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Macro-financial Linkages: Issues and Challenges

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Respected Chairperson

Esteemed Discussants

Distinguished Participants Observers and SEACEN Strategic Collaborators

Ladies and Gentlemen

1. Let me first congratulate fellow Governors of the SEACEN Board, Executive Director, and staff of the SEACEN Centre at this occasion of celebrating 30th anniversary of the SEACEN Centre. Our collective effort supported by several non-members and institutions has taken this organization to a new height which is reflected in its growing attraction. While celebrating this event, the Centre has created an opportunity for many central bank Governors to visit the Centre, may be for the first time to some of us - at least in the Governors' capacity. I also appreciate the Centre's initiative to carry forward discourse on financial stability and particularly on an evolving and increasingly popular issue of macro-financial linkages. We all know that this issue has drawn the interest of central bankers and macroeconomic policy analysts, particularly with the advent of the financial crises. I would like to sincerely thank the Centre for giving me this opportunity to share some of my thoughts in this area to this august gathering of fellow Governors and other dignitaries.

Fellow Governors,

2. A key feature of recent financial market development has been the close and immediate feedback between the real economy and financial conditions. We have observed that in many countries, the credit and



housing boom that preceded the recent financial crisis went hand in hand with strong spending and production. And during the economic crash, deteriorating financial conditions helped cause the recession and in turn exacerbated the deep declines in economic activity. This is manifested in the extraordinary financial market dislocations coinciding with a global macroeconomic free fall. Such a macro-financial linkage has brought public policy makers, macroeconomists and finance economists together to better understand the important aspects of the recent intertwined financial crisis and economic recession.

3. We know that there are strong theories and vast empirical literature regarding the effects of monetary policy on output and other macroeconomic aggregates. Also, there is a rapidly growing literature that pays special attention to monetary policy shocks (defined as the portion of the central bank policy variation not caused by systematic responses to variations in the state of the economy) which affect output with long delays, that their effect is highly persistent, and this accounts for the movement in aggregate price levels. But macroeconomic effects of monetary policy often differ from one study to the next with regard to both their timing and magnitude. However, the feedback from financial sector to the real economy is an emerging subject from both the theoretical and empirical aspects. Empirical studies show that financial market crashes decrease aggregate demand through a reduction in wealth and a rise in the cost of capital. This may also reduce consumer spending and real investment. Thus, stock market disturbances can produce additional stress on the economy, possibly leading to intervention by the central bank. Often times, the monetary authorities may react to movements in stock prices in order to stop bubbles from getting out of hand, or alternatively try to prop up the stock market following a crash through adopting an expansionary policy stronger than the one indicated



(by straightforward effects on aggregate macroeconomic variables). Central banks would do so if stock market crashes have the potential to destabilize the financial system and to produce more stress on the economy.

4. Over the last few years there have been dramatic changes in the operation of the financial system and the conduct of monetary policy, with the emergence of new ideas on how monetary policy affects real economic activities, leading to further evolution in our understanding of the macro-financial linkages. The advent of recent global financial crisis has exposed more complex and intricate linkages in the transmission mechanism of monetary policy. Consequently, the central bankers and policy analysts have now begun to focus their attention from traditional monetary system to the entirety of financial system and its linkages to the real economy.
5. Empirical studies suggest that monetary authorities take disruptions in the financial market into account when assessing monetary policy. A monetary authority's response to asset price movements is also taken as an expanded mission for monetary policy, but there are concerns that it might complicate inflation targeting procedures. It is argued that monetary policy is a macroeconomic policy tool that should be used for macroeconomic purposes, not for a single market or localized events, as in the financial market. However, as suggested by advocates of central bank intervention (in case of financial crisis), asset price movements may lead to sizeable debt build-ups, weakened balance sheets and financial imbalance which can generate financial instability and in turn, macroeconomic fluctuations. As monetary policy contractions and stock market collapses both have real effects on economic activity, monetary authorities have to take these facts into account when developing an optimal policy.



Distinguished Participants,

6. As greater trade and financial integration has contributed to many recent episodes of global financial crisis and have thus made more complex the maintenance of financial stability, the roles of central banks are also changing so as to address these newer challenges. The macro-financial inter linkage suggests that the direction or causality is potentially both ways, i.e., there is a feedback loop. Moreover, recently there has been considerable discussion regarding the appropriate monetary policy selected during the aftermath of a financial crisis. This suggests that there is a relation between monetary policy and financial stability, but there is still no clear consensus on how one affects the other. It is argued that the key problem facing monetary policymakers is not stock market crashes, but rather financial instability. Also not all stock market collapses are associated with financial instability, for they also arise from other sources such as a banking system crisis.
7. Some empirical studies reveal that monetary policy and financial shocks have significant effects respectively on output, price level and on other variables. It is then suggested that the central bank has to take the effects of financial collapses into account when conducting monetary policy, even when targeting price stability. We also find series of macro-financial research that focus on the linkages between interest rates and the economy. As a theoretical matter, asset prices and the macro economy are inextricably linked, as asset markets are the mechanism by which consumption and investment are allocated across time and types.
8. The nature of macro financial linkage is changing as there is both the trend for development of financial sector as well as greater trade and financial integration in the global economy. This can be reflected in the 'depth' and 'extent' of the financial system. The depth of financial linkage



is analogous to the depth of financial system. Traditionally, it involves indicators of banking institutions' activities such as the ratio of private sector credit to GDP. The sophistication of providing services, i.e. through technological innovation, is also reflected in the depth of financial system. This reflects the extent of interconnections between the real economy and the financial system. On the other hand, there is no consensus on the 'extent' of financial system; however, it can be characterized as the breadth of financial services, which includes deposit taking money market, capital market, and insurance market institutions, among others.

9. There is a widespread consensus regarding the impact of changes in financial conditions on real economy, particularly on household and business spending decisions. But, quantifying the overall strength of this linkage has been a great challenge for policy makers. A number of empirical literatures have shown relative role of the various monetary transmission channels through which the monetary impulses transmit to growth, employment and overall economic development. Traditionally, the transmission mechanism of monetary policy has been explained through either interest rate or exchange rate channels. With the deepening of financial markets and global integration, the development of other transmission channels namely, credit availability, asset price, and liquidity channels, have evolved to explain the financial sector linkages to the real economy. The effectiveness of either of these channels depends on the structure of the economy and the stage of financial system development.

Ladies and Gentlemen,

10. The macro-financial linkages could be analyzed from different channels, namely the credit channel, wealth channel, exchange rate channel and monetarist channel which also suggests a wide perspective of such links. In this regard, there has been a voluminous discussion, especially after the



global financial crisis beginning later 2007, on the effect of the macro-financial link such as on real business cycles – i.e. the finance accelerator and the relationship with the 'external finance premium'. In this regard, a BIS working paper identifies three channels which exist between the financial and real sectors - namely the borrower balance sheet channel, the bank balance sheet channel and the liquidity channel. The borrower balance sheet channel refers to both firms and household whereby lenders are unable to fully assess and monitor relevant risks as well enforce fully their repayment of debt. The bank balance sheet channel refers to financial institutions, which affect their lending behavior and affects economic activity. The liquidity channel refers to banks ability to extend credit and in turn to affect real economic activity. However at a fundamental and basic level, these channels simply suggest how financial markets efficiently allocate resources and risks to facilitate wealth accumulation, which leads to overall growth and development.

11. One way the macro-financial link can be characterized is via the textbook IS-LM analysis of the real and monetary sectors, where changes in the interest rate, i.e. the cost of funds, leads to an opposite change in national income via allocation of investment since an interest rate rise indicates a rise in the cost of funds, a reduction of both credit demand and investment, leading to an overall reduction in national income. Thus, interest rate can be specified as an instrument of the macro-financial linkage connecting the real sector with the financial markets, which provides information for the efficient allocation of scarce resources (financing) as well as a measure of risks via external finance premium. Given this characterization, we can also sense the role of monetary authority in affecting the macro-financial linkage. This is reflected in the monetary authorities' choice of the transmission mechanism relevant for their respective economies. Based on the above characterization, this is



reflected in the credit market, where supply of credit meets its demand as determined by the interest rate.

12. More recently, macro prudential measures exercised by the regulatory authorities affect the financial market along with the interest rate. Macro prudential regulation, specifically Capital Adequacy Ratio (CAR), credit to deposit ratio, loan-to-value ratio, liquidity ratio, single borrower obligation or sectoral credit restrictions influence the quantity of available credit. A higher CAR affects lending standard and the quantity of credit made. This categorizes the credit market into risk profile and accordingly the amount of credit available in the market (which will also affect the structure of the interest rate). This can be taken as a time varying external finance premium, which affects the economy business cycle (and is described as amplifying the effect of shocks hitting the economy).
13. The 'nature' of the macro-financial linkage is changing, as there is a trend of economies' internal financial deepening and greater trade and financial integration with the global economy. Let me start the discussion from closed economy case followed by open economy and then the depth and extent of the linkage.
14. The 'depth' of the financial link is analogous to the depth of the financial system. When banks are the only regulated institution which can provide loans, this could be a relevant measure of the credit depth of the monetary system. This measure would be too narrow when there are more institutions than banks doing the credit operation. The sophistication of providing services i.e. through technological innovation, have also to be reflected in the depth of the financial system. On the other hand, for 'extent' of the financial system - and as mentioned earlier - there is no consensus on this definition. However, it can be characterized as the breadth of financial services. The former is classified as an indirect source



of financing while the later is characterized as a direct source of financing (similarly with the above measure for the monetary system, depth of the direct financing system can simply be taken as the stock market capitalization and outstanding domestic private debt securities to GDP ratio) with other non-regulated forms of the financial system being a part of them. The depth and extent of the financial system in a closed economy indicate the 'nature' of the macro-financial linkage and thus gives information to the monetary authority for maintaining domestic financial stability.

15. The above description of financial system development is only one of the contributors to the nature of the macro-financial linkage. As I had mentioned earlier, the discussion of the linkage from a closed economy perspective has to be changed to an open economy context with higher degree of globalization (reflected in economic and financial integration). There is also a cross-cutting effect which relates to the flow of credit. The major contributors for analyzing the flow of credit is its ability to move beyond domestic borders and are affected by both the state of the capital account and the exchange rate regime in the domestic economy. Thus having a more liberalized capital account, where there are fewer controls and restrictions on the mobility of funds, as well as having a more flexible exchange rate make the flows of credit more responsive; and thus make it harder to predict the magnitude of the macro-financial linkage.
16. Let me also refer to some empirical studies on macro-financial links and factors which affect them. Empirical results from US data from 1961:1 - 1996:2 suggests that there is the presence of a macro-financial linkage in the US and that domestic monetary policy management has been effective in influencing the output gap. The same exercises with an update in 2009 suggest that securitization (i.e. activity that pools various types of contractual debt and sells them as bonds or securities) activities dampen



the interest rate elasticity of output in the US. The result implies that controlling for the relative share of securitized mortgages (i.e. in the property market) reduces the traditionally negative relation between output gap and real interest rates. The same methodology with data from South Africa suggests that the growing use of mortgage securitization in South Africa had, to some extent, eroded the general sensitivity of real output to monetary policy. A study done by SEACEN in 2010 shows similar but weakening link of traditional monetary policy. The above results suggest that there are unexplained factors which are not adequately captured, but which influence economic growth. These unexplained factors are of concern since they complicate monetary policy management. The unidentified factors, lumped together are mostly reflected in 'shadow banking' which I will discuss later.

17. Let me delve a bit on whether monetary policy continues to impact the real economy directly or through the financial system, and whether assigning single objective to monetary policy like that of controlling inflation is still a valid proposition. The traditional interest rate channel of monetary transmission is a key component of how monetary policy effects are transmitted to the real sector. This channel explains the impact of changes in interest rates on the cost of capital and hence on business and household investment spending. As we know, a lower real interest rate leads to higher investment (fixed, residential housing, inventory, etc.) and consumer spending, and this result in higher aggregate output and employment. Standard neoclassical models of investment explain that the user cost of capital is a key determinant of the demand for capital that has direct impact on real economy. But in the presence of extensive non-banking services, the traditional short term interest rate mechanism becomes weak to affect the real economy.



18. The exchange rate channel also involves interest rate effects when capital flows are open. As domestic real interest rate falls, return on domestic assets declines and hence it becomes less attractive relative to that on foreign assets. The interest rate arbitrage may lead to an outflow of capital pressing to depreciation of the domestic currency. Thus, changes in the interest rate directly affect the exchange rate and hence the external sector. This mechanism of course is effective in those economies having open capital account and flexible exchange rate regimes. The changes in net exports following exchange rate movement have direct impact on aggregate output and employment. The sensitivity of exchange rate to interest rate plays vital role for the effectiveness of this channel. Small and more open economies tend to have larger effects through this channel.
19. In the recent times, much attention has been paid to the credit availability channel in the monetary transmission process. This channel focuses on the role of banks in financial system particularly in reducing the problem of asymmetric information. Credit channel particularly becomes relevant for small firms/borrowers as they cannot raise external financing sources through the capital market. This channel directly works through its effect on investment and aggregate output. Lower interest rates may not always lead to higher investment spending. They may be constrained by regulatory requirements. Availability of credit directly affects the borrowers' decision, leading to a change in aggregate output and employment opportunities.
20. The role of macro-prudential policies is particularly important for effective macro-financial linkages through credit channel. The macro-prudential measures are designed to manage pro-cyclicality and to reduce interconnectivity and systemic risk. An improved financial market infrastructure with prudential regulatory and supervisory framework is critical to strengthen monetary transmission through this channel.



Moreover, the enforcement of credit contracts needs to be strengthened to ensure reliable and rapid resolution of defaults, bankruptcies and disputes. The credit conditions provide an important conduit through which financial conditions affect real output. Improved credit conditions lead to greater availability of credit and reduction in spreads, which has significant impact on growth. And, only a stable financial market condition can ensure such uninterrupted credit flows

21. Monetary impulses are also transmitted through the asset (real estate and stocks) prices channel. Fluctuations in asset prices influenced by monetary policy impulses have important impact on the real economy. A higher monetary expansion lowers the interest rate and, consequently, stocks become more attractive thereby leading to a higher stock price. Conversely, lower interest rate raises the demand for real estate, resulting in a higher price. Asset price channel works through Tobin's q and wealth effects leading to a change in business investment and households wealth which consequently affects the aggregate output accordingly. In an abnormal financial market situation, this channel also gets disrupted and the real economy is adversely affected
22. Empirical studies on macro-financial linkages, which examine the role of credit markets in the transmission of macro-financial shocks through the prism of a financial conditions index, conclude that credit conditions dominate the market variables highlighting the importance of credit supply in the monetary transmission process. Some studies suggest that securitization activities dampen the interest rate elasticity of output implying that controlling for the relative share of securitized mortgages reduces the traditionally negative relation between output gap and real interest rates.

Distinguished Participants,



23. Let me now move on to shadow banking and its implication for macro-financial linkage analysis. The 'shadow banking system' can broadly be described as credit intermediation involving entities and activities outside the regular banking system. The shadow banking system can become a source of systemic risk, especially when it is structured to perform bank-like functions like mobilizing current or call deposits, undertaking off-balance sheet activities, doing maturity transformation, and leveraging and when their interconnectedness with the regular banking system is strong. The interconnectedness implies that any shocks in the shadow banking will be transmitted to the proper banking system with a bearing to the real sector as well. Therefore, Financial Stability Board suggests that appropriate monitoring and regulatory frameworks for the shadow banking system needs to be in place to mitigate the build-up of risks. The Board also recommends that the mostly entity-based focus of the 'macro-mapping' should be complemented by obtaining more granular data on assets/liabilities (e.g. repos, deposits) or expanding activity-based monitoring, to cover developments in relevant markets where shadow banking activity may occur.
24. Despite that shadow banking system plays an important role in the economy by ensuring credit intermediation through extension of credit or through facilitating its intermediation, two concerns arise with the use of shadow banking system: (i) systematic risk concerns; and (ii) regulatory arbitrage concerns. The former predominantly deals with activities that generate maturity and/or liquidity transformation, that involves flawed risk transfer, and that create or facilitate leverage, much like banks however using non-deposit instruments without an 'explicit official sector backstop and/or without being subject to the same prudential standards and supervision'. Thus this implies that there may be a built up of leverage within shadow banking system. This has implication on pro-cyclicality



within the economy (i.e. shadow banking system can facilitate high leverage when asset prices are high and vice versa). The latter deals with activities for circumventing and undermining bank regulation, which generally has more restriction and supervision. This is attributed to the interconnectedness with the banking system where funds can easily move to take advantage of different regulations regarding assessing risk – this will lead to an unnatural buildup of leverage and risk in the system.

25. There are several challenges posed by shadow banking system in macro-financial linkages. This in large part may be due to regulatory arbitrage concern, where funds move between the regulated and unregulated banking system and vice versa. This interconnectedness 'raises systematic concerns and can exacerbate the pro-cyclical build-up of leverage and thus heighten the risks of asset price bubbles', for example, property markets which has a bi-directional feedback to the financial sector. This is more concerning with financial integration where credit is internationally mobile and affecting financial stability. Thus and based on the market situation, the nature of the link may be very fluid and dynamic, more volatile, makes warning of contagion effects more difficult and thus has made the job of identifying stress as well as monetary policy management more complicated.
26. Given the discussion and since shadow banking appears outside the scope of regulation but has an important impact in regard to monetary policy management, I feel that the monetary authorities have no choice; and they are compelled to address this issue. In my view, an important first step in addressing this challenge to monetary policy management is to enhance the monitoring framework on shadow banking system. In this regard, I want to emphasize that enhancing data collection is very important. This includes the quantitative approach from both the macro and micro perspective and qualitative information (i.e. market intelligence). The need



for enhancing better system wide data has also been voiced in a number of forums. In parallel, the scope of regulation of the non-banking sector in credit creation must be expanded, which in my view may necessitate coordination among domestic regulators. This may eventually be visualized to harmonize and open the channel of communication between different regulators (both domestic and international) and perhaps initiate the unification of these fragmented regulations to fully encompass the financial system. In my personal opinion, such activities will enhance our early warning ability.

Ladies and Gentlemen,

27. Let me now turn to the relative importance of various channels which are particularly relevant for low income economies. The relevance of these mechanisms vary over time and across countries, depending on the degree of institutional development, depth and size of financial markets, modalities for conducting monetary policy, degree of financial integration, among others. Given the characterization of various transmission channels, we can also sense the role of the monetary authority in affecting the macro-financial linkage. This is reflected in the monetary authorities' choice of the transmission mechanism relevant for respective economy.
28. As I explained before, the transmission process evolves through both price and quantities of credit. In price-mediated mechanisms, monetary impulses affect real economic activities through its effects on interest rates, asset prices and exchange rates. Given the existing monetary, financial and exchange rate framework and poor linkages among the financial variables, interest rate and exchange rate channels of monetary transmission have not been so effective in explaining the macro-financial linkages in the low income economies. This is because in these economies



real economic activities are less elastic with the price-mediated transmission channels. Additionally, in low income economies, where the informal financial market exists with high interest rates and the limited supply of fund cannot sufficiently meet the demand for credit, availability rather than cost of capital primarily determines the investment demand.

29. Empirical evidence have also shown that in emerging and developing economies with underdeveloped financial markets, quantitative regulations on credit, significant degrees of dollarization, and weak sensitivity of exchange rate with interest rate, the price-mediated channels, viz. interest rate and exchange rate channels, are less effective in explaining the monetary transmission process. Likewise, the asset price channel that also requires deep and sophisticated financial markets is less likely to explain the monetary transmission process in these economies. Such price-mediated mechanisms are supposed to be more effective in advanced economies in normal times but, they become more relevant again in the management of the financial crisis. This can be evidenced from the recent experience of many central banks, which provided liquidity not only by lowering interest rates but also by easing credit during the financial crisis.
30. The recent experience of the global financial crisis has highlighted the relative strength and weaknesses of monetary policy transmission mechanism. In particular, interest rate and exchange rate channels seem to be quite limited in some countries, while the credit channel appears to be stronger in some other countries. However, the weak interest rate pass through should not be interpreted as total ineffectiveness of this channel. The other factors, such as changes in risk premium and investment environment, could also offset the effects of interest rates on investment spending.



Ladies and Gentlemen,

31. Global experiences and a number of empirical works have shown a strong correlation between financial sector development and economic growth, with the causation running in both directions. A developed financial sector is better able to allocate resources and thereby promote economic growth. In the reverse direction, economic growth generates demand for financial services and spurs financial sector development. A downturn in economic activities lowers household and business income, which ultimately reduces the financial resources thereby adversely affecting the financial system. Moreover, decline in household/business income results in lower saving, leading to a higher interest rate or cost of capital.
32. Both borrowers' and banks' balance sheet positions are important in considering the real and financial transmission channels. Banks' balance sheet influences their ability to extend credit, which has direct impact on real economic activities. Weaker macroeconomic conditions reduce the profits of businesses and incomes of households, which results in slower increase or in some cases decrease in net worth. Moreover, weaker business revenues and household incomes push up borrowers' default risks, which in turn weaken the position of banks' balance sheets. Probably, the speed of this reversal mechanism (from real to financial sector) is slower but, the results may be more pervasive!

Ladies and Gentlemen,

Let me now conclude.

33. In the context of changing economic and financial landscape, understanding the evolving monetary transmission mechanism and its linkage to both the real and financial sectors is crucial for the macro policy makers. The issue of macro-financial linkages has regained its importance particularly after the advent of recent financial crisis, which



has made it increasingly complex. It is, therefore, critical for the central bankers to assess the nature of linkages, strengthen macro-prudential oversight accordingly, know how long it takes before their actions fully transmit to the economy and what determines the speed of transmission. The deepening financial liberalization and higher financial integration have a deep and pervasive impact on the monetary transmission mechanism, which also suggests a 'blurring' of the traditional macro-financial linkage. The pro-cyclical nature of financial sector in amplifying macroeconomic volatility has made monetary management even more complex.

34. The recent financial crisis has renewed the interest in exploring the linkages between financial variables and real economic variables. The central bankers are now facing obvious policy challenges in conducting monetary policy in an environment where financial development seemingly matter for their target variables. But, the question is how exactly do these macro-financial linkages work? Experience and the recent empirical works have called for the identification of more explanatory financial indicators that link the transmission process effectively.
35. The ever changing financial sophistication and their relationship to financial indicators, cross border financial integration and existence of shadow banking, particularly in low income economies, are magnifying the complexities in analyzing the extent of macro-financial linkages. We central bankers, therefore, need to be alert to the implications of such challenges and calibrate our policy responses to macroeconomic developments. For this, the policy authorities should enhance greater coordination and adequately monitor the financial system with upgraded data collection as well as analysis techniques.



36. Finally, I would once again like to express my sincere appreciation to the SEACEN Centre for providing me this opportunity to share with you all some of my views in such an important theme.

Thank you very much!



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