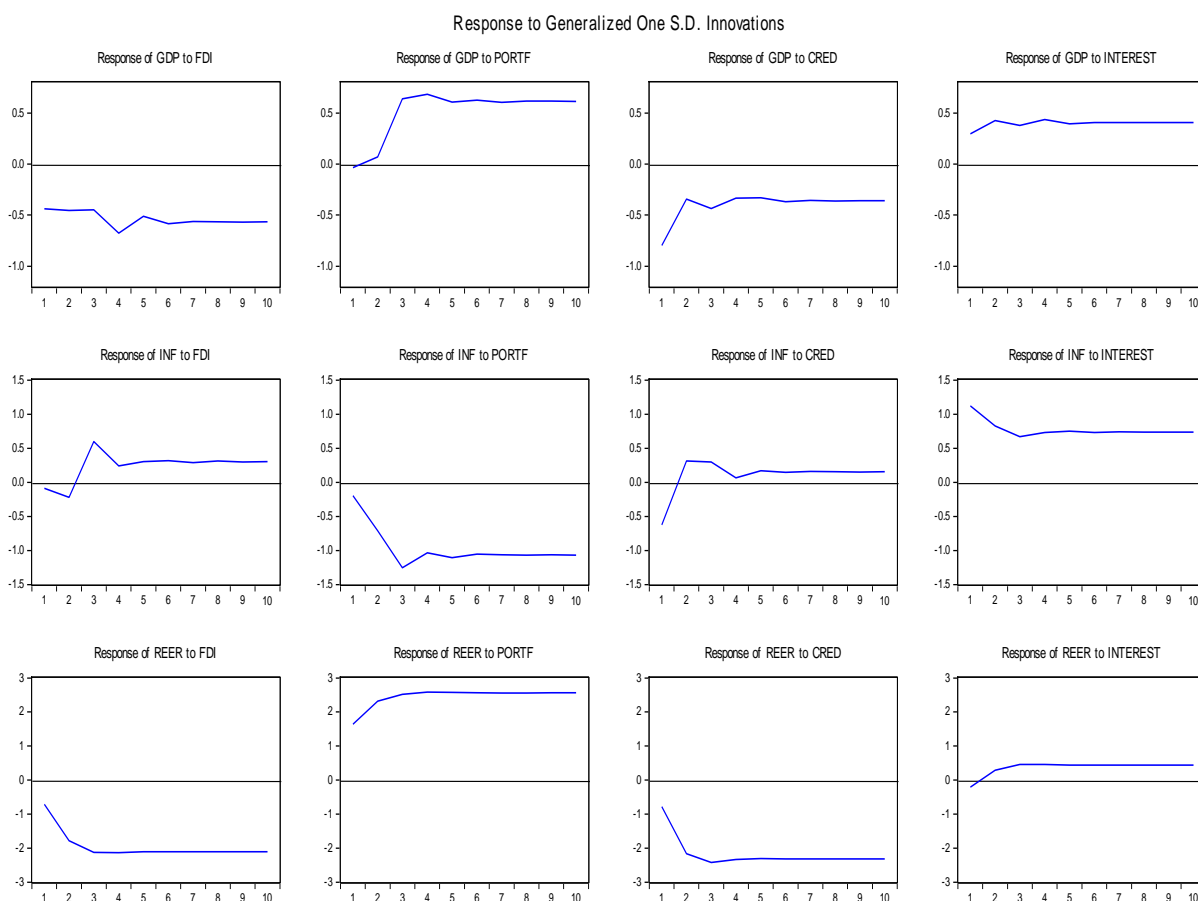


Figure 1. Generalized Impulse Response of VECM Estimation

Different with FDI, portfolio investment (PORTF) has a positive impact on GDP as the increase in investment portfolio boosts economic growth. Some countries with positive net portfolio investment value are Singapore, Korea, Japan, and Cambodia. While the inflation response to FDI is positive, it has a negative response until the second period, while the investment portfolio responded negatively, which means that the increase of inflation is less attractive for foreign investors to instill asset portfolio in ASEAN + 3 countries. The increase of portfolio investment to ASEAN + 3 countries causes exchange rate appreciation. However, the effect of portfolio investment is vulnerable to cause price instability that is marked by the increasing response of inflation. This is due to the expectation of exchange rate appreciation that exceeds the fundamental condition causing the happening of asset price bubble. Policy implications for the massive flow of foreign capital, especially portfolio investment, require good management to provide a positive impact on domestic financing and minimize short-term fluctuations, especially if there is a reversal of foreign capital flows. Improved macroeconomic performance is driving the strengthening of the exchange rate amid the recovery of global imbalances.

The management of capital inflows to systemic risk is not enough with policy instruments through increased interest rates because the policy creates a dilemma in high aggregate demand and encourages more massive inflows of capital so that the value of the currency will appreciate. A prudential policy is required in the capital inflows, so the management of capital inflows can be categorized as part of the macroprudential policy.

Some of the macroprudential policy instruments that can be used in connection with capital inflows are the restrictions on open foreign exchange positions and restrictions on foreign currency assets. [21] with Pigouvian taxation, namely the imposition of tax on foreign loans so that borrowers will be aware of the cost of currency mismatch. While some other instruments are still rarely used, the composition of bank balance sheets, such as loan-to-deposit ceilings, institution-specific capital add-ons, or time-varying capital charges.

According to [13], to mitigate the risk of financial stability associated with capital inflows can be classified into three things: capital transactions, exchange rate denominations and other prudential rules. Capital controls to restrict capital transactions enacted in the aggregate economy, the financial sector or industry for all capital flows or on such maturities as debt, capital, and short-term or medium-term direct investment. Foreign exchange (FX) for exchange rate denominations applies to financial institutions, especially banks related to foreign exchange asset investments. While for other prudential instruments such as maximum loan-to-value (LTV) ratio, domestic credit growth restriction, asset classification, dynamic loan-loss provision and counter-cyclical capital requirement.

Credit growth (CRED) has more impact on the decline in GDP. The financial system stability characterized by an increase in credit growth can lead to the vulnerability of macroeconomic stability. Interestingly, the result of this study is that an increase in credit growth causes an increase in inflation even in small standard deviations. According to [22] that banking credit offerings are affected by the monetary policy stance that interacts with pressure on bank balance sheets transmitted through bank losses. [23][24] explain the operation of monetary policy through bank reserves that affect the supply of bank credit in the economy. While [25][26] mentioned the importance of the risk-taking channel in the monetary policy transmission mechanism.

The risk-taking channel affects the supply of bank credit through changes in bank behavior in the face of credit risk [27]. In the risk-taking channel, changes in interest rates will affect the perception of banks and companies on the economy through bank reserves and companies in the face of risk. The existence of monetary tightening will increase perceptions of corporate risk on the deterioration of cash flow and balance sheet so that banks tend to be risk-averse. Conversely, if there is monetary easing with low-interest rates then encourage investors to seek assets with high returns. This condition causes banks to engage in more risky activities on asset prices, cash flow and income [28].

CONCLUSION

Conclusion

Based on the results of the analysis, it can be concluded:

1. The capital inflows in the form of portfolio investment have an impact on economic growth in ASEAN + 3 countries compared to net foreign direct investment (FDI). This is because some ASEAN + 3 countries have a negative net FDI. This indicates that the increasingly free mobility of capital between countries is vulnerable due to the diversification of risks and when it occurs in large quantities it can cause exchange rate appreciation that is detrimental to export competitiveness and lead to the emergence of risky asset systemic risk especially to the financial sector.
2. The occurrence of friction in the credit market creates a pattern of procyclicality that is when economic growth in the state of expansion or boom occurs high credit cycle without taking into account systemic risks and vice versa at the time of contraction or bust credit crunch occurs resulting in fluctuations in economic output.

Policy Implication

1. In general, maintaining financial system stability especially in response to the occurrence of external shocks is very important. Therefore, it is important to strengthen the policy mix comprehensively in monetary, macroprudential and fiscal policies in strengthening of macroeconomics stability.
2. The importance of policy coordination that harmonizes both monetary, macroprudential, microprudential and fiscal in determining the direction of macroeconomic policy.
3. The importance to further analyze the early warning system in anticipating or mitigating the risk of the financial crisis through a more comprehensive policy tool in accordance with the achievement of the objectives of each policy.

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