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A MACROPRUDENTIAL APPROACH TO FINANCIAL SUPERVISION AND REGULATION: CONCEPTUAL AND OPERATIONAL ISSUES^{*}

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I. Introduction

A class of financial terminologies that begin with macroprudential such as macroprudential policy, indicators, monitoring, analysis, concerns, vulnerabilities, and risk has been used with increasing frequency in the discussion of the assessment of the health and safety of the financial system in recent years.

Microprudential concerns, however defined, put emphasis on the need to orient financial supervision and regulation toward maintaining financial stability from the traditional approach to consumer protection. Reflecting this change, Crockett (2000) proposes “marrying the micro and macroprudential dimensions of financial stability.” This was followed by the construction of a macroprudential framework for financial supervision and regulation (Borio 2003) and a framework for macroprudential policies, which include monetary and fiscal policy in addition to prudential controls at the financial supervisory institution (White 2004).

Macroprudential analysis and policy has a relatively short history of development. A series of financial crises in the 1990s has elicited growing attention on the macroeconomic and institutional aspects of stability of the financial system in the domestic and international policy circles, underscored the importance of building resilience of the financial system to external shocks, and subsequently spawned the use of macroprudential terminologies.

The supervisory institutions are traditionally entrusted with the

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responsibility of ensuring safety of individual financial institutions to protect depositors and investors, and do not have direct responsibilities for stability of the financial system as a whole. However, this traditional view has been challenged by those who argue that the supervisory authority has an important role to play in safeguarding against financial distress in cooperation with the central bank and fiscal authority. This view has gained credence as an increasing number of countries have chosen to create independent supervisory institutions.

The financial stability assessment program at the IMF highlights macroprudential analysis as an integral part of the strategy for promoting financial stability. The BIS has taken a step further by developing a macroprudential framework for financial supervision and regulation. Although there is a growing literature on macroprudential supervision in recent years, there appears to be a considerable disagreement on the desirable scope of such supervision. Indeed, there is no widely accepted definition of financial stability, and the framework of macroprudential supervision is yet to be made operational.

This paper is an attempt to clarify some of the analytical as well as operational issues related to the construction of a macroprudential framework for financial supervision and regulation. To set the stage for the discussion, Section II examines the context in which various macroprudential terminologies, including macroprudential orientation of financial supervision, are used. This is followed in Section III by a discussion of the rationale behind the macroprudential analysis and policy in the conduct of financial supervision and regulation. Section IV is devoted to outlining an appropriate operational scope and modality of macroprudential supervision. Concluding remarks are in a final section.

II. Conceptual and Operational Definitions: What Macroprudential Means

Although the word “macroprudential” has found its way into many discussions on financial stability analyses and financial supervision and regulation, many macroprudential terminologies are not often clearly defined; as a result they often mean different things to different authors.

According to Sundararajan et al. (2002), “macroprudential analysis is the assessment and monitoring of the strengths and vulnerabilities of financial systems in terms of macroprudential indicators comprising both financial soundness indicators and other macroeconomic indicators such as GDP growth and inflation along with information on the structure of the financial system, qualitative information on the institutional and regulatory framework, particularly through assessments of compliance with international financial sector standards and codes, and the outcome of stress tests”. Financial soundness indicators are in turn those indicators “compiled to monitor the health and soundness of financial institutions and markets, and of their corporate and household counterparts,” and they include “both aggregate information on financial institutions and indicators that are representative of markets in which financial institutions operate” (p. 2).

For its guidance on conducting financial sector assessments, the IMF (2005) has developed a general analytical framework and specific technique and methodologies for assessing the overall stability and development needs of financial systems in individual countries and designing policy responses. One of these tools and techniques is macroprudential analysis, which includes “stress testing, scenario analysis, and analysis of financial soundness indicators and of macrofinancial linkages” (p.4). Macroprudential analysis as it is defined by Sundararajan et al. (2002) is therefore the same as the overall framework for financial sector assessment outlined in the Financial Assessment Handbook (IMF 2005). The same Handbook lists it as simply an analytic tool: the IMF has two different definitions for the macroprudential analysis.

The IMF Handbook (2005) points out that a sound and well-functioning financial sector is built on the three pillars that are necessary to support orderly financial development and sustained financial stability. One of the three pillars is macroprudential surveillance and financial stability analysis, which is to monitor the impact of potential macroeconomic and institutional factors on the soundness (risks and vulnerabilities) and stability of financial systems. The other two pillars are (i) financial supervision and regulation and (ii) financial system infrastructure.

In a series of papers published by its staff (Crockett 2000, Borio 2003, and White 2004), the BIS has taken up the second pillar to articulate the need to emphasize macroprudential dimensions and orientation of financial

supervision and regulation for financial stability. While Crockett (2000) and Borio (2003) focus on a macroprudential framework for financial supervision and regulation designed to “limit the risk of episodes of financial distress” (p.2) as opposed to microprudential supervision aimed at protecting consumers, White (2004) develops a broader framework for macroprudential policy, which subsumes the macroprudential supervisory framework as its subset.

Crockett (2000) and Borio (2002) highlight the differences between micro and macroprudential dimensions in terms of the objectives of financial supervision and regulation and the supervisory mechanism influencing economic outcomes. The macroprudential objective is to limit the systemic risk as a systemic crisis could result in the failure of the financial system whereas the microprudential objective is to limit idiosyncratic risk individual financial institutions are exposed to. The macroprudential perspective focuses on the overall health and soundness of the financial system. The macroprudential supervisory standard is derived from a top-down approach whereas the microprudential one is a bottom-up approach. In terms of conceptions, the systemic risk the macroprudential approach focuses on is endogenous as it is determined by the collective behavior of individual institutions whereas the idiosyncratic risk is exogenous.

The differences between the two supervisory and regulatory approaches are summarized in Table 1.

Table 1 Micro and Macro Approach

	Macroprudential	Microprudential
Objective	Limiting systemic risk of the financial system: mitigating the failure of a large segment of the financial system.	Limiting idiosyncratic risk of individual institutions: protection of depositors and investors
Implementation of supervisory controls	Top-down: setting prudential control in terms of the probability and costs of systemic distress	Bottom-up: setting and aggregating prudential control in relation to the risk of each institution

Characteristics of risk	Endogenous: Originating in the collective behavior of and interactions between institutions	Exogenous: Given to individual institutions and the disregard of feedback of collective actions
Common exposure to systemic risk	Relevant and important: causes of the fallacy of composition	Irrelevant
Use of instruments	Standard prudential tools plus linking provisioning and pricing of risk to the volume of loan	Uniform solvency standards and codes of conduct
Focus of supervision	(i) A greater weight given to banks and larger and more complex institutions; (ii) Market monitoring: and (iii) Countercyclical orientation	Protection of individual institutions

Sources: Crockett (2000) and Borio (2003)

According to Crockett (2000), microprudential supervision is liable to two critical weaknesses. The emphasis on the soundness of individual institutions may result in excessive protection which will weaken market disciplinary and allocative mechanisms without necessarily securing the safety of these institutions. Indeed the soundness of individual institutions is neither a necessary nor sufficient condition for the stability of the financial system as a whole. As Goodhart (2004) points out, depending on the nature of the interlinkages among financial institutions and markets it is possible that financial systems containing individually weak institutions may nevertheless be systemically robust and vice versa (p.9).¹ Another

¹ Goodhart cites the Japanese experience in the 1980s as an example in which banks were strong individually, but they were systemically weak in the face of the bursting of

weakness is that the microprudential approach may not be able to deal with common exposures of financial institutions and markets to macroeconomic risk factors, thereby failing in monitoring the increase in the systemic risk and taking appropriate remedial actions. The macroeconomic factors include such exogenous developments as a sudden supply-induced change in the price of oil, but also endogenous changes as in speculation in the asset market that would feed and be fed by rapid credit expansion.

What then, would be the precise nature of the role of the supervisory institution in formulating policy response to an impending financial disturbance? While it is intuitively clear that the supervisory institution has an important role to play in assessing financial stability and in responding to emerging financial imbalances, the precise contour of the macroprudential supervision in monitoring, analyzing, and participating in the designing of policy responses to an impending financial stress is not clearly defined. The proponents of the macroprudential framework for financial supervision do not necessarily propose either the creation of new prudential controls at or adding new functional responsibilities to the supervisory authority; they are advocating the adjustment of the traditional modality of supervision in a way that will contribute to mitigating systemic risks.

In a recent paper, White (2004) argues that the resolution of or a policy response to macroprudential concerns of avoiding the problems resulting from financial systemic imbalance (financial instability) with their attendant heavy costs in terms of output and employment requires a macroprudential framework for financial stability that encompasses the use of macroprudential instruments of the financial supervisory institutions as well as the use of monetary and fiscal policy. As noted before, the macroprudential framework for financial supervision would be one of its subsets. He claims that such a broad policy regime can provide critical information needed for financial stability about the distribution of risks and various systemic vulnerabilities stemming from the transfer of one type of risk into another through the interplay among market participants. The framework may also have advantages as it could facilitate policy coordination and institutionalize an integrated role of the central bank, the supervisory agency and the fiscal authority in limiting the expected losses

arising from system-wide financial excesses that could feed back on the real economy.

III. The Rationale

One of the lessons from the 1997-1998 Asian financial crisis is that structural weaknesses of the financial system exacerbate a crisis when it occurs though they may not trigger it. Asia's experience with the crisis leaves little doubt that the cumulative effect of financial imbalances could cause serious disruptions to the economy and interfere with real sector development. A second lesson is that when a financial crisis originates in the capital rather than current account of the balance of payments, as was the case in the Asian financial crisis, the traditional tools of monetary policy may not be as effective as they could be under different circumstances in moderating the virulence of and bringing to an end a financial crisis.

A third lesson is that in a global economy which has seen a sharp increase in the volatility as well as the volume of cross-border capital movements as a result of deeper integration of financial markets of individual economies both at the regional and global level, financial disruptions in one country could easily spill over into neighboring economies including even those with a strong and sound financial system, thereby destabilizing their financial systems as well.

These lessons have underlined the need to strengthen the foundations of domestic financial systems to build up resilience to the crisis contagion as well as the need to establish a system of policy harmonization and coordination at the regional and possibly at the global level for effective surveillance of capital movements and national financial systems. Both the IMF program for the assessment of systemic financial stability and the advocacy of a macroprudential framework for financial supervision at the BIS reflect these needs and the growing attention central banks and other policy authorities are paying to monitoring, analyzing, and devising policy responses to secure the safety and efficiency of financial markets and institutions.

Among the policy authorities, the central bank is primarily responsible

for the stability of the payment system as well as the clearing and settlement systems. It monitors the linkages between domestic and international financial markets, and serves as the lender of last resort. However, if monetary policy, though it is an essential component of any policy framework for financial stability, is limited in effectiveness in preventing the accumulation of financial excesses, then it reasons that the central bank alone cannot shoulder the burden of resolving financial distress and it has to coordinate its monetary policy with those of other policy authorities including the supervisory agency in managing systemic risks to the financial system. To complement and improve the effectiveness of monetary policy, for example, prudential tools at the supervisory authority can and should be employed in forestalling financial crises. This is one of the reasons for advocating the institutionalization of macroprudential supervision.

Even without introducing the macroprudential supervision, financial supervisory institutions help reduce the incidence of the run on the financial system and thereby preserve financial stability as they keep in check contagion of the failure of a financial institution by enforcing traditional prudential standards and codes of good behavior at individual institutions. Indeed, if individual financial institutions are healthy, sound, and efficiently managed, the likelihood of financial distress is expected to decline. The need to strengthen microprudential supervision is no less essential than before.

However, microprudential supervision alone is inadequate in managing the common exposure of financial institutions and market participants to an increasing array of common macroeconomic risk factors such as terms of trade deterioration, large capital inflows and outflows, incipient asset market bubbles, herding, and sudden changes in market sentiment and expectations. With the rapid progress in financial technology that has spawned an explosion of sophisticated financial products, it has become increasingly difficult to identify and monitor the distribution and the final resting places of new risks that these products create. Under these circumstances, the traditional microprudential approach is not sufficient to diffuse adverse market developments and market failures. It leads, therefore, to the conclusion that macroprudential risks and vulnerabilities dictate a macroprudential framework for financial supervision and

regulation that complements the traditional surveillance of individual institutions.

Another reason is related to the view that creating a unified financial supervising system independent from the central bank would improve the effectiveness of financial supervision and regulation. This view has gained ground recently. Accepting this view, a growing number of countries have gone on to establish a unified financial supervisory system covering all financial institutions and markets. If central banks were engaged in some types of macroprudential supervision before the supervisory oversight was separated out and transferred to a new independent institution, and most likely they were, they would certainly have tightened microprudential tools to restrain credit expansion to complement contractionary monetary policy in the up phase while relaxing them in the down phase of the business cycle. It should be noted that the macroprudential approach to financial supervision and regulation is not necessarily a new idea. The evidence for such a counter-cyclical management could be found at those banks that retain supervisory authority. When the supervisory function is separated from the central bank, then it stands to reason that the stability function needs to be shared by both the central bank and the supervisory authority.

A third reason that justifies macroprudential supervision is that a growing number of central banks have adopted inflation targeting as a framework for monetary policy in which the primary responsibility of the central bank is to stabilize prices of goods and services measured by a CPI or core price index. Many countries including emerging market economies have succeeded in stabilizing prices, but the price stability has not necessarily been accompanied by the stability of asset prices including those of housing and land. As a result, many countries have seen acceleration of asset inflation in an environment where prices of goods and services have been stable.

It has been suggested that in order to stabilize both the price of goods and services and assets, the CPI or core price index be replaced by a broader measure that includes housing and stock prices. However, it remains unclear whether asset prices help predict inflation and controversial whether monetary policy geared to stabilizing volatile asset prices will contribute to financial stability.

Finally, there is the problem of pro-cyclicality in the lending behavior

of banks and other financial institutions (Crockett 2000, Borio 2003, and White 2004). When the economy enters into an upswing phase of the business cycle, financial institutions expand their lending more than before in the belief that credit risk of their loans has decreased. In fact, lending for the financing of housing and commercial estate often is the major cause of a boom and a bubble. The credit expansion feeds and is often fed by the asset market boom. These institutions may realize that their lending operations may indeed create an asset market boom, sowing the seeds of a bubble, which will eventually burst. It would be in their interest to restrain their lending collectively, but there is no market mechanism that could bring about such collective actions among financial institutions.

Eventually the expansion phase or boom comes to an end and the economy enters the contractionary period of the business cycle. At this point, financial institutions become conscious of the potential increase in the credit risk of their loans and begin to recall the existing loans while refusing new credit extensions as the prices of assets, which are in part held as collateral, begin to fall. For an individual institution, cutting credit exposure is a rational decision, but if all institutions do the same, they end up deepening the contraction. This coordination failure dictates intervention on the part of policy authorities. Given the nature of the supervisory operations, the supervisory agency may be the authority to assume the market intervention.

Over the business cycle, the central bank is expected to tighten monetary policy to slow down the expansion and to reverse the policy stance during the downswing. However, depending on how vigorously it is tightened, monetary policy may not be effective in curbing the credit expansion, in particular when speculation sets in, in the asset markets. Furthermore, the central bank may be disadvantaged in gauging accurately the response of financial institutions to changes in the stance of monetary policy in the absence of supervisory oversight. Some of the prudential supervisory tools and scheme of dynamic provisioning could therefore be employed to strengthen the effect of monetary policy.

In view of the preceding discussion, the relevant question to be raised is not whether the supervisory institutions should orient their operations towards macroprudential supervision but how they should do it in cooperation with the central bank. However, the supervisory agencies are

not specifically entrusted with stability functions; they may also have not developed the expertise or culture of macroprudential orientation, while the central bank cannot exercise supervisory control at the level of individual institutions. These institutional constraints could hamper coordination of macroprudential policy, creating the danger that the policy authorities including the ministry responsible for fiscal and exchange rate policy may not be able to agree on the seriousness of financial distress once it arises and hence fail to devise a required collective policy response.²

IV. Making Operational a Macroprudential Framework for Financial Supervision

IV-1. A Framework for Macroprudential Policies

In contrast to the microprudential approach, the main objective of macroprudential supervision is to strengthen the safeguards against financial instability so as to prevent the accumulation of financial imbalances, thereby lowering the probability of financial crises that often result in the failure of banks and other financial institutions. This objective calls for an operational definition of financial stability and the construction of a rigorous framework for forecasting the emergence of financial distress. At this stage of discussion on prudential controls, the supervisory authority is not expected to replicate a policy regime as sophisticated as the one for monetary policy. However, in order to conduct macroprudential policies in a systemic manner, it needs to develop an analytical framework in which financial stability as the objective is quantified, operational targets and instruments of macroprudential policies are delineated, and, most of all, the emergence of potential systemic risk is predicted with a certain degree of

² The Bank of Korea publishes biannual reports on financial stability assessments. These reports do not include any discussion of macroprudential concerns and risk. The financial supervisory authority has only recently begun to collect macroprudential analysis. As a result, for almost ten years since the creation of the FSA, it appears that macroprudential vulnerabilities have not been fully addressed. Although a policy coordinating committee involving all major policy authorities was established in January 2004 and subsequently an Early Warning system (EWS) was constructed together with a manual for the crisis management, there has been no coordination efforts to develop a framework for macroprudential policies.

confidence.

As pointed out in the previous section, in assessing financial stability, it is important for analytical as well as policy purposes, to make a clear distinction between (i) a framework for prudential policies that comprise not only prudential controls at the supervisory authority but also monetary, fiscal, and foreign exchange rate policy and (ii) a macroeconomic framework for financial supervision and regulation. The former is, in fact, a macroeconomic policy framework where all policy authorities –the central bank, the supervisory institution, and the central government fiscal authority- are jointly responsible for maintaining financial stability. The latter refers to the macroprudential operations at the supervisory agency.

The framework for prudential policies is a macroeconomic policy regime in which all three policy authorities are expected to work together in detecting signs of the accumulation of financial imbalances and working out policy responses by selecting and setting the timing of implementation of policy tools at their disposal.

In this framework, therefore, efficiency of policy coordination together with a clear division of labor among the three policy authorities would figure importantly in achieving the objective of financial stability. In this section, the workings of the overall macroprudential policy framework are outlined first to be followed by a similar discussion of the macroprudential approach to financial supervision.

In the conduct of monetary policy, the goals are clearly defined. When inflation targeting is the framework for monetary policy, the ultimate goal of price stability is represented by a predetermined rate of change in the CPI or core price index. In this framework, the central bank has a set of policy tools at its disposal and operational or intermediate targets to aim for. The central bank monitors and analyzes a large number of economic indicators and makes use of macroeconomic forecasting models. In a similar manner, the three policy authorities will find it necessary to analyze and monitor a large number of financial stability indicators such as those identified by the IMF. This analysis will not be sufficient, however, because it cannot tell whether financial distress is in the making ex ante and explain the consequences of interactions of these variables, which are mostly endogenous. For this type of general equilibrium analysis, macroprudential analyses need to be supported by models of systemic stability that can

analyze and quantify aggregate financial stability (Goodhart 2004).

However, as noted by Aspachs et al. (2006), the pursuit of financial stability is far more difficult than that of price stability. In fact, at present, there is neither a widely accepted definition nor a quantitative measure of financial stability. According to the IMF Handbook on Financial Sector Assessments (2005), financial stability is broadly defined to mean “(a) an environment that would prevent a large number of financial institutions from becoming insolvent and (b) conditions that would avoid significant disruptions to the provision of key financial services such as deposits and investments for savers, loans and securities to investors, liquidity and payment services to both, risk diversification and insurance services, monitoring of the users of funds, and shaping of the corporate governance of non-financial firms” (p.4) .

Such a broad definition does not allow rigorous analyses of the causes and consequences of and policy responses to financial distress. As a result, most of the financial stability reports published by central banks are not backed by an overall coherent model that defines and quantifies financial fragility. As such, they are descriptive and lack the diagnosis and forecasting of financial stability.

In a series of studies, Goodhart (2004 and 2006) shows that a general equilibrium model based on a microeconomic foundation can be constructed to measure and predict fragility of the banking sector, not the overall financial system. He argues that a recent model he and his associates have developed qualifies as a full-fledged general equilibrium model and can be used as a practical framework to analyze the fragility of the banking sector (Aspachs et al. 2006). This model includes incomplete financial markets, heterogeneous banks, heterogeneous bank customers, endogenous default, and credit and deposit markets. An index of financial distress of the banking sector is defined in terms of the probability of default of the banking sector, which is chiefly related to bank profitability and the bank repayment rate. In this model, financial fragility is, therefore, an equilibrium phenomenon.

Recent studies on financial sector assessments have developed other less sophisticated and partial equilibrium approaches to defining and measuring financial distress, an extreme form of which is a financial crisis. Borio and Lowe (2004) propose a scheme in which the probability of

financial distress is evaluated in terms of a small set of variables that include the ratio of private credit to GDP, real asset prices, and investment. They show that over a three-year horizon, close to 60 percent of the crises are predicted in a sample of 34 industrial and emerging economies over the 1960-1999 period during which there were 38 crises. In a subsequent paper (2004), they find a similar pattern in emerging economies when an over-valued exchange rate is included as an additional variable.³

Illing and Liu (2003) derive an index of financial stress in terms of such variables as the probable loss, risk, and uncertainty compiled from the banking foreign exchange, bond and equity markets, and the banking sector of Canada. The authors show that their measures perform better than others in predicting the emergence of financial distress for Canada.⁴

The general equilibrium approach to the analysis of financial stability assessment developed by Goodhart and his associates is promising and in the right direction for a quantitative measure and modelling of financial fragility. Such a model can indeed be calibrated using the banking data to design policies. However, as Goodhart (2004) admits, these general equilibrium models suffer from many deficiencies. At this stage, the reliability and usefulness of this approach is not proven in emerging economies and is focused on the fragility of the banking system, not the overall financial system. Over time, these deficiencies will be removed, and the general equilibrium approach can be refined. Until then the policy authorities, in particular those from emerging economies, may have to be content with an index of financial stability to be selected from a variety of less sophisticated methods developed so far.

IV-2. An Operational Macroprudential Framework for Financial Supervision

As noted in the preceding sub-section, practicality and efficiency of an overall framework for macroprudential policy would require a division of labor with specific responsibilities for maintaining financial stability

³ The performance of the three variables is measured in terms of the noise-to-signal ratio. And in order to capture the buildup of financial distress, the authors use the deviations of the three variables from the levels of the time of assessment.

⁴ See Illing and Liu (2003) for a brief survey on the literature.

among the three policy authorities- the central bank, the fiscal authority (ministry of finance), and the financial supervisory authority.

One of the responsibilities of the supervisory authority would be to provide information on the health and efficiency of financial institutions and developments in financial markets pertinent to the assessment of financial stability, including the monitoring of various financial indicators, interpretation of scenario analyses, and stress testing for both individual financial institutions and banking and other financial industries. While this responsibility of supplying information and data is of crucial importance, the major task of the supervisory authority is to manage a macroprudential regime for financial supervision and regulation. Like any other policy regime, this one is also structured around the goal, intermediate targets, and tools of financial supervision.

- The Objective

Broadly speaking, the goal of the macroprudential approach to financial supervision is to maintain overall stability of the financial system in cooperation with other authorities. Since the assessment and monitoring of systemic stability has to be divided among the three major policy authorities, the role of the supervisory authority needs to be specified. That is, it is critical to agree on the scope of the macroprudential approach as part of the overall framework for financial stability (defined in terms of the specific operational tasks to be assigned to the supervisory authority). What would then be the goal of the macroprudential approach? To answer this question, it would be instructive to identify some of the most likely sources from which financial distress originates. Since these sources differ from country to country, this paper chooses to focus on emerging economies

One of the most prevalent sources is speculation in asset markets, in particular those for land, housing, and commercial real estate, which often leads to the boom-bust cycle of asset prices. In the run-up to a financial crisis or during the upswing phase of the business cycle, financial imbalances are often manifested in sharp increases in the prices of real and financial assets and investment in the construction industry, regardless of whether the causes of the imbalances are of domestic or foreign origin.

Other sources are likely to be speculative capital outflows and inflows, an unsustainable current account deficit, and a high degree of volatility in

the foreign exchange rate. Of these potential sources of financial instability, it appears that the supervisory authority has the comparative strength in controlling speculation in and stabilizing prices of real and financial assets as it has detailed information on and influence over the asset-liability management of banks and other financial institutions, which are often the major culprits of asset market speculation. Given this advantage in gathering necessary information, it would be logical to assign the task of stabilizing asset prices to the supervisory authority –in particular those of real assets- until more sophisticated approaches including the credit risk assessment model, which will help forecast the probability of default of banking and other financial industries, are developed.

As far as the supervisory authority is concerned, the most difficult decision to make in achieving asset price stability objective would be to evaluate whether asset price speculation is building up in a way that justifies a policy response in terms of prudential controls. In the absence of a general equilibrium model that can be used for determination and forecasting of asset prices, the supervisory authority will be constrained to rely on identification and observation of a number of asset market indicators that could help predict impending financial stability *ex ante*. In this regard, the most realistic option available to the supervisory authority is to construct an index of asset market stability *à la* methods developed by Borio and Lowe (2002) or Illing and Liu (2003).

- Intermediate Targets

Like the central bank's strategy of using operational and intermediate targets, the supervisory authority engaged in the macroprudential supervision needs to choose and aim at a set of variables that lie between its tools and the goal of stabilizing asset prices. The strategy to work with the intermediate target is desirable for two reasons. One is the difficulty of assessing and forecasting impending asset market instability. The difficulty is often compounded by the fact that the supervisory authority is not likely to be confident about its ability to influence the goal directly. Another reason for relying on the intermediate targets is that whatever operational mechanism is instituted for macroprudential supervision, it is not likely to be managed on a day-to-day basis, but to be activated only when threats to financial stability become visible. By then it may be too late to diffuse the

threats. By installing a system of monitoring and analyzing a set of intermediate targets, which may also serve as early warning indicators, the supervisory institution may have a better chance of detecting the signs of impending financial distress early on.

The criteria for choosing the intermediate targets are rather straightforward: they should be measurable, they should have predictable effects on financial stability, and the supervisory authority should command a certain degree of control over the variables. Which variables would then qualify as intermediate targets? It is neither possible nor practical to consider all those indicators identified by the IMF Handbook. A more realistic strategy would choose a manageable number of indicators that send clear signals of an impending asset market boom on the basis of the experience with past financial crises. They are likely to vary from country to country, but some of the candidate variables include the volume of lending, sectoral allocation of loans, risk spreads, and provisions at banks and financial institutions.

- Tools and Management of Macroprudential Supervision

As for the supervisory tools, it should be noted that in theory as well as in practice, macroprudential supervision does not necessarily need new ones but can utilize most of the traditional supervisory control measures (see Table 1). Dynamic provisioning is often regarded as a new macroprudential tool. It is true that by linking provisioning to the volume of lending, this policy tool may contribute to building up capital and slowing down the expansion of banks credit during the expansionary phase of the business cycle and reversing the process during the downswing phase. However, it is not a new tool; an existing tool is used in a way to dampen the amplitude of the business cycle. Other tools could also be tightened during the upswing and relaxed during the downswing.

In managing macroprudential supervision, it would be instructive to think of it as a two-stage process of policy implementation. The first stage is characterized by an assessment of asset market stability. If potential threats to asset market stability are detected, the supervisory authority may respond to the growing imbalances by tightening microprudential tools at its disposal.⁵ At this first stage, the macroprudential response would be

⁵ The central bank will also be alerted to the disruption and called into action. On its

tailored to treat all financial institutions the same, as if there were “n” number of identical financial institutions.

At the second stage of the policy response, microprudential supervision would dominate. The task of the second stage supervision consists of (i) monitoring the extent to which financial institutions adjust their asset and liability management in response to the tightening of prudential controls and (ii) enforcing these controls if they do not adapt to the change.

In executing prudential controls, microprudential supervision should take into consideration that different financial institutions including banks behave in different ways and are heterogeneous. This means that the level of risk financial institutions are exposed to is likely to be different and idiosyncratic from institution to institution. Therefore, microprudential supervision carried out to achieve the objective of macroprudential supervision may have to exercise considerable discretion in differentiating between financial institutions on the basis of their relative importance.

For example, macroprudential operations have to weigh up the knock-on effect of financial distress (Crockett 2000 and White 2004). Banks as the suppliers of liquidity to the system and large and more complex institutions, in particular those engaged in universal banking, should be subject to closer scrutiny in monitoring their imprudent behavior than smaller financial firms whose failure may not necessarily pose serious systemic risks.

As discussed in Section III, one of the main objectives of the macroprudential approach is to preserve financial stability by subduing procyclicality in the lending behavior. To this end, prudent tools including the loan-to-value ratio, the repayment period, collateral and margin requirements, capital requirements against real estate lending, and the exposure to the real estate sector are to be tightened in the upswing and loosened in the downswing phase.

These instruments can be complemented by the dynamic provisioning, but with caution. This is because the dynamic provisioning scheme may have an inherent bias against small and medium-sized firms and households that have increasingly accounted for a large share of customers at banks and other financial institutions. Large firms have access to international as well as domestic capital markets for the financing of their

part, the bank may raise its policy rate to discourage speculation and transaction.

investment. Denied credit at banks, they could issue commercial paper, bonds, and equities to raise funds they need. These financing alternatives are often not available to small and medium-sized firms. During an economic boom, those banks that are subject to the dynamic provisioning may discriminate against small and medium-sized firms, which are likely to be perceived as high-risk clients, in cutting down their lending.

On implementing prudential tools, questions have been raised as to the extent to which the supervisory authorities should be allowed to exercise discretion as opposed to relying on a set of rules. In view of the fact that the supervisory authority will have difficulty in diagnosing the health and soundness of the financial system independently or in cooperation with other authorities and that the effect of the macroprudential supervision on the behavior of financial institutions and markets is uncertain, relying on discretion could be counter-productive. There is also the danger that the supervisory authority loses its credibility and influence on financial market participants if they cry wolf too often.

Given these circumstances and risks together with the expediency of the rules, one can make a strong case for a rule-based, rather than a discretionary, macroprudential supervision. Goodhart (2004) is an advocate of linking not only provisioning but also the pricing of risks to the volume of the lending at banks. Borio (2002), however, argues that the rule-based supervision has its share of problems: it may not encourage financial institutions to improve their risk management, thereby exacerbating incentives to arbitrage it away; and it may not be consistent with promoting a better balance between market and policy-induced discipline.

- **Policy Coordination**

Before the supervisory function was separated out of the central bank to be assigned to a new supervisory authority, the central banks were likely to be engaged in some type of macroprudential supervision. Now that many central banks do not have the authority of supervising individual financial institutions, the responsibilities for financial stability have to be shared and the division of labor must be clearly agreed on among the three institutions in terms of policy tools they can use. In this regard, it may be advisable to replicate the tripartite committee of the U.K. for monitoring and analyzing various financial stability indicators and the results of stress tests conducted

for the financial system as a whole and making decisions on the activation of policy response to an impending financial crisis.

In a global economy which has witnessed increasingly large and volatile capital movements between countries and regions as a result of deeper international integration, individual countries are finding it increasingly difficult to construct a shield against adverse external shock emanating from speculation in international financial markets. Resolving the problems related to the cross-border transmission of financial distress would call for expanding the scope of and consolidating policy cooperation between countries at the regional level. The thirteen countries belonging to ASEAN+3 have instituted a forum for policy dialogue. Although it has a relatively short history, this forum has contributed to exchanging information and identifying potential sources of financial disruptions in the region. At present, the forum for the policy dialogue does not include supervisory institutions from the region. Now that the importance of prudential controls as a means of stabilizing financial markets has gained acceptance, it may be desirable to expand the ASEAN+3 forum to include the region's supervisory authorities as members.

V. Concluding Remarks

The macroprudential orientation of financial supervision and regulation is not necessarily a new idea. It would be reasonable to assume that most central banks with supervisory oversight have been and will be engaged in some type of macroprudential supervision by relying on some of the microprudential controls as a means of complementing monetary policy as they may in dampening pro-cyclicality in the asset and risk management at banks and other financial institutions.

Two relatively recent developments have garnered growing attention on macroprudential orientation of financial supervision both in domestic and international policy communities. One has been the realization that the best defense against financial instability begins with strengthening the foundations of the domestic financial system. This awareness has led to the advocacy of institutionalizing macroprudential supervision.

The other has been the creation of an independent supervisory institution in

a growing number of countries. Although they have become independent, most supervisory institutions still give priority to ensuring safety of individual financial institutions to protect consumers-depositors and other financial investors. At the same time, many central banks have chosen inflation targeting as the framework for their conduct of monetary policy. To be sure, central banks have the mandate to maintain overall financial stability as well. Nevertheless, the transfer of supervisory oversight and the focus of the central bank on inflation targeting appear to have created a vacuum of macroprudential supervision as a constituent part of an overall macroeconomic policy framework for financial stability. This is a highly undesirable and unsustainable state of policy management and will have to be rectified. This paper recommends the construction of an overall framework for macroprudential policy to be managed by an institution similar to the UK's Tripartite Standing Committee.

As a newly established institution, the independent supervisory agency may not have had the time to develop either the culture or the expertise needed to incorporate macroprudential controls in its supervisory operations. This internal constraint has been compounded by the additional burden of conducting macroprudential controls in the absence of a reliable operational framework for macroprudential policy that the authority can make use of in evaluating the emerging financial distress and charting appropriate policy responses. What is, therefore, needed at this stage of the debate on macroprudential policy is further research on the quantification of systemic financial risk and the scope and effectiveness of prudential controls at the supervisory agencies.

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