

Indonesia: the macroprudential framework and the central bank's policy mix

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Abstract

Recent crises have clearly highlighted the importance of understanding macro-financial linkages in order to mitigate the build-up of systemic risks to financial and macroeconomic stability, and sustainable economic growth. This note describes the role of macroprudential policy as an integral part of the central bank policy mix and financial stability in Indonesia. It encompasses regulation and surveillance from a macro perspective with a focus on systemic risk. A number of macroprudential policy measures have been implemented in Indonesia, including loan-to-value (LTV) ratios, reserve requirements and a capital conservation buffer, and these have proven successful in mitigating the build-up of systemic risks to financial stability as well as strengthening monetary policy in achieving price stability. In line with the central bank's revised mandate for combined price and financial system stability, the policy mix comprises interest rate, exchange rate, capital flow management and macroprudential elements. Our experience since 2010 shows that the current policy mix has advantages over the standard inflation targeting framework. In addition to implementing a sound macroprudential framework to promote financial stability, Indonesia has underpinned its crisis management protocol for prevention and resolution of the financial system crisis with a strong legal foundation (ie the Law on Financial System Crisis Prevention and Resolution of 2016).

Keywords: central banking, policy mix, financial stability, monetary policy, macroprudential policy, crisis management

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Macroprudential policy is an integral part of Indonesia's central bank policy mix. It encompasses regulation and surveillance from a macro perspective and focuses on systemic risk with the aim of supporting financial system stability. It is implemented through a number of instruments, including LTV ratios, reserve requirements and a capital conservation buffer, and has been successful in mitigating the build-up of systemic risks to financial stability as well as in strengthening the effect of monetary policy in pursuit of price stability.

Institutional setting: a brief perspective

Bank Indonesia started to develop its macroprudential function in 2002 as a part of its overall transformation programme, in line with trends in other central banks towards strengthening monetary and financial stability policy. While inflation targeting was adopted to achieve price stability, macroprudential policy was introduced to strengthen microprudential regulation and supervision in the interests of financial stability. Indonesia's macroprudential policy has the aims of (i) mitigating systemic risk; (ii) promoting a balanced and sound intermediary function; and (iii) increasing financial system efficiency and access. The latter objective is specifically designed to promote the development of the financial system, especially in terms of financial deepening and inclusion.

These three objectives strike a balance between maintaining financial stability and optimising the contribution of the financial system to economic growth. Macroprudential policy adds the macro-financial and system-wide dimensions of financial stability to the focus on individual bank soundness of microprudential regulation and supervision. Furthermore, it strengthens the effectiveness of monetary policy transmission in achieving price stability. Against this backdrop, Bank Indonesia started to implement a mix of monetary and macroprudential policies in 2010 (Warjiyo (2016a, 2016b)). Capital flow management also complements the central bank policy mix.

Bank Indonesia has continued to implement its macroprudential policy since 2013, when responsibility for microprudential supervision was transferred to the newly established Financial Service Authority (*Otoritas Jasa Keuangan*, OJK) under the OJK Law no 21 of 2011. The microprudential supervision of the OJK focuses on ensuring the soundness of individual financial institutions, while Bank Indonesia's macroprudential policy encompasses regulation and surveillance from a macro perspective, focusing on systemic risk. As the two policies are complementary in promoting financial system stability and their instruments may be similar, a mechanism for close coordination has been established between Bank Indonesia and the OJK at the board level as well as at senior official and technical levels. The OJK coordinates with Bank Indonesia in regulating banking sector supervision in such areas as (a) monitoring of banks' minimum capital; (b) integrated information systems; (c) policy on foreign fund flows, admission of foreign currencies, and foreign commercial lending; (d) banking products, derivative products, other bank business activities; (e) designations of institutions as systemically important banks; and (f) other data that are exempted from confidentiality rules.

In 2016, a new law was enacted to strengthen policy coordination in order to prevent or resolve a financial system crisis (ie the Prevention and Resolution of Financial System Crisis or *Pencegahan dan Penanganan Krisis Sistem Keuangan*,

PPKSK Law no 9). The law formalised the Financial System Stability Committee (*Komite Stabilitas Sistem Keuangan*, KSSK), which was set up in 2013 and is chaired by the Minister of Finance with the Governor of Bank Indonesia, the Chairman of the OJK, and the Chairman of Deposit Insurance Institution (*Lembaga Penjamin Simpanan*, LPS) as members. The law clarifies the roles and responsibilities of each of these four institutions in promoting financial stability, ie the Ministry of Finance's fiscal policy for mitigating excessive fiscal deficit, public debt and stability of the government bond market, Bank Indonesia's monetary and macroprudential policies for mitigating currency/external risks, macro-financial imbalances and systemic risks, and the OJK's microprudential supervision for mitigating individual banking and financial market failures, while LPS acts as the resolution institution for the financial system. The committee coordinates policy with the aim of preventing and resolving any financial crisis that may be caused by these multi-dimensional risks, paying due regard to the respective mandate of each institution. Crisis management protocols both at the national level as well as at each institution have also been developed to support policy coordination.

Furthermore, the new law sets out the criteria for the designation of domestic systemically important banks (D-SIBs) by the OJK, based on asset size, interconnectedness, complexity, and substitutability, following the recommendations of Bank Indonesia. D-SIBs are then required to (i) meet higher capital adequacy and liquidity ratios; (ii) maintain recovery and resolution (action) plans as agreed by the OJK, including the obligation that shareholders or other party increase bank capital or convert certain debt into equity; and (iii) meet the OJK's requirement for additional capital to absorb losses if the bank faces financial difficulty. The resolution mechanism for these D-SIBs by LPS is decided by the KSSK through the procedure and process under the national crisis management protocol as they pose systemic risks to the overall financial system, whereas resolution for non-D-SIBs is managed directly by LPS after closure on the instructions of the OJK. The resolution methods open to LPS have also been widened under the new law beyond the standard liquidation process to include purchase and assumptions, and bridge banks.

Macroprudential framework

Bank Indonesia's macroprudential framework is a part of the crisis management protocol at the national level along with the fiscal policy framework of the Ministry of Finance, the OJK's microprudential framework, and the LPS's resolution mechanism.

Objectives and instruments

The ultimate objective of Bank Indonesia's macroprudential policy is to mitigate risks emanating from the procyclicality of macro-financial linkages and to counter the build-up of systemic risk from interconnections and networks among and within financial institutions, markets and infrastructures, including the payment system. The first objective of macroprudential policy is to contain the build-up of risks from financial cycles driven by factors within the financial system as well as their interactions with economy. These risks can be in the form of excessive credit growth, property and asset bubbles, or excessive debt. The second objective is to strengthen

the resilience of financial system and to mitigate contagion from the interconnections and networks of the financial system. These two objectives are consistent with practice in other central banks.¹

Lim et al (2011) cite 10 macroprudential instruments for the management of procyclicality and systemic risks relating to exposures of credit, liquidity and capital. For procyclicality in credit, the instruments include loan-to-value (LTV) ratios, debt-to-income (DTI) ratios and limits on credit growth in certain sectors. For foreign exchange exposures, instruments such as net open positions (NOP), limits on foreign exchange credits, or regulations on hedging and maturity of foreign exchange debts can be adopted. For liquidity, reserve requirements are generally chosen calibrated according to the evolving liquidity condition. Meanwhile, instruments to strengthen capital in withstanding procyclicality and systemic risks include countercyclical capital buffers, regulations on allowances for non-performing loans according to credit procyclicality risk dynamics, and regulations on remuneration and profit distribution.

Galati and Moessner (2014) classified macroprudential instruments according to type of risk, ie leverage/credit boom/asset bubbles risks, liquidity/market risks, and interconnectedness/market structure risks, and according to risk dimensions, ie whether dynamically across time or statically across sectors. The first type of risk is generally addressed by dynamic across-time instruments to mitigate emerging procyclicality, eg LTV ratios and countercyclical capital buffers. For liquidity/market risks, dynamic instruments can be applied, such as loan-to-deposit ratios (LDR) and additional liquidity requirements for systemic banks, or static instruments such as additional capital for derivatives and levies on non-core liabilities. Meanwhile, for interconnectedness and market structure risks, cross-sectional static instruments are applied, such as higher liquidity and capital requirements for systemic banks or surcharges on deposit insurance premiums for systemic risks.

Bank Indonesia has applied a number of macroprudential instruments as shown in Appendix Table 1. To contain procyclicality in credit growth, LTV ratios on lending to the property sector and regulation of down-payments on car loans were applied for the first time in 2012. These measures also reinforced the effect of increases in policy interest rates in the interests of macroeconomic stability. To manage procyclicality in liquidity, Bank Indonesia enacted a loan-to-funding-linked reserve requirement whereby banks with an LFR below 78% or higher than 92% are subjected to higher reserve requirements. Bank Indonesia also put in place a regulation on a countercyclical capital buffer for D-SIBs in 2015, which is now set at 0% but can be increased up to 2.5% as necessary.

These macroprudential instruments can be tightened or loosened depending on any build-up in procyclicality and systemic risks. Claessens et al (2014), for instance, classify instruments that can be adopted during an economic expansion, contraction, or to mitigate contagion risks from interconnectedness and networks in the financial system. These instruments can be in the forms of limits on borrowers, instruments and transactions, or limits on the balance sheet of the financial sector, or regulations on a capital buffer. In Indonesia, the LTV ratio on property lending and down-payments on automotive lending were tightened in 2012 and 2013 but they were

¹ In addition to these two objectives, the ECB has also developed macroprudential regulation to promote incentives or disincentives for market players (structural dimension).

relaxed in 2015 and 2016. The floor of the LFR-linked reserve requirement was also raised from 78% to 80% while maintaining the ceiling at 92%.

It should be noted that Bank Indonesia has also put in place a number of measures that are classified as capital flow management instruments but which could also promote financial stability. To manage banks' foreign currency risks, in addition to limits on net open positions (NOP), Bank Indonesia sets a maximum limit on short-term offshore borrowing by banks of 25% of their capital. Banks that seek offshore borrowing with maturity beyond one year must seek clearance from Bank Indonesia. Meanwhile, to strengthen the risk management of non-bank corporates that have external debt exposures, Bank Indonesia issued a new rule in 2014 that require them to have (i) a currency hedging ratio of a minimum 25% of their net external debt due within three and six months; (ii) a liquidity ratio (including the current foreign assets in the hedging ratio) of a minimum 50% of their net external debt due within three and six months; and (iii) a minimum credit rating of one notch below investment grade. The effectiveness of these measures is encouraging, as about 92% of more than 2,400 companies that submit their quarterly financial reports in 2016 to the central bank have complied with the regulation.²

The policy process

Graph 1 depicts the policy process for formulating macroprudential regulation and supervision (Harun and Sagita (2013, 2015), Bank Indonesia (2016)). The process starts with the identification of a balanced set of systemic risks, followed by monitoring, identification and assessment of systemic risk, and policy formulation and evaluation. Bank Indonesia's systemic risk exercises cover the entire financial system, which comprises financial institutions (bank and non-bank), financial markets, corporations and households (as surplus and deficit units), and financial market infrastructure as well as domestic and global macroeconomic conditions. Data, information and research have been developed to support the process.

In the current process, a systemic risk survey is conducted biannually, in which respondents from the financial community are asked about (i) what shocks have the highest probability of happening and which would have the greatest impact on the financial system; (ii) which vulnerabilities raise the most concern, and whether these are structural or temporary; and (iii) the level of confidence in the financial system. The survey result is then analysed, with shocks and vulnerabilities paired to produce the most prioritised systemic risks in the form of a risk assessment matrix (RAM). The RAM then provides the focus of (i) activities in monitoring, identification and assessment of systemic risks; (ii) scenario design for stress testing; (iii) topical research; and (iv) the main pages in the macroprudential dashboard, which also helps to identify specific sources of risk and the relevant indicators to monitor.

Bank Indonesia has developed a number of tools for monitoring, identifying and assessing systemic risk. These include the Macroprudential Information System (SIMP) for banks and other data from financial institutions, as well as the Macroprudential Dashboard of risks in the market, which displays the most important

² The new rule also has a positive impact on the deepening of domestic foreign exchange market as hedging instruments in the form of swaps and forwards have increased significantly.

indicators including the Financial System Stability Index. The methodologies involved are grouped into three different subsystems, ie for banking; non-bank financial institutions, financial markets and infrastructure; and the corporate and household sectors. For risk assessment, microprudential top-down stress testing is conducted quarterly while a macroprudential stress-testing model is also under development. For risk signalling, policy communication on financial stability conditions is conducted regularly with other financial authorities, via the KSSK or other coordination meetings with relevant government agencies; and to the public via the biannual Financial Stability Review. To support assessment and surveillance systemic risks, thematic on-site examinations are conducted on daily liquidity reporting, bottom-up stress testing conducted by the banks themselves, and speculative activity in the foreign exchange market, among other topics.

Data are crucial for the monitoring, identification and assessment of systemic risk and the formulation of macroprudential policy. As a result of the separation of authorities, Bank Indonesia has developed its own interface for macroprudential data, tapping into the banking database shared with the OJK. A dashboard has also been developed to better monitor financial system stability conditions, while a big data application is used to support the identification of prioritised sources of systemic risk. Research topics include model development, systemic risk assessment tools, the corporate, household and financial system liquidity, as well as intermediation efficiency. Development, modification or evaluation of macroprudential instruments are based on a rigorous research process. Microprudential instruments that will be implemented by the OJK are also reviewed to assess their quantitative impact and their intended and unintended consequences. The research group also develops the models for microprudential and macroprudential stress testing, DSGE models for policy simulation, identification and assessment tools for the assessment group and topical research on the behaviour of market players.

Crisis management protocol

As stated above, the new PPKSK Law of 2016 formalises the protocol that has been in place since 2013 for the prevention and resolution of financial system crises. To support the protocol, each of the four institutions monitors early warning indicators and protocols for their respective roles and responsibilities. The Ministry of Finance, for instance, has developed fiscal indicators and government bond market indicators. The OJK has early warning indicators for problems at individual bank and non-bank financial institutions, as well as in the capital markets. Meanwhile, Bank Indonesia conducts its surveillance and assessment activities according to three sub-protocols that represent assessments on stress levels within (i) the monetary system (exchange rates and financial markets); (ii) financial system stability; and (iii) the payment system.³ Although the PPKSK Law classifies the stress level in the risks to financial system stability into “normal” and “crisis” levels, the crisis management

³ For these purposes, Bank Indonesia monitors a number of indices to assess the stress level: eg the Exchange Market Pressure Index (EMPI), the Financial Market Pressure Index (FMPI), the Financial Stability Index (FSI), and the Financial Institution Soundness Index (FISI), along with a heatmap of the indicators that underlie these indices. These indices and the heatmap are regularly reported to the Board of Governor meetings.

protocols of the four institutions use a four-stage classification: “stable” (green), “caution” (yellow), “alert” (pink) and “incipient crisis” (red).

These early warning protocols from each institution form the basis of discussions and policy coordination in the meetings of KSSK, which take place on a quarterly basis, with monthly meetings at a deputy level. Nonetheless, a KSSK meeting can be convened if any of the four institution’s protocols flags a warning that warrants an immediate policy response. For instance, if based on Bank Indonesia’s assessment process, exchange rate indicators have deteriorated from “stable” to “caution” or even “alert” due to sudden and huge foreign capital outflows, the Bank would summon a KSSK meeting. If the meeting should conclude that these risks do not threaten the overall financial system, or that they could be contained through a coordinated policy response, then there would be no declaration that systemic risks were present. If, on the other hand, the assessment process indicated a crisis condition, the KSSK would then report to the President as the basis for a presidential decision on whether a national crisis should be declared. If a crisis situation is declared, Bank Indonesia’s Board of Governors could decide to establish a crisis centre to monitor and coordinate the response. The crisis centre would be headed by a member of the Board of Governors.

National crisis simulations have been conducted regularly since 2014 in order to ensure the smooth cooperation of the four KSSK members. For instance, the scenario for the most recent crisis simulation, in September 2016, was designed to replicate the actual conditions for banks if crisis had occurred between August 2016 and January 2017. The scenario envisaged the rapid deterioration of global and domestic economic conditions, intertwined with vulnerabilities in a number of systemic and non-systemic banks that generated imminent systemic risks. In addition to crisis simulation within the KSSK, Bank Indonesia also conducts crisis simulations internally to ensure smooth collaboration and coordination among the relevant departments and working units during a crisis situation.

Macprudential elements in the central bank policy mix

As discussed above, the key issue for Bank Indonesia is how best to incorporate financial stability issues in monetary policy under a (flexible) inflation targeting regime with a view to addressing procyclicality and the build-up of systemic risks in macro-financial linkages. To enrich its understanding of macro-financial linkages, the Bank has expanded its macroeconomic forecasting model to include external default risk as a proxy for sudden stops and credit gaps with the aim of measuring 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 requirements from monetary policy and/or LTV ratios as possible macroprudential instruments. Since the forecasting model is forward-looking, it delivers important insights on how best to lean against the possible risks from sudden stops and the build-up of financial instability, ie via the policy interest rate or macroprudential measures or a combination of the two. For an improved understanding of credit booms and housing bubbles, separate models are run to assess the nature of such cycles and the possible build-up of systemic risks that are foreseen over the policy horizon (Alamsyah et al (2014), Harun et al (2014)).

Based on the overall policy process, the central bank policy mix consists of the following four main instruments (Warjiyo (2014a, 2015b, 2016a, 2016b)). First, based on the inflation targeting framework, the policy rate is set to ensure that the inflation forecast will fall within the targeted range (of 4%±1% in 2016–17). Second, the exchange rate policy is geared toward maintaining the stability of exchange rate movements along the fundamental trend to ensure their consistency with the achievement of inflation target and to avert any excessive volatility that may put pressure on financial stability. Third, capital flow management is conducted to support the exchange rate policy, particularly in periods of large capital inflows. Fourth, macroprudential policy is geared towards maintaining financial stability and supporting the effectiveness of monetary policy transmission. Financial market deepening is also encouraged to support the effectiveness of the policy mix. The central bank coordinates closely with the government, both at the central and regional levels, for macroeconomic management, as well as with the financial services authority and deposit insurance institution on matters relating to 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 the 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 a widely held view that, in many cases, both instruments can act in a complementary way to achieve 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 forecasts and analysis over the policy horizon, and their corresponding mix of monetary and macroprudential policy stances. At the first quadrant, where forecast 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 the fourth quadrant, where forecast risks to both price and financial stability are high, it is natural that both monetary and macroprudential policy stances are tight.

Four cases of price and financial stability

Table 2

		Forecast risk to price stability	
		Low	High
forecasted risk of financial stability	High	Quadrant II <ul style="list-style-type: none"> • Monetary NEUTRAL/LEANING • Macroprudential TIGHT 	Quadrant IV <ul style="list-style-type: none"> • Monetary TIGHT • Macroprudential TIGHT
	Low	Quadrant I <ul style="list-style-type: none"> • Monetary NEUTRAL/EASING • Macroprudential NEUTRAL/EASING 	Quadrant III <ul style="list-style-type: none"> • Monetary TIGHT • Macroprudential NEUTRAL/LEANING

The potential conflicts are in the second and third quadrants. In the second quadrant, where forecast risks of price stability are low but those to financial stability are high, the stance of macroprudential policy should clearly be tight. In this case, monetary policy could help macroprudential policy in leaning against the forecast

risks of financial stability. In the third quadrant, where the forecast risks of price stability are high but those to financial stability are low, the stance of monetary policy should clearly be tight. In this case, macroprudential policy could help monetary policy in leaning against the forecast risks of price stability. The choice and intensity of macroprudential measures will depend on the factors that give rise to these forecast risks to price stability. The selection could be directed toward reinforcing the channels of monetary transmission in safeguarding price stability. For instance, where risks to price stability stem from strong domestic demand induced by bank lending to the housing sector, an LTV ratio targeted on this sector would be one option.

The factual problems in the real world may not be as simple as just described, of course. But we think this approach could be a useful guiding principle to address the possible conflicts that may arise between price and financial stability objectives. Again, the choice of monetary and macroprudential measures will naturally depend on the corresponding factors that give rise to the forecast 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 outlined in Obstfeld (2015).

Experience since 2010

Indonesia's experience since 2010 shows that the current central bank policy mix has been superior to the standard inflation targeting framework relying solely on interest rates. Three episodes since the global crisis have provided evidence to support this case, ie the period from 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 benefited from favourable global spillovers, particularly high commodity prices and a surge in capital inflows (Warjiyo (2013b)). Economic growth peaked at 6.5% in 2011, moderating slightly to 6.3% in 2012. Inflation reached a historical low of 3.8% in 2011, below even the lower bound of the $5\% \pm 1\%$ target at that time. Indonesia also received large capital inflows, driven by global excess liquidity and the promising economic outlook. This lifted the exchange rate, which was also supported by the favourable current account surplus from high commodity prices. The challenge was how to mitigate the build-up in systemic risk as bank lending growth reached 23% annually during 2010–12. This is the case of second quadrant in Table 2, where the risks to price stability are low while those to financial stability are high.

Monetary policy

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 policy rate cuts would not have been consistent with the inflation targeting framework as inflation was then at its historical low. Nor would they have been effective in stemming capital inflows, which were driven more by "push" than "pull factors" (Indrawan et al (2013)). They would also have been inconsistent with the financial stability objective as bank lending growth was excessively high. As such, the central bank intervened in the foreign exchange market to stem the surge in capital inflows as well as to moderate the exchange rate appreciation. To sterilise its impact on domestic liquidity more

effectively, the reserve requirement was raised from 5% to 8% in November 2011. International reserves increased significantly from a mere US\$ 66.2 billion at the beginning of 2010 to a peak of US\$ 112.8 billion in 2012. It turned out that the increased reserves provided an important buffer against the capital reversals following the Fed taper tantrum in mid-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 behaviour that put both monetary and financial stability at risk (Warjiyo (2014b)). The problem was aggravated by the widening current account deficit, which peaked at 4.4% of GDP as exports fell due to plunging global commodity prices while imports continued to increase on strong domestic demand. Inflation surged to 8.4% in 2013 as the government raised the fuel price in July 2013 and to 8.3% in 2014 as the fuel subsidy was removed in October 2014. Meanwhile, bank lending growth was still high at 21.4% in 2013. This is the case of the fourth quadrant, where risks to both price and financial stability were high.

The central bank responded swiftly to stabilise the situation, raising the policy rate and tightening macroprudential measures. Indonesia was among the first central banks to raise its policy rate in the aftermath of the taper tantrum. The Bank increased its policy rate by 25 bp in June 2013, and then aggressively raised it consecutively in the following months for a total of 175 bp to 7.50% within the six months to November 2013. The primary objective was to pre-emptively contain the inflation pressures stemming from the fuel price hike. The aggressive move also served to slow down domestic demand to reign in the current account deficit. The timing of the decisions reflected the need to respond to the capital reversals. The bold and aggressive response sent a strong and clear signal to the market on monetary policy credibility.

The central bank also intervened to stabilise the exchange rate. This caused the reserves to fall to their lowest level of US\$ 92 billion in September 2013 before recovering to US\$ 99 billion at the end of 2013. The intervention was supported by central bank purchases of government bonds in the secondary market, especially during the period of heavy capital reversals, a tactic that we call dual intervention (Warjiyo (2013c)). In essence, this serves to make sterilisation more effective, as purchasing bonds from the secondary market eases the liquidity squeeze from capital reversals that could not be compensated by foreign exchange intervention. It also strengthens the effectiveness of intervention in stabilising the exchange rate. The central bank sends a clear signal that it stands ready to supply foreign exchange and at the same time buy the bonds that foreign investors wish to unload, thus preventing herding behaviour and contagion from escalating capital outflows. Moreover, the dual intervention helps to harmonise the monetary stability objective consistent with the aim of maintaining financial system stability. By stabilising the foreign exchange and government bond markets, the dual intervention helps to stabilise the overall financial markets.

The bold monetary policy adjustments paid off. Market confidence was quickly restored, and capital inflows resumed from the end of 2013 and continued throughout 2014. Macroeconomic and financial stability remain intact. In fact, inflation came down from 8.3% following the subsidy reform in 2014 to 3.3% in 2015 and the current account deficit quickly narrowed from 3.3% to 2.0% of GDP during the same period. This is the case of the first quadrant, in which the risks to both price

and financial stability are low. Nonetheless, economic growth slowed from 5.2% in 2014 to 4.9% in 2015, and bank lending growth is tight at about 10%. With stability assured, the central bank was able to cut the policy rate six times by a total of 150 bp during 2016 to its current 4.75%, following the successful reformulation of the policy rate from the 12-month BI-Rate to the seven-day (reverse) repo rate. Reserve requirements were also lowered by 50 bp in November 2015 and again by 100 bp to 6.5% in February 2016. We believe the monetary easing will reinforce the fiscal stimulus, supporting economic growth with inflation contained at 3.0% in 2016 or at the lower bound of the target range of $4\pm 1\%$. Together with accelerated structural reforms, Indonesia's economic growth will be around 5.0% in 2016 and should increase to 5.1–5.4% in 2017.

Macroprudential policy

Bank Indonesia has also developed models to assess the optimal bank lending growth (Utari et al (2012)). The model is applied to aggregate lending growth as well as lending growth at each bank, certain types of lending (consumption, working capital, and investment), and vis-à-vis specific economic sectors. By comparing optimal versus actual lending growth, we can determine where excessive lending occurs and assess the build-up of systemic risks. Analysis of the procyclicality of bank lending is helpful in determining the timing of countercyclical measures. And we also assess which macroprudential measures are justified and when they can be applied.

This is the approach that we applied when introducing LTV ratios averaging about 70% to auto and property lending in 2012 (Warjiyo (2015a)). As discussed above, while price stability remains under control, we faced a build-up of 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 tightened the LTV ratio on property lending in 2013, especially on mortgages for second or subsequent homes, or on purchases of certain types of housing and apartment. The measures were also complemented by supervisory actions vis-à-vis banks that we viewed as exhibiting excessive lending behaviour. We note that the formulation and implementation of macroprudential measures require detailed 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 have helped to reinforce the effectiveness of the monetary transmission mechanism and to support financial system stability (Purnawan and Nasir (2015), Wimanda et al, (2012, 2014)). Even though lending growth increased in the period prior to the implementation of these measures, probably because banks and their customers wanted to utilise the interim period, it fell substantially in a relatively short period subsequently (Graph 3). The growth of mortgage lending for housing of less than 21 square metres, for instance, declined from more than 100% to negative growth during the period between June and September 2012. Likewise, the growth of mortgage lending on apartments of less than 21 square metres dropped from more than 300% to less than 10% during January–November 2013. It should be noted that the auto and property sectors contain a large import content, and thus managing lending growth to these two sectors helps to reduce the current account deficit.

Subsequently, we relaxed our macroprudential measures by raising the LTV ratio by an average of 10% in June 2015 and again in August 2016 by an average of 5%, 10% and 15% for first, second and third mortgages (Tables 3a and 3b). As discussed above, our forecast risks to both price and financial stability were low, lying in the first quadrant. Nonetheless, the use of interest rate policy was constrained during that time due to uncertainty about the federal fund rate increase. For that reason, we started our easing policy stance by relaxing macroprudential measures in June 2015, only then following with policy rate cuts from January 2016. We believe our recent policy mix of policy rate cuts, lower reserve requirements, and relaxed macroprudential measures, together with an accelerated fiscal stimulus and structural reforms, will reinforce each other to deliver better economic prospects for Indonesia, in terms of both higher economic growth and enhanced macroeconomic and financial stability.

Final remarks

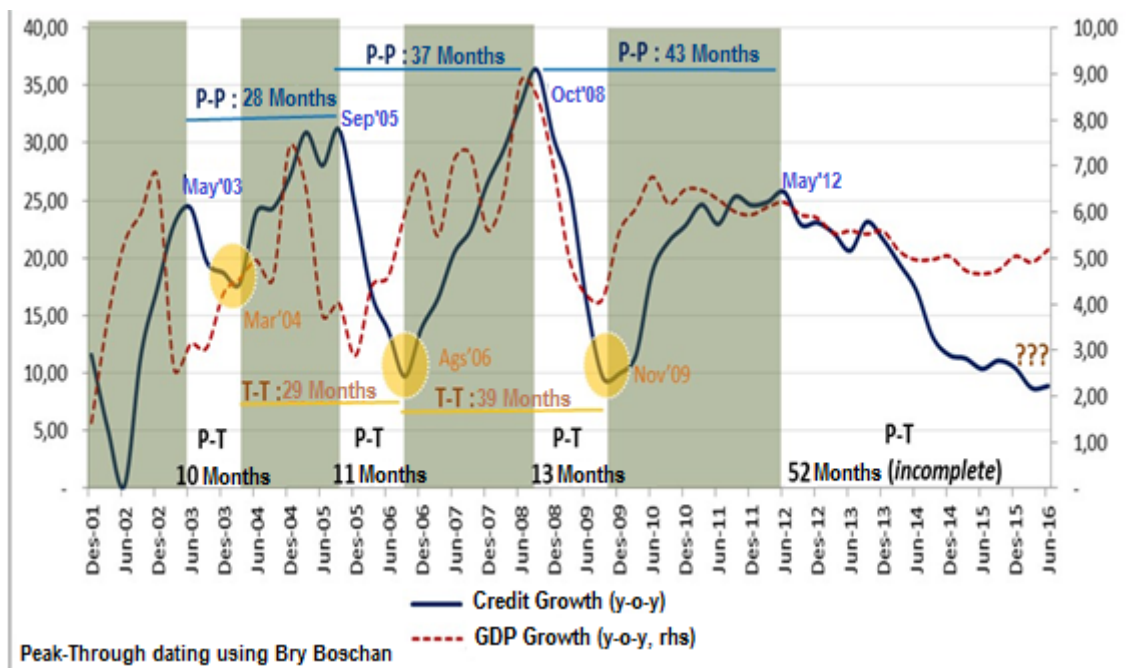
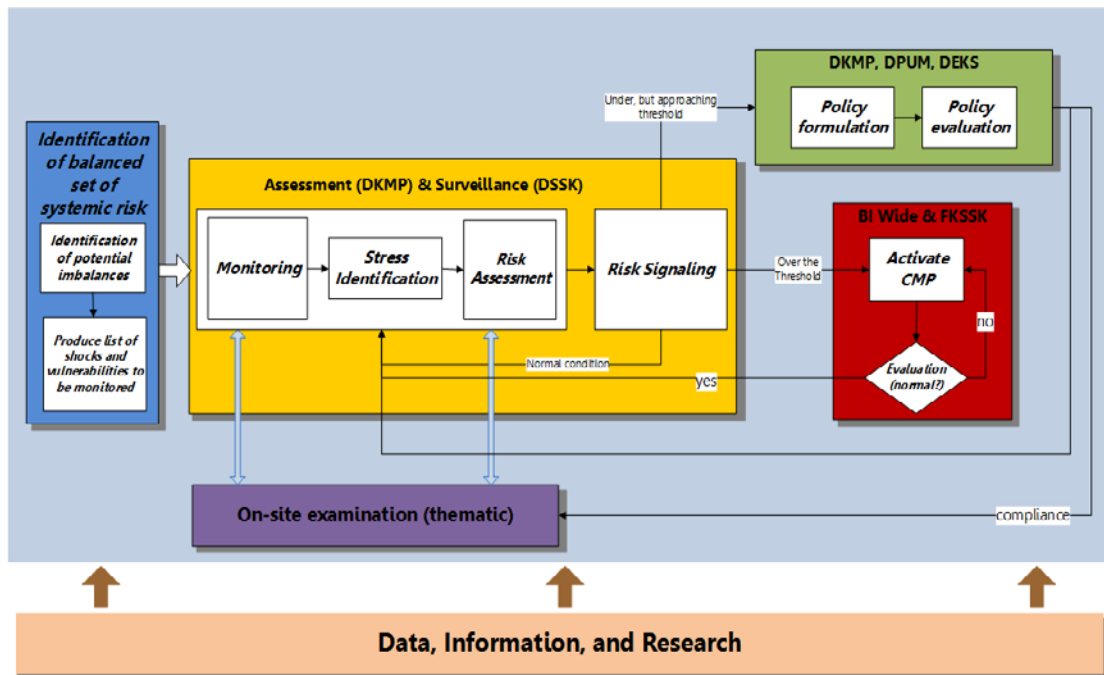
Macroprudential policy has played important role in the policymaking of many countries, including in Asia. The global financial crisis clearly shows the importance of understanding macro-financial linkages with a view to mitigating the build-up of systemic risks to financial stability. A sound framework for macroprudential policy with clear objectives and instruments, a detailed policy process, and corresponding crisis management protocols provide indispensable support for financial stability. Bank Indonesia has taken the initiative in implementing a macroprudential framework, as well as in advancing a crisis management protocol for the prevention and resolution of financial crises.

Furthermore, the central bank policy mix has been adjusted to meet the revised mandate for achieving price stability and supporting financial system stability. In Indonesia, policy comprises four key elements, on interest rates, exchange rates, capital flow management, and macroprudential measures. Our experience since 2010 shows that the new approach has proved superior to the standard inflation targeting framework. Closer coordination with the government and related agencies has also been strengthened, not only to promote financial system stability, but also to further macroeconomic policy and structural reforms.

Macprudential instruments implemented by Bank Indonesia

Table 1

No	Tool	Entities	Objective	Detail
1	Limit on Loan to Value/LTV and Financing to Value/FTV for Mortgage Lending	LTV: Commercial banks; and FTV: Sharia-based banks.	To contain excessive credit growth in the mortgage lending segment, and to dampen excessive housing price increase. However, in order to support economic growth by promoting more credit intermediation (in line with maintaining financial stability), BI has relaxed the limit since 2015.	Set the limit on LTV/FTV for consumer loan on residential properties (mortgage lending) at 85%–90% for the first mortgage lending facility, 80%–90% for the second mortgage lending facility, and 75%–85% for the third onward mortgage lending facility. The regulation is only applicable to banks with net NPLs for total loan and gross NPLs for property loan/financing below 5%, respectively. The measure excluded mortgage lending for properties used as home office/shop house and properties under the government housing program. Since it was introduced in 2012, BI has already changed the formulation of the LTV/FTV for mortgage lending 3 (three) times, either tightening/easing.
2	Limit on Down Payment (DP) for Automotive Loan	Commercial banks; Finance companies ^{*)} ; and Sharia-based banks. ^{*)} The regulation has been issued by the OJK	To contain excessive credit growth in the auto loan segment. However, to stimulate domestic demand in order to drive domestic economic growth momentum, BI has relaxed the DP since 2015.	Set the minimum level of down payment (DP) for auto loans/financing: (i) 20% for two-wheeled vehicles, (ii) 25% for three or more-wheeled vehicles for non-productive use, and (iii) 20% for three or more-wheeled vehicles for productive use. The measure is only applicable to banks with NPLs total and NPLs for auto loan/financing below 5 (gross), respectively. Since it was introduced in 2012, BI has already changed the formulation of the DP for automotive loan 3 (three) times, either tightening/easing.
3	Loan to Funding Ratio (LFR) linked Reserve Requirements	Commercial banks; and Sharia-based banks ^{**) still use LDR linked RR requirement}	To support economic growth by promoting more credit intermediation and to expand the source of bank's funding and the deepening of financial market. Previously, BI used loan to deposit ratio (LDR) linked RR. It was expanded to LFR by including limited Bond Issuance as part of bank funding.	Set the LFR-linked RR range: 78%–92%. Banks with a LFR below the lower limit will face an additional 0.1 RR from rupiah funding for each 1% short of the target, and an additional 0.2 RR from rupiah funding for each 1% above of the target with CAR below 14%. However, incentives upper limit of 94% were applied for banks that fulfil certain criteria: (i) allocation of loans to Micro Small Medium Enterprises (MSMEs) per BI Regulation no 14/22/PBI/2012; (ii) total NPLs below 5% of total loans; and (iii) NPLs to MSMEs below 5% of loans to MSMEs. BI raised the floor on the RR-LFR from 78% to 80%, with the ceiling maintained at 92%. (LFR range: 80%–92%).
4	Countercyclical Capital Buffer (CCB)	Commercial banks; and Sharia-based banks	Preventing systemic risk arises from excessive credit growth (procyclicality).	Implementation of CCB policy effective from January 1 2016 with initial rate 0% which will be evaluated at least every 6 months. During 2016, evaluation had been done on May and November. Both evaluations determine CCB rate remained 0%.

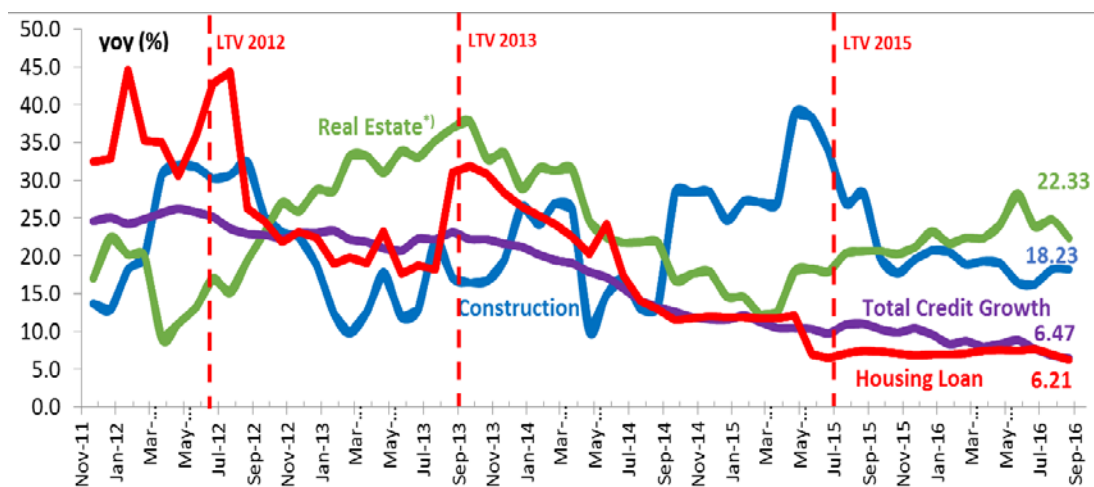


Property Loan and Property Financing based on Murabahah and Istishna'			
Property Type (m2)	Facilities		
	1st	2nd	3 rd and subsequent
House			
Type >70	80%	70%	60%
Type 22-70	-	80%	70%
Type ≤21	-	-	-
Apt/Condo			
Type >70	80%	70%	60%
Type 22-70	90%	80%	70%
Type ≤21	-	80%	70%
Small Office/Home Office	-	80%	70%

Property Loan and Property Financing based on Murabahah and Istishna'			
Property Type (m2)	Facilities		
	1st	2nd	3 rd and subsequent
House			
Type >70	85%	80%	75%
Type 22-70	-	85%	80%
Type ≤21	-	-	-
Apt/Condo			
Type >70	85%	80%	75%
Type 22-70	90%	85%	80%
Type ≤21	-	85%	80%
Small Office/Home Office	-	85%	80%

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Graph 3



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