The **SEACEN** Centre

Volume 6 / May 2016

SEACEN FINANCIAL STABILITY JOURNAL

Insights and Thought Leadership on Financial Stability

Supporting Financial Stability through Effective Crisis and Resolution Arrangements
Jean Pierre Sabourin

Promoting Financial Stability through Sound Bank Regulatory Policy and Supervisory Practices
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Improving the Effectiveness of Bank Supervision
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A Fundamental Challenge for the Banking Industry: Better Authentication in Electronic Infrastructure
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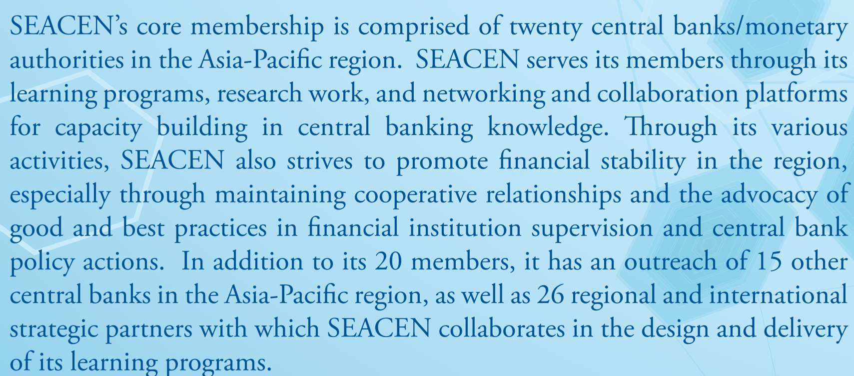
Managing Financial Crisis in an Interconnected World: Anticipating the Mega Tidal Waves
Dr. Zeti Akhtar Aziz



SEACEN's core membership is comprised of twenty central banks/monetary authorities in the Asia-Pacific region. SEACEN serves its members through its learning programs, research work, and networking and collaboration platforms for capacity building in central banking knowledge. Through its various activities, SEACEN also strives to promote financial stability in the region, especially through maintaining cooperative relationships and the advocacy of good and best practices in financial institution supervision and central bank policy actions. In addition to its 20 members, it has an outreach of 15 other central banks in the Asia-Pacific region, as well as 26 regional and international strategic partners with which SEACEN collaborates in the design and delivery of its learning programs.

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The Editorial Board has designated Mr. Zamorski as Chief Editor.

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Article Submission Guidelines

The ***SEACEN Financial Stability Journal*** Editorial Board welcomes potential contributions to the ***Journal.*** Articles written for the ***SEACEN Financial Stability Journal*** should focus on providing insights and thought leadership with respect to information and developments relevant and critical to promoting financial stability and related matters, contextualized to the Asia-Pacific region.

- Article drafts should be submitted in 12 point Times Roman font and should be double-spaced, and sent by email to: article@seacen.org.
- The length of draft articles will generally range from 3,000 to 5,000 words (12 to 20 double-spaced typed pages), though treatment of some topics could necessitate longer articles, which would be considered.
- Authors should include a biographical summary at the end of the article. If an article expresses expert opinions, contributors' expert credentials should be apparent.
- Articles will be evaluated by the ***Journal's*** Editorial Board.
- The Chief Editor and Senior Manager, Communications Unit, are available at any time to answer authors' questions, discuss potential articles, review early drafts, or provide other input. Their contact details are as follows:

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Letter from the Executive Director

Dear Colleagues and Readers

The IMF's most recent Regional Economic Outlook for Asia and Pacific, published on 3 May 2016, states:

> "Asia remains the most dynamic part of the global economy but is facing severe headwinds from a still weak global recovery, slowing global trade, and the short-term impact of China's growth transition. Still, the region is well positioned to meet the challenges ahead, provided it strengthens its reform efforts. To strengthen its resilience to global risks and remain a source of dynamism, policymakers in the region should push ahead with structural reforms to raise productivity and create fiscal space while supporting demand as needed."

Earlier this year there was significant volatility in regional financial markets. While conditions have since stabilized, this episode reminds us that periods of instability and crisis can sometimes arise suddenly and unpredictably from a variety of circumstances, including external factors such as those mentioned by the IMF. Ongoing and deepening regional financial integration will add challenges in dealing with future periods of instability and crisis impacting the Asia Pacific region.

From a financial stability perspective, the current non-crisis period is a good time for Asia Pacific jurisdictions to assess whether:

- National safety net authorities such as central banks, other financial sector supervisors, finance ministries, and deposit insurers are adequately prepared for any periods of turbulence or crisis that could arise, including situations that could have a cross-border impact.

- Their bank supervision methods are effective in detecting and stopping, at their incipient stages, unsound practices and excessive risk-taking that could jeopardize the safety and soundness of individual banks, or present systemic stability concerns.

Several articles have been selected for inclusion in this edition of the *Journal* that relate to such assessments.

Mr. J.P. Sabourin, a highly-respected practitioner and leader in developing international standards for deposit insurance systems and safety net arrangements, has provided an article covering considerations in developing effective crisis and resolution arrangements, especially dealing with cross-border risks and risks associated with large and complex institutions. We have also included two articles providing perspectives on enhancing the effectiveness of bank supervision by regulatory experts who have first-hand experience in dealing with multiple crises. The first article is by Thomas M. Hoenig, Vice Chairman of the U.S. Federal Deposit Insurance Corporation and

former President of the Federal Reserve Bank of Kansas City and member of the Federal Open Market Committee. Dr. Hoenig discusses several key elements that he believes are essential to achieving an effective supervisory process. The second article is by Jonathan Fiechter and Michael Zamorski, who discuss the need to emphasize "intrusive" on-site supervision in assessing and controlling banking system risk.

Rapid growth in financial technology and cyber security vulnerabilities are increasingly being recognized as important financial stability risk factors. Financial institutions have taken significant steps to bolster security efforts in recent years. However, banks and other financial services firms continue to be challenged by the speed of technological advances and the increasingly sophisticated nature of cyber threats. We have included an essay by Messrs. Karl Frederick Rauscher and Didier Vertichel on cybersecurity challenges, which focuses on technological advances in ensuring the integrity of customer authentication.

At the end of April 2016, Bank Negara Malaysia Governor Zeti Akhtar Aziz retired after a thirty-four year career of distinguished service with the bank, including sixteen years as Governor. She also spent the first six years of her professional career as a Senior Economist at The SEACEN Centre. I would like to take this opportunity, on behalf of SEACEN, to thank Governor Zeti for her many contributions to central banking in the region, and her strong support to the growth and development of SEACEN and its mission.

In 2014, Governor Zeti was selected to deliver the prestigious Per Jacobsson Foundation Lecture in conjunction with the Annual General Meetings of the Bank for International Settlements. We have included her seminal lecture in the *Journal*, as it provides outstanding insights with respect to challenges in the management of financial crises that arise from increased interconnectivity of national financial systems.

Dr. Hans Genberg
Executive Director
May 2016

Disclaimer:

The content and views expressed in the SEACEN Financial Stability Journal are solely the responsibility of the authors, and do not reflect the official views, policies or positions of The South East Asian Central Banks (SEACEN) Research and Training Centre or its member central banks and monetary authorities.

Supporting Financial Stability through Effective Crisis and Resolution Arrangements

Jean Pierre Sabourin

1. Background and Objectives

Financial stability operates within the context of financial regulation, crisis prevention, and crisis preparedness, containment and resolution. During periods of financial instability and crisis, authorities must act with a set of immediate policy responses aimed at restoring public confidence and calming markets so as to minimize the repercussions on the real economy. Crisis responses include policy actions designed to contain emerging crises through measures for providing liquidity support to the banking system, to stem liquidity outflows, and to maintain public confidence.

In a systemic situation, various measures may be taken, but the ultimate aim should be to minimize the length and severity of economic downturns and to help accelerate recovery. At critical moments and under intense pressure, policymakers are expected to explore and identify solutions, often on short notice. To do this as a crisis is unfolding is by itself already a major challenge. The challenges are magnified, as seen during the global financial crisis (GFC), where there are potential unknowns about the reach and complexities of financial conglomerates operating in multiple jurisdictions, and about the possible contagion to the rest of a financial system and the real economy.

From the GFC, it was also observed that deposit insurance did fulfil its primary objective of preventing runs on bank deposits, thereby helping to stabilize market confidence.[1] Since the fallout from the GFC, deposit insurers have increasingly assumed a more prominent role in helping to preserve the stability of the financial system.

This article explores three key considerations pertaining to the role of resolution authorities in contributing to and promoting financial stability following the GFC, namely:

a) the need for a properly designed deposit insurance system or financial compensation scheme to help maintain public confidence during periods of uncertainty;

b) implementing the Key Attributes for Effective Resolution Regimes[2] published by the Financial Stability Board (KAs); and,

c) the role of resolution authorities within the financial safety net.

2. Effective Deposit Insurance Systems and Market Confidence

A well-designed deposit insurance system helps to promote public confidence during times of financial instability and crisis. An improperly designed deposit insurance system renders the financial system susceptible to bank runs and can actually precipitate a crisis, as experienced in the United Kingdom with Northern Rock.[3] Deposit insurance systems should be well designed and well understood to be effective, and equipped with the appropriate mandates, tools and resources. Basic design features include a clear mandate, adequate powers, strong governance and operational independence, access to ex-ante funding and government liquidity support, as well as effective public awareness programs.[4]

Moral hazard issues also tend to be associated with deposit insurance schemes. However, such issues can be addressed through limited deposit insurance coverage and strong prudential supervision. Additionally, imposing differential deposit insurance premiums based on the risk profiles of institutions provides incentives to avoid excessive risk-taking, strengthens risk management, and introduces fairness into the deposit insurance premium assessment process. As to mandate, deposit insurers should have sufficient powers to promptly respond to crisis situations and intervene early in banks, so as to reduce the costs that the failure would otherwise inflict on the deposit insurance funds, taxpayers, as well as the financial system as a whole.

3. Effective Resolution Regimes

A significant issue following the GFC concerns the failures of large, complex or interconnected financial institutions such as systemically important financial institutions (SIFIs). The concern about systemic risks, including the threat of contagion associated with the disorderly unwinding of large bank trading positions (including derivative books), is the major issue that had led governments to resort to massive bailouts of private interests at the expense of the public.

The Financial Stability Board's "Key Attributes for Effective Resolution Regimes for Financial Institutions" recommendations[5] attempts to deal with this concern. Among others:

a) The KAs attempt to address the risks associated with SIFIs and in particular the type of impact that global SIFIs had on other financial systems and consequently on whole economies during the GFC.

b) Underlying the KAs is also an issue not unfamiliar to deposit insurers - moral hazard. The KAs take the position that there should no longer be state support for the financial industry and look to market participants to complement the work of regulators in monitoring financial institutions to reduce excessive risk-taking.

For certain countries, one might question the need to adopt the KAs in the first place. In particular, studies such as the 2013 World Bank Global Survey suggest that economies that suffered from the GFC had weaker regulation and supervision practices as well as less scope for market incentives than the rest.[6]

For example, on the whole, since the Asian Financial Crisis of 1997-1998, there have in fact been significant improvements in prudential regulation and supervision in East Asian countries. Asian authorities are using macroprudential policies to help ensure financial stability and respond to emerging systemic risks by deploying a variety of instruments. With the exception of Japan, the emerging economies in Asia were also largely insulated from the troubled assets and complex derivatives that perpetuated the GFC. Structurally, Asian banks have remained predominantly deposits-funded, with less dependence on wholesale funding compared with counterparts in more advanced global economies. Additionally, state ownership in financial institutions in these jurisdictions is not uncommon.

Thus for jurisdictions such as these, one might ask – what are the implications of the KAs, and why would they adopt the KAs?

3.1 More information

The KAs[7] recommend that authorities require financial institutions to develop clear recovery and resolution plans ("RRP"), and that they carry out resolvability assessments of these institutions.[8] This exercise, properly carried out, will provide meaningful disclosure about the risks that large or complex financial institutions might pose to the stability of the financial system, and allow authorities to be prepared for, and take appropriate actions in the event such risks arise.

Ensuring that financial institutions undergo this exercise has considerable benefits. Among them are the following:

a) Sound risk management. Financial institutions will be required to submit detailed information on their operations, group structures, risk management, IT systems and possible contingency plans to resolve severe distress or failure. In the course of the contingency planning, financial institutions must identify and test their risk assumptions and controls under various economic scenarios. The risks that are discovered as recovery and resolution planning takes place might enlighten even the institutions themselves, better informing their boards about the structures, complexities and risks taken by the organization, and encouraging better risk management practices and even operational efficiencies. In reality boards of these institutions have always had the duty to properly understand the structures of these organizations and the context in which they operate so as to properly manage the risks of failure. The RRP exercise will contribute to sounder risk management particularly in complex institutions as the boards and management become better informed.

b) Minimizing systemic risks. As for the authorities, this exercise will help identify the vulnerabilities of these institutions and the risks they might pose to the stability of the financial system. Once identified, these vulnerabilities may be addressed in a number of ways, for example by requiring additional buffers to account for the uncertainties that these risks pose or by requiring restructuring to mitigate its potentially adverse impacts on financial stability. The process of recovery and resolution planning can lead to a reduction in complexity thus placing the authorities in a better position to limit systemic risks and level the playing field among those that are considered too big to fail (that might otherwise be bailed out) and smaller banks (that would be allowed to fail). This will help minimize systemic risks.

c) Allow for better decisions during a crisis. As highlighted earlier, prompt access to information is difficult where the troubled institution is complex or operates across borders, and there will be a whole range of cross-border issues that must be dealt with. Pursuing recovery and resolution planning and resolvability assessments by the authorities as recommended by the KAs will provide the authorities much of this information in advance and allow the authorities greater awareness about the possible implications of a failure.[9] With a greater understanding of the particular structures of these entities and their involvement in critical economic activity, authorities will be in a better position to weigh the possible solutions during a crisis.

Overall, this exercise will allow authorities and the institutions themselves to develop a complete picture of the organizational structure, funding and liquidity arrangements, loss absorbency capacity and cross-border dependencies. The clear advantage of pre-planning - through the recovery and resolution process - is that it allows authorities the opportunity to identify the unique characteristics of significant financial institutions, thus allowing a better assessment of what might be done in a crisis situation. Absent such information, last minute attempts to resolve complex financial institutions in a way that preserves economic value and stems systemic risks are much more likely to fail.

3.2 Resolution Outside Normal Insolvency Regimes

The Basel Committee on Banking Supervision[10] has called for reform of domestic resolution regimes and tools. Resolution authorities must be able to deal with financial institution failures and have in place a wide range of mechanisms to deal with failures, including those not available to them during the recent global financial crisis. The KAs contemplate that special resolution regimes for financial institutions will also "... provide the resolution authority with a broad range of powers and options to resolve a firm that is no longer viable, and has no reasonable prospect of becoming so."[11] Resolution authorities need a range of bank restructuring and resolution tools - early intervention measures, stabilization options to achieve continuity of systemically important functions, and approaches for winding-down the financial institution or parts of the institution that are no longer deemed viable, and these should be provided

in clear and sound legislative backing. Several countries have addressed this by instituting special resolution regimes.[12]

Resolution regimes should also clearly prioritize the hierarchy of losses, beginning with shareholders and creditors who have assumed the risk of bank failure. They should, as far as possible, protect depositors and taxpayers from loss. The framework should also be designed to allow the preservation and maximization of value of the failed business for the satisfaction of creditors and other stakeholders.

As experienced over the financial crisis, crisis responses might tend to favor the most politically expedient response in the short-run and not focus on the longer term and more sustainable solutions. Ensuring sound special resolution regimes are in place will help mitigate systemic risk and can reduce the impact of the disorderly failure of individual systemic institutions. Having a legislative regime that provides the appropriate resolution tools and having access to sufficient information to prevent a disorderly failure means, first, that it becomes more likely that authorities will allow distressed financial institutions to fail, thereby diminishing the likelihood of resorting to taxpayers monies. Also, by lessening the impact of failure, special resolution tools can reduce the chances that political pressures might be brought to bear on authorities during a crisis.

3.3 Collaboration Across Borders

The recent global financial crisis revealed conflicting priorities among national authorities and their respective insolvency regimes in relation to the resolution of cross-border financial conglomerates. National resolution authorities effected measures at the single entity level and failed to consider the cross-border implications of a failing financial institution in its jurisdiction. Some national authorities ring-fenced assets belonging to the bank within their jurisdiction. Other countries announced a blanket guarantee, forcing neighboring countries to enhance their deposit protection systems to stem deposit outflows from their own banking systems. Yet others excluded foreign depositors from their deposit insurance coverage.[13]

The KAs provide a welcome reminder about the urgent need to bolster cross-border information-sharing and cooperation from the perspective of achieving effective resolutions of institutions with extensive cross-border operations. Clear areas for improvements include mechanisms for more information to be shared, the harmonization of national laws for easier and more effective resolution and legal certainty, and the co-ordination of national crisis responses.

The KAs highlight the following key matters:

a) Exchange of information. Where institutions are active across borders, the resolution authorities must co-operate and information exchange must take place. This should take place in advance for countries that are home and host to SIFIs and their material legal entities.

b) Harmonization of laws. The closing of gaps between national regulatory regimes will facilitate the co-ordinated and orderly resolution of firms that are active in multiple jurisdictions. This will, for example, provide legal certainty about the consequences of a winding-up of a financial conglomerate on foreign subsidiaries or branches. Current legal impediments that would impact an orderly cross-border resolution such as automatic ring-fencing of assets, or the winding up of subsidiaries in the event of intervention in the parent, would also need to be addressed. Without harmonization of relevant laws, cross-border recognition of foreign resolution action becomes difficult or impossible.

c) Co-ordination of national crisis responses. The global financial crisis is a reminder of the need for nations to act in a coordinated manner when taking crisis management actions. Thus the KAs recommend that resolution authorities should give prior notification to their international counterparts and should consider the impact on financial stability in other jurisdictions should they take "discretionary national action" to achieve domestic stability.[14]

One of the key challenges for resolution planning is to create a system capable of allowing the failure of individual financial institutions while preserving global economic and financial stability. The KAs recommend that "Crisis Management Groups" ("CMGs") be formed by the authority in the jurisdictions where the G-SIFI resides ("the home authority"), together with authorities in the jurisdctions where the G-SIFI has a significant presence ("host authority"). The CMGs – akin to supervisory colleges – lay out plans for orderly resolution of each SIFI together with host authorities, and it is intended that CMG members discuss, and ultimately agree to, the plan's credibility. Multilateral co-operation agreements are expected to emerge from the CMGs.[15] This process increases the chances for an orderly resolution of a SIFI, and is intended to mitigate potential obstacles to such resolution.

Generally, authorities in the United States, Canada and Europe have made some progress in their collaboration efforts. Elsewhere, establishing appropriate bilateral agreements with resolution authorities and supervisors in other jurisdictions to achieve greater cross-border collaboration have a long way to go.

The implications of the KA recommendations on cross-border issues for host authorities include the following:

a) Actions by host authorities can affect the orderly resolution of a G-SIFI, for example by ring-fencing a G-SIFI's funding sources, requiring the liquidation of the local bank branch, or limiting the availability of its shared services. Host authorities will thus be increasingly pressured for domestic institution

resolution plans as well as for explanations about how their jurisdictions have addressed any gaps in their resolution regimes. Host jurisdictions that fail to offer these resolution plans or explanations might find that they have limited or no influence in establishing an effective cross-border resolution plan that considers their country's interests.

b) The Financial Stability Board also recognizes that there will be non-CMG host authorities that might be impacted by the CMG plans for G-SIFIs. Thus, non-CMG hosts are encouraged to submit their assessments of the systemic importance of the G-SIFI's local operations to home authorities so as to enable the CMG to agree on arrangements that will address the needs of the non-CMG host authorities.[16] Again, taking a proactive stance in these circumstances will help ensure that the country's interests are not jeopardized by resolution plans for the G-SIFI.

4. Inter-agency Collaboration

Finally, financial crisis responses should take place within a framework that abides by principles of good governance. Freedom from political influence and intervention should be underpinned by legislation and the relevant institution's governance arrangements.[17] Legislation and protocols must support the following concepts:

a) Authorities will bear the responsibility for the restoration of financial stability and protecting the real economy and the public. They must exercise their authority in a way that reflects public interests.[18] Their mandates and roles for financial stability should be clearly set out, and their authority must come with appropriate accountability, in particular if it involves the distribution of public resources among various constituents.

b) "Close co-ordination between the central bank and the resolution authority is understood to be both inevitable and critical".[19] This recognizes the need for clarity about the roles of the various financial safety net players when faced with a systemic crisis, so that policymakers better understand how they must work during times of crisis.[20] In particular, there should be protocols on early communication even before the institution is non-viable, so that there can be co-ordinated responses to the crisis.

Deposit insurers, as significant actors in financial institution crisis management and resolution, should be involved in national crisis management and resolution arrangements. From a cross-border perspective, they should also be actively involved in discussions and policy decisions on issues such as RRPs and resolution strategies. In order that they are able to access cross-border information and to manage their risks effectively, they should also be privy to the discussions of the supervisory colleges.

5. Conclusions

As to the questions posed earlier, namely, the implications of the KAs and the rationale for their adoption, even in jurisdictions that may not today necessarily share the same types of risks, the following observations can be made:

a) First, one would need to be prepared for changes in financial landscapes, which will be likely as economies grow and integrate. In particular, as has been experienced both during the Asian financial crisis as well as the more recent crisis, much can and must be done to ensure better cross-border collaboration and co-ordination during crises. Regulatory cooperation has become key as the financial sectors become increasingly integrated, and countries – including resolution authorities - should play an active role in international fora if they wish to ensure that the process towards collaboration takes into account the interests of their country or even their region.

b) Also, as discussed earlier, G-SIFIs often have a presence in other jurisdictions including Asian jurisdictions. Authorities in such countries will be compelled to consider the KA recommendations and participate in relevant discussions, regardless of whether those jurisdictions are part of the CMGs, in order to protect their national interests.

c) Finally, while state ownership is a feature in some countries in Asia, it does not mean that it will remain the case in the future. In any case, for the reasons described earlier, undertaking processes such as the RRPs, informs authorities and has indisputable advantages for early identification and management of potential systemic risks as well as for orderly resolutions of financial institutions.

Authorities must remain alert to the types of risks that affected countries during the recent financial crises and other risks that come with regionalization and global integration. The global financial crisis has provided invaluable lessons on cross-border risks and the risks that come with complexity, size and opacity. Studying the KAs and applying the appropriate recommendations to the jurisdiction's circumstances would not in the least be a futile exercise. A key objective in the course of this exercise should be to ensure that authorities, subject to appropriate accountability measures, are sufficiently prepared and have a wide variety of resolution options and tools that are well-defined in legislation to meet the considerable challenges of dealing with financial crises in a way that minimizes long-term adverse consequences on the economy and the public.

In conclusion, the KAs are by no means an infallible solution to the vexing question of how to solve the complexities of financial crises. Nevertheless, at the very least, by identifying the critical points that expose financial systems to contagion, working on greater cross-border and inter-agency collaboration, and working on their resolution regimes, authorities will be better off in ensuring a more sustainable state of financial stability needed to support the continued growth of their economies.

Jean Pierre Sabourin is the Chief Executive Officer of Perbadanan Insurans Deposit Malaysia (PIDM), the Malaysian Deposit Insurance Corporation, and has held this position since PIDM was established in 2005. Mr. Sabourin began his career at the Canada Deposit Insurance Corporation (CDIC) in 1976 and progressed to more senior positions until his appointment by the Government of Canada as President and CEO in 1990, a position he held for 15 years until his retirement in April 2005. Under his leadership, CDIC developed into a best practice deposit insurer while successfully resolving over 40 financial institution failures. Over his 35-year career in deposit insurance, Mr. Sabourin' s expertise has been widely sought by many jurisdictions around the world planning to establish or improve their deposit insurance systems. In May 2002, he led the development and establishment of the International Association of Deposit Insurers (IADI) and was elected as the first Chair of the IADI Executive Council and President, a post he held until 2007. Under his leadership, IADI developed the Core Principles for Effective Deposit Insurance Systems, jointly adopted by IADI and the Basel Committee on Banking Supervision in 2009 and subsequently endorsed by the Financial Stability Board.

Endnotes

1. Traditionally, deposit insurance systems have been regarded as playing a limited role during a financial crisis, and are generally designed to deal with isolated or a few bank failures.

2. Financial Stability Board, "The Key Attributes for Effective Resolution Regimes," re-issued 15 October 2014.

3. Northern Rock failed on 22 February 2008.

4. The International Association of Deposit Insurers' "Core Principles for Effective Deposit Insurance Systems," reissued November 2014.

5. Financial Stability Board, "The Key Attributes for Effective Resolution Regimes", re-issued 15 October 2014, Key Attribute 11.

6. "Global Financial Development Report 2013: Rethinking the Role of the State in Finance." World Bank Publication.

7. Ibid, Key Attribute 11.

8. Ibid, Key Attribute 10.

9. Ibid, Page 37, I-Annex 3: Resolvability Assessments.

10. The Basel Committee on Banking Supervision's "Report and Recommendations of the Cross-border Bank Resolution Group, March 2010, Available at: http://www.bis.org/publ/bcbs169.pdf.

11. Financial Stability Board, "The Key Attributes for Effective Resolution Regimes," re-issued 15 October 2014, Page 3.

12. 2011: At the Cannes Summit, the G20 Leaders endorsed the implementation of an integrated set of policy measures to address the risks to the global financial system from systemically important financial institutions (SIFIs), and the timeline for implementation of these measures. Specific measures focus on global SIFIs (G-SIFIs) to reflect the greater risks that these institutions pose to the global financial system.

13. In contrast, some jurisdictions, such as Malaysia and Singapore, were seen to announce government guarantees at the same time.

14. Financial Stability Board, "The Key Attributes for Effective Resolution Regimes," re-issued 15 October 2014, Key Attribute 7.2.

15. These agreements must expand beyond basic knowledge-sharing initiatives, and address co-operation and coordination to deal with bank resolutions and financial crisis situations. In many jurisdictions, amendments to laws are also likely necessary to allow the entry into cross-border agreements for these purposes.

16. Financial Stability Board's "Guidance on Cooperation and Information Sharing with Host Authorities of Jurisdictions where a G-SIFI has a Systemic Presence that are Not Represented on its CMG."

17 Financial Stability Board, "The Key Attributes for Effective Resolution Regimes," re-issued 15 October 2014 page 6, paragraph 2.5.

18. "Financial crisis containment and its governance implications," Seraina N. Gruenewald, Available at: http://www.palgrave-journals.com/jbr/journal/v12/n1/full/jbr201022a.html.

19. Zeti Akhtar Aziz, (2013), "The Central Bank Financial Stability Mandate and Governance Challenges," *SEACEN Financial Stability Journal*, Volume 1, p. 14, October.

20. "Developing a Framework for Effective Financial Crisis Management," by Dalvinder Singh and John Raymond LaBrosse, OECD Journal: Financial Market Trends, Volume 2011 – Issue 2 OECD 2012.

Promoting Financial Stability through Sound Bank Regulatory Policy and Supervisory Practices[1]

Thomas M. Hoenig

1. Introduction

During nearly four decades in various roles in bank supervision inside the Federal Reserve System, and now at the Federal Deposit Insurance Corporation (FDIC), I have had the opportunity to respond to a host of financial crises, recessions, and problems at banks. In reflecting on the root causes of, and lessons learned from these various episodes of financial instability and crisis, the critical importance of sound regulatory policies and supervisory practices in proactively preventing, detecting and mitigating unsound banking practices and conditions that could lead to future difficulties is paramount. Tremendous damage can be done when supervisory policies and practices are inadequate.

Good supervision is a process. It involves setting financial standards, collecting and analyzing information, and ultimately applying judgment and demonstrating courage in conveying that information to financial firms and other market participants. Sometimes the information may not be welcomed, but it is essential that supervisors deliver clear and constructive feedback and, at times, criticism, to banks' senior executive managements and boards of directors.

With that in mind, I will discuss three key elements that I believe are essential to achieving an effective supervisory process.

First, commercial banking firms of all sizes, including the largest, should be subject to full-scope examinations. Second, because banks – especially the largest banks – have an outsized effect on the economy, they should be required to disclose important supervisory findings that serve to better inform the public regarding their financial condition. Third, supervisors must recognize their limits and insist that banking firms hold sufficient capital to backstop management mistakes and simply bad luck.

2. Full-scope Exams

A long-held and useful principle in bank supervision is that commercial banks should receive full-scope examinations on a periodic basis. While smaller banks are examined in this systematic manner, this is not the case for the largest banks. Instead, regulators rely upon continual on-site examiner presence and limited, rotating targeted reviews to validate findings. Supervisors of these firms have become overly reliant on bank models, model validation reviews, stress tests, and updates from bank management as a substitute for records review and hard questioning to draw conclusions regarding a firm's condition.

Full-scope examinations delve into the quality of asset portfolios, primarily loans, and their implications for banks' longer-term financial strength and resiliency. A full-scope exam is a point-in-time analysis of a bank's full balance-sheet quality and management competence. It includes the models and material provided by the banks that currently are used in exams, but a full-scope exam also involves reviewing and testing asset quality using accepted examination standards. In such an exam, examiners pull ledgers, review loans, and systematically review a cross-section of bank portfolios. These examinations focus on identifying a firm's risk profile and lapses in risk management practices. They include point-in-time analysis across the entire balance sheet of assets, earnings, liquidity, and sensitivity to market risk.

Bank supervisors also need to judge whether the bank's management – its senior executive management and its board of directors – and its systems and controls and financial strength and resiliency will be sufficient to effectively cope with future periods of internal or external stress. Examiners need to assess whether a bank's management has the capability of making timely adjustments to strategy when necessary, and whether internal strategic planning processes are robust and include a range of scenarios, including periods of economic stress.

The full-scope exam process aggregates and analyzes bank data and source records, thereby providing a thorough supervisory picture of individual institutions, in addition to enabling supervisors to better identify emerging risks and trends in the banking industry.

Full-scope examinations better use on-site staff as they are subsumed within the greater examination process, helping provide a deeper understanding of bank conditions, leadership, and performance.

Over time, as economists have come to play a greater role in the supervision of large firms, they have revealed a preference for relying on models – either their own or the firm's – to judge a bank's condition. Such reviews can be enormously helpful, but they would be most effective if used in conjunction with a full-scope exam and the systematic evaluation of exam results.

Focusing almost exclusively on models handicaps regulators to information and signals outside the model. Crises inevitably are instigated by events generated outside the assumptions and variables wrapped within these carefully constructed models, by unpredictable factors that by definition are impossible to include in models.

Effective supervision requires an objective review, which is difficult to maintain for embedded analysts who are practiced in reviewing management-presented material and reports. This too often becomes a self-assessment exercise that provides limited independent insight into the workings and risk profile of the largest firms.

Commissioned examiners[2] who rotate among banks and pull different bank ledgers and review loans develop a fuller understanding of the portfolio. Combined with the results of stress tests, this systematic approach allows supervisors to develop a comprehensive basis for judging bank soundness. The knowledge and skills of a commissioned examiner are distinct from those of an economist or a statistician. On-site staff, without broader information sources, develop a more insular perspective of a bank that makes it harder to identify excessive risks and poor risk management processes that are firm specific.

Finally, it's important to mention that the role of the examiner should be limited to maintain their objectivity. The examiner is not there to judge, approve, or identify with management decisions, as sometimes can happen with on-site examiners.[3]

3. Sampling and Bank Examination

It is somewhat misleading to assume that it would take an army of examiners to review the largest banks in a manner equivalent to that of a community bank. Sampling across a bank's portfolio can provide a sound means to judge balance sheet quality. Statisticians have longstanding sampling methodologies for determining the soundness of assets, at an affordable cost.

Sampling is used, for example, during narrowly defined bank reviews, such as the Shared National Credit (SNC) program used in the U.S. Under the SNC program, examiners sample a series of significant credits held among the largest banks and rate the credits based on performance, quality of underwriting, and risk profile of the borrower. The assessments of these credits are used in grading the risks for the same credits at examinations of banks which participate in the syndication of these loans, promoting consistency and efficiency.

Exams provide important insight into the quality of the asset portfolio, the overall credit culture of the bank, and the quality of its management. Both supervisors and management gain useful perspective on where future problems for this category of assets might arise in a downturn. In instances where underwriting is weak, remedial actions are required to strengthen the portfolio and perhaps avoid future losses.

Using statistical sampling, a broad portfolio of loans and other assets from across the firm would be pulled. The equivalent of a full-scope review for the largest firms could be accomplished using techniques comparable to those used in the SNC program. Within this framework, the Comprehensive Capital Analysis and Review (CCAR) and other complementary analyses also would be incorporated, providing a unique insight into the risk tolerance and risk profile of these systemically important firms.

The banking agencies devote enormous resources to reviewing models, developing models, and stress testing the largest firms. Some of these resources might be more productive if they were devoted to examining firms in a systematic, full-scope manner. Once developed, such exams would provide a much-needed assessment of a bank's asset quality, liquidity, operations, and controls. Only then can we accurately judge the bank's risk profile, balance-sheet strength, and management.

4. Disclosure and Transparency

The largest banking firms have a disproportional effect on the economy and may receive public support during times of crisis. Therefore, it is appropriate that they be highly transparent. Early disclosure of findings about the condition of a bank is an essential prerequisite for effective market discipline. This need increases as banks and financial products become more complex and, in many ways, more opaque.

Regulators can help improve bank transparency by assuring that valid information is brought forward, not only to bank management but also to the market. Regulators also should consider requiring banks to disclose significant or material findings, which could include examiner concerns about weak control systems or credit review programs. The disclosure of examination findings represents a natural outgrowth of the examination process that would help provide greater consistency to the balance-sheet, income statement, and related information publicly traded banks already disclose under SEC regulations. Such disclosure could be made by bank management with their explanations and plans to address such findings, after the examining agency reviewed the disclosure for accuracy.

Such disclosures would impose market discipline at an earlier stage, which would likely make banks more accountable for their risk choices and help limit the severity of problems identified by examiners. Additionally, enhanced disclosures would hold supervisors accountable and inhibit their being captured by firms.

I recognize that there is concern that disclosing supervisory information would be destabilizing for banks experiencing difficultly. I would agree that bank ratings should not be disclosed, as this would make supervisors rating agencies, which they are not. Beyond this, however, I believe the fear of disclosing findings is misplaced. Disclosure, especially early disclosure, is the best cure for unanticipated crises. It seems that the market already recognizes the absence of full disclosure by the largest firms, as evidenced by the fact that many are trading below their book values.

5. Capital Matters

Finally, an integral part of the supervisory process is insisting on strong capital. The purpose of bank supervision is to verify that banks are operating soundly and to assure that noted weaknesses are addressed. No supervision program can, should, or is

intended to shield firms from the consequences of failed business decisions, even those that appeared reasonable at the time. That is the role of ownership capital.

The question, then, is: what level of ownership capital is sufficient? The largest banking firms insist that they are well capitalized, but data and evidence suggest that this is not the case. In an "apples-to-apples" comparison, it is striking that the largest firms are the least well capitalized of any group of banks operating in the United States.

Capital adequacy is judged using a number of risk-based measures. One, using internal models, adjusts capital of the largest banks to 13 percent of assets or higher. But this is capital against risk-weighted assets, which are only about 40 percent of total assets. No other industry is allowed to remove 60 percent of its assets when its financial condition is assessed. I do not believe it's an accident that these risk-based standards have increased in importance and complexity as supervisors have moved away from full-scope exams. Instead of relying on strong examinations to address risk concentrations, regulators have relied on risk-based capital rules.

A more dependable measure of capital is the tangible leverage ratio, based on International Financial Reporting Standards (IFRS). This measure, which market investors rely on, shows that U.S. G-SIBs have a tangible capital ratio of only 5.73 percent and foreign G-SIBs have 5.13 percent.

To appreciate the significance of these percentages, compare them to the conservative estimates of bank losses in the 2008 crisis which show the industry lost approximately 7 percent of assets.[4] Leverage ratios currently around 5 percent might boost ROE to individual firms and facilitate growth of economies during boom times, but they provide virtually no sustainability during downturns nor enough margin for inevitable errors by even the best bank managers or simply from bad luck.[5]

It has been suggested that using the more strict leverage ratio as the principal measure of capital adequacy would cause loan and economic growth to slow. Incongruously, it is also argued that demanding capital would cause bankers to take on greater risks to boost returns. Research on these topics, however, suggests otherwise. Going into the crisis of 2008, banks holding an average 12 percent capital saw more modest declines in loans and a quicker recovery. In contrast, banks with capital below 8 percent, including the largest banks, experienced more dramatic declines in lending. Strong capital levels support growth over the business cycle and are good for the economy.

From a supervision program perspective, moving away from risk-based capital measures toward an assessment of adequacy based on tangible equity would generate more reliable information from which to make supervisory judgments and would free up billions of dollars from supervision budgets currently spent waiting for,

understanding, and implementing risk-based measures. Risk-based capital models do have an appropriate role as a component of the supervision process for stress testing different scenarios, but the extension of their use to judge bank health is misleading. The leverage ratio – which the market uses to access banks, as seen by the price-to-book ratios of the largest firms – in combination with strong examinations is the only real way to ensure firms have sufficient capital and to enhance stability.

6. Final Thoughts

The process of bank supervision is demanding. Extensive data collection and analysis are required. Asset and liability portfolios must be tested. Operations and related controls must be understood and tested, and the quality of management must be judged. Supervision requires an appreciation of the best balance of transparency and confidentiality, especially as it might involve disclosure of some examination findings. Finally, capital standards – so necessary to the resiliency of individual firms and the industry – must be determined and enforced.

The keystone on which the usefulness of these principles rests is the willingness of supervisors to do their job, which includes operating with healthy skepticism and asking tough questions. Importantly, it also includes the responsibility and courage to convey their findings to bank management – even in an environment of growth, when it is often easier to accept the prevailing view. But within reasonable bounds, it is the supervisors' responsibility to swim against the tide of enthusiasm. In 2006 and 2007 there were clear signs that problems were surfacing, and yet supervisors were slow to act. Even when guidance was issued about commercial real estate, the agencies quickly backed down after the industry raised objections. In hindsight, the regulators were correct in their projections, and the only mistake was in backing down.

More serious, perhaps, was that the bank regulatory agencies appeared to have actually joined the chorus of "this time it's different," judging from the absence of any supervisory actions against some of the world's largest and most complex firms and the decision to cut back on systematic examinations in the years leading up to 2008. All the exam findings in the world and all the model warning signals are of little use if leaders of the regulatory bodies fail to carry the message forward.

The views expressed are those of the author and not necessarily those of the FDIC.

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His research and other material can be found at http://www.fdic.gov/about/learn/board/hoenig/.

Endnotes

1. This article is based on remarks the author delivered at the Federal Reserve Bank of New York Conference on Supervising Large Complex Financial Institutions on 18 March 2016.

2. Commissioned examiners are bank examiners who have been certified, based on extensive training and demonstrated subject matter expertise and proficiency, to serve as Examiners-in-Charge of bank examinations.

3. An International Review of OCC's Supervision of Large and Midsize Institutions: Recommendations to Improve Supervisory Effectiveness, available at http://www.occ.treas.gov/news-issuances/newsreleases/2013/nr-occ-2013-184.a.pdf

4. See Hanson, Kashyap and Stein, (2011), *Journal of Economic Perspectives*, Vol. 25, No. 1, Citing IMF (2010).

5. Global Capital Index: https://www.fdic.gov/about/learn/board/hoenig/capitalizationratio2015-2.pdf

Improving the Effectiveness of Bank Supervision

Jonathan L. Fiechter and Michael J. Zamorski

1. Background and Introduction

Keeping national banking systems safe and sound throughout the business cycle, while giving banks the flexibility to remain competitive and meet the productive credit needs of their customers, is a challenging task. And yet, this is what is expected of bank supervisors.

Bank supervision is an inherently judgmental process in which experienced professional bank supervisors assess risk by taking into account the context in which bank strategies and practices occur. This process requires the application of practical skills gained over many years of apprenticeship and training. Effective bank supervision is not a mechanical, "checklist" process with binary outcomes. It requires evaluations by highly skilled and experienced professionals who apply expert judgment in considering a variety of risk factors.

Personal interaction during on-site examinations enables bank examiners to assess the quality and depth of bank management. Policies and procedures may look good on paper, but their effectiveness is best determined by experienced bank supervisors who evaluate bank practices and condition based on direct interaction and dialogue with bank management.

On-site inspections and examinations enable bank supervisors to understand a bank's risk culture, its risk appetite, risk governance, the adequacy of its systems and controls, and its overall risk management competency. How well does a bank's senior management and its board of directors identify, measure, monitor, and control risk? Do business heads understand and buy into the bank's risk appetite statement? Are strategies and practices in place that will enable the bank to adapt and remain stable under less favorable or volatile economic conditions?

The Global Financial Crisis (GFC) erupted in 2008 in the U.S. and Eurozone, with adverse spillover effects impacting many other economies. Studies of the GFC have identified a long list of contributing causal factors. Some problems originated outside of the banking system, governmental policies sometimes permitted incentives for excessive risk taking, and many banks' risk management practices and risk cultures did not provide effective checks and balances to monitor and control excessive risk. It is evident that ineffective financial sector regulation and supervision contributed to the onset and severity of the GFC.

To contain the GFC, many large financial institutions received government support to prevent them from failing. This bailout of major banks was hugely unpopular politically. It put tremendous pressure on the U.S. and European governments, central banks, and supervisory agencies to devise measures going forward to ensure the public that government would never again be forced to use taxpayer funds to rescue big banks.

This article discusses the authors' views of the key factors in achieving successful supervisory programs based on our personal experiences in dealing with previous banking crises, and lessons learned from the GFC.

2. International Regulatory and Supervisory Standards

For many years, supervisors at the national level developed their own rules tailored to meet the needs, structure, and level of sophistication of their national financial systems. Some did it better than others. But with the globalization of financial services, increased attention has been devoted to ensuring that the same prudential rules apply to all internationally-active banks. This helps promote a "level playing field" and reduce the opportunities for regulatory arbitrage, which can undermine financial stability.

Over the past several decades, an extensive set of minimum prudential standards and sound practices have been developed at the international level, mostly under the auspices of the Basel Committee on Banking Supervision (Basel Committee), to "strengthen the regulation, supervision and practices of banks worldwide."[1] Most jurisdictions have passed legislation formally adopting these standards and national supervisory authorities have issued implementing regulations.

One of the first major attempts at developing an international prudential standard was the Basel Capital Accord, issued by the Basel Committee in July 1988. This standard, which was developed at the initiative of the United States and United Kingdom, was the first minimum capital standard for internationally active banks. The impetus for this initiative "…was a strong recognition within the (Basel) Committee of the overriding need for a multinational accord to strengthen the stability of the international banking system and to remove a source of competitive inequality arising from differences in national capital requirements."[2] Bank supervisory policymakers came together and agreed on minimum international prudential standards, which they were then expected to implement at a national level.

A parallel international focus arose to promote global financial stability in the international financial system following the severe and unexpected financial crises in Southeast Asia in the late 1990s. The G-7 Finance Ministers and Central Bank Governors created the Financial Stability Forum (FSF). Its objective was to periodically bring together central bankers, supervisors and treasurers from the major developed countries, the heads of the various financial sector standard setters such as the Basel Committee, along with the IMF and World Bank, in an effort to identify risky trends and market practices ahead of the next crisis.

Following the GFC, which originated in several of the advanced economies, the FSF membership was expanded to include major emerging markets and its charter was converted to a more powerful Financial Stability Board (FSB), which assumed the role of promoting the global adoption of more comprehensive, detailed, and conservative supervisory policies. An important part of the FSB's authority derives from its ability to track and publically report on the progress of its members in implementing agreed-upon policies.

Beginning in 2010, the Basel Committee commenced an extensive effort to revise international standards and supervisory practices related to capital, liquidity and other banking system risk factors, based on lessons learned from the GFC. That effort has included both standards development as well as tracking how well the standards are being implemented across countries. The Basel Committee and its governing body provide periodic progress reports to the G20 leaders on post-GFC reform efforts.

3. Regulatory and Supervisory Standards versus Supervisory Discretion and Judgment

Post-GFC, there has been a major effort by international bank regulatory standards-setters, primarily the Basel Committee, and national supervisory authorities, to revise existing regulations and supervisory standards and develop new ones to prevent a repeat of the recent crisis. While in many cases, the former rules were found to be inadequate, placing too much of a focus on new and improved rules, may not accomplish the overarching goal of preventing future crises.

As the rules have become more detailed and complex, there is a risk that bank supervisors may be forced to place a disproportionate emphasis on assessing compliance with rules, rather than judgment-based assessments of bank risk, management capabilities and practices that are at the heart of effective supervision. This focus will in turn force banks to devote more of their resources on compliance – huge sums are now being spent by banks hiring ex-supervisors to staff compliance offices – and less on what are the fundamental risks facing the bank and its management.

Clearly some of the rules leading up to the GFC were inadequate and needed to be revisited. It was unhealthy that some financial institutions had come to be viewed as so large or important that governments felt obligated to use taxpayer money to prop up these banks rather than allow them to go out of business.

Technology and interconnectedness of institutions and capital markets have increased the speed of transmission and the contagion potential of adverse external events. Financial innovation may produce new banking products and strategies whose risk characteristics are not well understood and/or may be excessively risky if not adequately managed or controlled. Existing supervisory tools and methods need to be continuously refined and enhanced to keep pace with innovation. Above all, however, expert judgment based on experience, is critical in assessing the vulnerabilities arising from new and evolving risks in the banking system.

A critical question is whether the revised rules and standards will provide a sufficient safeguard against future crises? In the context of a global financial system with numerous large complex financial institutions, and a wide range of institutional arrangements and stages of financial development, how much reliance can be placed on new and revised detailed rules to materially reduce the likelihood of the next crisis? Can economic models and stress tests be devised to pick up the vulnerabilities and build up in risks? To what extent do we need to balance the focus on detailed rules and economic models with an equal amount of attention to improving the quality and effectiveness of hands-on supervision and a focus on the more qualitative aspects of banking such as governance, risk appetite, and business acumen?

For example, can capital requirements, set at a global level, be equally effective in all circumstances? While it may be feasible to set minimum bank capital requirements, these requirements are minimums, and would presumably only be appropriate for those banks that are well run, have diversified business models, proven management, operate in economies that are stable and highly transparent, and have well-developed, predictable legal systems. Most banks should hold more capital than the minimum. How much more capital will depend on various factors, which are not easily prescribed in advance. Capital add-ons tied to empirically-based economic models may not be an adequate substitute for an experienced supervisor with the ability, willingness, and political backing to exercise supervisory judgment.

Bank supervisory authorities use a combination of supervision and regulation to reduce the level of risk in the commercial banking sector. Bank examiners must be able to routinely provide expert opinions and assessments on such diverse matters as:

1. A bank's overall financial strength and condition, the adequacy of its strategies, policies and practices, and its ability to withstand the onset of adverse business conditions.
2. The adequacy of a bank's corporate governance arrangements and practices, including the performance of senior executive management and the quality of oversight and level of engagement of the bank's board of directors.
3. The bank's overall capabilities to identify, measure, manage and control risk.
4. A bank's "risk appetite" and strategies, judging whether they are reasonable in relation to its financial strength and its risk management capabilities.
5. The quality of a bank's loan portfolio and loan administration practices.
6. Remedial actions when there are weaknesses or unsound practices or conditions in evidence.

Accurate assessments of these matters and quantifying related risks can best be achieved by a thorough analysis of a bank's business model, accompanied by a program of on-site supervision that has a reasonable level of transaction-testing and first-hand inspection of the bank's books and records. These assessments, in turn, form the basis for meaningful qualitative discussions with senior executive management. Is management aware of the bank's key vulnerabilities and does it have a strategy to address such vulnerabilities?

4. Supervisory Effectiveness Varied Greatly during the GFC

One indication of the importance of supervision is the way some similarly situated countries fared better than others during the GFC. We believe that differences in financial sector supervision are a key factor in explaining disparate outcomes.

A noteworthy example is the performance of the Canadian banking system.[3] Canada avoided the severe problems in its banking system that occurred in many other advanced economies. Why the difference? All advanced countries' banking systems operated broadly under the same regulatory standards. They all had well-established bank supervisory agencies that were instrumental in the creation of the international supervisory standards in Basel. The supervisory agencies all believed that they had implemented these standards faithfully. And yet, the performance of banking systems among the advanced countries varied widely.

Despite the proximity of Canada to the United States and the active participation of Canadian banks in the U.S. retail market, Canadian banks avoided many of the problems encountered by U.S. banks. Canadian banks did not generate large volumes of subprime mortgages, nor did they take large positions in subprime mortgages, mortgage-backed securities, or related derivatives. Unlike U.S. banks, the credit quality of Canadian banks' domestic portfolios of loans and securities remained high throughout the Crisis years.

While there are size and structural differences between the Canadian banking system and other advanced countries, we believe a key difference in outcomes was Canada's bank supervision practices.

The Office of the Superintendent of Financial Institutions (OSFI) supervises Canada's banking system. It practices intrusive or "close touch" supervision and is not reluctant to take pre-emptive supervisory actions when necessary – the type of action that may sometimes by successfully blocked by the industry in some other jurisdictions. It has a clear mandate, which grew out of bank failures in the late 1980s, focused on prudential issues and an emphasis on early supervisory intervention in problem banks to minimize potential losses to depositors.

An example is supervisory action to raise capital requirements during a rapid credit expansion - the supervisory equivalent of having "the punch bowl removed just when the party (is) really warming up."[4]

Before the GFC, OSFI established higher capital requirements than required under Basel rules, emphasizing both the quality and level of capital, and retained a formal leverage limit. By contrast, supervisors in some other advanced economies allowed leverage at big banks to increase, and allowed inclusion of debt-like instruments in computing banks' capital, even though such instrument did not provide loss absorbency.

It has also done a good job of communicating its supervisory expectations to the public. OSFI has established a formal system of placing institutions into one of four stages of supervisory intensity and intrusiveness based on OSFI's assessment of the risks posed by the institution. The process of "staging" an institution is described in a public document[5] issued jointly by OSFI and the Canadian Deposit Insurance Corporation (CDIC).

5. Core Elements of Supervisory Effectiveness

In reflecting on the lessons learned from various crises, we believe there are seven key principles that are the core drivers of effective supervision:

1. Supervisors need a clear and unambiguous mandate, with accompanying regulatory authority, focused on the safety and soundness of the banking system.
2. Supervisors need the legal authority and political independence to be able to intervene in an institution early, while it is still solvent and before a small problem can turn into a crisis.
3. The supervisory function needs to be able to build and retain a cadre of experienced supervisory personnel, with adequate resources to support their activities.

These elements need to be combined with:

4. A clear and well-communicated strategy – what is it that the supervisors expect to achieve?
5. Effective working relationships among relevant national authorities (central banks, other bank regulatory authorities, market conduct regulators, deposit insurance agencies, resolution authorities, and ministries of finance).
6. A constructive and independent relationship with the banking industry.
7. Proper regulatory accountability.

A detailed discussion of these principles follows:

First, a clear and unambiguous mandate to promote a healthy and well-functioning banking system.

A key goal of banking supervision is to promote a healthy banking system that meets the needs of its customers through prudent risk-taking. The supervisor's mandate should include the authority to do whatever needs to be done, in their expert opinion, to achieve this goal.

Making this goal explicit, educating legislative bodies on what this mandate means, and then holding supervisors accountable for meeting this goal, can go a long way to promoting effective supervision.

It is very important that the supervisory mandate place safety and soundness ahead of other goals. Assigning a supervisory agency multiple, potentially conflicting mandates, such as market access and development of the financial sector, can lead to ineffective supervision.

An example of this is the former U.S. Federal Home Loan Bank Board (Bank Board), which was created in the 1930's after the Great Depression to supervise savings and loans. The Bank Board was also assigned the goal of promoting the U.S. residential housing market. These two mandates at times conflicted, particularly during periods of high interest rates, when the housing market suffered from the high cost of housing loans. Holding the Bank Board accountable for the dual objectives of supporting the housing market while supervising the savings and loans meant that occasionally it had to choose between maintaining the flow of credit to the housing market versus enforcing prudential lending rules in the savings and loan industry.

This conflict was a contributing factor to the crisis in the U.S. savings and loan (S&L) industry in the mid-1980's, when undercapitalized savings and loans were permitted to continue to take on new residential mortgage loans. (An FDIC staff analysis[6] in 2000 estimated that "As of December 31, 1999, total direct costs attributable to the closing of insolvent thrift institutions over the 1986 - 1995 period amounted to US$145.7 billion." This amount does not include the substantial capital dissipation that the institutions also experienced prior to government intervention.)

When in 1989, the mandate of the S&L supervisor was changed to emphasize dealing proactively with weak institutions and promoting a healthy savings and loan sector, the industry rapidly recovered. Following the closing of the weak savings and loans, which represented close to a quarter of the industry, the surviving institutions became highly profitable and well capitalized and were able to support the housing market in a prudent fashion.

Second, supervisors need discretionary legal authority and the resolve to impose extraordinary requirements on riskier institutions early.

Preventing problems may require supervisors to take judgmental, discretionary actions, such as raising lending standards ahead of any problems manifesting themselves, or increasing reserves for possible loan losses through increased loan loss provisioning requirements, even when the loans are to important sectors of the economy.

Post-mortem analyses of the GFC in the U.S. (and of the earlier savings and loan crisis in the 1980s) showed that problems in the housing market had been identified pre-crisis, but that there was a failure to follow-through – a failure to support front line supervisors in confronting the management of risky institutions.

This highlights the importance of a supervisory culture that encourages early intervention by supervisors in institutions when problems arise and which requires concrete remedial actions even when management in the institution argue that the problems are immaterial or that with time, the problems will go away.

It helps to have clearly communicated expectations that it is the role of the supervisor to act preemptively, and the implicit backing by government in support of such extraordinary measures.

Third, prudential authorities need adequate financial and human resources to carry out their mandates.

Attracting and retaining quality talent in a bank supervisory organization requires a reasonable level of compensation and an opportunity for career progression. While it is recognized that there are limitations on government compensation arrangements, there often is need to make exceptions to government salary scales to retain experienced bank supervisors and other supporting staff with specialized skills. Unlike many other parts of government, financial sector regulators compete directly with the private sector in attracting the expertise necessary to carry out their mandates.

The cost of maintaining a properly resourced and effective supervisory function, which is often funded by levies on the banking industry rather than the general revenue of the government, is more than justified when compared to the direct and indirect costs, including economic output losses, which typically arise in a banking crisis.

Fourth, banking agencies need to have a clear and well-articulated strategy that is conveyed to political leaders and the public.

During 1986, in the early phases of the U.S. S&L crisis, the leadership of the responsible regulatory agency, the Bank Board, initially described the problem as involving a few weak savings and loans with about US$5 billion in losses. This turned out to woefully understate the problem. Over a quarter of the industry – close to a 1,000 institutions – were found to be close to insolvency. After the initial estimates, there were frequent upward revisions in the size of the problem. This caused credibility problems with legislative bodies and undermined public confidence in the S&L industry and its regulator.

When legislation passed abolishing the old Bank Board and creating a new supervisor (the Office of Thrift Supervision), new leadership was brought in. To generate public support for ridding the industry of weak institutions, the new agency embraced a policy of total transparency. It began holding quarterly press briefings where it outlined: (1) the financial condition of the industry; (2) the number of institutions deemed to be in danger of failing; and (3) detailed progress toward resolving these institutions. Each press conference was well attended by both print and electronic media. For a period of several years, an average of 4 to 5 non-viable institutions were

closed every week and turned over to the Resolution Trust Corporation. This process prompted weaker institutions that still had some value to seek out new sources of capital and/or merger partners. As the list of problem institutions became smaller and smaller, the thrift industry's problems were no longer newsworthy and the major news networks stopped sending reporters to the press conferences.

During this period when institutions were being shut down, the regulator would receive calls from Congressmen and state politicians attempting to intervene on behalf of their local troubled institutions. The solution to preventing such political interference in the regulatory process was the introduction of a policy of sending a letter from the agency head to the Chairs of the Congressional banking committee each month describing every call received from a politician related to a specific institution. Not surprisingly, the number of such calls dropped dramatically once that policy was made known.

Fifth, it is important for a bank supervisory agency to maintain effective working relationships with other relevant national authorities, especially those that form the financial sector "safety net" (central banks, other financial regulators, deposit insurers and finance ministries).

Canada's federal financial sector regulatory structure includes OSFI, a standalone bank and insurance supervisor, the central bank, a deposit insurer, a financial consumer protection agency, and a department of finance. (Securities supervision occurs at the provincial level.) Unlike many other countries, supervisory information, including institution-specific information, is shared among these safety-net participants on a timely, confidential basis. This sharing of information facilitates more informed federal policies and coordination. The heads of each entity work together collaboratively – a concerted effort is made by the agency heads to truly cooperate. During the GFC, this group met at least once a week.

By contrast, in post-mortems of other countries, there are accounts of ineffective communications and even a lack of collaboration among safety net authorities during the GFC. Information was not shared and some agency heads were cut out of decision-making. The result was sometimes confusing messages to markets and the public and lost time, resulting in inefficient decision-making and in some cases increased costs to taxpayers.

Sixth, a healthy and open relationship with industry is beneficial, to reinforce agency credibility and authority, so that regulatory policies and actions are understood and taken seriously.

Periodic meetings with key industry officials, such as CEOs and Chief Risk Officers, can be valuable sources of market intelligence, allowing supervisors to be more aware of emerging industry risks and thus more proactive in related supervisory activities.

Transparent rule-making and supervisory guidance are also helpful in promoting industry buy-in. While bankers may not be able to persuade supervisors to adopt all of their suggestions, they at least should believe they were given a chance to provide meaningful input into the decision-making process and hopefully will better understand the supervisory objectives of the final rules.

Regular meetings between supervisors and board members, particularly chairs of board committees such as those covering risk and audit, help to enhance the understanding of the regulatory process and reinforce bankers' and boards' fiduciary duties and responsibilities.

Seventh, regulatory discretion and independence requires proper public accountability.

In exchange for independence and flexibility being granted to supervisory authorities to carry out their responsibilities effectively, supervisors should expect to be subject to close oversight and transparency.

Supervisors should have to report to the public on their priorities, use of resources, key decisions, and, as far as possible, the effectiveness of their activities in relation to their goals and objectives. The last aspect may be challenging because of the traditional policy of supervisors avoiding disclosure of confidential examination and supervisory information; it may be especially difficult when a jurisdiction has a small number of institutions. At the same time, the public needs to be assured that the supervisory authority is performing effectively and is properly using their resource.

6. Conclusions and Recommendations

Effective prudential supervision is difficult to achieve. Post-GFC, there was an intense focus on developing and revising regulations and standards at the global level, which were in turn adopted by national regulatory authorities. Less attention was given to ways of enhancing actual supervisory methods. This may be due in part to a sense that promulgation of detailed rules would be easier to implement in a uniform fashion across different supervisors than softer policies governing intensity or intrusiveness of supervision.

However, the GFC and other banking system crises clearly demonstrate a critical component of a healthy banking system is a regular program of intensive on-site inspections/examinations at appropriate intervals, conducted by experienced professional bank supervisors who perform a reasonable level of transaction-testing and review of bank records and documents. Supervisors need to have proper legal authority to require banks to take timely action to curtail and remedy objectionable and undesirable practices and/or conditions. They need to be supported in the proper exercise of those authorities.

The "art" of supervision is at least as important as the quality (and quantity) of regulations. It is too easy for governments to fall into the trap of writing complex and detailed rules when, in fact, what really matters is having a cadre of experienced and empowered supervisors who have the freedom to exercise judgment, in return for being held accountable. The Canadian approach to supervision exemplifies that expert judgment and intrusive supervision is critical part of achieving effective supervision.

The Asia Pacific region has avoided a significant cross-border banking crisis since 1997-1998. While the region was adversely impacted by the GFC, jurisdictions experienced mostly secondary effects that were managed by central banks and other national authorities. Now is a good time, during a non-crisis period, for jurisdictions to evaluate their supervisory approaches, processes and resourcing. A key determination is whether their supervisory functions are able to detect and curtail excessive risk or unsound banking practices and strategies at their incipient stages. Further, do supervisory authorities and processes, and the supervisory culture promote timely remedial actions to prevent or lessen adverse outcomes that could contribute to future episodes of instability and crisis? Achieving these goals requires an intrusive, judgement-based supervisory approach, avoiding undue reliance on prescriptive rules. The foregoing principles may provide some insights in that regard.

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Endnotes

1. BCBS (2013), p. 1.

2. BCBS (2015), p. 2.

3. See IMF (2014), "Intensity and Effectiveness of Federal Supervision in Canada - Technical Note."

4. Martin (1955), p. 12.

5. OSFI (2014).

6. Curry and Shibut (2000), p. 32.

References

Basel Committee on Banking Supervision (BCBS), (2012), Core Principles for Effective Banking Supervision, Basel: Bank for International Settlements (BIS), September.

BCBS, (2013), Charter, Basel: BIS, January.

BCBS, (2015), A Brief History of the Basel Committee, Basel: BIS, January.

Curry, Timothy and Lynn Shibut, (2000), "The Cost of the Savings and Loan Crisis: Truth and Consequences," *FDIC Banking Review*, Volume 13, No. 2, January, pp. 26-35.

Fiechter, Jonathan, et al., (2013), An International Review of OCC's Supervision of Large and Midsize Institutions: Recommendations to Improve Supervisory Effectiveness, December 4.

International Monetary Fund (IMF), (2014), "Intensity and Effectiveness of Federal Supervision in Canada - Technical Note," *IMF Country Report*, No. 14/70, March.

Isaac, William M., (2014), "Sound Financial Regulation Essential to Sustainable Financial Growth: We Can All Do Better," *SEACEN Financial Stability Journal*, Volume 3, November.

Martin, William McChesney, Jr., (1955), Address of Wm. McC. Martin, Jr., Chairman, Board of Governors of the Federal Reserve System before the New York Group of the Investment Bankers Association of America, October 19.

Mohd Zabidi Md Nor and Michael J. Zamorski, (2014), "Consolidated Supervision: Achieving a 360 Degree View of Bank Risk," *SEACEN Financial Stability Journal*, Volume 2, May.

Office of the Superintendent of Financial Institutions Canada (OSFI), (2014), Guide to Intervention for Federally Regulated Deposit-Taking Institutions, February 4.

Viñals, Jose and Jonathan Fiechter, et al. (2010), "The Making of Good Supervision: Learning to Say 'No'," *IMF Staff Discussion Note,* SPN/10/08, May 18.

Zamorski, Michael J., (2012), "Post Crisis Strategies to Enhance Prudential Supervision and Regulation to Promote Financial Stability," Remarks at the 2nd CEMLA-SEACEN Conference, Punta del Este, Uruguay, November 15.

Zamorski, Michael J., (2015), “Strengthening Bank Supervision: The Need for Forward-Looking, Intrusive Supervision and a Supportive Supervisory Culture,” *SEACEN Financial Stability Journal*, Volume 5, November.

Zamorski, Michael J. and Minsoo Lee, (2015), “Enhancing Bank Supervision in Asia: Lessons Learned from the Financial Crisis,” *Asian Development Bank Economic Working Paper Series*, No. 443. Manila: Asian Development Bank, August.

A Fundamental Challenge for the Banking Industry: Better Authentication in Electronic Infrastructure

Karl Frederick Rauscher and Didier Verstichel

1. Introduction

Banks and other financial services firms have invested heavily in technology during the past fifty years to measure, monitor and control risk, and also provide convenient and efficient delivery of banking services between institutions and to their customers. With respect to the latter, the industry has come a long way since the introduction of the first automated teller machine in 1967 by Barclays Bank in London. Recent years have seen the pace of change accelerate rapidly as technological improvements have greatly reduced the cost and increased the efficiency and functionality of mobile service delivery. This has lead to new risks and new competitive pressures. Some non-bank competitors, who are offering banking and financial services, are unregulated or lightly regulated. Transactional security is a constant challenge due to the variety and volume of threats.

Nearly two years ago, The SEACEN Centre held a Cyber Security Summit with regulators and technology experts to discuss the implications of these industry trends and how to control risks to individual institutions as well as financial stability risks.[1] One of the main conclusions was that bank regulators need to emphasize the engagement of institutions' senior executive management and boards of directors in controlling these risks. Technology risk is a strategic business risk that needs proper oversight at the highest levels of a firm. A fundamental aspect of that risk concerns the authentication of individuals – whether within banking institutions, or as end users.

2. Understanding a Core Challenge of the New Paradigm: Authentication

For some time now, the world of banking has become essentially electronic. Banks have traditionally focused on safeguarding physical assets as the primary means of protecting the value entrusted to them. In this new paradigm, where we are dealing primarily with electronic data and transaction, protecting physical assets has been overtaken with a new priority.[2] Now, the primary concern for banks protecting the value entrusted to them is about managing identities, i.e., who is it that you are dealing with?[3] In the modern world, the actual possibilities are an authorized person, an unauthorized person, or not even a person, i.e., a machine.

Banking, like the rest of society, has been transformed by the benefits of pervasive connectivity, and as a trade-off, now also shares the cyber security risks; risks that are now here to stay. These risks have been recognized by the industry as a major operational concern for well over a decade.

"The Bank for International Settlements' Basel Committee on Banking Supervision introduced operational risk as an element of the first of its "Three Pillars" of sound banking practice. The Basel II Accord defines *operational risk* as "the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events." In modern banking, "processes" are largely performed via electronic means. Likewise, "people" perform their various functions in a banking environment via electronic means. Even the banking "systems" are implemented by electronic means. The inescapable conclusion is that due diligence in cyber security is central to operational risk management."[3]

The challenge of cyber security is everywhere; it is faced throughout the entire banking system, from regulators to all banks, even the smallest retail banks. The weakest link for any of these banks' electronic systems is the entry point, when access is initially granted. One of the conventional practices has been to manage an individual's access via a unique username and password. With the proliferation of such interfaces in their lives, individuals are required to manage a large number of passwords, which they usually write down, or otherwise record, somewhere, bringing into question the whole security of the process. If not required to be more rigorous in their design, individuals tend toward quite predictable passwords, as surveys of the most common choices reveal: "123456", "password", "12345678", and "qwerty".[4]

Another conventional approach for authentication is the required use of a second factor such as a secure token. However the inconvenience of carrying such additional devices is undesirable to customers. In addition, unlike a biometric factor, such devices can be misused by an unauthorized individual who may obtain knowledge of the assigned user's pin. In the eyes of expert observers, these conventional approaches are falling short in keeping up with the expectations and needs of the emerging environments requiring secure authentication.

In seeking new solutions, it may be instructive to consider the forces behind the use of electronic systems that are so compelling: *convenience, speed and cost reduction*. These forces are each relevant to consumers, bank employees and bank managers across the banking industry. Fighting these trends is difficult, if not impossible. Thus, the ideal solution space is to offer effective countermeasures to both (a) improve cyber security and also (b) be convenient, fast and cost effective.

3. Countermeasures with Promise

Fortunately, there is a solution space where these requirements can be met. That is, there are approaches that align with the forces just described, and that are also more effective in providing secure authentication. The Fast Identity Online (FIDO) Alliance is an example of a strong move underway to make online

authentication *more effective*, while also keeping in mind the need to be convenient, fast and cost effective. The mission includes "developing technical specifications that define an open, scalable, interoperable set of mechanisms that reduce the reliance on passwords to authenticate users; operating industry programs to help ensure successful worldwide adoption of the specifications; and submitting mature technical specification(s) to recognized standards development organization(s) for formal standardization."[5] The initiative is an international, non-profit organization whose membership includes Alibaba, American Express, Bank of America, BC Card, Google, ING, Mastercard, PayPal, Visa and WoSign. The progress of this initiative provides ample evidence that an international movement is underway to transform the way authentication is performed.

Many new approaches to improve authentication make use of emerging biometric technologies, including those that exploit the uniqueness of an individual's fingerprint, iris or voice. Other technologies include user habits like body movements, typing speed and patterns that include such aspects as logistics, e.g., location where a function is typically performed by an individual. However, not all technologies and implementations are the same. Considerations going forward will include (i) privacy – protecting the personal biological and other behavior information, (ii) spoof resistance – preventing false acceptance of something fake, (iii) adoption – where there are two aspects: namely, consumer and industry.

In recent years, the use of biometric sensors in smart phones demonstrates a critical mass of public acceptance of the technology. The touch sensors on phones are being used by consumers to conduct a wide range of financial transactions with their banks.

4. Next Steps for the Banking Industry

As institutions take initiatives to improve authentication in the coming years, the practical implementation of new technologies, such as biometrics, faces several hurdles. On the consumer side, there is a huge base of personal card readers and security tokens already deployed that provide two-factor authentication. Biometrics alternatives need to offer improved efficiency and effectiveness. Another challenge for new technologies is the method of enrolling users. The effectiveness and efficiency of such processes must also be at least comparable to existing benchmarks, if not improved.

With respect to bank's back office environments, there is massive legacy infrastructure systems and workstations and, at present, some institutions have committed limited financial resources to invest in new technology. The reality of the situation is that the conventional user identification and password technologies are well entrenched and a widespread change of new authentication technologies will require re-prioritizing development agendas.

It should be kept in mind that technologies develop fast in the Internet age, and therefore, it is prudent for regulators to lend a soft hand when trying to guide the industry. The industry initiatives cited above are evidence of existing, tangible results being produced that are benefitting the industry.

5. Conclusion

In summary, one of the critical cyber security focal points for banks in the coming years should be on improving the authentication of the individuals throughout the entire banking system. Fortunately, there are solutions being developed that *both* meet the demands of current competitive trends, i.e. *convenience*, *speed*, and *cost effectiveness*, and the demand to be *more effective* than practices currently widely deployed. The challenge for many institutions in implementing new technologies that improve authentication are prioritizing funding for new technologies, maintaining current levels of security and maintaining operability of systems and services during transitions to the new technologies.

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Both authors serve on the advisory board for Sonavation, which develops advanced biometric sensors using ultrasound technology.

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Endnotes

1. SEACEN Cyber Security Summit 2014, *Demystifying Cyber Risks: Evolving Regulatory Expectations*, www.seacen.org/file/file/2014/CyberSecurity/Pre-Summit%20Press%20Release_19August%202014.pdf

2. The authors acknowledge that information systems also require physical protection.

3. On the consumer interface side, there is a standard practice known as "Know Your Customer" (or KYC). Banks should only allow their "known customers" to access their systems.

4. Rauscher Karl, Frederick, (2014), "The Mindset and Management for Mastering Financial Stability in the Cyber Frontier," *SEACEN Financial Stability Journal*, Volume 2, p. 27, May.

5. www.teamsid.com/worst-passwords-of-2014/

6. https://fidoalliance.org/

Managing Financial Crisis in an Interconnected World: Anticipating the Mega Tidal Waves*

Dr. Zeti Akhtar Aziz

1. Introduction

It is my very great honour to be invited to deliver the Per Jacobsson Foundation Lecture to this most distinguished audience here at the BIS in Basel. This lecture series commemorates the lifelong contributions of Per Jacobsson to the international financial system. While his contributions have been extensive, important to mention is his role in the early years of the BIS where he served for twenty five years as the Economic Advisor. We are now the beneficiaries of this contribution. It is my privilege to be part of this lecture series.

The focus of this lecture will be on the new challenges in the management of financial crises that arise from the increased interconnectivity in national financial systems that have also become increasingly internationalised and thus internationally integrated. In my career of more than three decades at the Central Bank, I have had the experience of being close to three major financial crises; the first when I was based in London during the ERM crisis in the early 90s, then the Asian Financial Crisis in the late 90s in which I was directly involved in its management, and the third is the recent global financial crisis. The observation is that the manifestation of a financial crisis is highly dynamic, evolving not only with the changes in the financial landscape but also with the changes in the circumstances during different stages of the crisis. This lecture will identify the different phases in the evolution of a crisis, each phase demanding for a different policy solution. The paper sets out to suggest the indicative thresholds in the transition of a crisis to its next phase. The aim is to anticipate the next eventuality of the crisis, and allow for its effective management.

The world has continued to experience successive financial crises with its reach now extending both to the emerging and developed economies. The cost of such financial crises has been immense. It has drawn significant research on the subject. The literature has for the most part focussed on explaining the causes of such financial crisis, the lessons that might be drawn and the debate on the solutions for containing and managing the crisis. And yet, financial crises have continued to happen, and with it new challenges for its management. While it may not be possible to avoid a financial crisis, it will certainly be possible to enhance our management of the crisis to minimise its costs on the financial system and the economy. This paper therefore takes the crisis as a given and focusses on its management during the different stages of its evolution.

The literature distinguishes between different types of crisis, including currency, banking and debt crisis.[1] To take into consideration the role and implications of interconnectivity in financial crises, I will look at the underlying financial and economic conditions behind the factors that explain the crises. These conditions can

be grouped into three categories. The first relates to financial crises that are set off by an unexpected development. The shock could be financial, economic, social or political. Examples include sudden changes in the terms of trade arising from disruptions in the commodity markets or from contagion effects in another jurisdiction. The second set of factors relates to financial crises that follow the build up of excesses over an extended period of time. These include the build up of financial imbalances such as unsustainable levels of leverage and indebtedness, formation of asset bubbles, or from the pursuit of policies that fuel exuberance and encourage asset prices or exchange rates that do not reflect underlying fundamentals.

The third set of financial crises are those that are a consequence of structural deficiencies in the financial system. These deficiencies may exist within the legal framework, regulatory and supervisory regimes and incentive systems or in the international financial architecture that have not kept abreast with the fundamental changes taking place in the national and the international financial systems. Over time, the system may no longer able to cope with the developments that are taking place. Financial crises may also be the result of the combination or cumulative effects of these conditions. The analysis of the underlying conditions prevailing in a financial crisis is important and valuable for our understanding of the nature of the crisis and how it might evolve and thus provide implications for its effective management.

2. Interconnectivity and Internationalisation

In managing a financial crisis in today's world, an appreciation of the increased interconnectivity in the financial system and the intensification of its internationalisation has become vital. While this trend has improved opportunities to diversify and thus reduce risk concentration, this phenomenon has also significantly increased the potential for the transmission of systemic risks throughout the financial system and across borders. Financial interconnectivity has also increased the channels through which localised financial stress in one institution or a segment of a financial market can spread to the rest of the financial system and to the overall economy. The key channels through which systemic risks can spread have been well documented.[2] These channels include the linkages that exist between financial institutions, the interactions between the financial intermediaries and financial markets, and the linkages between the financial sector and the real economy. Further channels exist through the market infrastructures and the two-way interaction between the financial sector and the Government.

In addition, with the increased international integration of financial systems, the scope for cross border contagion has also become more extensive, introducing new regional and international dimensions for the effective management of crises. With the intensification of financial globalisation in this recent two decades, international financial linkages have become an important source of the spread of a crisis across borders. The ramifications of the financial crisis during this period have been more extensive and pervasive than in any other period. The international aspects of financial crises have drawn significant attention to the phenomenon of international contagion;

on the factors underlying the contagion, the channels that facilitate the cross border effects, the consequences of the spill-over effects and the possible policies for mitigating such contagion. For the most part, the literature has focussed on the contagion impact on liquidity conditions, cross-border exposures of financial intermediaries, the co-movements in asset prices including interest spreads and on economic activity across jurisdictions.[3]

The international connectivity has also intensified due in part to fundamental changes in the real economy. Not only have we seen increased trade flows, these flows have also been driven by the emergence of global supply chains. Over the years, businesses have divided their production into specialised phases, by outsourcing to other local or international companies or relocating part of their supply chain to other countries. While technological advancements have made such global supply chains more feasible, the lowering of trade and investment barriers, and the drive for close proximity to larger markets, have reinforced this trend, tightening the economic connectivity between countries.

For emerging economies, the degree of financial interconnectivity will increase as the financial systems become more developed. In the early stages of financial development, financial systems tend to be clearly segmented, characterised by the closer proximity between the origination and retention of risks; the distinct separation between the core activities of financial institutions operating in the different segments and between such financial institutions and their related entities. Cross border exposures are also more limited in less developed systems. As financial markets deepen and expand, financial connectivity will correspondingly increase, first within the domestic economy, and then with liberalisation – at the international level.

As financial networks become more complex, mapping financial interconnections will continue to be a challenging task. Financial networks are also highly dynamic and change over a relatively short period of time in response to market incentives. Market imperfections further complicate the ability to predict the response of market participants to systemic shocks. Such behaviours may also be affected by the assumptions or perceptions about the extent of interdependencies between the institutions, financial markets and the economy; or may arise from a reassessment of the fundamentals by market participants following a shock. It may also result from irrational and herd behaviour. These indirect effects of contagion may at times be as important as the direct contagion effects.

In such a complex adaptive system, a greater understanding of the financial network and the manifestations of behaviour under stress becomes important. With better frameworks and tools for identifying and measuring interconnectedness, our understanding of how such systemic risk is transmitted has advanced considerably.[4] However, this understanding still remains incomplete. For the most part, the focus of work in this area has been on the banking sector, in particular on systemically important banking institutions, and its interconnections within the financial sector and to other parts of the financial system. Other frameworks developed have drawn on the field of

corporate finance which allows for the assessment of transmission of risks between sectors in the financial system and between the financial system and the real economy.[5] Following the 2008 Global Financial Crisis, a number of major advanced economies have also implemented regulatory and supervisory responses to address such system risks arising from the increased connectivity.[6]

Better data on financial networks are key to achieving a better understanding on the network dynamics following a shock and increase our understanding of how developments are transmitted throughout the financial system. This includes an understanding of the major nodes in the networks where risk propagation is likely to be the strongest both in terms of magnitude and speed. Therein lies the importance of cooperation both at the national and international level to improve transparency and the collection of data on balance sheets of the respective financial intermediaries. In particular, the more timely and granular data on common exposures and bilateral links between institutions will be important to gauge the potential transmission effects on the rest of the financial system.[7]

3. Manifestation and Dynamics of Financial Crises

The increased domestic and international connectivity has changed the manifestation and dynamics of a financial crisis. While the dynamics of each crisis has been unique, each successive crisis since the 1990s has spread more quickly and further afield from its epicentre, following the paths of increasingly complex financial networks. A deeper understanding and awareness of such networks and the associated contagion paths of how a crisis could unfold is vital for the effective management and containment of crises.

In this part of the paper, I divide a financial crisis into five potential phases, a succession of mega tidal waves. To understand the progression of a financial crisis through its different phases would provide for the identification of the appropriate policy responses, and the timing of such actions. Of particular importance is the ability to anticipate the next tidal wave and provide for more forward looking actions to withstand it.

Phase 1: The Onset of a Financial Crisis

The first phase of the crisis is perhaps the most difficult to recognise. While the manifestation and dynamics of the start of a financial crisis is generally evident in the financial markets, less clear is when a financial market turmoil becomes a crisis. Financial markets have a vital role in the intermediation process connecting surplus and deficit units. The ability of the market to intermediate the surplus and deficit funds, and to perform in this clearing function is impaired during the onset of a crisis. Such disruptions can occur from losses experienced by financial institutions or investors on assets that they hold or from defaults by borrowers on loans extended by the financial institutions. As such losses begin to spread among market participants, increased risk

aversion will result in segmentation in the interbank and funding markets which in turn affects the liquidity conditions across the financial markets. Asset liquidations by the affected financial institutions experiencing losses further exacerbate the liquidity conditions.

When then does a financial market stress become a crisis? In the asset markets, common early signs are sharp increases in volatility in asset prices and a generalised deterioration in credit quality of one or more asset classes. The fire-sale disposal of assets in the markets experiencing stress will depress prices, creating a spiral in which asset liquidations begin to spread across to other markets to compensate for the losses. Increasingly, market players are only able to liquidate at increasingly larger price concessions as buyers begin to disappear, creating further downward pressure on asset prices. Under these conditions, liquidation occurs even in well performing asset markets resulting in an across the board generalised price decline including across borders.

During this phase of the crisis, a deterioration in funding conditions can be observed. There is heightened uncertainty over the financial health of counterparties with exposures to the affected markets or credits. At this stage, liquidity begins to evaporate and financial institutions begin to be confronted with the inability to access liquidity or funding in the money markets. Increasing number of banking institutions with liquidity will become less willing to provide such liquidity. This breakdown in the interbank market also hampers the ability to make markets across other asset markets. Money market rates and the diverging spreads between banking institutions provide early indications of such systemic stress. Behaviours in the markets during such periods shift rapidly, resulting in discontinuous and significant jumps in liquidity premiums.

A similar pattern can be observed in the foreign exchange market during the early phase of an imminent currency crisis. The mounting pressures in the currency market are generally accompanied by increased volatility, while the thinning of liquidity in the market results in a significant widening of the bid-ask spreads. Such stress in the foreign exchange market may follow a trigger event that results in sudden shifts in investor behaviour, risk aversion and herd phenomenon. Incomplete information and increased uncertainty prompts investors to liquidate their positions. Moreover, the central role of expectations produces an overshooting in the foreign exchange market which further exacerbates the distressed conditions.

During the Asian financial crisis, sharp price movements first became evident in the asset markets. In Thailand the stock market index declined by 37% in 1996 following disruptions in the construction sector which resulted in sharp declines in property prices. This rapidly spilled over into a number of other regional equity markets that precipitated outflows, leading to mounting pressures on the currencies in early 1997. As liquidity tightened, money market rates then rose sharply. The months that followed the collapse of the Thai Baht on July 2, 1997 saw a widespread liquidation of

stocks in the equity and bond markets across Asia, pressures on the regional currencies and a tightening of liquidity conditions in the money markets.[8] Yet during this period, most of the countries in the region, did not fully recognise the developments as the unfolding of a major regional financial crisis.

Similarly, in the United States, following the decline in house prices, the subprime securities market began to experience massive losses. The effects of widespread liquidation of assets in the market rapidly spread to other markets. The signs of liquidity strains were reflected in the widening of interest rate spreads in the interbank market.[9] By mid-2008, as the credit market became increasingly impaired, the spreads between the corporate and Treasury bonds increased sharply. At this phase of the financial market turmoil, it was also not recognised as the unfolding of a major financial crisis. During this period, the concern was still on the risks of inflation and on the need for interest rates to be increased.[10]

Similarly in Europe, liquidity constraints were experienced in 2007 as the subprime crisis unfolded.[11] Several major banking institutions in Europe faced losses arising from their exposure to the assets associated with the subprime crisis. The euribor-eonia swap spread, a standard measure of the interbank market tensions, rose sharply, accompanied by a significant increase in excess reserves as banks hoarded liquidity during this period.[12] At this stage of the financial turmoil it was not envisaged that it could evolve into a severe banking and economic crisis. In fact, in mid-July 2008 interest rates were raised to address inflation. In late 2009, a further disruption in the sovereign debt market that followed the fiscal distress in Greece and several other European economies further worsened the conditions in the funding markets. While the money market rates had stabilised prior to this, the financial position of banking institutions had been substantially weakened. By 2010, this deteriorated further. Widespread losses were experienced from exposures to sovereign debt arising from the massive selloff and liquidation of the papers. This was reflected in sharply higher bond yields, further declines in the equity markets and a tightening money market conditions.

These experiences suggest for the need to identify the thresholds beyond which market stresses will turn into a full-blown crisis. Rigorous stress tests need to be applied to asset markets under severe scenarios to provide early signs of severe market stress. Such stress tests should provide insights into the potential changes in liquidity conditions in key asset markets by gauging the trends and volatility of key asset prices, the volume of activity in the respective markets under plausible stress scenarios, taking into account the risks associated with the underlying conditions in the markets.[13] Among such risks are the degree of household and corporate indebtedness and foreign holdings of domestic financial assets. In the money markets, relevant risks include the maturity profile of banking institutions' liquidity positions, funding concentrations and the strength of contingency funding arrangements.

Phase 2: The Impairment of the Financial System

Unless the underlying distressed asset class and the inefficient distribution of liquidity in the markets are swiftly and systematically addressed, financial market participants will begin re-evaluating their initial risk perceptions and valuation of assets on a broader scale. A generalised risk aversion then results in rapid shifts in trading and investment strategies to cut losses. As panic sets in, it becomes a race to the bottom through the massive deleveraging and disposal of toxic assets.[14] As financial institutions and other investors rush to sell off assets across other segments of the financial markets, asset prices experience further and extreme downward pressures.

To the extent that different parts of the financial system are likely to be impacted by systemic stress in a synchronous way, interdependencies between financial institutions and asset markets are likely to intensify, leading to further significant co-movements and volatility in the financial markets. Common risk models used by financial institutions partly explain why banks and investors find it optimal to deleverage and shed higher risk assets when a shock to one asset class occurs. The pro-cyclicality of credit ratings also serves to amplify this trend. During this phase of the crisis, financial assets become increasingly difficult to value with any degree of reliability. Realised and unrealised financial losses escalate and weaknesses of institutional balance sheets become more evident.

The second phase in the evolution of a financial crisis is thus marked by distressed in financial institutions and their possible failure. At this juncture, mounting credit and market losses, exacerbated by deeper liquidity and funding uncertainties precipitates increases in insolvencies. This is compounded by the erosion of public confidence that induces runs on healthy banking institutions by both depositors and investors. The crisis has now evolved into a banking crisis. Spill-over effects to other financial systems in other jurisdictions, also intensify during this period. The collective deleveraging actions across the globe result in the gradual deterioration in global liquidity, further increasing volatility in domestic and international financial markets. Additionally, the withdrawal of financial activities by the major internationally active financial institutions in markets in which they perform critical functions intensifies the contagion across borders.

During the Asian crisis, within six months following the waves of the disruptions in the foreign exchange, money and asset markets, there were wide spread financial distress and subsequent failures of financial institutions.[15] In the United States, it was about eight months following the disruptions in the financial markets before it translated into a banking crisis.[16] In Europe, financial institutions were also substantially weakened by their exposure to assets related to the subprime crisis. While relative calm in the financial markets had been restored prior to the sovereign debt crisis, the undercapitalising and solvency problems experienced by European financial institutions saw more than 100 failures of since 2008.[17]

It is therefore during the early stage of the crisis that viability tests and stress tests need to be applied to large financial institutions to assess whether they were confronted with solvency problems.[18] While stress tests and network analysis were extensively applied to provide indicators on the threshold levels that would precipitate severe financial distress in highly connected financial institutions, such tests during this recent global financial crisis were undertaken during the more advanced phase of the crisis, and for institutions that had for the most part already been recapitalised. They nevertheless, provided a basis for actions to conserve capital in order to avoid widespread insolvencies, and served to shore up confidence in the financial system.

By this phase of the crisis, two further sets of conditions will provide indications of the unfolding of the financial crisis into an economic crisis. The first relates to the level of distress in household and business sector, in particular, should these sectors be highly indebted. The second relates to the supply of credit and the potential for disruption arising from the erosion of bank capital. Evidence generally shows a tightening of lending standards, increased focus on recoveries and heightened scrutiny of the creditworthiness of borrowers during this period. This is compounded by the more difficult access to capital markets. When these threshold conditions are breached, the financial crisis begins to affect the wider economy which brings us to the next stage of the crisis.

Phase 3: The Onset of the Economic Slowdown

The crisis enters into the third stage when it transitions into a fundamental economic slowdown, which rapidly evolves into an economic crisis. The strong linkage between the financial system and the real economy is further reinforced by the increased exposure of the economic sectors to the financial system. Disruptions in financial intermediation amid liquidity and capital constraints, and the consequent withdrawals of credit facilities to both businesses and consumers are the early signs of the effect of the crisis on the economy. The negative wealth effect from the significant declines in asset prices also lowers not only the present value of income but also the value of collateral, thus further limiting the access to financing. Additionally, the stressed conditions of a highly indebted household or business sector will have a dampening effect on their spending activities. Firms affected by the tighter access to credit and the weakening demand, will commence to scale back production and thus labour requirements. This further accelerates the spiral of the economic downturn.

Across borders, this phase of the crisis is transmitted through both the financial and trade channels. While the contagion effects on domestic asset markets and the withdrawal of international credit lines are already evident during this period, these effects are intensified by the increased trade linkages and the more globalised production networks. Lower final demand from the crisis-affected economies not only directly dampens the export sector, but the prevailing global supply chain will also exerts cascading effects on a broader network of economies. The consequent weaker

economic conditions during this period will subsequently feed back to the crisis-affected economies as the trade and cross border investment channel amplifies the depth of the economic crisis.

During the Asian Financial Crisis, most regional economies began to experience an economic contraction six to seven months into the crisis. The decline in GDP was most severe in 1998, ranging from -5.7% in Korea to -13.1% in Indonesia. In the recent financial crisis in the advanced economies, the synchronised slowdown in the global economy was experienced in late 2008 and early 2009. By the fourth quarter of 2008, real GDP in the United States declined by 5.4% and by 6.4% during the first quarter of 2009. By the second half of 2009, unemployment breached the 10% level. In Europe, growth started to contract in the second half of 2008. While Asia was affected by the global financial turmoil during this period, most economies in the Asian region still continued to experience growth that ranged from 5.1% to 7.3% in 2008. However, as the crisis evolved into an economic crisis, the ensuing collapse in world trade resulted in an economic contraction that ranged from -4.6% to -1.6% in 2009. For the less open economies in the region, growth slowed but did not go into negative territory.

Two reasons may explain the relatively less severe effects of the global financial crisis on the Asian region. While it would be correct to say that Asia had less exposure to the toxic assets of the distressed financial markets in the advanced economies, the surges of capital inflows and their sudden reversals were far larger and more volatile than that experienced during the Asian financial crisis. However, Asia was better able to intermediate these massive and volatile capital flows, thus reducing its effects on the domestic financial system and economy. This followed from the payoffs from a decade of financial reforms and financial market development that were supported by economic restructuring to enhance the role of domestic demand. Therefore, while the increased interconnectivity has not rendered Asia immune to the effects of the global financial crisis, Asian economies have been better able to absorb and manage the consequences of the global crisis.

Phase 4: The crisis runs its course

Policy inaction or inappropriate policy intervention during the early stages of a crisis may contribute towards its further escalation to eventually exceed thresholds beyond which the crisis will run its course. This phase is characterised by conditions in which asset prices collapse to their lows and incidences of defaults by households and businesses increase sharply. The worsening economic conditions then feed back to the financial sector. Impaired financial institutions become widespread resulting in a breakdown of the financial intermediation process. These spirals into a self-reinforcing process, leading to the failure of financial system to function and a further deepening of the economic crisis. As extensive foreclosures and bankruptcies occur, rising unemployment becomes prevalent amid the severe economic contraction.

At this point in the crisis, rating agencies adjust the sovereign ratings several notches down, while confidence levels fall to an all time low. Capital outflows intensify, precipitating capital fight by residents. The exchange rate trends into uncharted territory, recording meaningless levels. Resources become limited, reducing the prospect for any policy flexibility and international reserves become depleted. At this phase, social unrest sets in, political upheavals occur – usually involving leadership change. The crisis reaches a stage at which it is not possible for the crisis to get worse. Cases of this stage of the crisis are evident during both the Asian and the European financial crises.

Phase 5: The Aftermath of the Financial Crisis

An economic recovery that begins to take hold marks the fifth stage in the dynamics of a crisis, when the broader economy shows signs of improvements. The strength of the recovery is generally characterised by several developments. First, the deleveraging activities subside and asset markets recover. Second, financial intermediation resumes as the balance sheet positions of the financial institutions improve. Third, there is lower financial market volatility with the reduced uncertainties while the return of confidence gradually occurs. Fourth, there is a recovery in economic activities in the most affected sectors. The recovery in the housing sector is particularly important given that activities in this sector have significant spillover effects to other parts of the economy. It also represents the main assets of households. Fifth, there is a recovery in domestic demand conditions. Key to supporting this trend is the status of the balance sheets of the household and business sectors. Sixth, there is a recovery in investment spending. As demand improves the recovery will start to become more broad based and there will be less reliance on the policy support. Seventh are the developments in the conditions in the labour market. Companies start to replenish their workforce as demand conditions improve. The improvement in employment prospects further supports the recovery in private consumption.

The recovery process during the aftermath, however, remains highly vulnerable to new domestic and external shocks, and risks remain for the potential of a relapse back into a crisis. While there is greater optimism, market confidence remains vulnerable to unexpected setbacks that could undermine the sustainability of the recovery.

4. The Resolution and Management of the Crisis

What lessons can policymakers draw in managing financial crisis? The questions relate to outcomes: What will it take to restore stability and bring about a lasting recovery? Why is it that the outcomes are sometimes not within our expectations? Why is it that the recovery has been elusive at times, and not commensurate with the massive policy interventions? Why has the period in the aftermath frequently been plagued by subpar growth and high unemployment? Policymakers are also at times confounded by continual risks to setbacks that change the dynamics of the environment. Then finally, why has the costs of the crisis varied so significantly from crisis to crisis, imposing such a significant burden on society?

The focus of the next part of this paper is on the management of a financial crisis as it unfolds, and an examination of the policy choices while taking into account the environment of greater interconnectivity, including across borders. While financial crises may differ according to their underlying causes and the circumstances in which the crisis occurs, let me venture to put forward a number of guiding principles for the management of crises that can be drawn from a greater appreciation of the manifestation and dynamics of the crisis in its different stages.

- First, the changing manifestation and dynamics of a financial crisis at its different stages call for different policy interventions. The calibration and timing of the policy mix during the different stages of the crisis will have a significant impact on the overall outcome of the crisis.
- Second, anticipatory policy actions which recognise the next eventuality as the crisis unfolds will be key in preventing a worsening of the crisis and in mitigating its impact in its subsequent stages.
- Third, the focus of policy actions in managing financial distress has to reach beyond the conditions in distressed financial markets and institutions, to actions that address the broader conditions of the affected asset markets and distressed borrowers.
- Fourth, greater recognition of the escalation in the costs of a crisis at its advanced stages would provide a more balanced and informed evaluation of the trade-offs associated with specific policy interventions at the earlier stages.
- Fifth, considering the entire evolutionary path of the crisis will avoid a partial policy response and prompt for a more comprehensive and complete solution.

In my following remarks, I will draw on these key principles.

Stage 1: Containing the Onset of the Crisis

The initial policy interventions at the onset of a financial crisis need to achieve three objectives: to restore stability in the short-term money markets and ensure access to liquidity, to stabilise the conditions in the specific asset markets in which the turmoil originated, and to address the consequent erosion in confidence. The early policy interventions in most financial crises are well known. It has generally involved providing massive liquidity support through wide-ranging facilities, including large-scale asset purchases and expanded international swap arrangements to improve global liquidity conditions.[19]

The provision of liquidity will relieve pressures in the funding markets. But this will likely be temporary if conditions in the asset markets which are in distress have not been addressed. Early attention to improve conditions in the distressed asset markets is, therefore, equally important. Account must be taken of the exposures of the household, business and financial sectors to these markets, which will amplify the contagion arising from a further deterioration of conditions. In a financial crisis triggered by developments in the housing market, the response therefore needs to address both the conditions in the distressed housing market and the sectors that have exposures to the market. The mechanisms and schemes for the restructuring of home

mortgage loans will be important to avoid widespread defaults and foreclosures, as will be the programmes and incentives to support the housing market.

Similar observations can be made for policy responses during episodes of reversals in capital flows following large-scale liquidation of assets in the financial markets. Policy interventions involve avoiding a collapse in the affected asset markets.[20] In the foreign exchange markets, the most pressing challenge is to restore orderly market conditions. While intervention operations may precipitate a substantial decline in reserves, the costs of sharp discontinuous depreciations beyond which a free fall occurs would be much higher. At the same time, the underlying internal factors that contributed to the unstable conditions in the foreign exchange market, including a deteriorating current account deficit, or high levels of external indebtedness or the pursuit of unsustainable exchange rate policies, also need to be addressed. This will require a clear understanding of the structural adjustments and reforms by both the public and private sector which will be required to achieve these outcomes.

At this stage of the crisis, recognition of the interlinkages between the depressed asset markets, the depreciated currencies and the growing uncertainties on the growth prospects would provide an indication of the implications for the balance sheets of the business sector and the financial institutions, even before they materialise. Establishing the institutional arrangements and mechanisms at this early stage to address such eventualities will allow for swift actions that would limit defaults and bankruptcies at subsequent stages of the crisis. Pre-positioning these arrangements to support debt restructuring for the respective sectors would also minimise the rapid deterioration of the balance sheets of financial institutions and reduce the prospect of a systemic threat of widespread institutional failures. It will also give the authorities to carefully consider appropriate guidelines and conditionalities to mitigate moral hazard. Additionally, it can provide a more complete assessment of the costs of such arrangements against the costs at the more advanced stage of the crisis when it has become more severe.

Even if the degree of financial institution insolvency at this stage of the crisis may be minor, assessments based on viability and stress tests will be the basis for early action that will reduce the systemic repercussions of a financial institution failure on other parts of the financial system. Consistent and credible market-wide institutional stress tests can reduce information asymmetries in the market and so moderate extreme market reactions. And banks can be compelled to take early actions to shore up capital buffers in anticipation of a further deterioration in market conditions. During the Asian Financial Crisis, however, as part of the IMF bailout package for Thailand and Indonesia, widespread closures of stressed financial institutions were imposed by the programme.[21] This precipitated a further deterioration of asset prices and further sharp depreciations of the domestic currencies.

There has been less consensus on the macroeconomic policies needed during the early stage of the crisis. In situations in which monetary policy was tightened, priority was being accorded to addressing inflationary concerns prevailing during the period. In several cases, however, the policies needed to be reversed when deteriorating conditions

intensified, and when confronted with the heightened potential of systemic financial failures and the reality of the heavy costs on the economy.[22] To avoid future drastic adjustments, macroeconomic policies would, therefore, benefit from guidance on the next eventuality in the evolution of the crisis. This would involve the anticipation of further stress in asset markets, and the consequent banking stress, and its negative subsequent consequences on the economy.

Similar trade-offs need to be examined in addressing capital outflows. Raising interest rates may not always contain capital outflows and stabilise market conditions when irrational market behaviour prevails. The exceptions have, however, been the Republic of Turkey in January of 2014, when interest rates were raised sharply and had successfully slowed the outflows. Another example was India, although increasing interest rates was complemented by other measures. Both economies, however, experienced a moderation in growth. This has to be a judgement call that takes into account the next eventuality of the crisis and the balance of costs to the market, the financial sector and the overall economy.

Collectively, these conditions underscore the importance of a comprehensive approach at the early stage, when the oncoming tidal wave is already on the horizon. Most significant is that stressed conditions in the financial and asset markets may morph into insolvencies on a wider scale and that this would rapidly have implications on the economy. Particular actions directed towards arrangements and mechanisms for the distressed financial markets and intermediaries as well as the stressed borrowers during this stage of the crisis need to be an integral part of the solution.

Stage 2: Repair and Resolution

Should the crisis progress beyond the first stage with rapidly deteriorating financial and asset market conditions, its management will need to address both the systemic threat of widespread financial institution failures and the intensification of distressed conditions in the household and business sectors. In addition to the restructuring and resolution of distressed financial institutions, the efficient execution of pre-positioned debt restructuring arrangements for the household and business sector on a wider scale at this stage of the crisis will also be critical. Acting on two fronts will limit the adverse feedback effects from a weakened household, corporate and financial sector to the real economy.

For the most part, the focus of attention in the management of a financial crisis that has advanced to this stage has been on the restructuring and resolution of the financial sector. The objective at this stage is to minimise the systemic risk of the failure of financial institutions and to facilitate its efficient resolution through asset carve-outs from distressed banking institutions, the recapitalisation of viable institutions and the orderly unwinding of insolvent institutions. But support to financial institutions in distress can raise the issue of moral hazard. Such concern, although legitimate, should not prevent actions that will avoid disruption to the overall functioning of the financial system. By this stage of the crisis, there would also already be severe

limitations on the capacity to achieve private sector solutions. The solution then lies in ensuring adequate safeguards to limit moral hazard and thus minimise the risk of loss to public funds. These could include ensuring that financial assistance is only extended based on commercial terms with strict adherence to the principle that losses incurred are first borne by the existing shareholders. Appropriately designed incentives with provisions for sharing in the upside potential of subsequent recovery values can also address some of the valuation challenges involved. In addition, legislative changes may also be needed to manage the problem assets and to achieve enhanced recovery values, while preserving financial discipline among defaulting borrowers.[23]

Current reforms led by the Financial Stability Board on recovery and resolution planning for global systemically important banking institutions will better support the ability of authorities to achieve an orderly unwinding of failed financial institutions while minimising the loss of public funds.[24] Significant challenges however remain with respect to the coordination of the resolution of insolvent institutions with extensive cross-border operations. While there has been some meaningful progress towards improving the processes for monitoring, supervising and resolving globally systemic banks, the process is far from complete and continued work in this area at both the national and international levels will remain important.

Stage 3: Supporting the Economic Recovery

The most pressing challenge as the crisis evolves into an economic crisis is to support an economic recovery. A prolonged period of economic weakness even after liquidity conditions have normalised and when credit flows have resumed is likely. First, a significant macroeconomic response may have averted the collapse of the financial system but it will not, on its own, support an economic recovery. Monetary policy is able to deal with the downside risks, but it is less able to deal with the upside potential of an economy. Second, an economic recovery will also depend on effectively addressing conditions in the asset markets, including the foreign exchange market and the repair of the balance sheets of the borrowers – namely, the household and corporate sectors, including the small and medium-scale enterprises.

Third, delay in macroeconomic policy responses may retard the recovery. An accurate assessment of the effects of the turmoil in the financial markets on the financial system will provide an early indication that the balance of risks have shifted to the downside. A delayed or insufficient monetary policy response could well prolong the weak demand conditions and result in lasting damage to the productive capacity of the economy, which could be difficult to reverse.[25] The earlier lowering of interest rates would also reduce the debt servicing burden of borrowers at a time when incomes are already affected. Given the sizeable amplifying feedback loop between the financial and real sectors, monetary policy action during the onset of the crisis can be instrumental in reducing the overall severity of the crisis on the real economy.

During the Asian financial crisis, most affected economies – which had initially raised interest rates to support the exchange rate – began lowering the policy

rates to historic lows only ten months into the crisis. Many complemented these actions by reductions in the statutory reserve requirement during the same period to improve liquidity conditions. Similarly, in the advanced economies, monetary policy was only rapidly eased ten months into the crisis in September 2008. From the perspective of the greater interconnectivity that exists in the financial system and its inter-linkages with the economy, the recognition of the next eventuality of the crisis would prompt earlier anticipatory actions that would avoid the severity in the damage to the economy.

Experience from successive crises, has nevertheless, warned against the over-reliance on monetary policy. Not only are there limits to what monetary policy can deliver, but an over-reliance could also lead to other unintended consequences. Monetary policy also cannot address the structural issues, including the economic rigidities and economic competitiveness. It has been acknowledged that the highly accommodative monetary policy cannot be a substitute for the necessary reforms and structural adjustments. Additionally, the prolonged period of a low interest rate environment may also contribute towards the build-up of financial imbalances. The monetary accommodation, therefore, would need to be reinforced with the intensification of the debt restructuring efforts for the household and business sectors to increase the potential for spending and investment activity. Supply-side policies across economic sectors, including in the labour market, will also be important to the recovery process.

In an environment of weak private sector spending, fiscal measures have an important role in supporting the domestic economy, even though by this stage in the crisis, the policy space may have become limited. There are, however, wide-ranging measures that do not involve significant costs. They range from the provision of incentives to firms to preserve jobs and reduce the shedding of labour, to fiscal incentives to promote debt restructuring for viable corporate, small and medium-scale enterprises and the household sector to support the recovery in domestic spending. In addition, financial policies that include funding schemes, credit guarantee facilities and special funds established to increase access to financing have been highly successful in supporting the growth process.

At this stage of the crisis, the redistributive effect of the financial crisis that disproportionately impacts the poor and the vulnerable need to mitigated. According to the World Bank, the financial crisis can cause the income of poor households to fall 10 times more than the average household.[26] While the management of financial crises has not always given explicit consideration to the redistributive effects of the crisis, there have also been highly successful programmes that have been implemented in several parts of the world. These programmes can be grouped into four important areas. The first relates to the mechanism to restructure small loans, including for housing and for small businesses. Second are the cash transfers that are part of the social safety net to assist the poor households to pay for essentials, children education and programmes that support better health outcomes. Third are the programmes for skills development and education for the unemployed, and to develop entrepreneurial

skills. Finally is infrastructure investment, which creates employment opportunities, while also building the foundation for future productivity enhancement.

Stage 4: Recovering from the Trough

By the time the crisis reaches the threshold beyond which it will run its course, further policy interventions become limited at best. Amid high tensions, undermined confidence and political upheavals, preserving socio-political stability and forging a national consensus become a challenge. Even in cases where international assistance has been sought, it will be important at this stage to gain support for the national economic recovery plans. Earlier introduced life support measures can no longer provide any breathing space. The focus now has to be on addressing the underlying weaknesses in a gradual and sequenced manner. Harsh conditionalities will not only worsen conditions, but will delay the prospects for a potential recovery and will also increase further the costs of the crisis.

While it will be critical to re-examine the necessary policy interventions, the key focus of the programme needs to address the prevailing fundamental weakness. During the Asian Financial Crisis, the IMF programmes took the opportunity to address all the areas of weakness, including those not directly related to the crisis. This worsened the crisis and increased substantially its costs to the economy. Diagnosis of the conditions and balancing of the trade-offs will provide guidance on the sequencing of the priorities. During this period, measures to address the redistributive effects of the crisis become highly important, while communications will be vital to promote a wider understanding that the stage of the crisis had now required for urgent private and public sector adjustments that would provide the promise of a better future.

Stage 5: The Unfinished Business in the Aftermath

The management of the crisis in the aftermath is equally important, requiring attention to the risks and vulnerabilities that could threaten the sustainability of the recovery and to the unfinished business that relates to the structural adjustments and reforms that will increase the medium and long-term potential of the economy. During this period in the aftermath, the country is not out of the woods. In addition, there is the challenge of unwinding the extreme measures that were implemented during the extreme conditions of the crisis. The premature lifting of the life support systems instituted during the earlier stage of the crisis may derail the recovery, while the structural adjustments that will contribute towards the future growth potential may also entail costs to growth in the immediate term.

Demand management measures continue to be important in the period of the aftermath to provide support to the recovery and to provide the enabling environment for the implementation of the structural adjustment policies. Other supply side policies and incentives also need to aim to promote consumption spending, improve the investment climate, while being complemented by measures that would promote financial and economic inclusion. The growth generated by these measures would

allow for it to be politically more palatable to address the more challenging structural reforms that involve costs to the economy.

The challenge surrounding the successful unwinding of the extraordinary measures that were introduced during the early stages of the crisis is not unique to monetary policy. In the aftermath of the crisis, when the initial extreme conditions no longer prevailed, an effective exit from the unconventional or unprecedented measures is needed to ensure that they do not generate their own set of unintended consequences. Clarity of the objectives of such unconventional measures and an assessment as to whether these objectives have been achieved provide the identification of the indicators that signal the timing for the exit from such policies. Such policy normalisation during the aftermath of a crisis has been known to lead to significant shifts in market expectations that could result in significant over- adjustments in the financial markets, hence affecting the strength of the recovery.

During the Asian Financial Crisis, Malaysia implemented measures seen at the time as being highly controversial.[27] Malaysia began lifting the capital control measures six months after their introduction, as the measures were judged to have achieved their objectives and were no longer necessary. Macroeconomic and financial stability had been restored, and the economic recovery was well underway. The liberalisation of the exchange rate regime, however, took longer. It was after over six years following the strengthening and development of the financial system, in particular, the development of the domestic bond market and the progressive liberalisation of the financial system that provided the preconditions for the effective transition to the floating exchange rate regime.

The implementation of the adjustment programmes to strengthen the underlying financial conditions and the economic potential has its best chance to succeed in an environment of stable financial markets, the efficient functioning of the intermediation process and the resumption of growth. The structural adjustments and reform agenda need to address the underlying weaknesses and structural deficiencies that were made visible by the crisis and to strengthen the potential of the economy. The reform therefore needs to extend beyond the financial sector to issues relating to competitiveness and economic structures, and to education and health reform. Finally, new legislation and institutions may need to be established in a changed and more interconnected economy, while obsolete institutions may need to be dissolved.

At this stage, it is also important to recognise the risks and vulnerabilities that could threaten the sustainability of the recovery. As part of the national risk management framework, a matrix of indicators on these risks and vulnerabilities will provide insights into the unfinished business in the management of the crisis. Given the dynamic nature of the systemic risks to the financial system and the economy, the network analysis framework, including the analysis of broader contingent claims, can illuminate these risks, so that effective action can be taken. Finally, gradually rebuilding the policy buffers that had been drawn down during the crisis will help to prepare for the management of future shocks.

5. Financial Crisis and Governance Challenges

The greater interconnectedness within national financial systems, the stronger two way linkages between the financial sector and the economy, and the new channels through which risks can be transmitted, collectively present significant governance challenges for the management of a financial crisis. The internationalisation of national financial systems adds a further global dimension to the governance challenges in crisis management. Existing governance arrangements, therefore, need to be reviewed to reflect the new realities of crisis management in this environment. The management of crises is no longer confined to the remit of one authority or an individual country, but calls for collective efforts by multiple agencies and authorities within the country and across countries. The key new feature in the design of governance arrangements arising from the increased connectivity in the world calls for the need for greater effective cooperation, collaboration and coordination within a country and across borders.

Let me highlight five important issues that will confront Central Banks in the consideration of these new governance arrangements. The first relates to the need for effective interface with other agencies, including the government, while avoiding being compromised by the actions that may be taken. Frequently cited reasons are political realities that need to be taken into account. The second relates to the challenges of boundary management. The Central Bank may be expected to do more than its legislated mandate either due to constraints experienced by other authorities or the lack of clarity and understanding of their integral role in the dynamics of the crisis.

The third relates to the potential erosion of Central Bank autonomy and independence in such an integrated governance arrangement. This can arise when coordination arrangements involve fiscal costs, such as for the restructuring and resolution of financial institutions. It is frequently maintained that the decision-making process should be led by the government. The fourth relates to the need for speed of action during a crisis. Elaborate governance arrangements across agencies may result in delays or compromises that may not produce the desired outcome. And finally the fifth relates to ensuring consistent and effective communication at a time when there is great uncertainty and when the challenge is made more intense by the instantaneous information flows from alternative market sources on the developments taking place during the crisis.

Clearly defined governance arrangements will enhance the potential for the effective management of the crisis. Such arrangements need to be established at three levels: at the Central Bank, at the national level across agencies, and the regional and international level. Central to these arrangements is an agreed framework for the decision- making process, which defines the responsibilities and accountabilities of different authorities, the inter-agency relationships and the procedures and the protocols to be observed during a crisis.

While there may already be existing committees at the Central Bank to address the mandate of monetary and financial stability, a dedicated group for crisis management will be key to supporting efficient and coordinated information flows and in monitoring the implementation of crisis responses from the different parts of the Bank. For this purpose, there has to be great clarity on the objectives to be achieved by the dedicated group. This will provide the strategic focus, while providing the ability to mobilise key resources across the organisation to support swift actions. Such a group would be similar to the dedicated group for business continuity that already exists in most Central Banks. The responsibilities of the crisis management group would involve mobilising the necessary information, coordinating the diagnosis and assessment of the risks and the policy choices, making assessments on the timing of policy responses and ensuring their effective execution. Such a group would also be responsible for coordinating crisis communications and engaging with the markets, the industry and economic sectors.

In most emerging economies, Central Banks generally have a broader mandate that includes institutional building. The Central Bank is expected to establish institutions and arrangements that support the effective functioning of the financial system. This may include establishing institutions that have a role in the management and response to a crisis.[28] Additionally, not all the channels of the transmission of risks in the financial system are within the span of direct control and influence of the Central Bank. Policy instruments for responding to risks to financial stability are correspondingly dispersed across multiple agencies. As such, institutions and arrangements need to evolve to take into consideration the implications of greater inter-connectivity. Collaboration across institutions and agencies within the government, in the surveillance of risks and in the implementation of the measures during a crisis, becomes increasingly more important.

Central Banks in different parts of the world have addressed this in different ways, including through the establishment of financial stability committees or councils with broader representation,[29] and through more formalised cooperation agreements between authorities. For the coordination of policies for economic management during a crisis, national level councils have been established, chaired by the political leadership to centralise the decision-making process and to ensure the government machinery would facilitate the efficient economic management.

Equally important in the governance arrangements for the management of crisis at the Central Bank and at the national level is the arrangements for communications. An analytical framework that recognises the differential impact of the crisis on different groups of stakeholders will guide the nature of the communications and engagements that will be needed. Rigorous stakeholder analysis and engagement become highly important to gain their understanding of the dynamics of the conditions unfolding and an appreciation of the policies being implemented during the crisis. It will also enhance the prospects for managing conflicts during such period.[30] Such a framework details the stakeholder network and maps the key relationships and the strength of

their linkages to the different parts of the financial system and the economy. It can serve as an important basis for the formulation and prioritisation of communication strategies.

At the international level, the global reach of the spill-over effects of the 2007-2008 crisis has highlighted the significance of the international dimension in coordination and cooperation arrangements with respect to policy responses and the sharing and exchange of information.[31] The high degree of interconnectivity across financial systems has also brought to the fore the importance for such cooperation and coordination arrangements to be more inclusive. Institutionalised bodies, such as the Bank for International Settlements (BIS) and its various Committees, have provided important platforms for the sharing and exchange of information among a larger number of Central Banks. Meanwhile, the establishment of the G20 and the Financial Stability Board (FSB) has strengthened and broadened the cooperation among Ministers of Finance, Central Banks, regulatory authorities, standard setters and the multilateral agencies. More recently, the Financial Stability Board has also extended further its global outreach through the six regional groups that were formed in 2012.

There has also been significant progress in establishing regional governance arrangements in addressing financial stability risks. Drawing on the experience of the Asian Financial Crisis, the Central Banks of the East Asian Pacific economies have come together to develop an integrated framework for Crisis Management and Resolution that outlines the cooperative and coordination arrangements to deal with the cross-border effects of financial crises. The framework details the alert and activation protocols, the arrangement for the assessments of emerging and imminent risks that could threaten regional financial stability and the operational arrangements for decision-making during an imminent crisis. It is supported by a regional monetary and financial stability committee that was established in 2006. In Europe, progress on the Single Supervisory Mechanism and Resolution Directive[32] has similar objectives, but the challenge has been to achieve this during the midst of an on- going crisis.

6. International and Regional Responses

The global response to financial crisis has evolved significantly over the decades. Early on, financial crises were mainly confined to national systems and were generally managed at the national level. By the 1990s, financial crises had become more regional in nature as evidenced by the financial crises in Latin America, Europe and Asia. Nonetheless, they were still managed by the individual crisis-affected country. The global response during this period involved multilateral agencies that dealt directly with the crisis-affected economy, without any policy coordination across countries although inter-connectivity and contagion had already become prevalent.

The recent Advanced Economies Crisis was marked by its international dimension and the policy responses were international. Coordinated interest rate cuts,

provision of US dollar liquidity facilities by several key central banks, and the concerted fiscal expansion by many countries turned the tide of the global recession. The crisis also set in motion an international process for the fundamental overhaul of regulatory and supervisory frameworks aimed at minimising the likelihood and impact of future financial crises. The establishment of the Financial Stability Board (FSB) in 2009, together with expansion of the Basel Committee of Banking Supervision, have also been at the centre of the work of the global financial reform. The reforms have largely aimed at strengthening the supervision and resolution frameworks for systemically important financial institutions. Emphasis has also been on enhancing collaboration in the areas of surveillance and risk assessments that take into account the implications of increased connectivity in the global financial system.

Three main challenges confront the international collaborative efforts in crisis management. The first is that national authorities need to accord priority to national considerations even while national developments and policy actions could have widespread global implications. National resolution frameworks would for example result in solutions that would have ramifications to financial stability in other jurisdictions. The second is that international interconnectivity and inter-linkages are less well understood and appreciated. The third relates to the leadership that is required to build regional and international consensus in an environment that is wrought with diverse backgrounds, ideology and perceptions.

The global dimension of crisis has drawn significant responses by the multilateral organisations. So far these responses have focussed on efforts to improve the effectiveness of risk surveillance capabilities and in the provision of financial safety nets. There is now greater emphasis on global surveillance and stress testing frameworks on macrofinancial and systemic risk assessments, including the contagion spillovers both within domestic and across national borders. The focus of FSAP and the IMF Article IV consultations are now better aligned with these approaches. Liquidity facilities have also been augmented.[33] Much less progress however has been made in developing the mechanism for restructuring of sovereign debt, a vital requirement for addressing the consequences of a sovereign debt crisis. Building the consensus to achieve this has been less successful given that the solution would impinge on the sovereignty of countries. Such restructuring would avoid defaults that could have more pervasive implications at a global and regional levels.

Regional collaborative efforts have also intensified particularly in regions that have become more integrated and cohesive. In Europe, an important initiative is the financial safety net arrangements with the European Stability Mechanism (ESM) which is the largest existing regional arrangement. In Asia, a regional financial safety net, the Chiang Mai Initiative Multilateralisation, was established in the aftermath of the Asian Financial Crisis. It is now the second largest regional financial safety net in the world, and it is supported by regional surveillance mechanisms to assess risks confronting the region. An integrated regional crisis management framework has also been put in place.

While these international and regional responses go a long way towards addressing crisis conditions, they do not obviate the more encompassing need for a more robust international monetary system. The ongoing reforms of the international monetary system will continue to remain a challenge. Moreover, when a crisis becomes more than a liquidity crisis, resources provided in existing international financial safety net arrangements are likely to be insufficient. Multilateral agencies need to recognise the complementary role of regional groupings in achieving the common cause. This interaction with the multilateral institutions needs to be based on the relative strengths of respective regions and that of the multilateral agencies. To maximise the benefits of these complementary roles, cooperation can be based on where the concentrations of the expertise, experience and knowledge base reside. Such increased scope for regional and international cooperation can strengthen the existing international and regional responses.

7. Conclusion

Policies and reforms that have followed successive financial crisis have contributed significantly towards strengthening the resilience of financial systems and economies across the world. Going forward, financial crises will however be an eventuality that will still continue to happen. Our efforts will not be sufficient to prevent the next mega tidal wave. Moreover, the next tidal wave that surges on to our shores is unlikely to be identical to those experienced previously. The exact manifestation of a future financial crisis will be different amid the vast and rapid changing terrain in our landscape. The lesson to be drawn is that crisis prevention, while important, will not be sufficient. Policymakers need to be prepared for the effective management and resolution of such financial crisis.

To quote Mark Twain, "History does not repeat itself, but it does rhyme."[34] Key then are the lessons that might be drawn for the effective management of financial crises. An appreciation of the increased interconnectivity in the world, at both the national and international level, together with an understanding of the manifestations and dynamics of a financial crisis as it progresses from one stage to another, will enable policymakers to anticipate the next oncoming eventuality in the evolution of the crisis. This addresses shortfalls that may arise in the diagnosis that focuses on any single period or on a specific aspect of the crisis during its evolution. This will also avoid reactive policy responses to the unfolding conditions and will allow for pre-emptive and forward-looking policy solutions that will be better able to arrest the crisis at its early stages. If a financial crisis cannot be avoided, being pre-emptive in the management of its systemic consequences will enhance the potential for minimising its costs and thus the degree of severity of the crisis.

The perspectives and approaches to policymaking in these circumstances will need to evolve with the changing environment. The Central Bank needs to transform itself into an enduring organisation that will best deliver its mandates in this new environment. This requires new institutional and governance arrangements with new

capabilities in crisis management in a world that continues to be highly unstable. Treacherous waves will be before us and we need to be highly suspect of the calm before the storm. Great forces of change and the rapid shifts taking place will remain our challenge. This will also be the challenge for the other agencies in the public and private sectors. The Central Bank however cannot just lament on the inertia of the others. The Central Bank needs to exercise influence to gain the consensus on the necessary collective action to deliver the needed outcomes. Greater engagement and effective collaboration supported by the necessary governance arrangements need to be in place – both in normal times, and in particular, during times of crises. The intensification of international integration and the significant implications of policy spill-overs across borders have also surfaced new considerations on the current global governance arrangements.

It is often said that the evolution of a crisis is better understood and becomes clearer only in hindsight. Indeed, the encounters with crises have demonstrated that the level of uncertainty that prevails as a crisis unfolds cannot be underestimated. Even while timely information is scarce, there are strong pressures for policymakers to respond swiftly and decisively. Policymakers at the centre of managing a crisis need to have courage, nerves of steel and be steadfast in the endeavour. Therefore, it is my sincere hope that my thoughts presented in this paper, on the manifestation and dynamics of a financial crisis and the policy choices during the unfolding of a crisis, will contribute towards the on-going dialogue that is so important in guiding us in navigating the raging waves to safer shores.

Dr. Zeti Akhtar Aziz was Governor of Bank Negara Malaysia from 2000 to April 2016. She had an important role in successfully managing the repair and resolution of Malaysia's financial system during the Asian financial crisis and the consequent strong recovery of the Malaysian economy. In the decade that followed, she also had an important role in the reform and transformation of the Malaysian financial system, including overseeing the modernisation and enactment of ten major pieces of legislation for the financial sector. This period also saw the progressive liberalisation of the Malaysian financial system.

In the Asian region, Dr. Zeti had been actively involved in strengthening cooperation and financial integration. In 2006, she chaired the taskforce of the Executives' Meeting of East Asia-Pacific Central Banks that prepared the report for the future direction of central bank financial cooperation in the region, which continues today. A founding member of the Bank for International Settlements (BIS) Asian Consultative Council, she was also the first co-chair of the Financial Stability Board Regional Consultative Group for Asia.

Dr. Zeti has also had an extensive role in the global development of Islamic finance, being part of the group of Governors that established the Islamic Financial Services Board and the International Islamic Liquidity Management Corporation. She headed a taskforce that prepared a report identifying the building blocks that would further strengthen the institutional arrangements for stability in the Islamic financial system.

Endnotes

*. Dr. Zeti's speech was delivered at the Per Jacobsson Foundation Lecture in Basel, Switzerland on 29 June 2014. SEACEN thanks Dr. Zeti and the Per Jacobsson Foundation for permission to reprint the speech.

1. Claessens and Kose (2013) provides an extensive review of the analytical and empirical explanations of the different types of financial crisis.

2. Arregui et. al. (2013) provides a review of the tools for identifying and measuring interconnectedness to provide increased understanding of the direct and indirect spillover channels of systemic risks in the financial system.

3. Forbes (2012) and Forbes et. al. (2013), discuss the evolution of the factors underlying interdependence and contagion which have increased considerably over the recent years, as well as the effectiveness of various policies in mitigating contagion.

4. Haldane (2009) elaborates on the value provided by the network analysis to enhance our understanding of financial systems and crises. These frameworks developed using network analysis and market price based measures have been applied to augment stress tests conducted on financial institutions and to improve early warning systems.

5. Gray, Merton and Brody (2008) have developed a contingent claims framework for the national level that illustrating how sectoral contingent claims in the balance sheets for the respective sectors can be constructed to provide forward looking market based set of indicators to measure the vulnerability of various respective sectors in the financial system and the economy.

6. Yellen (2013) discusses in detail the reforms in the banking and the OTC derivatives market aimed at reducing the systemic risks to the financial system arising from the complex interconnectivity by the financial system.

7. Caruana (2012) discusses the importance of international cooperation, including in the collection and sharing of data, which is essential for monitoring and responding to vulnerability arising from increased interconnectivity.

8. In Malaysia, the daily money market rates increased from 7.5% to 40% in July 1997. In Korea, the monthly average money markets rates rose sharply in November that year to peak at 26% the following year. In Indonesia, money market rates rose from 16% to 65% in one month between July and August 1997. In Thailand, it increased from 8% in March to 24% in September 1997.

9. The TED spread jumped from an average of around 40 basis points before 7 August 2007 to 240 basis points by 20 August 2007.

10. Mishkin (2011) highlights that even at the onset of the financial crisis during the summer of 2008, there were discussions at the FOMC meetings on the need to raise interest rates to contain inflation.

11. A review of the European experience during this period can be found in Heider et. al. (2009) and Lane (2009)

12. The 3-month euribor-eonia swap spread, a standard measure of the interbank market tensions, rose to almost 100 basis points in end 2007 from an average of five basis points prior to that.

13. During the Asian Financial Crisis, Malaysia conducted these assessments on the foreign exchange market that took into account the net foreign exchange position of banking institutions, the degree of non resident participation in domestic markets, the degree of external indebtedness of the different sectors and the volatility of the international reserve level.

14. Kindleberger (1973) in his reinterpretation of Hyman Minsky's work describes this phenomenon in the financial markets during such a crisis. More contemporary overview of the literature can be found in Allen and Gale (2009), and Haubrich and Lo (2013).

15. As part of the IMF programme, 56 finance companies and 8 commercial banking institutions were required to be closed in Thailand while in Indonesia, 64 banks were closed.

16. The collapse of Bear Sterns in March 2008 was followed by the collapse of AIG and the Reserve Primary Fund on the following day. By 2012, 465 banks and credit unions entered into receiverships. Brunnermeier (2009), Cecchetti (2009) extensively discuss this early phase of the US financial crisis. Mishkin (2011) discusses this and the next phase of the crisis.

17. While formal Europe-wide database of bank failures are not available, estimates can be found in the publication of the Open Economics Working Group (2014).

18. During the Asian Financial Crisis, Malaysia applied these viability tests to assess the capital position of banking institutions including their ability to access liquidity and to regularise their liquidity position and to manage their deposit withdrawals. The viability tests included assessments on the structure of the loan portfolio, the trend of delinquencies and the adequacy of provisions to absorb losses. It also included assessments of future business prospects and the availability of critical talent to execute necessary internal restructuring and recovery plans within the financial institutions.

19. The Federal Reserve has on a number of occasions provided dollars to other central banks to ensure dollar liquidity in the international financial system.

20. In recent crises, these have included establishing arrangements for outright purchases, reducing restrictions on share buy-backs, and more contentiously, changes in accounting classifications on an exceptional basis in order to stabilise rapidly falling prices.

21. In Thailand, the closure of 42 finance companies was announced on 20 August 1997 while taxes were also raised as part of the fiscal austerity programme. By December 1997 the number of finance companies closed was 56. In Indonesia, the IMF restructuring programme initially involved 16 banks in November 1997.

22. During the European Exchange Rate Mechanism (ERM) crisis, the Bank of England initially raised its minimum lending rate from 10% to 12% and subsequently to 15% in defence against the currency, but six days later, the rate was brought back down to 9%, as it became clear that the rate increase did not deter the speculators and stem the sterling's slide. More recently in Europe, the ECB had initially raised its main refinancing rate by 25 basis points in July 2008 from 4% to 4.25% despite the emerging stress in the United States, citing inflation concerns. As the crisis unfolded, however, the ECB reduced the rate sharply. Within a seven month period between October 2008 to May 2009, the rate was reduced by 325 basis points.

23. In Malaysia the asset management company established in June 1998, distinguished between viable and non-viable loan assets. For the viable loan assets, the management involved restructuring and rehabilitation of the loans, whilst non-viable loan assets were dealt with through management of the borrower and/or collateral.

24. Financial Stability Board (2011) The ongoing work involves identifying such systemically important financial institutions and requiring for resolution and recovery plans (RRP) for these institutions to enable the authorities to resolve the institution without systemic disruptions and without exposing taxpayers to significant losses.

25. A recent paper by Reifschneider, Wascher and Wilcox (2013) suggests that a more activist role of monetary policy can reduce the depth and length of a recession, thereby preventing damage to the supply side of the economy from becoming entrenched.

26. World Bank (2012) used simulations based on data collected from Bangladesh, Mexico and Philippines to show that a financial crisis can cause the income of poor households to fall between 25% and 50%. In comparison, the average household would only suffer income losses of between 3% and 5%. Poor households refer to the population in the 4th to 7th decile of income distribution of respective countries.

27. The capital control measures implemented on September 7, 1998, followed waves of sharp depreciation in the currency over an eighteen month period. It aimed to serve as a circuit breaker to the further sharp declines in the currency. A day later, following an appreciation of the currency, the exchange rate was fixed against the U.S. dollar.

28. Examples of such institutions include credit guarantee corporations, deposit guarantee corporations and asset management corporations, and during periods of crisis, mechanisms for debt restructuring and resolution or to introduce special schemes for specific sectors.

29. In the US, the council is chaired by the Secretary of Treasury, while in Australia, the Governor is the chair of the council.

30. This approach was rigorously adopted with the domestic stakeholders at the time of the 1998 Asian Financial Crisis. Despite the circumstances of great uncertainty and the implementation of unconventional policies Malaysia did not experience capital flight. More recently Henisz (2014) has applied such a framework to offer insights for stakeholder engagement strategies to generate value enhancing results.

31. Trichet (2013) reviews the evolution of the global governance and assesses its performance.

32. The Single Resolution Mechanism, Bank Recovery and Resolution Directive, and Deposit Guarantee Schemes Directive, put forward by the European Commission in June 2012, were approved and adopted by the European Parliament on 15 April 2014.

33. The Precautionary and Liquidity Line was introduced in November 2011, aimed at providing liquidity to all countries that were threatened by contagious shocks, even countries that had sound economic fundamentals. In addition, the IMF also, through a programme in collaboration with the European Commission and the European Central Bank provided support to several distressed countries.

34. The quote can be traced back to Mark Twain's novel, "The Gilded Age: A Tale of Today", published in 1873.

References

Allen, Franklin and Douglas Gale, (2009), "Understanding Financial Crises (Clarendon Lectures in Finance)," Oxford University Press.

Arregui, Nicolas; Mohamed Norat; Antonio Pancorb; Jodi G. Scarlata; Eija Holttinen; Fabiana Melo; Jay Surti; Christopher Wilson; Rodolfo Wehrhahn and Mamoru Yanase, (2013), "Addressing Interconnectedness: Concepts and Prudential Tools," *IMF Working Paper* 13/199, International Monetary Fund.

Bilal Habib; Ambar Narayan; Sergio Oliveri and Carolina Sanchez, (2010), "The Impact of the Financial Crisis on Poverty and Income Distribution: Insights from Simulations in Selected Countries," World Bank.

Bloom, Nicholas (2009), "The Impact of Uncertainty Shocks." *Econometrica* 77.3: 623-685.

Carrière-Swallow, Yan and Luis Felipe Céspedes, (2013), "The Impact of Uncertainty Shocks in Emerging Economies," *Journal of International Economics,* 90.2: 316-325.

Caruana, Jaime, (2012), "Interconnectedness and the Importance of International Data-sharing," Speech Delivered at the 3rd Swiss National Bank-International Monetary Fund Conference on the International Monetary System, Zurich.

Claessens, Stijn and M Ayhan Kose, (2013), "Financial Crises: Explanations, Types, and Implications," *IMF Working Paper,* 13/28, International Monetary Fund.

Coeurdacier, Nicolas; Hélène Rey and Pablo Winant, (2013), "Financial Integration and Growth in a Risky World," Manuscript, London Business School and Political Science.

Douglas Alexander, (2010), "The Impact of the Economic Crisis on the World's Poorest Countries," *Global Policy*, Volume 1 Issue 1, January 2010 p.1

Forbes, Kristin J., (2012), "The "Big C": Identifying and Mitigating Contagion," Paper Prepared for 2012 Jackson Hole Symposium by the Federal Reserve Bank of Kansas City.

Forbes, Kristin J.; Jeffrey Frankel and Charles Engel, (2012), "The Global Financial Crises," *Journal of International Economics,* 88 (2. Nov), pp. 215-436.

Geithner, Timothy, (2014), "Stress Tests: Reflections on Financial Crises," Random House.

Giannetti, Mariassunta, (2002), "Financial Crisis and Incomplete Information," Paper Presented at the Third Joint Central Bank Research Conference on Risk Measurement and Systemic Risk, Bank for International Settlements, Basel.

Gray, Dale F.; Robert C. Merton and Zvi Bodie, (2008), "New Framework for Measuring and Managing Macrofinancial Risk and Financial Stability," *Harvard Business School Working Paper*, No. 09-015, Harvard University.

Haldane, Andrew, (2009), "Rethinking the Financial Network," Speech at the Financial Student Association, Amsterdam.

Haubrich, Joseph G. and Andrew W. Lo (Eds.), (2013), "Quantifying Systemic Risk," National Bureau of Economic Research, The University of Chicago Press.

Heider, Florian et. al., (2009), "Liquidity Hoarding and Interbank Market Spreads: The Role of Counterparty Risk," *ECB Working Paper Series*, No. 1126.

Henisz, Witold, (2014), "Corporate Diplomacy: Building Reputations and Relationships with External Stakeholders," Greenleafs.

Hurd, Michael D. and Susann Rohwedder, (2010), "Effects of Financial Crisis and Great Depression on American Households," *NBER Working Paper*, No. 16407.

Kindleberger, Charles, (1973), "Manias, Panics, and Crashes: A History of Financial Crises," Wiley Koo, Richard C., (2011), "The Holy Grail of Macroeconomics: Lessons from Japans Great Recession," Wiley Lane, Philip, (2012), "The European Sovereign Debt Crisis," *Journal of Economic Perspective*, Winter.

Mishkin, Frederic S., (2011), "Over the Cliff: From the Subprime to the Global Financial Crisis," *Journal of Economic Perspectives*, 25(1): 49-70.

Obstfeld, Maurice, (2009), "International Finance and Growth in Developing Countries: What Have We Learned?" *NBER Working Paper,* No. 14691.

OECD, (2011), "Taxation and Employment," OECD.

Phu Huynh; Steven Kapsos; Kee Beom Kim and Gyorgy Sziraczki, (2010) "Impacts of Current Global Economic Crisis on Asia's Labour Market," Asian Development Bank Institute.

Rey, Hélène, (2013), "Dilemma not Trilemma: The Global Financial Cycle and Monetary Policy Independence," Paper for Federal Reserve Bank of Kansas Jackson Hole Symposium, August, Forthcoming in Proceedings.

Reinhart, Carmen M. and Kenneth S. Rogoff, (2009), "The Aftermath of Financial Crises," *NBER Working Paper,* No. 14656.

Singh, S., Tng and Loo, (2012), "Labour Market Dynamics in Asia during the Recent Financial Crisis," Bank of England Conference Paper.

Shambaugh, Jay, (2012), "The Euro's Three Crises," *Brookings Papers on Economic Activity*, Spring.

Trichet, Jean-Claude, (2013), "Central Banking in the Crisis: Concept Convergence and Open Questions on Unconventional Monetary Policy," Per Jacobsson Foundation Lecture.

United Nations ,(2014), "Voices of the Vulnerable," United Nations.

Yellen, Janet, (2013), "Interconnectedness and Systemic Risk: Lessons from the Financial Crisis and Policy Implications," Speech Delivered at the American Economic Association/American Finance Association Joint Luncheon, California.

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Published twice a year by:
The South East Asian Central Banks (SEACEN)
Research and Training Centre
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No. 2, Jalan Dato' Onn
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