The Nexus Between Capital Flow, Welfare, And Financial Stability System: Evidence From Indonesia

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Abstract: This study aimed to analyze the function of the central bank's objectives (welfare loss) by using four simulation policies, namely the Plain Vanilla Taylor rule, Lean against the wind Taylor rule, Independent Macroprudential policy rule and Lean against the wind Taylor rule with Macroprudential policy in small open economy model by including capital flow variable in model. Observation data used is the output, inflation, interest rates, credit growth, exchange rate and capital flow with the observation range 2006.1 - 2016.12. The initial value of parameter was obtained from Ordinary Least Square (OLS) estimation and previous empirical study. The optimal coefficient of simple rule is calculated using Dynare Optimal Simple Rule routine with dynare 4.5.7 and Matlab software. The result of analysis show that Independent Macroprudential policy rule generating the most minimal value of loss function. More comprehensive modeling with the capital account in the model provides result of loss function is smaller. This suggests that macroprudential instruments as a buffer in monetary policy is optimal in minimizing the loss function of central bank. Central banks conduct monetary policy and macropudential policy in an integrated manner for two different purposes. Interest rate policy aimed at achieving stability in inflation and output, while macroprudential policies for credit growth. The simulation results show the achievement Tinbergen Principle.

Index Terms: Capital Flow, Loss Function, Monetary Policy, Macroprudential Policy.

1. INTRODUCTION

The experience of the global financial crisis that occurred in 2008 provided important lessons in managing macroeconomic policies, especially attention in maintaining financial system stability. The global financial crisis in 2008 became a phase of global economic conjuncture decline again after the monetary crisis that occurred in mid-1997. Towards the end of the third quarter of 2008, the world economy was faced with a phase of global economic stability that was marked by the widening financial crisis to various countries since last month August 2007, when one of the largest French banks, BNP Paribas, announced the freezing of several securities related to high-risk housing loans in the United States (subprime mortgages). The freezing has implications for the emergence of turmoil in the financial markets and ultimately has a domino effect throughout the world. At the end of the third quarter of 2008, the intensity of the crisis was sharper with the bankruptcy of the largest investment bank in the United States namely Lehman Brothers, and was followed by financial difficulties in a number of large-scale financial institutions in the United States, Europe and Japan. According to [1] there are some lessons from the global financial crisis. First, there is a decline in real Gross Domestic Product (GDP) and high unemployment rates of countries experiencing crisis due to the financial crisis. Second, the magnitude of the cost of economic recovery after the crisis is marked by the large bail-out of financial institutions, fiscal stimulus and economic contraction resulting in a decrease in tax revenue and increased government debt. Third, the increased liquidity balance and the purchase of long-term assets that are exposed to interest rate risk and price fluctuations.

Fourth, the achievement of price and output stability in fact does not guarantee financial system stability and there are broken lines in financial system regulation [2]. The phenomenon of the 2008 global financial crisis described as "once-in-a-hist-century credit tsunami" not only had an impact on the contraction of the world economy since the Great Depression, but also raised various questions about the effectiveness of policies, especially monetary policy, in achieving stabilization inflation and output. The global financial crisis shows that monetary policy is insufficient in maintaining overall financial stability. Low inflation and output volatility drives low economic players' expectations of risk, making the financial system more vulnerable to crisis. According to [3] that the crisis was caused by the policy of the central bank in maintaining interest rates that are too low due to low levels of inflation in a fairly 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 [4], [5], and [3] that the case of "leaning against the wind" through the use of interest rate instruments in achieving price and output stabilization has implications for the emergence of risks to credit growth and asset prices. [6] states that low interest rates will increase the incentives of business people to look for assets with excess income and high risk. While the [7] shows that when the economy is in good condition it makes the financial system more vulnerable due to excessive risk taking. Monetary stability encourages speculative actions of financial actors in seeking higher profits and increasing leverage when interest rates are low and creating moral hazard from market participants against macroeconomic risks [8]. This is due to expectations that are too high for the economy to come, thereby pushing the risk of excessive credit growth and creating asset price bubbles. Related to the asset price bubble, [1] stated that there is an important debate about lean versus clean monetary policy responses to the asset price bubble. Meanwhile according to [9] it is difficult to distinguish the types of asset price bubbles, because not all asset price bubbles are the same. There are two types of asset price bubbles, namely the credit-driven bubble as happened in the 2008 crisis which is considered
more dangerous and the type of irrational exuberance bubble with lower risk. [10] state that the main source of financial system procyclicality is asymmetric information between borrowers and savers. This is due to the financial markets not working perfectly, especially in their effects on the real sector because of asymmetric information [11]. The procyclicality of the financial sector is more influenced by the response of actors to changes in risk, when the economy expands, the response to risk is low resulting in excess credit, conversely during a recession the response to high risk causes credit to decline. Responding to the phenomenon of financial system vulnerability a prudential financial system policy is needed, especially to overcome the boom and bust cycles in credit and asset prices [12], [13]. Friction in the credit market creates a procyclicality pattern, namely when economic growth is in a state of expansion or boom, a high credit cycle takes place without taking into account systemic risk and vice versa when a credit crunch occurs when a credit crunch occurs, causing fluctuations in economic output. The results of studies with econometrics techniques also show credit growth to be a strong prediction of financial pressures in several countries [14]. Even the occurrence of a prolonged recession is closely related to the occurrence of a bust in credit and the housing market [15]. According to [16] that the supply of bank credit is influenced by the monetary policy stance that interacts with the pressure on the bank’s balance sheet which is transmitted through bank losses. [17]; [18] describe the workings of monetary policy through bank reserves which affect the supply of bank credit in the economy. While [19] mention the importance of risk taking channels in the transmission mechanism of monetary policy. The risk taking channel affects the supply of bank credit through changes in bank behavior in dealing with credit risk [20]. 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. Monetary tightening will increase the company's risk perception of deteriorating cash flow and balance sheet so that banks tend to be risk averse. Conversely, if there is monetary easing with low interest rates, it will encourage investors to look for assets with high yields. This condition causes banks to carry out more risky activities on asset prices, cash flow and income [21]. Characteristics of financial sector vulnerability in Indonesia occurred in 1997-1998 where economic sector instability was caused by external imbalances and led to an exchange rate crisis that impacted banking stability. As a result of the sharp depreciation of the Rupiah exchange rate, in 1998-1999 Indonesian banks suffered heavy losses due to the difference in credit interest rates and fund interest rates (negative spread) as well as the decline in the quality of bank assets due to deteriorating debtor performance. In addition, the impact of the imbalance in the balance sheet is difficult to overcome because banks have structural vulnerabilities stemming from weaknesses in the application of the precautionary principle and high moral hazard. Likewise, the granting of Bank Indonesia Liquidity Assistance (BLBI) in the context of functioning as a lender of last resort, in its development has led to monetary expansion that exceeds the real needs of the economy, causing an increase in inflation and exacerbated by the disruption of the monetary policy transmission process due to the slow process of adjusting the balance sheet of the banking sector. In contrast to the 1997/1998 crisis, the global financial crisis of 2008, the Indonesian financial system showed a strong resilience. This is due to learning from the experience of the 1997/1998 Asian financial crisis that encouraged authorities and actors in the financial sector to improve the principle of prudence. Bank Indonesia and the Government issued regulations and policies that prioritize the principle of prudence while still providing space for bank intermediation and financing through the capital market and other non-bank financial institutions. Apart from the resilience of the Indonesian financial sector, a challenge that needs attention is the potential for asset bubbles to be in line with market players' optimism about the prospects for the Indonesian economy. Given excessive optimism has the potential to put back pressure on financial markets. Another problem is that the shallowness of the financial markets causes limited market ability to absorb risk and has the potential to disrupt financial stability [22]. In many emerging countries such as Indonesia, the management of the procyclicality of the financial system is more on the management of the banking sector, which can be seen from the development of bank credit in a period of expansion and contraction. This is due to the asset component of the largest financial institution, which is the banking industry which reaches 75.8 percent compared to other financial institutions. Growth in property loans is believed to have contributed to an increase in the property price index. If the price increase is not controlled until it is a bubble, then this condition will increase credit risk for banks with large property credit exposure. Whereas the vulnerability to motor vehicle loans is the ease of credit requirements and the large number of motorized vehicle withdrawals from consumers who are unable to meet their obligations. Vulnerability that occurs in the property and motor vehicle sector credit requires a counter cyclical policy so that the growth rate of the property and motor vehicle sector in the long run can minimize unexpected surprises. High credit growth can be controlled by setting interest rates, but the use of these instruments can also create a dilemma for other sectors. Loan to Value (LTV) and Down Payment (DP) policies are alternative policies to manage the desired credit segment. This policy is intended to strengthen financial sector resilience in minimizing sources of vulnerability due to excessive credit growth. LTV and DP provisions in Indonesia come into force on June 15, 2012. The maximum LTV is 70 percent for the consumption of residential ownership, including flats and apartments, with building types greater than 70 m2 and given to individual debtors except KPR for the Indonesian government program. As for the regulation of Down Payment (DP) Motorized Vehicle Loans (KKB), which is at least 25% for two-wheeled vehicles, at least 30% for the purchase of four-wheeled vehicles for non-productive purposes while less than 20% for productive purposes (Summary of Regulations invitation from Bank Indonesia). Procyclicality also occurs in the flow of foreign capital. When a country's economy improves, it will affect investors' perceptions through the financial sector and create credit expansion [23]. When capital inflows are sufficiently massive and cannot be absorbed by the economy as a whole, this will have implications for weakening export competitiveness due to the tendency for exchange rate appreciation to exceed fundamental conditions and also supported by positive interest differentials [24]. This condition also caused the 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 sentiment that triggers large and sudden reversal of capital and has the potential to create pressure on macro stability and create complexity in monetary policy. Procyclicality patterns also occur in the flow of foreign capital. In Indonesia, the development of Foreign Direct Investment (FDI) in the aftermath of the global financial crisis in 2009 decreased from 9,318 million US dollars to 4,877 million US dollars, and in 2010 significantly increased to 13,771 million US dollars. Meanwhile portfolio investment positions experienced an upward trend from 1,764 million US dollars to 10,336 million US dollars in 2009 and 13,202 million US dollars in 2010 (http://bi.go.id). Procyclicality pattern is more dominant, indicated by foreign direct investment which has increased following the strengthening economic trends. While portfolio investment experienced a downward trend in 2011. This was due to uncertainty over the resolution of the European debt crisis and the slowing down of the United States economy, which put pressure on capital outflows. The implications of implementing monetary policy oriented to low inflation, such as the Inflation Targeting Framework are not enough. This needs to be supported by the existence of a regulatory instrument in the banking sector that is designed to maintain overall financial stability which is often referred to as macroprudential policy. In this context, the central bank must always pay attention to interactions between the financial sector and the real sector. That is, it needs a synergy between monetary policy and macroprudential policy. Macroprudential policy which has the role of suppressing procyclicality supports monetary policy to reduce output fluctuations. Macroprudential policy in this context functions mutually reinforcing with the monetary policy adopted. This is because there are differences in the objectives of monetary policy and the financial system allowing to separate governance between monetary policy and financial system through macroprudential policies. By considering situations where the central bank minimizes losses in the interaction of monetary policy and the financial system, the central bank usually has an objective function. The commitment and credibility of the central bank is very important in setting inflation targets and directing inflation expectations of market participants in accordance with the target so that it does not cause inflation bias. Therefore, the central bank has a loss function as an optimal policy. Until now, what is widely implemented by central banks in the world is the loss function of monetary policy and there is no consensus on the loss function in macroprudential policy. But given the importance of financial system stability, macroprudential policy is very important in a loss function. The purpose of this study was to calculate welfare loss function from the central bank’s objective function through policy simulation using policy instruments namely Plain Vanilla Taylor Rule, Lean against the wind Taylor rule, Independent Macropudential policy rule and Lean against the wind with Macroprudential policy rule in small open economy.

2 LITERATURE REVIEW

2.1 Macroprudential Policy

Procyclicality of the financial system and capital inflows into the economy will have an impact on the effectiveness of monetary policy implementation. The experience of the financial crisis illustrates the importance of the financial system in monetary policy. So in this case, macroprudential policy is a complement or buffer to the effectiveness of the implementation of monetary policy. Tinbergen (1952) in [25] mentions that there is at least one independent instrument for each policy objective. While Duisenberg (2003) in [25] states that monetary policy cannot compensate for structural rigidity, so macroprudential policy is needed. The use of the term macroprudential has increased since the 2008 global financial crisis. According to [26], macroprudential is used to mitigate risks in the financial system so that it influences output fluctuations. While the [27] states that macroprudential policy is intended to maintain the stability of banking intermediation on the economy. Meanwhile, according to [28] that macroprudential policy is used to mitigate systemic risk due to linkages between financial institutions that follow the economic cycle (procyclical). [29] states that macroprudential policy is intended to limit the risks and costs of systemic crises stemming from domestic and external shocks. While [30] mentions macroprudential policy as an instrument of prudence with the aim of overall financial stability. Because the financial market is forward looking, then the same as monetary policy requires credibility and expectations of economic actors [25]. Macroprudential policy aims to look at systemic risks that occur in the financial system as a whole. Related to these risk factors, top-down systemic risk monitoring is needed which consists of time varying risk and cross section risk. Time varying risk is the risk associated with the evolution of aggregate risk in the financial system over time. Risk in the financial sector and the economy raises the procyclicality of the financial cycle and business fluctuations that can lead to boom and bust conditions. Whereas cross section risk is related to the distribution of credit and liquidity risk among financial institutions at one time and is more related to the resilience of market structures. This is due to portfolio similarities between institutions in the system such as interbank loans. Macroprudential policy instruments are used to prevent systemic risk from financial system instability both from time varying risk or cross section risk. In practice, the use of micro, macro or crisis management instruments is quite difficult with the same instruments to achieve more than one goal. For example, the use of contingent capital, if applied to all banks before the occurrence of systemic events, microprudential is used, if applied systemically in financial institutions, macroprudential is used and if to respond to systemic events a crisis management instrument is used. Macroprudential instruments related to time dimension aim to reduce the accumulation of systemic risk. Three instruments to mitigate procyclical are countercyclical capital buffers like Basel III, levy on non-core short term liabilities and countercyclical variations on margins or haircut on collateral. Whereas the recalibration category used to overcome procyclicality uses loan to value, loan to income and haircut on collateral. Whereas the recalibration category used to overcome procyclicality uses loan to value, loan to income and haircut on collateral. Whereas the recalibration category used to overcome procyclicality uses loan to value, loan to income and haircut on collateral.

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instrument, risks due to leverage or a number of debts to add excessive assets with restriction instruments to profit distribution, systemic liquidity risk by limiting the maturity mismatch and risk originating from capital flows or exchange rate fluctuations using the currency mismatch instrument.

2.2 Macroprudential Policy of Foreign Capital Flow

Unlimited inter-country integration provides space for each country in the mobility of capital flows in the form of capital inflows and outflows and follows the boom and bust of the economy. When the economy is in good condition, capital inflows occur quite massively and vice versa when the economy is in bad condition reverses capital outflows and often triggers a financial crisis. Vulnerability of foreign capital flows to macroeconomic stability because they relate to the procyclicality pattern of capital flows in accordance with the economic conjuncture. The flow of foreign capital into a country including emerging countries has implications for the increase in aggregate demand, which is also accompanied by inflation risks and high credit growth and followed by rising asset prices, creating vulnerability in the financial sector. On the one hand, the inflow of foreign capital indicates market confidence in a country’s economic fundamentals and is a source of investment financing, increasing the intensity of trade activities and accelerating the development of financial markets. However, on the other hand, capital inflows create vulnerability due to risk diversification and if they occur in large quantities, it can cause exchange rate appreciation that harms export competitiveness as well as the emergence of asset price bubbles that pose systemic risks, especially to the financial sector. Managing capital inflows against systemic risk is not enough just by policy instruments through an increase in interest rates because the policy actually creates a dilemma in the high aggregate demand and encourages more massive capital inflows so that the value of the currency will be appreciated. Then a prudential management policy is needed on capital inflows, so that the management of capital inflows can be categorized as part of macroprudential policy. Some macroprudential policy instruments that can be used related to capital inflows include restrictions on open foreign exchange positions and restrictions on foreign currency assets. According to [32], to mitigate the risk of financial stability related to capital inflows can be classified in three ways, namely capital transactions, exchange rate denominations and other prudential rules. Capital controls to limit capital transactions that are enforced in the economy in the aggregate, financial or industrial sector for the entire capital flow or based on time periods such as debt, capital and direct investment in the short or medium to long term. Foreign exchange (FX) for exchange rate denominations is applied to financial institutions, especially banks related to investment in foreign exchange assets. Meanwhile, other prudential instruments include maximum loan-to-value (LTV) ratios, restrictions on domestic credit growth, asset classifications, dynamic loan-loss provisions and counter-cyclical capital requirements. Macroprudential policy responses related to capital inflows are multifaceted, varying by country. According to [33], some policy responses to capital inflows are first, if the exchange rate is appreciated, that although appreciation can reduce export competitiveness, if the exchange rate is undervalued, the nominal exchange rate is passively appreciated in response to capital inflows while if overvalued then the impact of appreciation on competitiveness. Second, the accumulation of foreign exchange reserves, if a country has a small foreign exchange reserves, capital inflows are very important to increase reserves owned by the central bank. Third is sterilization. If price stability becomes a focus, then the increase in money supply can be sterilized through open market operations and lowering domestic credit. The inflow of foreign capital can create vulnerabilities in the financial system, especially related to various types of loans that are prone to risk between debtors and creditors. The presence of capital inflows encourages credit growth, including loans in foreign currencies, accompanied by excessive behavior from creditors and debtors’ behavior that is myopic towards risk, causing financial stability. So the policy instruments used when in normal times can be with capital requirements, but if there is a high credit growth can use direct methods such as taxes on financial transactions and a minimum period of capital flow.

3 METHODOLOGY

The data used in this study are secondary time series monthly data with a range of observations for the period 2006.1 to 2017.12. The indicators used are the Gross Domestic Product (GDP) of the base year 2010 ($\gamma_i$), the inflation rate in units of percent ($\pi_i$), the BI rate and 7-day repo rate ($r_{p}$), the Rupiah exchange rate against the US Dollar ($s_i$), bank credit in Rupiah and foreign currencies ($c_i$), current account ($ca_i$), capital flow ($cf_i$), spread in lending rates and deposit rates ($spread_i$), property loans in Rupiah and foreign currencies ($l_{tv_i}$), reserve requirement ($gwm_i$), Non-Performing Loans ($NPL_i$) to measure financial risk ($risk_i$), tax ($tax_i$), and foreign debt ($debt_i$). Data sources were obtained from the Indonesian Economic and Financial Statistics from Bank Indonesia. The choice of policy instrument, namely the interest rate ($i_t$), is used to minimize the loss function in the equation. The choice of movement of this policy instrument is stated in the same policy rules. While the parameter selection in the loss function is a measure of how flexible the application of inflation targeting is. If the parameter $\lambda$ is set to zero, that is, ignoring the impact of output shocks that will be caused by policy, in the sense that the stability of inflation is preferred. The application of inflation targeting is called strict inflation targeting. While the alternative is flexible inflation targeting, where the monetary authority gives a positive weight to the parameter $\lambda$, which means that output shocks are also considered in the loss function. The study of [35] builds a loss function by including variants of the loan to output ratio and the variability of macroprudential policies. [35]Angelini et al (2010) sum the loss function of monetary and macroprudential policies as follows.

$$L = \gamma'(\pi - \pi_\lambda)^2 + \lambda(y - \gamma^*)^2 + v(i - i_{\lambda})^2$$

Where, is the loan to output variant, the output variant, is the inflation variant, and the variability of macroprudential instruments.

The basic model is as follows:
The subject of this analysis is to calculate the optimal simple rule in responding to variable shocks in the financial sector through several policy scenarios. The optimal simple rule is intended to provide maximum benefit to the economy (social welfare). Optimal monetary policy by minimizing the loss function in this study uses a welfare-based comparison through four policy regimes, namely the Plain Vanilla Taylor rule, lean against the wind Taylor rule, independent macroprudential policy, and lean against the wind Taylor rule with macroprudential policy rule. Policy simulation through four policy rules aims to identify whether the existence of macroprudential policy as a buffer or additional tool in monetary policy can improve welfare. The results of the calculation of conditional welfare by using the second-order approximate solution and rule are as in table 1 below.

### Table 1: Optimal Simple Rule

<table>
<thead>
<tr>
<th>Skenario</th>
<th>( \sigma_{rp} )</th>
<th>( \sigma_\gamma )</th>
<th>( \sigma_s )</th>
<th>( \sigma_c )</th>
<th>Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plain Vanilla Taylor Rule</td>
<td>0.289</td>
<td>0.011</td>
<td>-0.099</td>
<td>0.071</td>
<td>-1.070</td>
</tr>
<tr>
<td>Lean Against the Wind Taylor Rule</td>
<td>-0.837</td>
<td>0.425</td>
<td>0.074</td>
<td>0.188</td>
<td>0.396</td>
</tr>
<tr>
<td>Independent 1 Macroprudential</td>
<td>0.004</td>
<td>0.012</td>
<td>-0.000</td>
<td>0.071</td>
<td>-0.304</td>
</tr>
<tr>
<td>Lean Against the Wind Taylor Rule with Macroprudential</td>
<td>0.452</td>
<td>0.056</td>
<td>-0.047</td>
<td>0.071</td>
<td>0.005</td>
</tr>
</tbody>
</table>

Source: secondary data processed, 2019

Table 1 shows that the scenario is independent macroprudential policy and the smallest compared to the Taylor rule standard model, lean against the wind taylor rule and lean against the wind taylor rule with Macroprudential. This shows that the modification of the macroprudential policy model is quite effective in minimizing the loss function of the central bank. The use of macroprudential policy instruments provides greater benefits in achieving optimal monetary policy. This shows that monetary policy as a complement or buffer to monetary policy is quite effective in achieving macroeconomic stability. The smallest loss function value is obtained when the central bank runs monetary policy and macroprudential policy in an integrated manner where the two policy instruments are used for two different purposes. In this case interest rate policy is aimed at achieving inflation and output stability, while macroprudential policy in this case loan to value ratio is used to achieve stabilization of credit growth. This means, the results of the analysis support the argument of the Tinbergen Principle (1952), the first winner of the Nobel prize for economics, which states that at least one independent policy instrument is needed for each objective function. The simulation of the policy rule shows that the interest rate responds to the smaller inflation variance compared to output as well as the exchange rate which has the smallest coefficient. The lean against the wind taylor rule scenario that includes the effect of credit directly on interest rates with a coefficient of -0.396, which means that when credit growth is high it will be responded to with a low interest rate, vice versa. Low interest rates encourage excessive expectations of market participants, causing risk in the financial markets. Monetary stability encourages speculative actions of financial actors in seeking higher profits and increasing leverage when interest rates are low and creating moral hazard from market participants against macroeconomic risks [8]. This is due to expectations that are too high for the economy to come, thereby pushing the risk of excessive credit growth and creating asset price bubbles. Compared with the results of the previous study of [34] with no capital account variables included, the value of the loss function model shows a greater value. This shows that the influence of capital accounts is very large in influencing the effectiveness of monetary and macroprudential policy interaction. The difference in value in the plain vanilla taylor rule, inflation deviation shows a smaller value compared to the independent macroprudential policy rule. While the exchange rate deviation is smaller for independent macroprudential compared to the plain vanilla taylor rule. Unlimited inter-country integration provides space...
for each country in the mobility of capital flows in the form of capital inflows and outflows and follows the boom and bust of the economy. When the economy is in good condition, capital inflows occur quite massively and vice versa when the economy is in bad condition reverses capital outflows and often triggers a financial crisis. Vulnerability of foreign capital flows to macroeconomic stability because they relate to the procyclicality pattern of capital flows in accordance with the economic conjuncture. The flow of foreign capital into a country including emerging countries has implications for the increase in aggregate demand, which is also accompanied by inflation risks and high credit growth and followed by rising asset prices, creating vulnerability in the financial sector. On the one hand, the inflow of foreign capital indicates market confidence in a country’s economic fundamentals and is a source of investment financing, increasing the intensity of trade activities and accelerating the development of financial markets. However, on the other hand, capital inflows create vulnerability due to risk diversification and if they occur in large quantities, it can cause exchange rate appreciation that harms export competitiveness as well as the emergence of asset price bubbles that pose systemic risks, especially to the financial sector. Managing capital inflows against systemic risk is not enough just by policy instruments through an increase in interest rates because the policy actually creates a dilemma in the high aggregate demand and encourages more massive capital inflows so that the value of the currency will be appreciated. Then a prudential management policy is needed on capital inflows, so that the management of capital inflows can be categorized as part of macroprudential policy. Some macroprudential policy instruments that can be used related to capital inflows include restrictions on open foreign exchange positions and restrictions on foreign currency assets. According to [32], to mitigate the risk of financial stability related to capital inflows can be classified in three ways, namely capital transactions, exchange rate denominations and other prudential rules. Capital controls to limit capital transactions that are enforced in the economy in the aggregate, financial or industrial sector for the entire capital flow or based on time periods such as debt, capital and direct investment in the short or medium to long term. Foreign exchange (FX) for exchange rate denominations is applied to financial institutions, especially banks related to investment in foreign exchange assets. Meanwhile, other prudential instruments include maximum loan-to-value (LTV) ratios, restrictions on domestic credit growth, asset classifications, dynamic loan-loss provisions and counter-cyclical capital requirements.

5 CONCLUSION
Based on the analysis of the monetary policy reaction function in Indonesia, it shows:
1. Policy scenarios using independent macroprudential show the smallest loss function. This shows that macroprudential instruments as a buffer in monetary policy are very optimal in minimizing the loss function of the central bank. The central bank carries out monetary policy and macroprudential policy in an integrated manner for two different purposes. The interest rate policy aims to achieve inflation and output stability, while the macroprudential policy is in response to credit growth as per the Tinbergen principle. While the policy rule that includes credit growth directly with the policy interest rate produces the largest or less effective loss function value.

The influence of capital accounts is very large in the interaction of monetary policy and macroprudencial in Indonesia. Deviation of inflation in the plain vanilla taylor rule shows a smaller value compared to the independent macroprudential policy rule. While the exchange rate deviation for independent macroprudential is smaller than the plain vanilla rule. The flow of foreign capital into a country including emerging countries has implications for the increase in aggregate demand, which is also accompanied by inflation risks and high credit growth and followed by rising asset prices, creating vulnerability in the financial sector.

Policy Recommendations
1. In general, Indonesia's macroeconomic fundamentals are quite good in maintaining financial system stability, especially in responding to external shocks. Therefore, it is very important to strengthen the policy mix comprehensively in monetary, macroprudential and fiscal policies in strengthening Indonesia's macroeconomics.
2. The importance of coordinating policies that are aligned both monetary, macroprudential, microprudential and fiscal in determining the direction of macroeconomic policy.
3. It is important to further analyze the early warning system indicator in anticipating or mitigating the risk of financial crisis through more comprehensive policy instruments in accordance with the achievement of the objectives of each policy.

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