Chapter 1

Central Bank Policy Mix: Key Concepts and Indonesia's Experience

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Abstract Central banks' mandates cannot merely be to achieve price stability; they should be enlarged to include promoting financial system stability. To achieve this dual mandate, central banks are advised to formulate and implement a policy mix of interest rate policy, combined with exchange rate policy, capital flow management as well as macro prudential policy. This policy mix should be further complemented with strong coordination and communication.

Keywords Central bank policy • Policy mix • Bank Indonesia • Global financial crisis (GFC)

Introduction

It is my pleasure to deliver the keynote address for this important workshop. After serving my term as executive director of the Funds, in 2010 I initiated the development of what is now termed the central bank policy mix in Indonesia. This period coincides with the aftermath of global financial crisis 2007–2009, which marks a fundamental change in the mandate and function of the central bank. The mandate of central banks cannot merely be confined to achieving price stability, but and should be enlarged with promoting financial system stability. To achieve this dual mandate, it is advisable for the central bank to formulate and implement a policy mix of interest rate policy, combined with exchange rate policy, capital flow management as well as macroprudential policy. Policy mix should also be complemented with strong coordination and communication. Our experience in Indonesia since 2010 has shown that implementing a central bank policy mix is superior rather than only applying a certain framework such as Inflation Targeting Framework (ITF), as we have done in the past. In addition, the central bank also needs to be ready with the challenge and opportunity from the rising of digitalization. When we are facing unbundling of financial services through fintech and e-commerce, the central banks need to understand and response properly. The fundamental idea is that monetary policy and

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financial system stability policy can still be utilized to address the digitalization in the financial services, including in the payment system. I believe, integrating economic and financial in the era of digitalisation end-to-end process is the key success of any central bank that not only want to survive in the digital era but also to reap the benefits from the rapid development of digital economy and finance. These are the new central bank paradigms.

What Has the Global Financial Crisis (GFC) Taught Us?

Let me first discuss what the global financial crisis (GFC) taught us, especially on the issue of enlarging the central bank's mandate. As we all know, prior to the GFC, the global macroeconomic condition was relatively stable. Inflation and interest rate were declining for the last two decades before the crisis. This development, among others, is due to the increasing number of central banks adopting monetary policy framework, which focus on maintaining price stability, known at that time as the inflation targeting framework. In the US, the period prior to the GFC was known as the Great Moderation. Sustained monetary stability, however, occasionally created another problem of financial system instability. This reminds us of what Hyman Minsky alluded to in 1982, namely the financial instability hypothesis (Minsky, 1982). Under an economy where capital is the backbone of the economy, low inflation and low interest rates during a period of economic boom create the booms and busts of the financial cycle. This leads to financial cycle pro-cyclicality. During an economic boom, there are housing bubbles, asset price bubbles, credit expansion, an accumulation of external and domestic debt, and risk-taking behavior. This is what we have had in the past. Where there is economic stability, an economic boom, boom and bust in the financial cycle, pro-cyclicality and systemic risk create the problem of financial system instability. A lot of research has been done on that area, including what caused the global financial crisis. Various research has documented that boom and bust cycles during an economic crisis were usually preceded by pro-cyclicality and systemic risk, along with a housing bubble, credit boom and external debt as well as the influence of capital flows (Jordà et al. 2010; Claessens et al. 2011; Claessens and Kose 2013).

Against the backdrop of GFC, let me put forward three salient lessons for central banking. First, as I indicated earlier, the mandate of the central bank cannot be confined only to achieving price stability, it should be enlarged by also promoting financial stability. How does financial stability need to be incorporated into the monetary policy setting of the central bank? This reminds us of the debate between the lean versus clean approach to monetary policy (OECD and White 2009). In the clean approach, central bank does not react to future financial system instability risk but letting the market to adjust by itself. During a crisis, the central bank will just clean up the mess. I think this approach was adopted by the US Federal Reserve under Chairman Greenspan. Bubbles may result from a declining risk premium and irrational exuberance, while rising interest rates could cause a bubble to burst more

severely. The global financial crisis taught us, however, that it is better for monetary policy to lean against future financial instability and future financial cycle risk. On the other hand, the lean school of thought implies that interest rates also need to be formulated with regard to pro-cyclicality risk in the economy. A number of countries have shown success with this approach, for example Australia when addressing the housing bubble in 2002–2003. Chairman Bernanke back in 2009, in the *Washington Post*, also stated that the Fed plays a major role in arresting the financial crisis and should be seeking to preserve, not degrade, the institution's ability to foster financial stability and to promote economic recovery without inflation. This is the first lesson that we must draw from the global financial crisis. In addition to price stability, central banks need to also pay due regard to financial system stability.

Second, the global financial crisis also taught us the importance of the linkages between macro economy and financial system; or the macro-financial linkages as we know it today (Morley 2016). It is important to understand the relation between financial cycle and systemic risk, the pro-cyclicality of the financial system and the systemic risk. Housing price bubbles, asset price bubbles, and excessive external debt sometimes occur when the economy is accelerating (in a boom phase). The pro-cyclicality of the financial sector also has a higher amplitude than the economic cycle. During a boom period, there is usually excessive credit growth compared to the amount required by the economy along with external debt. Whereas during a crisis period, credit growth is far more constrained than what is required in the economy. This macro-financial linkage of the financial system through pro-cyclicality and systemic risk cannot be addressed only by monetary policy but also through micro-prudential regulation and supervision. Monetary policy can lean against the wind of financial instability but interest rates alone will not be sufficient. Low interest rates environment may cause a housing bubble, coupled with risk-taking behaviors and other factors. Micro-prudential policy which focused on the healthiness of individual banks and financial institutions, can also address these issues. For example, if we want to increase the risk-weighted measure of capital requirements that would be ineffective in terms of addressing a housing bubble because a risk evaluation of capital requirements is also pro-cyclical. Usually, the risk evaluation tends to underestimate the true risk during an economic recession. This nature of macro-financial linkages, through pro-cyclicality and systemic risk in the financial system, requires a new tool, a new measure and a new policy, which is now known as macroprudential regulation and supervision. This addresses pro-cyclicality and systemic risk in the financial system. Looking at the experiences of a number of countries, it is evident that a central bank is well-qualified to assume the macroprudential function from the point of view of surveillance capacity as well as the policy tools that the central bank has. Kawai and Morgan (2012), for example, also showed this. A study of 13 developed and emerging market economies by the Bank for International Settlements (BIS) in 2011 also concluded that the central bank must be involved in the formulation and execution of financial stability policy for such policy to be effective. The performance of the monetary policy function provides the central bank with a macroeconomic focus as well as institutional capacity to enlarge their monetary policy framework with additional macroprudential measures and assessments of macro-financial linkages.

When there are costs in the economy, the central bank will be the ultimate source of liquidity for the economy, especially through the lender of last resort (LOLR) function.

The third lesson from the global financial crisis is capital flow volatility (Hannan 2017). This issue applies mostly from the perspective of emerging market economies (EME). Capital inflows were huge during the period following the GFC until the middle of 2013, namely the Fed's Taper Tantrum, due to unprecedented quantitative easing (QE) in advanced economies coupled with low interest rates. However, EME experienced sudden capital reversals following the Taper Tantrum in 2013. Currently capital flow volatility is still relatively high. EME needs to address this issue since capital flows volatility contributes to financial and macroeconomic instability in the economy (Baum et al. 2017). Central banks can respond with interest rate policy or greater exchange rate flexibility, but we need to complement it with new measures and policies, known as capital flow management.

A Post-GFC Paradigm of Central Bank Policy Mix

The three above-mentioned lessons have changed the mandate and function of the central bank. A central bank can no longer be confined to only achieving price stability, financial stability must also be incorporated. Central banks need to enlarge and complement the monetary policy framework with additional measures that lean against the wind in the form of macroprudential policy and capital flow management. This lesson leads us to the concept and key feature of the central bank policy mix and how this is being formulated and implemented through the central bank.

Let me begin the discussion of the concept and key features of the central bank policy mix. To achieve price stability and support financial stability, the central bank should assess not only the macroeconomic and risk outlooks but also enlarge the assessment to detect macro-financial imbalances in the financial system. This can be achieved by incorporating the financial sector and the external sector in the central bank's macroeconomic forecasting and analysis models. A number of models have been developed in the literature, including the model by Angelini et al. (2012). This assessment of macro-financial linkages usually emerges in the form of pro-cyclicality and a build-up of systemic risk concerning housing and other asset price bubbles, credit booms, accumulation of external debt and capital flow volatility. Based on this macroeconomic and macro-financial imbalances assessment and outlook, the following three building block forms the central bank's policy mix. As I alluded to earlier, monetary policy still needs to be directed towards achieving price stability but taking into account the financial instability and risk outlook. This is important, namely how interest rate or monetary policies need to address the emergent of pro-cyclicality and systemic risk in the financial system, such as monetary and financial stability inter-linkages. The second building block is macroprudential policy and the third is capital flow management.

From the first building block, financial system stability can be incorporated into the monetary policy framework through the lean versus clean debate that I alluded to earlier. One of the approaches is to incorporate financial stability into the inflation targeting framework of monetary policy. Agenor and da Silva (2013) discussed what they called integrated inflation targeting framework that incorporated financial stability. They argued that in addition to the inflation and output gaps, monetary policy also needs to consider and react to credit gaps, namely the credit boom aspect as well as the real exchange rate in order to address the time-series dimension of systemic risk. In a paper written in 2012, Woodford also proposed an optimal solution for monetary policy when the central bank formulates a trade-off between a greater degree of price stability and the output gap for the sake of stabilizing the financial system in terms of systemic risk (Woodford 2012). Another paper written in 2014 also shows the kind of information needs to be included by incorporating financial stability in the inflation targeting framework, in particular the transmission mechanism of financial conditions, indicators of financial stability relating to the financial cycle, financial market vulnerabilities as well as early warning signals.

The second building block of the central bank policy mix is macroprudential policy, consisting of regulations and supervision concerning financial services institutions from a macro perspective with a focus on systemic risk, as required for promoting financial system stability. The macroprudential policy has both time dimension and cross-section aspects. The time dimension of macroprudential policy aims to mitigate financial cycle pro-cyclicality as well as credit booms and busts in the economy, while the cross-section aspect of macroprudential policy focuses on addressing and mitigating the risk of interconnectedness in the financial system network. These are the two dimensions of macroprudential policy, namely the time dimension of pro-cyclicality and the cross-section dimension of interconnectedness and systemic risk. Several policy instruments have been developed and practiced by the central banks. For example, macroprudential policy instruments to address pro-cyclicality includes the loan-to-value (LTV) ratio aims to manage the credit cycle and a countercyclical capital buffer (CCB) as well as limits on foreign exchange risk exposure and offshore borrowing to address the systemic risk. These are macroprudential policy instruments available for the central bank to implement in their policy mix.

The third building block is capital flow management, which aims to mitigate pro-cyclicality and the build-up of systemic risk from the accumulation of external debt as well as capital flow volatility. As documented in the International Monetary Fund (IMF) in 2012, 2013 and 2015, the best defend to address this is through macroeconomic policy, exchange-rate flexibility, financial market deepening, strengthening financial regulations and supervision, which is now known as the Institutional Approach to Capital Flow Management. Capital flow management complements monetary policy and exchange rate flexibility. A number of countries have already implemented this, including a tax on equity portfolio and debt inflows in Brazil in 2009, for example. In Indonesia, we implemented a holding period on central bank bills and limits on short-term foreign borrowing in 2010–2011. South Korea implemented a withholding tax on interest income and non-resident purchases of

treasury and monetary stabilization bonds in 2011. Also, Thailand implemented a withholding tax on non-resident interest earnings and capital gains on new purchases of state bonds in 2010. There are a number of measures associated with capital flow management.

Conceptually, the central bank policy mix is coherent and can be implemented. Indeed, a number of central banks, including Bank Indonesia, have already implemented a central bank policy mix, which is becoming a new paradigm of central banking.

Bank Indonesia's Policy Mix

I would like to share with you some of Indonesia's experiences in terms of formulating and implementing the central bank policy mix. To support the formulation of a central bank policy mix and to enrich our better understanding of the macro-financial linkages, we have already enlarged our macroeconomic forecasting and analysis models to include macro-financial linkages. This includes external default risk as a proxy of a sudden stop capital reversal as well as credit gaps to incorporate financial system pro-cyclicality and has already been published in the papers (Harmanta et al. 2012, 2013). Even now, we have completed our DSGE model, which incorporates macro-financial linkages in the forecasting and analysis models. This is important for our policy formulation process.

The model provides policy scenarios with the basic inflation targeting framework through the interest rate response under the Taylor rule as well as a mix of reserve requirements from monetary policy and our loan-to-value (LTV) ratio as macroprudential policy instruments. The model already includes the macro-financial linkages and the instruments in the central bank policy mix include the interest rate response a la Taylor rule, exchange rate flexibility, reserve requirements and the loan-to-value (LTV) ratio to address credit cycle booms and busts. This is the model that we have already developed, which plays an important role underlying our policymaking. The central forecasting model is forward-looking, it sets important considerations on how best to lean against the possible risk from sudden stop capital flows and the build-up of pro-cyclicality and systemic risk in the financial system; whether we only need to address through interest rates alone, or complemented with exchange rate flexibility as well as other macroprudential measures, for example reserve requirements and the loan-to-value (LTV) ratio.

To strengthen our understanding of pro-cyclicality of macro-financial cycles, credit booms and housing bubbles in particular, we also run a separate model to assess the nature of their cycle and possible build-up of systemic risk both at an aggregate level and cross-section. A paper published by Alamsyah and Harun also supports our policymaking (Alamsyah et al. 2014; Harun et al. 2014). This provides a good approach and framework for our central bank policy mix, consisting of the following four main instruments. First, as with the inflation targeting framework, interest rate policy is being formulated to ensure the inflation forecast falls within

the targeted range. Second, the exchange rate policy is geared towards maintaining the stability of exchange rate movements along its fundamental trend to ensure consistency with achieving the inflation target as well as to mitigate excessive volatility that may put pressure on financial stability. Third, capital flow management is conducted to support exchange rate policy, particularly during periods of large surges of capital flows and heightened risk of capital reversal. Fourth, macroprudential policy is geared towards maintaining financial stability and supporting the effectiveness of monetary policy transmission. Policy mix effectiveness are also supported by financial market deepening, policy coordination and communication. Further, the central bank also maintain close coordination with the government through the Ministry of Finance and other agencies in the form of a Financial System Stability Committee, which consists of the Minister of Finance, Governor of the central bank, Chairman of the Indonesian Financial Services Authority and the Chairman of the Deposit Insurance Corporation (LPS). This is the framework of the central bank policy mix that Bank Indonesia has already implemented since 2010.

Let me share a brief overview of three episodes of policy mix implementation in Indonesia, considering what we have implemented, the implementation challenges as well as our central bank policymaking response since the global financial crisis. The first episode is during the period of 2010–2013. Back then, Indonesia was enjoying the benefits of conducive global economic and financial conditions. We experienced a commodity price boom and high economic growth, supported by commodity exports. This then created a housing price boom, while simultaneously accelerating credit growth. We also experienced huge capital inflows at that time, which added stimuli to the economy through liquidity injections, a credit boom and soaring house prices. This is when we introduced and started to implement a central bank policy mix because this was a challenge that we could not resolve only through interest rate policy. Low inflation environment provides the room for lowering the interest rate as we did cut our policy rate back then. However, lowering the interest rate further stimulated credit boom and housing boom. At that time, capital inflows were less sensitive to the interest rate because of abundant global liquidity. Our interest rate response through FX intervention mitigated the further misalignment of the real exchange rate that had appreciated beyond the currency's fundamental value. These policies were complemented with capital flow management. We started to issue a holding period as well as limits on short-term offshore borrowing by banks. We also introduced the loan-to-value (LTV) ratio in the automotive and property sectors because both sectors were experiencing excessive credit growth above 30% (yoy). This was more effective than only resorting to the interest rate. A policy mix of interest rates, exchange rates, capital flow management and macroprudential policies has proven to be more effective.

The second episode was much more challenging, during the period of Taper Tantrum. This was the most challenging period confronted by central banks around the world. The Fed's Taper Tantrum triggered a huge capital reversal in a very short-term period, squeezing domestic liquidity, encouraging herding behavior in the FX market as well as triggering monetary and financial instability pressures. Domestically, we still had housing and credit booms. Back then, credit growth was still

relatively high at around 27% (yoy). The situation getting more complicated, as we started to experience a current account deficit, as a result of declining international commodity prices coupled with persistently strong domestic demand. At the same time, there was uncertainty concerning government energy price policy.

The complexity of maintaining internal balance and external balance could not only be resolved through the standard inflation targeting framework and interest rate policy. Bank Indonesia was the first central bank reacting to the Fed's Taper Tantrum through an interest rate policy response. Bank Indonesia increased its policy rate aggressively, totaling 175 basis points within six months. We still based our central bank policy mix on the inflation targeting framework by responding through interest rate policy. However, we needed to complement that policy mix with other policy instruments. Thus, we also intervened in the FX market through dual intervention policy to maintain exchange rate stability. For Indonesia, most of the exchange rate pressures originated from external shocks in the form of a global reversal by investors from government bonds. Consequently, we complemented our FX intervention to stabilize the exchange rate with the purchase of government bonds from the secondary market. This dual tactic of intervention was more effective than just intervening in the FX market. We addressed the source of the risk, namely foreign investors flying from government bonds. To that end, we coordinated with the Ministry of Finance to make intervention more effective. We also relaxed our holding period from six months to one month and also expanded the scope of transactions excluded from the calculation of offshore borrowing in the banking industry with respect to capital flow management.

The complication still exist due to high bank lending growth which requires tightening the macroprudential measures. Although we relaxed the policy in terms of capital flows, we tightened our macroprudential measures in 2013, especially lending to the property sector, which was excessive at that time. Therefore, we tightened our loan-to-value (LTV) ratio for subsequent mortgage facilities. We also complemented this measure through supervisory actions for banks that were exhibiting excessive lending behavior. This was the central bank policy mix that we believed would be more effective than only relying on one instrument, namely an interest rate response. The bold monetary policy adjustment, coupled with close policy coordination with the Government and Indonesian Financial Services Authority, contributed to Indonesian resilience in the face of global financial shocks. Macroeconomic and financial system stability remained intact, as evidenced by low inflation and a narrower current account deficit from 3.3% of GDP to 2% of GDP. Consequently, economic moderation was less severe than if only one policy instrument had been used. Despite domestic economic moderation, growth remained relatively high compared with other emerging market economies. We have forecasted economic growth this year at around 5% and increasing next year. The central bank policy mix in terms of maintaining macroeconomic, monetary and financial stability, successfully navigated the second episode of the economy.

Starting in 2015, we had the liberty to adjust our policy stance. As our risk forecast for prices and financial stability starting in 2013 was low, we started to adopt accommodative monetary policy in early 2015. Last year, we started to relax reserve

requirements and macroprudential policy instruments because in 2015 we could not start with interest rates due to the uncertainty affecting the expected federal funds rate (FFR) hikes. Our policy stance came from the other instruments of the central bank policy mix. We lowered our reserve requirements by 50 basis points in November 2015 and by 100 basis points in February 2016. Lowering the reserve requirements was part of monetary easing. We also relaxed our loan-to-value (LTV) ratio by an average of 10% for lending to the property and automotive sectors in 2015. In August 2016, we relaxed our macroprudential policy on subsequent mortgage facilities.

With growing certainty concerning the future trajectory of the federal funds rate (FFR), we began to cut our policy rate this year. In 2016, we have cut our policy rate six times, totaling 150 basis points to 4.75% currently, accompanied by successful monetary operations reforms, moving our policy rate from the 12-month BI Rate to the BI 7-Day (Reverse) Repo Rate. Those were the three salient episodes when we formulated, designed and implemented the central bank policy mix. The building blocks of our central bank policy mix remained grounded in the inflation targeting framework but we enlarged our forecasting model to include macro-financial linkages, credit gaps as well as a capital reversal. We complemented this with research on the financial cycle, credit booms and busts as well as other aspects of financial imbalances. Bank Indonesia was also the first central bank amongst emerging market economies to develop a national balance sheet to address macro-financial risk. At that time, the central bank had more space and liberty to optimize its instruments, namely the interest rate, exchange rate, capital flow management and macroprudential policy.

I hope I have been successful in presenting the key concepts as well as the implementation of central bank policy mix. Hopefully our country's experience contributes to the discussions in academia and central bank policymaking. Let me add two key takeaways before closing. First, strengthening the institutional capacity of the central bank is important to support the policy mix. In Bank Indonesia's case, we enlarged our policy forecasting and analysis models to encompass macro-financial linkages, research on the financial cycle, micro-financial linkages, as well as systemic risk and interconnectedness in the financial system, in addition to the risk of capital flows, private external debt and other aspects. The internal decision-making process has also been strengthened by introducing a joint committee. Over the past two years we have held a joint monetary policy and financial system committee meeting prior to the monthly board meeting, which was previously held separately. At the meeting, we discuss the macro-financial linkages and recommend an optimal policy mix. This has been very positive and has strengthened the policy mix. Second, closer coordination with the government and other related agencies is also being strengthened. In Indonesia's case, a new law established the Financial System Stability Committee to coordinates the regulations amongst the four agencies to ensure financial system stability and support overall macroeconomic stability. Coordination is also being strengthened in terms of the structural reforms. A mix of macroeconomic policies and structural reforms is very important. We hope that this strengthens the central bank policy mix to support sustainable economic growth with sound macroeconomic and financial stability.

What's Next: Dealing with Diminishing Globalisation and Rising Digitalization

Since the GFC until recent development, everything that we learned at the university are being challenged. We need to rethink the macroeconomic theory and practice. We need to think how the financial services operated and how to response, not just from the perspective of policy maker, but also academician and researcher. The increasing and continuing trade tension we are facing leads to an era of diminishing globalisation and rising digitalisation. I will share my thoughts from the central bank perspective on how we as academicians and policy maker need to understand what is happening in the diminishing of globalisation and the rise of global digitalisation. I invite all participants to think about the economic underlying as well as the theory that we have to teach and research we conduct in order to advance our academic thinking and the appropriate policy response. In the first part, I will talk about the characteristics of diminishing globalisation and rising digitalisation. And in the second part I will discuss the central bank's response.

Let me start with the first part. So many characteristics and stylized facts that we can learn and research since the global financial crisis. The first characteristic is the rise of inward looking policy, anti global trade. We are currently still facing the trade war between US versus China and others. Previously, trade globalisation is perceived to be the component to actually promoting our global economic growth and increasing the capacity of the country to rise as well as where actually the adjustment in the global trade can be smoothed to the equilibrium. With the ongoing trade war, is there still any room for international trade to equilibrate the disequilibrium in the global economy? Global communities are discussing whether US economy will continue to grow. Some of the financial market analysts already forecasting US will probably be in the recession in 2021 if the trade war continues. This is the issue where the trend of trade globalisation in the past is already diminishing. The next question is how the academic and policy maker may help to understand this phenomenon and how can we explain it to our students and researchers? The diminishing market mechanism in the global trade is the first characteristic.

The second characteristic is in the global financial sector. In the past, the interest rate parity and free of flow capital have become the engine to distribute saving-investment gap and promote economic growth. Interest rate parity can equilibrate the prices of capital flows. However, the volatility of capital flows has been increasing, especially since the taper tantrum. It is very difficult to understand the movement of capital flows solely from analysing the interest rate parity condition. Risk premium may help to explain the phenomenon, however we also aware that risk premium dynamics is similar to a random walk variable rather than following fundamental factors that can be explained by theory. Hence, we need to re-look the paradigm of free capital mobility as well as the interest rate parity theory, such as the Mundell-Fleming theory and the Dornbusch over-shooting model, in order to better understand the increased volatility of capital flows. Those kind of the things that we have to understand as the second characteristic.

The third characteristic is on the policy response. If we look at both in the advanced countries and the emerging countries, the policy responses are becoming less effective now. Advanced countries in the past formulate their monetary policy based on policy rules, such as the Taylor rule, Yellen rule or other rules, especially in the context of inflation targeting framework. However, when the interest rate is near or zero, the inflation targeting framework becomes less effective. Recently, we witness the implementation of unconventional monetary policy namely the quantitative easing (QE). In the past, we have learned that if we use interest rate channel then the quantity channel will adjust. But now we cannot only rely on interest rate policy for monetary policy response. We have to combine the interest rate policy with the quantitative policy, whereby in the past we learned and also taught student that this is not the proper way. This is the third characteristic.

The fourth characteristic is digitalisation. There are so many digitalisation, but I just want to talk about the digitalisation in the financial services. In the past financial services are being provided in one room by the banks and financial institutions, through deposit, lending or financing, and assets management services. Those financial services are becoming unbundled by digitalisation with the rise of fintech in the area of payment, crowd funding, peer-to-peer lending and assets management. Even in the financial market the trading is no longer conducted by people but by machine through artificial intelligent. How can the phenomenon of digital era such as of the unbundling of financial services, the use of the machine learning in trading, the transmission of monetary policy, the inter-relation function of financial services be explained from the conventional theory of financial services? Last but not least, how can we understand the central bank role on those aspects where we are facing with the emergence of digital currency such as libra and bitcoin.

In the second part, I will discuss the response from the central bank perspective. Central banks in the past are being taught to have a single objective of price stability and the use single instrument of interest rate. In Bank Indonesia's case, we had Bank Indonesia rule as opposed to the Taylor rule and Yellen rule. When I was an executive director in the IMF, representing 13 member countries in the region during 2007 and 2009, I witnessed the fall of financial services and monetary transmission mechanism globally. I also saw the fall, or at least the diminishing, of implementation of inflation targeting framework. I learned that the mandate of central bank cannot be only confined to price stability. Central bank must have a mandate of supporting financial stability because otherwise price stability cannot be achieved without financial stability thereby effective transmission as well as financial stability cannot be achieved if we cannot maintain the stability of the price and assets price.

The mandate of central bank must have promoting financial stability in addition to price stability. On the monetary policy side, even we have to complement interest rate policy with some aspects of exchange rate stability, some aspects of also managing the quantitative of money in circulation. On the financial stability area, the importance of macroprudential policy is increasing. The role of macroprudential policy, by definition, is to promote financial stability into two aspects. Managing cross-section systemic risks as well as time dimension of systemic risks, what we call financial

pro-cyclical. Those aspects of macroprudential policy must be complemented by the standard of monetary policy for achieving the price stability.

This is what I call the central bank policy mix. IMF calls it integrated policy framework, BIS is now discussing how to merge the theory and practice of central bank policy, but Solikin and I already wrote a book on that area. The Indonesia version of the book was published three years ago. More recently, Emerald published the English version titled “Central Bank Policy: The Theory and Practice” (Warjiyo and Juhro 2019). This book represents accumulation of all our knowledge, my knowledge, and Solikin’s knowledge on the theory, empirics, and policies. Chapter thirteen, fourteen, and fifteen especially discuss the subject of central bank policy mix. Now is just the right time to apply the central bank policy mix, in the era of diminishing of globalisation and the rise of digitalization. This is the first aspect on the central bank policy mix.

The second aspect is the institutional setting of public policy mix in the central bank as well as on the public institutions. In the past each public institution is assigned one objective with one instrument; central bank with price stability and interest rate policy; fiscal authority with fiscal rule and fiscal sustainability; financial services authority responsible for financial stability with microprudential corporation supervision. There are ongoing debate globally whether the independence of central bank is still valid. From my point of view, I believe those institutional setting are still valid. However, I emphasise the need of simultaneously coordinate the policy within a solid synergy. The independencies of central banks must be put together in the simultaneity through coordination with public institutions as each of the equation cannot work alone. This is the policy coordination and synergy that we adopt in Indonesia.

The third aspect is the era of rising digitalisation, which is very challenging as there are still a lot of things to uncover. When we are facing unbundling of financial services through fintech and e-commerce, the central banks need to understand and response properly. The fundamental thinking is that monetary policy and financial system stability policy can still be utilized to address the digitalization in the financial services, including in the payment system. This is why in 2019 we unveiled the first ever central bank policy response in the digitalisation of economic and financial services through the Indonesia Payment System Blueprint of 2025.

In this blueprint, we need to integrate economic and financial in the era of digitalisation end-to-end process. Similar with the process in money supply where we use paper money or account based, the money issued by central bank are transmitted to the bank and circulating to the fintech and real sector and return to the central bank at the end of the day. These whole aspect of money supply process still can be used as basic reference. The second aspect of our Indonesian Payment System Vision is making the digitalization of the banking as the core of the ecosystem. We opted not to let the unbundling of financial services to grow outside the core banking. We are still promoting the growth of the fintech, the crowd funding, the peer-to-peer-lending, and the payment system, but we try to interlink those fintech with digitalization of the banking to avoid shadow banking as experienced by other countries as it possesses the risk to diminish the role of central bank and the financial services.

The fourth aspect is to find the balance between innovation versus stability and risk management, as well as know your customer and competitive policy. Last but not least, we have to deal with cross-border digitalisation of financial services to better manage capital flows and other aspect of financial services from global perspective. As an example, on August 17th 2019 we launched our Quick Response Indonesian Standard (QRIS) which aims to encourage transaction efficiency, accelerate financial inclusion, and advance Micro Small Medium Enterprises (MSMEs).

Understanding the digital economy and finance are very important and this is my new baby. The issues that I everyday try to understand with my knowledge of monetary, central bank, financial aspect in the digitalisation of economy and finance. It is a very fascinating time and hopefully I will have the luxury of time to write a book on central bank in the digital area.

Closing

With the above-mentioned exploration, I invite all professors and scholars to study, to explain the underlying theory, provide some empirical assessment, and provide some policy response so all of us, myself as governor, and other governors have a better understanding and a better response.

I do hope the next five days will be enriching and will prove to be a very fruitful and beneficial event, not only for me, but for all of us to learn new things, especially the participants, towards a new dimension of central banking. Once again, welcome to this prestigious forum. Thank you.

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