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Perry Warjiyo

Bank Indonesia, Indonesia, perry_w@bi.go.id

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CENTRAL BANK POLICY MIX: KEY CONCEPTS AND INDONESIA'S EXPERIENCE

Perry Warjiyo

Abstract

The global crisis brings about renewed reforms on central bank policy. First, in addition to the traditional mandate of price stability, there are strong supports for additional mandate of the central bank to promote financial system stability. Second, macroprudential policy is needed to address procyclicality and build-up systemic risks in the macro-financial linkages of financial system that in most cases precede and deepen financial crisis. Third, monetary and financial stability are also prone to volatility of capital flows, especially for the emerging countries, and thus there is a need to manage them. The challenge is how to mix the policies of monetary, macroprudential, and capital flows management to meet the renewed mandate of central bank on monetary and financial stability. This paper reviews theoretical underpinnings and provides key concepts to address the issues. We show that central bank policy mix is both conceptually coherent and practically implementable. We provide a concrete recommendation with a reference from Indonesia's experience since 2010. We also raise a number of challenges from practical point of views, especially relating to decision making process, forecasting model, and communication, for the success of the policy mix.

Keywords: Central bank, monetary, macroprudential, capital flows management.

JEL classification: E58, E52, G28, F38.

¹ Deputy Governor, Bank Indonesia. Address: Jl. MH. Thamrin No. 2, Jakarta, Indonesia. E-mail: perry_w@bi.go.id; perry_warjiyo@yahoo.com. The views in this paper are of the author's own personal and do not necessarily represent the official views of Bank Indonesia.

I. INTRODUCTION

The global crisis unveils a number of flaws in the economy that is based on capital financing intermediated through financial system. In the words of Minsky (1982), financial instability is inherent within capitalist economy whereby inflation and debt accumulation have the potential to spin out of control in the period of economic upswing. Stability is destabilizing, and thus leads to 'boom' and 'bust' in the financial cycles, causing the economy falls into crisis. That procyclicality of asset price bubbles and credit booms precedes and causes crises in many countries was not new (Claessens and Kose, 2013). Equally, that crisis is fundamentally a problem of excessive accumulation of debt, be it by public or private, has been found in long history of crises (Reinhart and Rogoff, 2009; Kindleberger, 1978). And that the crises are more frequent and metaphors into multifaceted financial crises of currency, debt, and banking in many countries are widely evidenced (Bordo, et.al, 2001).

What the global crisis have the implications on the central bank mandate and policy? First, beyond the primacy of price stability, central bank needs to have a key role in financial system stability. For one thing, monetary policy impacts stability of financial system through interest rate, exchange rate, firm's decision on investment, bank lending, and investor portfolio decisions. Prolonged low interest rate under low inflation environment could elevate financial cycles and build-up systemic risks, and thus cause instability in the financial system and economy. The US experience clearly show this, whereby Great Moderation leads to housing bubbles, credit booms, excessive risk taking, and leverages. The Asian crisis of 1997-1998 shows similar case, whereby more than a decade of East Asian Miracle induced macro-financial imbalances that were then unveiled from the crisis: credit booms, property bubbles, and excessive private external borrowing. For the other thing, the stability of financial system is a key for effective monetary policy transmission. The recent experiences of advanced countries since the global crisis, notably in the US, Euro area, and Japan, show that the effectiveness of their ultra-quantitative easing and near zero interest rates has been constrained by deleveraging and restructuring process of their financial systems. The relation between monetary stability and financial stability is thus mutual, complimentary, and reinforcing.

Second, procyclicality and systemic risks in macro-financial linkages of the financial system could not be addressed by interest rate policy or microprudential measures. Monetary policy generally do not take sufficient account of build-up systemic risks from asset price bubbles or leverages, and assume that microprudential regulation could control such build up risks, of which is not the case (IMF, 2010). Monetary policy could "lean against the wind" to mitigate the asset price bubbles, e.g. by increasing interest when there is evidence of accelerated housing prices. But housing markets are driven mostly by factors beyond interest rates, particularly by buoyant expectation on further price increases and lackluster financing from banks, developers, or foreign borrowings. Interest rate increases also impact across the board to all sectors, not only to the housing market. Likewise, microprudential may be used to address the housing bubbles,

e.g. by increasing its risk weighted measures on capital requirement. But this is where another problem lies: risk valuation of capital requirement is by in itself procyclical. Risk valuation tends to underestimate the true risks during economic boom and overestimate during recession. For these conceptual and fundamental reasons, macroprudential policy gains wide supports as instrument to address procyclicality and systemic risks in the financial system, and that the central bank is the most appropriate institution to assume this function.

Third, volatility of capital flows to emerging countries has been excessively high since the global crisis. During the period from 2009 to mid-2013, large capital inflows to emerging market economies (EMEs) have been unprecedented, driven by huge global excess liquidity from ultra-quantitative monetary easing and near zero interest rates in the advanced countries searching for high returns. But the Fed taper tantrum in May 2013 has changed their behaviors: excessively volatile and prone to risk-on and risk-off investors' perception responding to short-term news. While their invaluable benefits for the economy are widely acknowledged, large capital flows, if not managed properly, can expose the EMEs to serious macro-financial imbalances and risks. Kawai and Takagi (2008) cited three types of risks emanated from volatile capital flows, i.e.: (i) macroeconomic risks of rapid credit growth, current account imbalances, and real exchange appreciation, (ii) financial instability risks of maturity and currency mismatches, asset prices increases, and decelerating quality of assets, and (iii) sudden stops risks and/or capital reversals of capital flows. Again, interest rate response alone would not be effective. While exchange rate flexibility is generally accepted response as shock absorber to external shocks, its excessive short-term volatility may pose serious risks to both monetary and financial stability. For these reasons, central banks in the EMEs adopts various measures of capital flows management to support their interest rate and exchange rate policies in achieving price stability and promoting financial stability.

The two main purposes of this paper are modest. First, we review growing thinking from the policy makers and academicians with a view to draw some common ground on the possibility of a policy mix on how central bank respond to these three challenges. Our focus is from the perspective of the EMEs. Key concepts will be discussed and outlined, including the mandate of central bank in financial stability, role and instruments of macroprudential policy, as well as capital flows management. Second, we present Bank Indonesia experience in formulating conceptual framework and implementing the policy mix since 2010. The policy framework is based on the inflation targeting using interest rate as the main instrument, complemented by exchange rate policy, capital flows management, and macroprudential measures. We find the policy mix plays an important role for Indonesia resilience in withstanding the bouts of uncertainty and volatility from the global economy and financial markets since the global crisis.

Next section of this paper outline the theory and concept of policy mix, the interest rate and exchange rate, financial stability, macroprudential policy, and the management of capital flow. Section three outline the method, while section four provide the result and analysis. Conclusion is presented section five and will close the presentation of this paper.

II. THEORY

Towards Central Bank Policy Mix

How central bank integrates monetary policy, macroprudential policy, and capital flows management in its policy mix to carry the dual mandates of achieving price stability and promoting financial stability? The already established monetary policy framework in the central banks provides strong basis for this. More than last two decades, the central banks have been successful in delivering price stability in many countries, both advanced and the EMEs. In part this reflects the intense sharing experiences around the close central bank community, and in other part it is supported by the credible adoption of inflation targeting framework. This framework has been successful in bringing down long-term trend of inflation, higher output, and declining interest rates in many countries (Berg, et. al., 2013). A number of key features of the framework that support the monetary policy credibility includes: clarity of inflation target to be achieved, rigorous macroeconomic forecasting and policy analysis models, consistency of the interest rate to achieve the target, independency of the central bank, formal and regular decision making process, publication of inflation forecast and other modes of communication to anchor inflation expectation. To carry the additional mandate of promoting financial stability, what needs to be done is to enlarge the framework by incorporating macro-financial linkages, particularly through the financial system and capital flows, into the macroeconomic forecasting and policy analysis. This will provides the basis for formulating the monetary response, as well as macroprudential policy and capital flows management that are needed to achieve price stability and promote financial stability.

Central Bank's Mandate of Financial Stability

There has been now strong supports for the central banks to assume a role in promoting financial system stability (BIS, 2011). But what is financial stability? Even though academic literature already brought the issue of 'financial instability' dated back to the writing of Minsky (1982), the global crisis of 2007-2008 make it becomes increasingly serious concerns for policy makers around the globe. The precise definition of 'financial stability' differs among academicians and policy makers, but it generally refers to condition in which the financial system functions effectively and efficiently in the economy and resilience in withstanding shocks from both domestic and overseas. Some literature define it in contrast to the conditions that could lead to a financial crisis. Allen and Wood (2006), for instance, referred to 'financial instability' as *"episodes in which a large number of parties, whether they are households, companies or governments, experience financial crises which are not warranted by their previous behavior and where these crises collectively have seriously adverse macroeconomic effects"*. 'Financial stability' is then described as *"a state of affairs in which an episode of financial instability is unlikely to occur."* More practical definitions can be found in many central banks. For instance, the European Central Bank (ECB) defines 'financial stability' as a condition in which the financial

system – intermediaries, markets and market infrastructures – can withstand shocks without major disruption in financial intermediation and in the general supply of financial services.

From the definitions, there are four key aspects that need to be stressed. First, soundness of individual financial institutions is necessary but not sufficient. Financial stability relates to how the system functions for and able to withstand the shocks from macroeconomy. It is more about macro-financial linkages of the financial system than the soundness of individual financial institutions. Second, history tells us that causes of financial crisis are many, but four are the most common: asset (financial and housing) bubbles, credit booms, excessive debt accumulation, and sudden stop of capital flows (Reinhart and Rogoff, 2009; Claessens and Kose, 2013). These macro-financial imbalances tend to be procyclical and propagate the boom-bust of financial cycles in relation to economic cycles, and in most cases precede the financial crises (Claessens, et. al., 2011; Jorda, et. al., 2011). We witness these in Latin America crisis, Asia crisis, US crisis, Europe crisis, and the recent global crisis.

Third, while a financial crisis could emanated from macroeconomy shocks or individual failure of financial institution, its contagion to a systemic crisis evolves through interconnection and networks in the financial markets and infrastructures (Allen, et. al., 2010; Acemoglu, et.al., 2015). Currency crises, for instance, can be caused by sudden stop of capital flows and then spread out to financial system failures because of foreign exchange market freeze (Calvo and Reinhart, 2000). Similarly, bank runs could lead to bank contagion because of liquidity squeeze in the inter-bank money market (Freixas, et. al., 2000; Morris and Shin, 2004). Fourth, propagation that follows and leads to full-blown and wide-spread financial crisis commonly accelerates through information contagion and herding behavior (Acharya and Yorulmazer, 2003; Bikhchandani and Sharma, 2001). The crisis in the US sub-prime mortgage show how its contagion escalates through fire sales in the financial market and credit squeeze in the banking system (Diamond and Rajan, 2010). Information contagion and herding behavior then lead to wide-spread and multifaceted financial crises, not only in the US, but also in Europe and around the globe.

Considering the wide range and large negative impacts of a crisis, financial system stability is clearly a shared responsibility. There is no single institution could and should be left alone for assuming this function. There is a need, and now it becomes common practices in many countries, to have a coordination institution or mechanism for overseeing overall financial stability at the national level. Financial supervisory authority, be it in the central bank or a specialized institution, assumes a responsibility for the soundness of individual financial institutions through its microprudential regulation and supervision. The central bank assumes responsibility of the macroprudential regulation and supervision for mitigating macro-financial imbalances and systemic risks of the financial system, in addition to its functions of monetary policy, payments system, and as lender of the last resort. Deposit insurance institution has the role for mitigating the impact of information contagion of bank runs and participate in the

early intervention and resolution of problem banks. And the government, through the ministry of finance, needs to lead the national financial system stability as to prevent the crisis to pose severe detrimental effects to the economy and heavy fiscal burdens.

A country's central bank is well qualified to assume macroprudential function for regulating and supervising financial stability from the point of view of its surveillance capacity and the policy tools at its disposal (Kawai and Morgan, 2012). Furthermore, the study from 13 developed and emerging countries by Bank for International Settlements, BIS (2011) concluded that the central banks must be involved in the formulation and execution of financial stability policy if such policy to be effective. There are three key reasons why central banks should assume macroprudential policy. First, the performance of their monetary policy functions provides central banks with macroeconomic focus and an understanding of financial markets, institutions and infrastructures needed for the exercise of macroprudential policy. Second, financial instability can be caused by and affect macroeconomic performances, with substantial consequences for economic activity, price stability and monetary policy transmission. And third, central banks are the ultimate source of liquidity for the economy, through its monetary policy and lender of the last resort functions, and appropriate liquidity provision is crucial for financial system stability.

How the central bank incorporates its macroprudential policy for financial stability in its policy making together with its monetary policy and payment systems? This is where central bank policy mix becomes important. For achieving price stability and supporting financial stability, the central banks should not only assess macroeconomic outlooks but also address macro-financial imbalances in the financial system. They are commonly emerge in the procyclicality and build-up systemic risks of asset (financial and housing) bubbles, credit booms, accumulation of external debts, and volatility of capital flows. That said, the following three key concepts constitute the building block of the central bank's policy mix.

- First, monetary policy needs to be directed for achieving price stability, with pay due regard to asset (financial and housing) prices, be it directly or indirectly. As we know, asset prices bubbles commonly build-up during economic upswing and then bursts that lead to financial crisis and economic recession.
- Second, macroprudential policy constitutes regulation and supervision to financial services institution from macro perspectives and focuses on systemic risks required for promoting financial system stability. It is geared toward mitigating procyclicality of the financial system (time-dimension), as well as build-up systemic risks that emanate from the interconnectedness and networks of financial institutions, markets and infrastructures, including payment systems (cross-section dimension).
- Third, capital flows management is directed to mitigate procyclicality and build-up systemic risks from accumulation of external debt and volatility of capital flows. It supports the stability of exchange rate and helps in preventing balance of payments crisis and sudden-stop capital flows that constitute key parts of maintaining financial stability.

Financial market deepening is very important to support the policy mix. As we know, more developed financial market will strengthen the effectiveness of monetary policy transmissions. It also facilitates product innovation and risk diversification in the financial system to support economic financing and financial stability, as well as better absorbs the benefits and reduce the risks of volatile capital flows. Sound prudential measures and appropriate market conducts, nonetheless, need also be strengthened to ensure deepened financial markets would not pose greater risks to monetary and financial stability. As will be discussed in the next sections, greater diversification and product innovation could induce higher systemic risks to financial stability as networks of financial institutions, markets, and infrastructure becomes closer interconnected.

The central bank policy mix is conceptually coherent and practically implementable. The challenge is how to internalize it into integrated policy formulation process in the central bank, supported by, among others, enhanced forecasting model and decision making process. It should be noted that for financial stability, as alluded to above, the central bank's role and function in macroprudential policy needs to be put as an integral part of overall financial stability policy coordination at the national level. Equally important, the central bank needs to be clear in its communication about to which policy addresses to what objective, based on the policy assignment and exercises in the policy mix.

Monetary Policy And Financial Stability

How financial stability can be incorporated into the monetary policy framework? There are at least two issues to be addressed, i.e.: (i) incorporation of asset (financial and housing) prices into new dimension of price stability, and (ii) how monetary response to emerging macro-financial imbalances and systemic risks of financial stability. On the first issue, there was debate about whether the Fed long-standing success of low inflation and interest rate was one of the causes of the recent crisis in the US. Taylor (2010), for example, argued that the Fed's monetary policy stance was too easy, in that it kept the federal funds rate too low for too long, fueling the housing boom and other economic imbalances. Bernanke (2010), on the other hand, disputed this view. The primary cause of housing bubbles was because of exotic types of mortgages and the associated decline of underwriting standards, so that the best response to the housing bubble would have been regulatory, not monetary. Filardo (2001), in other side, found that monetary authority should respond to asset prices as long as asset prices contain reliable information about inflation and output, even if a monetary authority cannot distinguish between fundamental and bubble asset price behavior.

Subsequent empirical findings, however, have fundamentally changed for the supports of central bank policy to response to housing prices in the post-global crisis. Jorda, et. al. (2014), for instance, provide an important evidence on the link between monetary conditions, credit growth, and house prices using data spanning 140 years of economic history across 14

advanced economies. In particular, an exogenous 1 percentage decrease in the short-term interest rate elevates the ratios of housing price to income and mortgage loans to GDP by about 4% and 3%, respectively, within four years. These historical insights suggest that the potentially destabilizing by-products of easy money must be taken seriously against the benefits of stimulating unsustainable economic activity. Williams (2015), however, warns that there is a very costly tradeoff of using monetary policy to affect housing prices when macroeconomic and financial stability goals are in conflict. Using the same data, he shows that 1 percentage increase in interest rates tends to lower real (inflation-adjusted) housing prices by over 6% within two years, while real GDP per capita declines by nearly 2%. These empirical findings show that central banks need to strike a right balance between price stability and financial stability when formulating its monetary policy

The preceding findings lead to the second issue on how monetary policy respond to macro-financial imbalances and build-up systemic risks reflected in the procyclicality of housing bubbles, credit booms, accumulation of external debts, and capital flows volatility. This issue is closely related to the “lean versus clean” debate: whether it is preferable for the central banks to “leaning against the wind” to manage the bubbles from bursting, or they are better to wait until the bubble bursts and then “clean” up the mess afterward via aggressive monetary policy easing. The “clean” school was adopted by the US Fed under Chairman Greenspan. There are a number of reasons for this view: investment booms were generating by productivity, bubbles may be resulted from declining risk premium and irrational exuberance, and raising interest rate may be ineffective in restraining the bubbles but could cause a bubble to burst severely, thus damaging the economy (Greenspan, 2002).

However, global financial crisis have undermined these arguments. The crisis clearly unveils the potential risks of excessive credit and leverage driven bubbles, and thus provides supports for the “leaning”, rather than cleaning, to prevent such bubbles. The experience in Australia, for instance, shows the leaning could be done and successful. Increasingly concerned about excessive lending in the housing sector in 2002 and 2003, the central bank gradually raised interest rates, even though the outlook for inflation was benign (Bloxham, et. al., 2011). While justify its tightening decision within the framework of inflation targeting, the central bank repeatedly expressed concerns about high credit growth. The consensus has now swung strongly for the central banks in many countries to paying close attention to financial stability and leaning against the wind, even if it is not an official part of their mandate. Bernanke (2009), for instance, stated that the Fed played a major part in arresting the crisis, and it should preserve the institution’s ability to foster financial stability and to promote economic recovery without inflation.

Growing literatures have been devoted to incorporate financial stability into inflation targeting framework of monetary policy. Agenor and da Silva (2013) discuss the integrated inflation targeting regime that incorporates financial stability. In particular, in addition to

inflation and output gaps, monetary policy should react to credit gap and real exchange rate to address the time-series dimension of systemic risks. Monetary policy and macroprudential policy are largely complementary instruments, and thus must be calibrated jointly in the context of macroeconomic models that account for credit market imperfections and effectiveness of monetary transmissions. Woodford (2012) shows the optimal solution for monetary policy when the central bank willing to trade-off a greater degree of stability in price and output-gap for the sake of stabilizing systemic risks of financial stability. Vredin (2015) provides detail descriptions on relevant information for the central bank to incorporate financial stability into the inflation targeting framework. In particular, in addition to macroeconomic, financial conditions and transmission mechanisms, indicators of financial stability relating to financial cycles, financial market vulnerability, and early warning signals would be useful.

Macroprudential Policy

As stated above, macroprudential policy constitutes regulation and supervision to financial services institutions from macro perspectives and focus on systemic risks required for promoting financial system stability. It is particularly geared toward mitigating procyclicality from macro-financial linkages, as well as build-up systemic risks that could emanate from the interconnectedness and networks of financial institutions, markets and infrastructures, including payment systems. The first objective of macroprudential policies aims to prevent the excessive build-up of risks from the boom and bust of the financial cycles resulting from external factors and market failures (time dimension). The second objective is to make the financial sector more resilient and limit contagion effects from interconnectedness and networks of the financial system (cross-section dimension). These two key objectives constitute the main factors that precede and propagate the instability in the financial system that in many cases lead to a crisis. Another objective of macroprudential, e.g. by the ECB, is to encourage a system-wide perspective in financial regulation to create the right set of incentives and disincentives for market participants (structural dimension). This is important as to manage risk taking behaviour that is a key for both the soundness of individual financial institution as well as for mitigating build-up systemic risks.

A number of studies have documented that the financial cycles tend to be procyclical and amplify the economic cycles (Claessens, et.al, 2011). They tend to precede and propagate build-up systemic risks in the financial system that could lead to a crisis (Claessens and Kose, 2013; Reinhart and Rogoff, 2009)). Empirical studies also reveals four main procyclicality systemic risks that in many cases lead to financial crises: housing bubbles, credit booms, excessive accumulation of external debts, and volatile capital flows (Jorda, et.al., 2011, 2014; Calvo and Reinhart, 2000). They are inherent within capitalist economy whereby inflation and debt accumulation have the potential to spin out of control in the period of economic upswing (Minsky, 1982). Stability is destabilizing, and thus leads to 'boom' and 'bust' in the financial cycles, causing the economy

falls into crisis. Macroprudential policy addresses the first two procyclicalities (housing bubbles and credit booms) while the other two (external debts and volatility of capital flows) are dealt with capital flows management discussed in the next section.

Interconnectedness and networks in the financial system could also lead to build-up systemic risks during the economic upswing along with procyclicality of the financial cycles discussed above. As explained earlier, during financial distress, contagion and propagation to a systemic crisis evolve through interconnection and networks in the financial markets (e.g. interbank and foreign exchange markets) and infrastructures (including payments system) that lead to liquidity squeeze and market freeze. During the period of economic upswing, financial interconnection and networks could also propagate the upswing of financial cycles into build-up systemic risks. Portfolio diversification beyond certain threshold increase the risks of financial system failures, even though it may benefit the risk distribution from individual institution. It resembles to complete financial networks that are prone to systemic failures from large shocks or multiple/common shocks (Allen, et. al., 2010; Acemoglu, et.al., 2015). The originate-to-distribute bank model in the case of US sub-prime mortgage failure is a clear example.

Propagation of build-up systemic risks during the upswing of financial cycles could also be facilitated through herding behaviour (Bikhchandani and Sharma, 2001). This can be happening due to a number of reasons. Some banks or investors, especially those with limited information, tend to base their decisions on other reputable banks or investors or advisors rather than their own analysis. Performance measurement system that lead to remuneration and bonus on profit or based on the certain performance benchmark that is commonly practiced in the financial system is another factor behind herding behaviour. In the banking system, Rajan (1994) shows that reputation and remuneration system could lead to fluctuations of lending standard, i.e. tends to ease during upward economic trend and tight during recession. In addition, as in the event of financial distress, information contagion could also lead to herding behavior during the upswing financial cycles (Acharya and Yorulmazer, 2003).

These objectives of macroprudential policy, i.e. macro-perspective and systemic risk focus of financial stability, differs from microprudential regulation and supervision which aim at the soundness of individual financial institutions, banks and non-banks. Individual institution soundness is necessary for financial stability, but not sufficient. Individual failure of financial institutions, if it is not deemed systemic, could be regarded as a problem of capital insolvency due to excessive risk taking, mis-management, and/or losing competition. This is also as a natural process of banking restructuring and a test for the resiliency of the overall financial system. The case is different to those that are deemed as systemically important banks, which their failures could potentially cause financial instability. BIS (2012) provides a framework for assessing and dealing with domestic systemically important banks based on four main criteria, i.e.: size, interconnectedness, complexity, and substitutability. They are subjected to stringent rules of regulation and supervision to make them internalize and absorb the systemic risks,

including, among others, higher liquidity coverage, total loss absorptive capacity of capital, stricter risk management framework, and requirement for adhering the set-out recovery and resolution plan.

Instruments of macroprudential policy for addressing procyclicality could include loan-to-value ratio for managing credit cycles and counter-cyclical capital buffer, while limits on foreign exchange exposures and offshore borrowing are examples for systemic risks instruments. Microprudential instruments consist of measures for rating individual bank soundness, managing liquidity risks, minimum capital requirement based on risk profile, and prudent risk management. A number of instruments of both macro and micro regulations may be the same, as they are based on the assessments of liquidity, market, and credit risks. But the objective and perspective of the two regulations differ. The objective of macroprudential regulation is to limit system-wide distress and avoid macroeconomic costs linked to financial instability, while microprudential regulation aims at limiting distress of individual financial institutions to provide protections to consumers (depositors and investors). For some possible common instruments, there are three dimensions that need to be considered, i.e.: individual soundness, systemic risk, and procyclicality. Thus, for every common instrument could be set the levels that represent requirements from individual soundness, systemic risk, and procyclicality based on assessment of the financial stability during the period. This point of view could be used as an approach for resolving any instrument of regulations that have two objectives of both microprudential and macroprudential.

Recent regulation on capital by the Financial Stability Board (FSB) issued on November 2015 which sets out minimum amounts of Total Loss Absorbency Capacity (TLAC) for Global Systemically Important Banks (G-SIBs) is an example of this approach. The TLAC is to ensure that G-SIBs have the loss absorbing and recapitalization capacity so that, in and immediately following resolution, critical functions can continue without requiring taxpayer support or threatening financial stability. The TLAC is set at 16% to 20% of the capital requirement based on the risk weighted assets and at 6% to 6.75% of the capital requirement based on the total exposure measurement. This applies to G-SIBs that are determined before 2015. First, the Basel III minimum of an 8% total capital ratio based on risk profile must be satisfied for all banks, systemic or not. This level of capital is purely for individual bank soundness. Second, the various Basel III buffer requirements must also be met, i.e.: capital conservation buffer for systemic risks, counter-cyclical capital buffer for addressing procyclicality, and capital surcharge for G-SIBs. The level of counter-cyclical buffer could be set higher or lower according to the extent of procyclicality at certain period. And third, additional regulatory capital and debt instruments with a minimum remaining maturity of one year that are subordinated to all other creditor claims in insolvency (eligible debt instruments) can then be included in the TLAC. Such approach of structuring regulation according to the objectives of individual soundness, systemic risk, and procyclicality could also be applied to other instruments that are both microprudential and macroprudential in nature.

Capital Flows Management

Capital flows management (CFM) aims to mitigate procyclicality and build-up systemic risks from accumulation of external debt and volatility of capital flows. It supports the stability of exchange rate as well as helps in preventing balance of payments and sudden-stop crises that constitute integral part of financial stability. That capital flows have many benefits to the economy are widely acknowledged (Koepke, 2015). FDI and long-term banking flows could facilitate domestic investments and, if they are accompanied by productivity in the economy, increase growth. Nonetheless, some banking and portfolio flows are volatile, particularly those of short-term and speculative natures, and could pose risks to macroeconomic and financial system stability. These flows could surge in some period and reverse in other period, responding to relative magnitude between “push factors” of global output, interest rate and risk aversion in one side, and “pull factors” of domestic output, asset returns, and country risk in the other side. The surge of capital inflows to the EMEs during the period since the global crisis and their reversals following the Fed taper tantrum in mid-2013 provide a clear example. Increasing volatility of capital flows poses central banks in the EMEs serious challenges in safeguarding monetary and financial stability.

The best defence for the EMEs to better absorb capital flows and reap their benefits is by implementing sound macroeconomic policies, exchange rate flexibility, deepening financial markets, strengthening financial regulation and supervision, and improving institutional capacity (IMF, 2012, 2013, 2015). But surges of inflows can lead to macroeconomic and financial instability, signs of economic overheating or asset bubbles, strong currency appreciation, rapid credit expansion, and build-ups systemic risks in balance sheet and other vulnerabilities that can induce sudden-stops or reversals of these inflows. Under such circumstances, interest rate increase will not be effective as it will induce more capital inflows, especially when inflation is under controlled. Foreign exchange intervention could moderate exchange rate appreciation and at the same time increase the international reserves for building up buffers in case of capital reversals. Increasing reserve requirements could absorb excess liquidity in the domestic banking system from capital inflows. To support these policies, the CFM could be implemented in the forms of tax on portfolio equity and debt inflows (Brazil, 2009), holding period on central bank bills and limit on short-term foreign borrowing by banks (Indonesia, 2011), withholding tax on interest income on nonresident purchases of treasury and monetary stabilization bonds (Korea, 2011), fee on nonresident purchases of central bank paper (Peru, 2010), or withholding tax on nonresidents’ interest earnings and capital gains on new purchases of state bonds (Thailand, 2010).

Similarly, large, sustained, or sudden outflows can give rise to macroeconomic and financial stability risks. In this regards, increasing interest rate can be used, especially when there is pressure to inflation. Foreign exchange intervention could moderate exchange rate depreciation, as long as it does not cause serious depletion on the adequacy of international

reserves. Reducing reserve requirement is also an option, and relaxation of the existing CFM could be implemented. Additional CFM measures could include imposition of 12-month waiting period for nonresidents to convert proceeds from the sale of securities (Malaysia, 1998), limits on forward transactions and introduction of export surrender requirements (Thailand, 1997), limit bank withdrawals and imposed restrictions on transfers and loans in foreign currency (Argentina, 2001), stop of convertibility of domestic currency accounts for capital transactions (Iceland, 2008), and a 5-day waiting period for nonresidents to convert local currency proceeds from investment transaction to foreign currency (Ukraine, 2008).

III. INDONESIA'S EXPERIENCE

Macroeconomic Setting

Indonesia is an inflation targeting country, introduced in 2003 and implemented strictly since 2005. The framework suits well in bringing down inflation from about 9% in 2003 to now within the target range of $4\pm 1\%$. With subsidy has been revamped at the end of 2014—the main factor behind high administered prices shocks in the past, inflation will be more under controlled and continued on the declining trend toward a medium-target of $3\pm 1\%$. From the institutional aspect, the framework has been successful for the central bank in gaining monetary policy credibility. The discipline that it brings to the formal and regular policy forecasting and decision making process in the monthly board meetings put the central bank in forefront in keep updating the macroeconomic outlook and policy responses needed for achieving price stability. These regular assessments also serve well for close policy coordination between the central bank and government in formulating fiscal, monetary and structural reforms to safeguard macroeconomic stability and supporting economic growth. Moreover, the aggressive communication by the central bank provides important instrument to anchor inflation expectation as well as broader macroeconomic outlooks. Overall, the already established framework provides strong foundation for the central bank to assume macroprudential policy for promoting financial system stability.

The challenges for the success of implementing central bank policy mix in Indonesia come from both domestic and external. First, the Indonesian economy is widespread through archipelagoes and dependence on commodity, and thus subjected to recurrent shocks from foods prices inflation and current account imbalances. Addressing these internal and external imbalances through monetary policy is a key for the success of maintaining both macroeconomic and financial stability. Second, the financial system is bank dependenced with shallow financial market. Managing procyclicality and systemic risks of the banking system through macroprudential regulation and supervision not only will be a key for financial stability but also strengthen the effectiveness of monetary transmissions. And third, Indonesia is small economy with fully open capital account, and thus management of volatile capital flows is very important.

These three challenges of monetary policy, macroprudential policy, and the CFM needs to be addressed in the central bank policy mix.

Furthermore, these challenges are closely linked and intertwined, making the policy mix even become utmost requirement. During economic upswing, e.g. because of commodity prices boom, financial deregulation, or favorable global environment, accelerated domestic demand then created credit boom, property bubbles, high inflation, widening current account deficit, and accumulation of external debt. We witness this in the history of big and mini crises in Indonesia. The economic bonanza following the broad based financial deregulation during 1983-1988 ended up in deep crisis in 1997-1998 which unveils those serious macro-financial systemic risks. The mini crisis in 2005 was led by rapid growth of domestic demand, bank lending, and large capital inflows following global commodity boom. We also record recurrent problems during 2010-2013 whereby commodity export induced domestic demand acceleration created large current account deficit when commodity cycle was sharply reversed. These macro-financial imbalances could not be resolved either by monetary policy, CFM, or even by microprudential regulation and supervision. Macroprudential policy is the additional instrument, and it needs to be integrated with monetary policy and the CFM of the central bank.

Bank Indonesia's Policy Mix

As discussed above, two issues are of particular important to incorporate financial stability issues in monetary policy under (flexible) inflation targeting, i.e.: (i) enlarging the scope of price stability to include assessment of asset (financial and housing) prices, and (ii) addressing procyclicality and build-up systemic risks in the macro-financial linkages. For the first issue, in addition to CPI inflation, we put particularly emphasis on the assessment of exchange rate, government bond yield and equity prices, and housing prices. For the exchange rate, we already incorporate it into our macroeconomic forecasting and policy analysis model in setting monetary policy response. Consistent with the inflation targeting framework, the ultimate objective remains the CPI inflation. The inclusion of exchange rate in the model provides useful exercises on the consistency of (market-based) exchange rate and guidance on exchange rate policy to deal with possible excessive misalignment that is risking both the achievement of the inflation target and in support for financial stability. On the other asset prices, we opt to analyze them separately (outside the model), but they enrich our understanding on the overall macroeconomic forecasting and what monetary and/or macroprudential instruments that are best suited to address emerging risks.

On the second issue, to enrich our better understanding of macro-financial linkages, we enlarge our macroeconomic forecasting model to include external default risk as a proxy for sudden-stops and credit gaps to measure procyclicality in the banking system (Harmanta, et.al, 2012, 2013). The model provides policy scenarios with the interest rate response (Taylor rule type) and reserve requirement from monetary policy and/or loan-to-value ratio as possible

macroprudential instruments. Since the forecasting model is forward looking, it sheds important considerations on how best to lean against the possible risks from sudden stops and build-up systemic risk of financial stability, i.e.: through monetary policy interest rate or macroprudential measures or combination of the two. To sharpen our understanding on the procyclicality and macro-financial cycles, particularly credit booms and housing bubbles, we run separate models for assessing the nature of their cycles and possible build-up systemic risks that are foreseen over the policy horizon, at the aggregate level and cross-section (Alamsyah et.al, 2014; Harun et.al, 2014).

From the financial stability perspectives, we run in-depth assessments that are suggested in the literature (Bisias, 2012) and practiced in a number of central banks (e.g. EBA, 2015). We focus on systemic risks assessment (not individual soundness rating) of systemically important banks, both from top-down and bottom-up approach, of their key risks of capital, asset quality, liquidity risk, market risk, and earnings. Assessments on the inter-connectedness of those banks in the interbank market and payment system are also conducted. Tail-risk analyses on the credit risk are performed by several methods such as probability of default and transition matrix of asset quality. Stress-test of financial stability to the banking system on its resilience to macroeconomic shocks through integrated and/or balanced approaches based on the risk survey that we introduces. Risk assessments are also conducted to corporate and household balance sheets on their financial performances on how theses would impact to the banking system risks. To facilitate theses assessment of macro-financial linkages among the financial system, both from the procyclicality and build-up systemic risks, we are developing statistics on balance sheets interlinkages among economic agents and financial system, both public and private, at the national level and cross-geographical within sub-national levels.

Based on the overall assessment of monetary policy forecasting and analysis as well as of time-dimension and cross-section of financial systemic risk assessments, the central bank policy mix consists of the following four main instruments (Warjiyo, 2014a, 2015b). First, as in the inflation targeting framework, interest rate is set to ensure that inflation forecast to fall within the targeting range, i.e. at $4\pm 1\%$ in 2016 and 2017. Second, exchange rate policy is geared toward maintaining the stability of exchange rate movements along its fundamental trend to ensure their consistency with the achievement of inflation target and to avert their excessive volatility that may put pressures on the financial stability. Third, capital flows management is conducted to support the exchange rate policy, particularly in the period of large surge of capital inflows and heightened risks of capital reversals, for achieving monetary and financial stability. Fourth, macroprudential policy is geared towards maintaining financial stability and supporting the effectiveness of monetary policy transmission. Financial market deepening is also accelerated to support the effectiveness of the policy mix. The central bank is also engaging close coordination with the government, both at the central and sub-nationals, for macroeconomic management, as well as with financial services authority and deposit insurance institutions on

matters relating to the national financial system stability. Clear communication is very important for the success of the policy mix.

A key question is how to mix the monetary and macroprudential policies in responding to different cases that may give rise to conflict between price stability and financial stability objectives. This is an open debate as it deviates from the Tinbergen rule of one instrument for one policy objective. But there is convergence view that there are many cases that both instruments are complimentary for achieving both objectives (Yellen, 2014). The following table presents four cases of price stability and financial stability risks based on forward looking macroeconomic and macro-financial forecast and analysis over the policy horizon, and their corresponding mix of monetary and macroprudential policy stances. At the first quadrant, where forecasted risks to both price and financial stability are low, it is natural that both monetary and macroprudential policy stances are neutral. At the other extreme of fourth quadrant, where forecasted risks to both price and financial stability are high, it is natural that both monetary and macroprudential policy stances are tight.

Table 1 Four Cases of Price and Financial Stability			
		FORECASTED RISK OF PRICE STABILITY	
		LOW	HIGH
FORECASTED RISK OF FINANCIAL STABILITY	HIGH	<u>Quadrant II</u> • Monetary NEUTRAL/ LEANING • Macroprudential TIGHT	<u>Quadrant IV</u> • Monetary TIGHT • Macroprudential TIGHT
	LOW	<u>Quadrant I</u> • Monetary NEUTRAL/ EASING • Macroprudential NEUTRAL/ EASING	<u>Quadrant III</u> • Monetary TIGHT • Macroprudential NEUTRAL/LEANING

The potential conflicts are in the second and third quadrants. In the second quadrant, where forecasted risks of price stability is low but of financial stability is high, the stance of macroprudential policy is clearly tight. In this case, monetary policy could help macroprudential policy in leaning against the forecasted risks of financial stability in the policy horizon. This is the case in the US in the period preceding the global crisis as debated between Taylor (2010) and Bernanke (2010) as discussed above. In the third quadrant, where forecasted risks of price stability is high but of financial stability is low, the stance of monetary policy is clearly tight. In this case, macroprudential policy could help monetary policy in leaning against the forecasted risks of price stability in the policy horizon. The extent to which and choice of macroprudential measures will depend on the factors that give rise to forecasted risks of price stability. A natural selection could be directed toward reinforcing the channels of monetary transmissions in safeguarding price stability. For instance, where risks to price stability stems from strong

domestic demand induced by bank lending to housing sector, a loan to value ratio targeted to these sector is an option to be considered.

The factual problems in the real world may not be as simple as just described, of course. But we think this approach could be used as useful guiding principles to address the possible conflicts that may arise between price and financial stability objectives. Again, the extent to which and choice of monetary and macroprudential measures will naturally depend on the corresponding factors that give rise to forecasted risks of price and financial stability in the respective countries. We also think the same approach could be used to address the policy trilemma of monetary independence in achieving price stability, exchange rate stability, and capital mobility as we know in the international finance (Obstfeld, 2015). The following sub-sections will discussed how we implement this approach and the choice of instruments in the central bank policy mix in managing monetary and financial stability in Indonesia during the periods of heighten global economic and financial turbulences since the global crisis.

Interest Rate And Exchange Rate Policies

Under the inflation targeting framework, our decision on interest rate is to ensure the achievement of inflation target. The issue is how to deal with exchange rate movements that may give rise to the risks of forecasted inflation off the target. This is particularly the case for many EMEs when facing unprecedented large volatility of capital flows since the global crisis. In contrast to the advanced countries, exchange rate stability matters for the EMEs due to a number of reasons, e.g. under-developed domestic financial market, their detrimental effects to banking conditions and financial stability, and rigidity in the economy. Under such circumstances, dual targeting of exchange rate for achieving the inflation target will strengthen the monetary policy credibility under the inflation targeting framework (Ostry et. al., 2012). Specifically, exchange rate targeting could be used to mitigate the unintended impacts of capital flows to the inflation target, both directly via exchange rate pass-through and indirectly through domestic demand. Many EMEs have included exchange rate in the Taylor rule (Mohanty and Klau, 2004; Aizenmann et. al., 2011). Foreign exchange intervention is another option. When capital flows causing significant exchange rate misaligned from its fundamental and inflation will be off the target, a combination of interest rate responses and foreign exchange intervention would be more effective and thus strengthen monetary policy credibility.

We adopt this approach since 2010 and find it superior than the standard inflation targeting relying solely on interest rate. Three episodes since the global crisis provide evidences, i.e. the period of 2010 to the Fed tantrum in May 2013, the period since the Fed taper tantrum to mid-2015, and the period since then. During the first period, Indonesia enjoys most of the favorable spillovers from the global crisis, particularly high commodity prices and surge in capital inflows (Warjiyo, 2013b). Economic growth was high at the peak of 6.5% in 2011 and moderate slightly at 6.3% in 2012. Inflation was at the lowest history of 3.8% in 2011,

even below the lower bound of the target of $5\pm 1\%$ at that time, and only slightly increased to 4.3% in 2012. During this period, Indonesia received large capital inflows, driven by both global excess liquidity searching for higher yield and Indonesia promising economic outlook. Exchange rate appreciated by the surge in capital inflows, corroborated with favorable current account surplus from the high global commodity prices. The challenge is how to manage these inflows to mitigate build-up systemic to financial stability as bank lending growth was high at above 23% per year during 2010-2012. This is the case of second quadrant where the risks of price stability are low while of financial stability are high as discussed above.

Consistent with the inflation targeting framework, the central bank cut the policy rate by 75 bps from 6.5% in 2010 to 5.75% in 2012. Further cuts of policy rate would not be consistent with the inflation targeting framework as inflation at the historically low. It would not be effective in stemming the capital inflows driven more by 'push factors' than 'pull factors' (Indrawan et.al, 2013). And it was also not consistent with the financial stability objective as bank lending growth was excessively high. The central bank intervene in the foreign exchange market to stem the surge in capital inflows as well as to moderate the exchange rate appreciation. To sterilize its impact to domestic liquidity more effectively, reserve requirement was raised from 5% to 8% in November 2011. The international reserves increased significantly from a mere of US\$ 66.2 billion at the beginning of 2010 to the peak of US\$112.8 billion in 2012. It turned out that the increase of reserves provided important buffers for the capital reversals following the Fed taper tantrum in mid of 2013.

The situation was then reversed. Large capital reversals immediately followed the surprise Fed taper announcement, running over the months of May to August of 2013. The sudden reversals from both government bonds and equity markets in such a short period created herding behavior that was put both monetary and financial stability at risks (Warjiyo, 2014b). The problem was aggravated by widening current account deficit at the peak 4.4% of GDP as exports fall due to the plunge of global commodity prices while imports continued to increase at the back of strong domestic demand. Inflation surge to 8.4% in 2013 as the government raised the fuel price in July 2013 and to 8.3% in 2014 as fuel subsidy was removed in October 2014. From financial stability, bank lending growth was still high at 21.4% in 2013. This is the case of fourth quadrant as risks to both price and financial stability were high.

The central bank responded swiftly to stabilize the situation: raising interest rate and tightening macroprudential. Indonesia is among the first central bank that ahead of the curve raised its policy rate in the aftermath of Fed taper tantrum. We started to increase the policy rate by 25 bps in June 2013, and then aggressively raised it consecutively in the following months with a total of 175 bps to 7.50% within six months to November 2013. The primary objective was to preemptively contain the inflation pressures stemming from fuel price hike. The aggressive moves also to slow down the domestic demand to reign in current account deficit. Timing of the decisions were perfectly match the needs to respond to the capital reversals. We

believe bold and aggressive response in interest rate is a key to send a strong and clear signal to the market for monetary policy credibility.

The central bank also intervened heavily in the right aftermath of the Fed taper tantrum to stabilize the exchange rate before it resumed since September 2013. The intervention caused the reserves to fall to the lowest of US\$ 92 billion in September 2013 before it recover to US\$99 billion at the end of 2013. The intervention is supported by central bank purchases of the government bonds in the secondary market, especially during the period of heavy capital reversals, a tactic that we call dual intervention (Warjiyo, 2013c). This is in essence to make sterilization more effective, as purchasing bonds from secondary market release the liquidity squeeze because of capital reversals that could not be compensated by foreign exchange intervention. It also strengthens the effectiveness of intervention in stabilizing the exchange rate. The central bank send clear signals to stand ready to supply the foreign exchange and at the same time buy the bonds that foreign investors wish to unwind, and thus avoiding herding behavior and contagion of escalating capital reversals. Moreover, the dual intervention is a way to bring about the objective of monetary stability to be consistent with maintaining financial system stability. By stabilizing the foreign exchange market and government bond market, the dual intervention helps in stabilizing the overall financial markets.

The bold monetary policy adjustments pay off and gain credibility. Market confident quickly resumed and capital inflows were flourish since end of 2013 and throughout 2014. Macroeconomic and financial stability remain intact. In fact, inflation was down from 8.3% following subsidy reform in 2014 to 3.3% in 2015 and current account deficit quickly narrowed from 3.3% to 2.0% of GDP during the same period. This is the case of first quadrant, whereby risks of both price and financial stability is low. Nonetheless, economic growth slowed down from 5.2% in 2014 to 4.9% in 2015, and bank lending growth is tight at about 10%. With stability intact and the Fed policy communication becomes clear of gradual normalization process, the central bank cuts the policy rate three times a total of 75 bps during the first three months of 2016 to 6.75% at present. Reserve requirement was also lowered by 50 bps in November 2015 and again by 100 bps to 6.5% in February 2016. We believe the monetary easing will reinforce fiscal stimulus to support economic growth with the inflation is forecasted to be within the target range of $4\pm 1\%$. Together with accelerated structural reforms, Indonesia economic growth will be around 5.2-5.6% in 2016 and increase to 5.3-5.7% in 2017.

Capital Flows Management

The CFM in Indonesia is to complement, not substitute, sound macroeconomic policy. We continue to believe that the best defense for mitigating the global spillovers is strong economic fundamentals, sound macroeconomic and financial system stability, and accelerated structural reforms. Specifically, the CFM Indonesia is guided with the following three principles. First, the objective is to mitigate the negative impacts of short-term volatility in capital flows to

instability of exchange rate as well as the overall monetary and financial system. Second, they are targeted, i.e. to short-term and speculative capital flows, as we welcome those inflows that are of medium-longer term that benefits the economy. Third, the measures are consistent with our broad principle of maintaining free foreign exchange system. As much as possible, we do not differentiate resident with non-residents. And they are temporary, i.e. the measures are strengthened when too much capital inflows and relaxed when too much capital outflows.

Followings provide clear examples. During the period of heavy capital inflows to the Fed taper tantrum, we introduced in 2010 measures of CFM in the forms of six month holding period for transactions in the central bank bills and imposed a maximum of 30% capital to the short-term off-shore borrowings of the banks. But in the period following the Fed taper tantrum in 2013 we relaxed the holding period to one month and expanded a number of transactions that are excluded from the calculation on off-shore borrowing of the banks. We view that these measures help in dampening the short-term and volatile capital flows, and thus are consistent with the objective of managing price and financial system stability. Significant progress in financial market deepening provides better facilitation to these capital flows and greater exchange rate flexibility. In the foreign exchange market, for instance, the introduction of JISDOR (Jakarta Interbank Spot Dollar Rate) as market reference for exchange rate has been a success and there has been significant increase in the transactions of hedging instruments (e.g. swaps and forwards) in the market. Repo market is also progressing in the money market.

We also introduced a new regulation at the end of 2014 for strengthening risk management of non-bank corporate external debts. In Indonesia, public debts are under controlled by the law limiting fiscal deficit of both central and sub-national government to maximum 3% of GDP. For banks, in addition to limit on short-term borrowing above, they are required to seek the central bank approvals to ensure their external borrowing consistent with the objective of macroeconomic and financial system stability. Under the new rule of 2014, non-bank corporate external debts are subjected to strengthened risk management in the forms of requiring them to have: (i) currency hedging ratio of minimum 25% of their net external debts due within three and six months, (ii) liquidity ratio (including the current foreign assets in the hedging ratio) of minimum 50% of their net external debts due within three and six months, and (iii) a minimum credit rating of one notch below the investment grade. The effectiveness is encouraging, as about 88% of more than 2000 companies that submit their quarterly financial reports in 2015 to the central bank comply with the regulation. The new rule have also positive impacts to domestic foreign exchange market deepening as hedging instruments in the forms of swap and forward increase significantly.

Macroprudential Policy

In addition to enlarging macroeconomic forecast and analysis to include macro-financial linkages for the formulation of macroprudential policy, we developed models to assess the

optimal lending growth of the banks (see Utari et.al, 2012). We apply the model to aggregate lending growth as well as lending growth to each bank, certain types of lending (consumption, working capital, and investment), and per economic sectors. By comparing these optimal vs. actual lending growth, we can determine where excessive lending occurs and assess their build-up systemic risks. Analyses of procyclicality of bank lending are useful in determining the timing of the counter-cyclical measures. And we assess what and when some instruments of macroprudential measures are justified and can be applied.

Following the empirical model explained above, we assess the macroprudential policy particularly the optimal lending growth of the banks to determine if the bank's lending is excessive and build up systemic risk. This is the approach that we applied when introducing loan-to-value (LTV) ratio to lending to automotive and property sectors averaging at about 70 percent in 2012 (Warjiyo, 2015a). As discussed above, while price stability remains under controlled, we faced build-up risks to financial stability as bank lending growth was rapid during this period. To strengthen the adjustment needed to ensure macroeconomic and financial stability following the Fed taper tantrum, we then strengthen the LTV ratio to lending to property sectors in 2013, especially to mortgages for the second, third, and so on purchases of certain types of housing and apartments. The measures are also complemented by supervisory actions to banks that we viewed exhibit excessive lending behavior. We note that the formulation and implementation of macroprudential measures require a much detail and complex analysis and calibration, as well as the need for clear communication to the banks and business community.

Our experience shows that the macroprudential measures and supervisory actions help in reinforcing the effectiveness of monetary transmission mechanism and supporting the financial system stability (Purnawan and Nasir, 2015; Wimanda et.al, 2012, 2014). Even though lending growths increased in the period prior the implementation of these measures, probably because banks and their customers wanted to utilize the interim period, they declined substantially in relatively short-period in the subsequent episode. The growth of mortgage on housing for less than 21 square meter, for instance, declined from more than 100% to the negative growth during the period of June to September 2012. Likewise, the growth of mortgage on apartment less than 21 square meter dropped from more than 300% to less than 10% during the period of January to November 2013. It should be noted that the automotive and property sectors contain substantially large import content, and thus managing lending growths to these two sectors help in reducing the current account deficit.

Subsequently, we relaxed our macroprudential measures by increasing the LTV ratio by an average of 10% in June 2015. As discussed above, our forecasted risks to both price and financial stability based on macroeconomic and macro-financial forecasts and policy analysis were low, a case of first quadrant. Nonetheless, the use of interest rate policy was constrained during that time due to uncertainty of the Fed fund rate increase. That is the reason why we started our easing policy stance with relaxation of macroprudential measures in June 2015,

and then followed by policy rate cuts started in January 2016. We believe our recent policy mix of policy rate cuts, lowering reserve requirement, and relaxing macroprudential, together with accelerated fiscal stimulus and structural reforms by the government, will reinforced each other to deliver better economic prospects of Indonesia with higher economic growth and sound macroeconomic and financial stability this year and beyond.

As a part of its macroprudential policy, the central bank started to adopt a regulation on Countercyclical Capital Buffer (CCB) since end of 2015. Consistent with the easing stance of the central bank policy mix, the CCB is currently set at 0% and will be reviewed every six month. The central bank's adoption of CCB is in accordance with the international standard on macroprudential policy.

Institutional Setting

The effectiveness of central bank policy mix needs to be supported by strengthening institutional setting within the central bank and its close coordination with the government and related agencies. As we explained on methodology, we did enlarged the model to also include the external and banking sectors. Researches are conducted to better understand the behavior of capital flows and procyclicality of bank lending. More researches are underway to have more insights on the macro-financial linkages, procyclicality, and systemic risks. Better data and statistics are also important, including development of financial stability indicators and statistics on balance sheets interlinkages in the national as well as sub-national levels.

On the decision making process, there is debate to which better option to continue separate committees or to have joint committee for monetary policy and financial stability. Kohn (2015), for instance, prefers to have separate committee, considering differences in objective and focus, instruments, as well as for accountability. He cited the experience in the Bank of England setting up three committees outside monetary policy committee after the global crisis, i.e.: Prudential Regulation Authority (PRA) was set up under the Bank to conduct microprudential, Financial Conduct Authority (FCA) to oversees the financial markets, and Financial Policy Committee (FPC) for macroprudential policy. In Indonesia, we do not have the problem since the board of central bank is one board that oversees all of monetary, macroprudential, and payment system policies. The central bank do have separate committees chaired by deputy governor of each monetary, macroprudential, and payment system policies. To support the central bank policy mix, a joint policy committee is set up before the board meeting to integrate the analysis of macroeconomy and financial stability, as well as to coordinate recommendation on the policy mix. We find the joint policy committee enrich our understanding of the interlinkages between macroeconomy and financial system, and what policy mix that better suits for achieving price stability and supporting financial stability.

The central bank is also in close coordination with the government and other related agencies. Coordination of monetary and fiscal policy is closely conducted between central bank

and ministry of finance in the budget formulation as well as other aspects of macroeconomic management. Even though the central bank is independence, its policy mix constitutes an integral part of macroeconomic policy mix of monetary, fiscal, and structural reform at the national level (Warjiyo, 2013a). On financial system stability, coordination is done through Financial Stability Policy Coordination Committee (FSPCC) chaired by Ministry of Finance with members of Bank Indonesia, Financial Service Authority (IFSA), and Deposit Insurance Institution (IDIC). A new law on prevention and resolution of financial system stability was just passed which provides strong legal foundation of roles and responsibility of each institution on financial stability, dealing with systemically important banks, and crisis prevention and resolution mechanism. The central bank's macroprudential policy is also closely coordinated with the FSA's microprudential regulation and supervision.

IV. CONCLUSION

We already present the key concepts and implementation of central bank policy mix in meeting the renewed mandate for achieving price stability and supporting financial system stability. It comprises four key elements of policies on interest rate, exchange rate, capital flows management, and macroprudential. The renewed mandates of central bank on price and financial stability are complimentary. We present four different cases of price and financial stability that warrant different policy mix. Monetary policy with inflation targeting framework serves as a foundation for the policy mix. The key is to enlarge the standard macroeconomic policy forecasting and analysis to incorporate macro-financial linkages to assess procyclicality of the financial system and build-up systemic risks, and the corresponding policy mix that is consistent with the emerging problems.

Our experience with the central bank policy mix in Indonesia since 2010 shows that it is superior than the standard inflation targeting framework. We present three episodes with the policy mix that play important role for Indonesia resilience in withstanding the global spillovers. To support the policy mix, we enlarge our policy forecasting and analysis model to encompass macro-financial linkages, especially external and banking sectors. A number of researches are developed to better understand the macro-financial linkages, focusing on the procyclicality and systemic risks from capital flows, private external debts, housing bubbles, and bank lending. Internal decision making process has also been strengthened by introducing joint monetary and financial system stability committee within the central bank to formulate the policy mix.

Closer coordination with the government and related agencies has been strengthened. At the national level, the central bank's policy mix constitutes an integral part of economic policy mix of macroeconomic policy, financial system stability policy, and structural reforms. Accelerated structural reforms aim at achieving higher output potential for economic growth. Coordination on fiscal and monetary policy is geared toward managing economic cycles for maintaining both macroeconomic internal balance (low inflation) and external balance

(sustainable current account). At the same time, policy coordination on financial system stability, including macroprudential policy of the central bank, aims at managing financial cycles and mitigating systemic risks for promoting macro-financial balances. These measures of national economic policy mix is very important for achieving sustainable economic growth with sound macroeconomic and financial stability.

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