



# **FOSTERING FINANCIAL STABILITY**

DEVELOPING A FINANCIAL STABILITY FRAMEWORK AND POLICY INSTRUMENTS - A POLICY REPORT



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Centrale Bank van Aruba

# **FINANCIAL STABILITY FRAMEWORK WORK GROUP**

*In 2014, the Centrale Bank van Aruba (CBA) established a work group to design a policy framework and policy instruments for promoting financial stability. The Financial Stability Framework Work Group (FSFWG) worked diligently on developing relevant policy insights for framing financial stability within the context of Aruba's economic development and financial conditions.*

*Over the past two years, the FSFWG produced several working papers and delivered numerous presentations to the Executive Board of the CBA. This report is the final product of aforementioned papers and presentations.*

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## EXECUTIVE SUMMARY

**Fostering financial stability and building a more resilient financial ecosystem have emerged as a strategic priority on the policy agenda of monetary and financial authorities.** It is a truism that financial systems are susceptible to the vulnerabilities and volatilities of contemporary economies. Increasingly, this exposure is amplified by the highly interconnected nature of financial institutions and markets. Subsequently, policy discussions and studies on financial stability have focused on identifying the systemic risks and commensurate policy responses, i.e., macroprudential regulation to strengthen the resilience of the financial system. In the wake of the financial crisis and economic recession, fostering financial stability has indeed emerged as a significant challenge on the policy agenda of contemporary monetary and financial authorities.

**Based on its statutory objectives, the Centrale Bank van Aruba (CBA) plays a pivotal role in promoting financial stability in Aruba.** The CBA has three main objectives, i.e., maintaining the stability of the Aruban florin, promoting a sound banking and credit system, and ensuring a smooth circulation of the Aruban florin. Whereas the CBA currently has no explicit financial stability mandate included in the Central Bank Ordinance, the aforementioned combination of responsibilities renders financial stability an integral and requisite extension of the CBA's responsibilities, especially considering the systemic interdependencies between macroprudential and macroeconomic development, in addition to the central role of financial institutions in Aruba's small open economy.

**This Financial Stability report provides a review of policy insights and lessons learned on designing financial stability.** The report addresses three main questions:

- *What is financial stability and how to design a suitable financial stability framework for the CBA to promote the stability and resilience of the (domestic) financial ecosystem?*
- *Within the context of macroprudential policies for fostering financial stability and mitigating systemic risks, what policy instruments and complementary policies can best be devised and deployed?*
- *What are the suitable institutional arrangements and governance mechanisms for implementing macroprudential policies in fostering financial stability?*

Based on a comprehensive analysis and synthesis of policy discussions and best practices for macroprudential recommendations, several important lessons are drawn and recommendations are provided to the CBA.

**Financial stability is defined as the capability of a financial system to enable and enhance economic processes, notwithstanding shocks and structural disruptions.** Financial stability underscores the ability of financial ecosystems to function smoothly and maintain viability under conditions of stress, i.e., reduce the risks of shocks, withstand and absorb the subsequent effects of disruptions, and recover from financial-economic distresses. A principle focus in designing financial stability, and thereto *macroprudential regulation*, is the manner in which the

interconnectedness of financial institutions and markets, common exposures to economic variables, and procyclical behaviors create systemic risk. While monetary and financial authorities have recognized certain macroprudential issues in the past, it is clear that a more robust macroprudential regime is necessary in framing and fostering financial stability (See Figure 1).

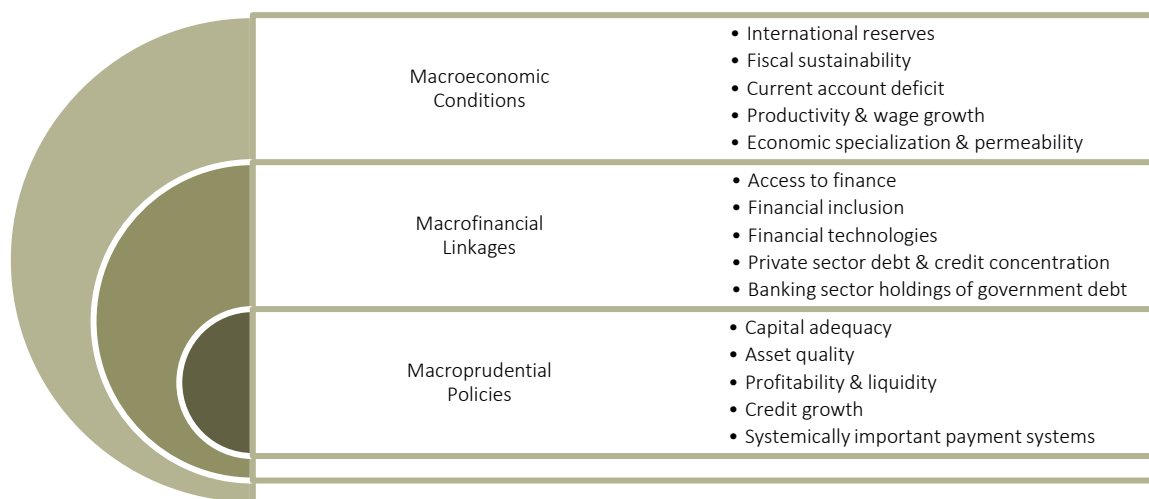
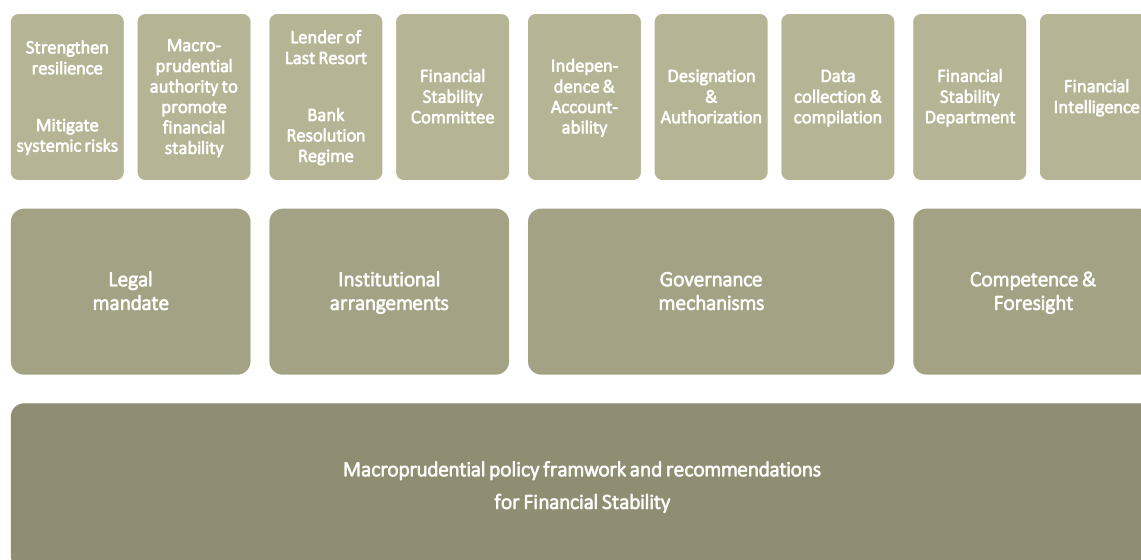


Figure 1. Framing Financial Stability.

**Central banks increasingly have a formalized financial stability mandate for their financial ecosystems.** Based on a comprehensive analysis of select central banks, several strategic developments in the financial stability mandate are discerned. Firstly, central banks increasingly demonstrate an *explicit* financial stability mandate for *the whole financial system*. The majority of central banks expresses their financial stability objective as *to promote* the stability of the financial system. In terms of governance mechanisms, most central banks have designed a multi-layered organization of intra-institutional and inter-institutional committees, with distinct authorities, responsibilities and competencies.

**Within the context of formalizing financial stability mandates of central banking, macroprudential policy refers to the use of primarily prudential tools to limit systemic risks and thus foster systemic stability.** Macroprudential policy concentrates on the soundness of the financial system as a whole and focuses on the interactions between financial institutions, markets, infrastructure, and the wider economy. It complements the microprudential focus on the risk position of individual institutions. A fundamental concern of macroprudential policy is that the interconnectedness of financial institutions and markets, and their common exposure to economic variables, may increase the fragility of the financial ecosystem. An effective macro-prudential framework for monitoring systemic risk considers at least three basic elements: (1) total credit growth and macroeconomic drivers of imbalances; (2) financial linkages between the financial sector and domestic households and corporations (the real sector), and between each sector and the rest of the world; and (3) the structure of the financial system and linkages within and across key categories of intermediaries and market infrastructures.

**Macro-prudential regulation requires strong institutional and governance mechanisms to control and coordinate prudential oversight, market intelligence, and aggregate (macro-economic) information.** For intervention, several regulatory agencies may have to be involved if measures are imposed across broad classes of financial intermediaries. Central banks should be assigned a leading role in macro-prudential regulation and supervision. Central banks are typically independent from the political process, and they have an established role in market monitoring and participation (including the lender of last resort function). Central banks provide a valuable source of market intelligence, and they already have the analytical resources needed to inform prudential policy with system-wide analysis. Having the central bank in a key role also facilitates monitoring of the interaction between macroprudential and monetary policy interventions, both of which have impacts on financial stability and economic activity, and which need to respond to generally different signals about financial and business cycle developments.



*Figure 2. Macroprudential policy recommendations.*

Based on the synthesis of macroprudential policy studies and the emerging best practices and guidelines for central banking on financial stability, and the subsequent comparative analysis of the CBA, several macroprudential policy recommendations are presented (See Figure 2). These recommendations, presented in chronological order of implementation, cover the following aspects for designing and implementing a comprehensive financial stability framework for 2020 (See Figure 3: Pathways to Financial Stability:

- i. *The ultimate objective of macroprudential policy;*
- ii. *The macroprudential authority;*
- iii. *The role of the CBA in macroprudential policy and necessary changes in mandate/powers;*
- iv. *Governance mechanisms and decision-making arrangements;*
- v. *The organizational structure for macroprudential policy within the CBA;*
- vi. *Toolkit of financial soundness indicators for systemic risk;*
- vii. *The Lender of Last Resort function by the CBA;*
- viii. *The bank resolution regime;*
- ix. *Staged implementation of financial stability; and*
- x. *Future studies on financial stability.*

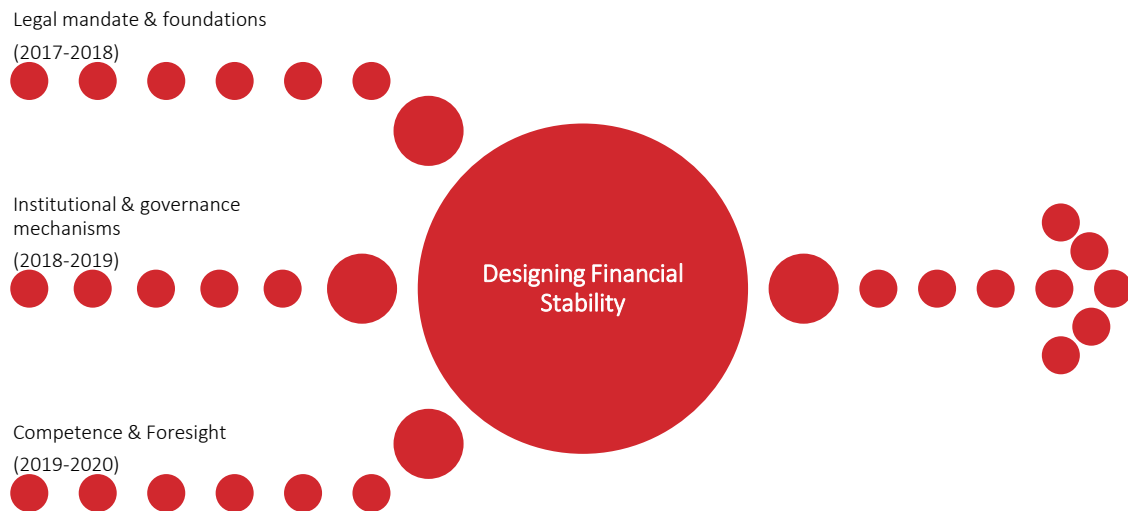


Figure 3. Pathways to Financial Stability.

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# CHAPTER 1

## INTRODUCTION TO FINANCIAL STABILITY

### 1.1 Background & Questions

It is a truism that sound financial systems are quintessential for sustainable economic development. Without a healthy financial system, consisting of stable financial (and non-financial) institutions, an economy is unlikely to prosper. A growing body of research continues to provide empirical support for the critical role of financial stability in macro-economic development (Narain et al., 2012). More so within the case of small open economies, which by their permeable nature are relatively more vulnerable to the volatilities of global developments and disruptions, both economically, financially, as well as socio-ecologically. In addition, small open economies are oftentimes characterized by shallow financial systems (IMF, 2013), thereby increasing their exposure to endogenous shocks and contagions. Robust financial systems and financial stability are thus quintessential for economic resilience, particularly under conditions of systemic risk.

This report provides a synopsis of policy insights and lessons learned on designing financial stability. Thereto, it addresses three main questions, which are pertinent for central banking in contemporary environments (Akerlof et al., 2014):

- *What is financial stability and how to design a suitable financial stability framework for the Centrale Bank van Aruba to promote the stability and resilience of the (domestic) financial ecosystem?*
- *Within the context of macroprudential policies for fostering financial stability and mitigating systemic risks, what policy instruments and complementary policies can best be devised and deployed?*
- *What are the suitable institutional arrangements and governance mechanisms for implementing macroprudential policies in fostering financial stability?*

Within the delimitations of this report, *financial stability* is defined as the capability of a financial system to enable and enhance economic processes, notwithstanding shocks and structural disruptions (IMF, 2006). Hereto, financial stability underscores the ability of financial ecosystems to function smoothly and maintain viability under conditions of stress, i.e., reduce the risks of shocks, withstand and absorb the subsequent effects of disruptions, and recover from financial-economic distresses. Endemic to the (conceptual) design of a financial stability architecture is systemic resilience, i.e., the holistic capability to (i) anticipate, withstand, and absorb shocks, and (ii) recover, regrow and re-orient financial-economic systems (Blanchard et al., 2015). The concept and practice of financial stability is further elaborated in Chapter 2.

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*Financial stability is defined as the capability of a financial system to enable and enhance economic processes, notwithstanding shocks and structural disruptions.*

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**Microprudential regulation is partial equilibrium in nature.** While necessary for prudential policies (of individual financial institutions), microprudential regulation does not consider sufficiently or explicitly enough the (i) interactions among financial institutions, and, subsequently, the (ii) interdependencies between the financial sector and the real economy (Akerlof et al., 2014). The global financial crisis a decade ago, and the great recession that followed suit, are not only a remembrance of the intrinsic importance of, e.g., asset quality, capital adequacy, and corporate ethics to economic processes and progress, but more importantly, the complex and dynamic interdependencies across global financial ecosystems that reach well beyond the epicenters of disruption. Indeed, one of the few unambiguous lessons of the crisis is the fragility of financial systems. Beneath a seemingly settled macro-economic surface, lurking imbalances and financial (mis-) behaviors may exist and expand.

**Enter macroprudential regulation and policy instruments to address the increasing interconnectedness of contemporary financial and economic systems.** Due to the magnitude and mobility of international capital flows, it is imperative to survey the systemic risks and commensurate (policy and regulatory) responses of the financial ecosystem as a whole, including the interrelationships with enterprise and consumer confidence, investment climate, public finances, financial inclusion, as well as domestic financial intermediation and systemically important financial institutions (IMF, 2006). While the former captures the main focus of macroprudential regulation, the latter describes an ecosystem of interconnected financial institutions and interdependent economic agents. Thus, unlike microprudential policies, *macroprudential policies focus on the financial ecosystem*, including the macroeconomic conditions, the macrofinancial linkages, and the macroprudential policies (IMF, 2006; See Figure 1.1), which are discussed in Chapter 3 of this report.

**Macroprudential regulation is quintessential for designing financial stability, particularly in small open economies that are susceptible to economic vulnerabilities and capital flow volatilities.** Macroprudential policy refers to the use of primarily prudential tools to limit systemic risks and foster systemic stability. Macroprudential policy concentrates on the soundness of the financial system as a whole and focuses on the interactions between financial institutions, markets, infrastructure, and the wider economy. A fundamental concern of macroprudential policy is that the interconnectedness of financial institutions and markets, and their common exposure to economic variables, may increase the fragility of the financial ecosystem. In Chapter 4, different policy instruments for macroprudential regulation are explored.

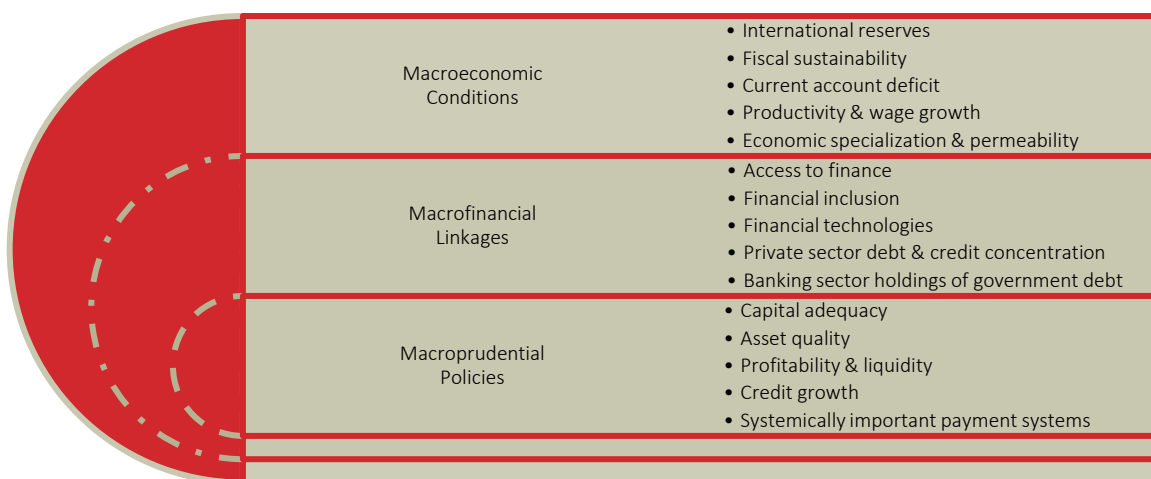


Figure 1.1. Framing Financial Stability (Adapted from IMF, 2006, 2017; FSB, 2017).

**Akin to macroprudential regulation are the measurement and monitoring of systemic risks.** The use of *financial soundness indicators* (FSIs) are often used to (i) assess financial sector vulnerabilities arising from credit, market and liquidity risks, and subsequently (ii) the capacity of the financial sector to withstand shocks and absorb losses, including, e.g., capital adequacy, asset quality, market liquidity, earning and profitability (IMF, 2006). Accordingly, macroprudential policy instruments are used as prudential tools to limit systemic risks (CGFS, 2010). *Systemic risks* entail the exposure to and probability of disruptions to the provision of financial services, which are caused by an impairment of all or parts of the financial system, thereby having a significant negative on the real economy (IMF, 2013). The range of systemic risks and risk indicators are discussed in Chapter 5.

## 1.2 Outline of report

**The remainder of this report is structured as follows.** Chapter 2 focuses on the concept and practice of financial stability within the context and mandate of central banking. Macroprudential regulation is introduced in Chapter 3, and provides an analytical framework for assessing systemic risks. Building forth on the financial stability framework, Chapter 4 describes a macroprudential policy toolkit for the CBA, whereas Chapter 5 elaborates on the diversity of indicators for measuring and monitoring systemic risks. In Chapter 6, complementary policies are described, which are deemed necessary for designing financial stability, including the concept of lender of last resort and bank resolution regime. In concluding the report, Chapter 7 summarizes the main recommendations for designing financial stability and provides a pathway for implementation by the CBA.

<i>Chapter 1</i>	<i>Introduction to Financial Stability</i>
<i>Chapter 2</i>	<i>Policies &amp; Practices of Financial Stability</i>
<i>Chapter 3</i>	<i>Macroprudential Policy</i>
<i>Chapter 4</i>	<i>Policy Instruments for Macroprudential Regulation</i>
<i>Chapter 5</i>	<i>Indicators of Systemic Risk</i>
<i>Chapter 6</i>	<i>Complementary Policies for Financial Stability</i>
<i>Chapter 7</i>	<i>Pathways to Financial Stability</i>

Figure 1.2 Outline of the Financial Stability report 2017.

## CHAPTER 2

# POLICIES & PRACTICES OF FINANCIAL STABILITY

### 2.1 Defining Financial Stability

When conceptualizing financial stability, one of the first questions that comes to mind is: what is financial stability? Unfortunately, there is no single, widely accepted and used definition of financial stability. Rather, various authors and institutions approach financial stability distinctively. Akerlof et al. (2014) conclude that existing international experiences indicate important conceptual differences and assumptions in financial stability. They distinguish between type 1 and type 2 definitions, i.e., either as a ‘macro-extension’ of microprudential policies (type 1) or as an ‘extra arm’ of macro-economic policy (type 2). The profusion of macro-prudential frameworks and financial stability policies has consequently led to an amalgam and growing array of assumptions and definitions.

Despite the multiplicity of definitions, several key principles of financial stability can be distinguished. Schinasi (2004) introduces five key principles for a working definition of financial stability. First of all, (i) financial stability is a broad concept, encompassing the different aspects of finance and the financial system—infrastructure, institutions and markets. Furthermore, (ii) financial stability not only implies that finance adequately fulfills its role in allocating resources and risks, mobilizing savings, and facilitating wealth accumulation, development and growth; it also implies that the systems of payment throughout the economy function smoothly. The efficiency and reliability of payment systems, and in its extension financial inclusion, are integral to financial stability.

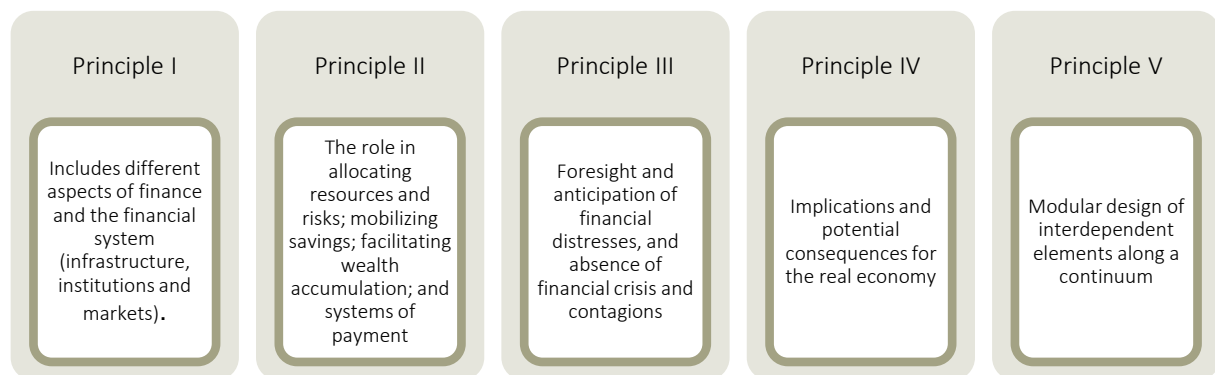


Figure 2.1 Principles of Financial Stability (Adapted from Schinasi, 2004).

The concept of financial stability relates not only to the absence of actual financial crises but also to (iii) the ability of the financial system to limit, contain, and deal with the emergence of imbalances before they constitute a threat to the financial system or economic processes. Therefore, foresight and anticipation of financial distresses are quintessential in mitigating systemic risks. Moreover, (iv) financial stability should be expressed in terms of the potential consequences for the real economy. The last principle (v) indicates that financial stability occurs along a continuum and is modular by design. This implies that maintaining financial stability does not necessarily require

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that each part of the financial system operates persistently at peak performance. Based on these principles, Schinasi (2004) defines financial stability as the ability of the financial system to facilitate and enhance economic processes, manage risks, and absorb shocks.

**Alternatively, financial stability can be defined based on its system orientation, i.e., in terms of preconditions (input), capabilities (processes) and effects (outcomes).** The BIS (2011) distinguishes several approaches to defining financial stability.

- *In terms of preconditions (rather than outcomes)*  
The Reserve Bank of New Zealand considers that financial stability can be achieved when risks in the financial system are adequately identified, allocated, priced, and managed. These are the preconditions for financial stability. Defining financial stability in terms of preconditions may help policy makers to ask the right questions, according to Adrian Orr of the Reserve Bank of New Zealand (Orr, 2006).
- *The absence of the negative (in terms of outcomes)*  
According to Andrew Crockett, previously General Manager of the Bank for International Settlements, financial stability can be seen as a condition in which economic performance is not being impaired by asset price fluctuations or by an inability of financial institutions to meet obligations. Likewise, Robert Ferguson of the Board of Governors of the US Federal Reserve System describes financial stability as an absence of instability characterized by some combination of (a) divergence of asset prices from fundamentals, (b) significant distortions in market functioning and credit availability that thereby causes (c) aggregate spending to deviate (or to threaten to deviate) from long run potential.
- *Smooth functioning (in terms of outcomes)*  
Wim Duisenberg, when President of the European Central Bank, defined financial stability as the smooth functioning of the key elements that make up the financial system. Similarly, Y. V. Reddy, as governor of the Reserve Bank of India, interpreted financial stability as the smooth functioning of financial markets and institutions, but not the complete absence or avoidance of crisis. This definition does require judgments on what constitutes “smooth functioning” of the financial system.
- *Robustness to shocks (in terms capability)*  
According to the Bank of Norway, a stable financial system would be robust to disturbances in the economy, and able to mediate financing, carry out payments, and redistribute risk in a satisfactory manner even under stress. A similar approach by Tomaosso Padoa-Schioppa (ECB Executive Board Member) defines financial stability as a condition in which the financial system is able to withstand shocks without giving way to cumulative processes which impair the allocation of savings to investment opportunities and the processing of payments in the economy.

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- *Smooth functioning and robustness to shocks (Combination of capability and outcomes)*

The Deutsche Bundesbank defines financial stability as a steady state in which the financial system efficiently performs its key economic functions, such as allocating resources and spreading risk as well as settling payments, and is able to do so even in the face of shocks, stress and profound structural change. Approaches like this one, emphasize certain aspects of functioning that merit public policy attention, including, notably payment services, credit supply and risk redistribution.

- *Multidimensional approaches to financial stability objectives*

This approach is encountered in the new Banking Act in the UK. The latter defines five objectives for policy actions, including (i) system stability, with particular reference to continuity of service, (ii) confidence, (iii) depositor protection, (iv) fiscal protection of the country, and (v) property rights protection. Within the context of financial stability in general - rather than bank resolution in particular - , a multidimensional list of objectives might include:

- Resilience, such that shocks to essential services do not become self-reinforcing;
- Protection for small creditors;
- Anticipation by informed investors of a risk of loss;
- Protection of the fiscal position;
- Property rights protection, conditional on avoidance of moral hazard;
- Dynamic and productive efficiency; and
- Respect for the rights of citizens of other jurisdictions.

This multidimensional approach, however, requires an interpretative strategy statement, in order to elaborate the meaning of each component and to define their relative weights.

**Conceptualizations of financial stability vary across central banks.** Emphasizing a combinatory approach of robust functioning, *De Nederlandsche Bank* (DNB) defines financial stability as a financial system that is (i) capable of efficiently allocating resources and absorbing shocks, and (ii) preventing these from having a disruptive effect on the real economy or other financial systems. Also, (iii) the system itself should not be a source of shocks. This definition implies that money can properly carry out its functions as a means of payment and as a unit of account, while the financial system as a whole can adequately perform its role of mobilizing savings, diversifying risks, and allocating resources (Wellink, 2002). The Central Bank of *Curacao and St. Maarten*, financial stability is defined as the capacity of the entire financial sector to absorb shocks. The authorities in *Barbados* define financial stability as the resilience of the financial sector in the face of adverse events. In *Singapore*, financial stability is defined as the ability of the financial system to withstand potential shocks. Financial stability in *Canada* is also defined as the resilience of the financial system to unanticipated adverse shocks, which promotes the continued smooth functioning of the financial intermediation process.

**In designing financial stability, systemic risks beget systemic resilience.** The latter definitions of financial stability emphasize the central notion of resilience, thereby underscoring the capability to absorb and withstand adverse shocks, while maintaining stable operational capacities (Blanchard et al., 2015). From a systemic perspective, the

law of requisite variety<sup>1</sup> indicates that to maintain stability in dynamic and disruptive environments, the system - as whole - requires a complex of capabilities to remain responsive and viable. Accordingly, the resilience of financial ecosystems is measured not only by the ability of individual financial institutions to absorb or withstand (exogenous) shocks; it reflects the *system's* tendency to generate (endogenous) shocks, and the *system's* ability to adapt and evolve in response to stimuli (NEF, 2015). Resilience thus means more than just the capacity to withstand unforeseen developments; it also means reducing the likelihood that shocks materialize in the first place, by limiting policy uncertainty and the build-up of vulnerabilities (BIS, 2017). Financial ecosystems are thus viewed as complex adaptive systems, in which financial stability reflects the systemic capabilities to adapt and innovate, rather than solely conserving the status quo.

## 2.2 Financial stability mandates of central banks

Turning to the role of central banks in fostering financial stability, the BIS (2010/2011) notes that in general central banks should have a prominent role in financial stability policy due to three main reasons (See Figure 2.2):

1. Financial instability can affect the macroeconomic environment, with substantial consequences for economic activity, price stability and the monetary policy transmission process;
2. Central banks are the ultimate source of liquidity for the economy, and appropriate liquidity provision is crucial to financial stability;
3. The performance of monetary policy functions provides central banks with a macroeconomic focus and an understanding of the financial markets, institutions, and infrastructures needed for the exercise of a macroprudential function.



Figure 2.2 Central banking for Financial Stability.

<sup>1</sup> In active (feedforward) regulation, each disturbance (D) will have to be compensated by an appropriate counteraction (V) from the regulator (R). If we wish to maintain stability in the face of vulnerability, the regulator (R) must be able to produce at least as many counteractions as there are disturbances in D. Therefore, the resilience of R must be at least as great as the variety of D.

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**Despite the relevance of leading with financial stability, formalized mandates tend to lag in practice.** FSB, IMF and BIS (2011) note that less than half of the jurisdictions surveyed by the IMF have a formal macroprudential mandate in place. Even though it is difficult to define and operationalize financial stability concepts, it is important for a central bank to have a formal mandate (BIS, 2010). This mandate can provide clarity about financial stability responsibilities that are needed to reduce the risk of a mismatch between what the public expects and what the central bank can deliver, as well as for accountability purposes. An official mandate is also advantageously in view of the public announcement of a financial stability strategy, clarifying the central bank's intention.

**Financial stability in central banking is inclined to be a secondary generic objective.** According to Jeanneau (2014), a high proportion (82 percent) of central banks have some form of explicit financial stability objective. However, for more than two thirds of these central banks the objective appears to be generic, applying to all of the central bank's functions. For just over half of these central banks, the objective is explicitly secondary to another (usually price stability) objective. Four fifths of central banks report that the objective pertains to the entire financial system. For just over half of these central banks, the objective is expressed in qualified language, such that the central bank is required to contribute to, or work towards, or use best endeavors in the pursuit of - rather than ensure, guarantee, maintain, or safeguard - financial stability.

### *2.2.1 Central banking on financial stability*

**With regard to the financial stability mandates of central banks, several distinctive trends are observed across the European Union (EU) and the United States** (BIS, 2010). With respect to macroprudential supervision in the European Union (EU), almost everything is new, including the concept of macroprudential supervision. The new European Systemic Risk Board (ESRB), with representatives from central banks and supervisors, is responsible for macroprudential oversight of the financial system within the EU. The ESRB does not have direct authority over any policy instrument, but instead has the power to issue recommendations and risk warnings concerning systemic risks to the authorities that control the macroprudential tools or instruments. The ESRB's views on macroprudential risks will be formulated by the members of the General Board (national central banks, ECB, EC, European Supervisory Authorities (ESAs) and scientific experts, all participating with voting rights). National supervisors and the European and Financial Committee (EFC) participate without voting rights. The implementation of appropriate policy responses is still mainly the responsibility of microprudential supervisors, however, the division of national responsibilities is currently under consideration.

**In the United States of America (USA), through the Dodd-Frank Act, the Financial Stability Oversight Committee (FSOC) was created.** The FSOC has no rule-writing enforcement authority, but has powers to recommend, and in some cases require, action by member agencies, as well as determining important aspects of the regulatory boundary. Actually, the FSOC is quite similar to the ESRB with 2 exceptions. First, recommendations of the FSOC will be public, and secondly there is a less prominent role for the central bank in the new US arrangements compared to Europe. Unlike in Europe, the FED is the microprudential supervisor for all systemically important firms, with the express power to adjust prudential standards for macroprudential reasons. In contrast with the

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European approach, the FED has a significant direct formal responsibility for macroprudential regulation and supervision. In Europe the ECB's role is until recently indirect (through national central banks and supervisors who have a direct role). However, currently, all systemic banks fall under the supervision of the ECB.

**In the jurisdictions above, new high-level coordination or decision-making bodies have been formed with explicit mandates to focus on systemic risk identification and management.** However, in none of the aforementioned cases an independent macroprudential policy function was allocated to a specialized body or agency. The main task of the FSOC concerns the identification of systematically important entities and ensuring that gaps in the regulatory framework are not allowed to develop or persist. Except for the US, macroprudential analysis is primarily assigned to the central bank. In case of the ESRB, the ECB provides analytical support.

**Central banks increasingly have a formalized financial stability mandate for their financial ecosystems.** Based on an analysis of select central banks (three Caribbean central banks and four central banks of advanced economies), several developments in the financial stability mandate can be observed (See Figure 2.3). Firstly, the cases of central banks demonstrate an *explicit* financial stability mandate for *the whole financial system*. The majority of the selected central banks have expressed their financial stability objective as *to promote* the stability of the financial system. In terms of governance mechanisms, most central banks have designed a multi-layered organization of intra-institutional and inter-institutional committees, with distinct authorities, responsibilities, and competencies.

**In the Netherlands, a Financial Stability Committee was formed in November 2012 following the recommendations made by the Parliamentary Commission of Inquiry on the Financial System.** Its task is to identify risks to financial stability in the Netherlands, and to make recommendations with respect to these risks. The Financial Stability Committee (Establishment Order, November 2, 2012) cannot engage in the exercise of statutory power of DNB, the Authority for the Financial Markets (AFM) or the Dutch Minister of Finance. In this committee, representatives of DNB, the Netherlands AFM, and the Dutch Ministry of Finance discuss developments relating to the stability of the financial system in the Netherlands. These meetings are chaired by the DNB president. The committee has the following activities: The exchange of information about the stability of the financial system in order to identify possible risks to financial stability. The committee members also discuss possible actions to mitigate these risks, including the options for reinforcing the statutory instruments that DNB, the AFM, and the Minister have at their disposal. They issue warnings and recommendations with respect to the identified risks. The representatives from the Ministry of Finance do not take part in decision-making on warnings and recommendations. These are made public, unless disclosure is unwarranted due to possible risks to financial stability. Aligning and coordinating the response to the warnings and recommendations made by the European Systemic Risk Board is also part of its responsibility. At the DNB there is a separate financial stability division which resides under the Executive Director of Monetary Affairs and Financial Stability, who is responsible for economic policy and research, financial markets, financial stability, and statistics.

**In Curacao and St. Maarten, the Central Bank Ordinance mentions promoting the health of the financial system as one of the goals of the Central Bank.** This can be interpreted as placing the financial stability mandate with the Central Bank. At the Central Bank of Curacao and St. Maarten (CBCS) there is a separate unit responsible for

financial stability. This unit is currently under the Director Supervision and works closely with the Supervision Department. However, the intention is that at some point the financial stability unit will reside under a broader division. The financial stability unit is responsible for analyzing financial and monetary data and coordinating actions with the other departments of the central bank such as the Supervision and Research Departments. The unit advises the executive board on actions to undertake with regard to financial stability. The decisions are ultimately taken by the executive board.



Figure 2.3 Financial stability mandates of central banks in select countries.

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**In Barbados, the Central Bank of Barbados (CBB) and the Financial Services Commission (FSC) are jointly responsible for continuous oversight of the financial system.** There is an oversight committee that includes the governor of the CBB and the CEO of the FSC. The objective of this committee is to meet regularly to discuss and formulate the financial stability report and to closely monitor and respond to developments within the financial system. The mandate given to the authorities to monitor financial stability includes the assessment of risk exposure, which covers activities of banks, international banks, insurance companies, international insurance and reinsurance companies, nonbank deposit taking financial institutions, credit unions, activities of the Barbados Securities Exchange and issues and redemptions of government securities. The mandate for the Central Bank of Barbados relating to financial stability is implied in the purpose mentioned in the CBB act “to promote a sound financial structure”. The authority of the FSC is arranged in the FSC act. According to the IMF Article IV consultation report for Barbados, the mandate and tools of the oversight committee should be clarified and improved.

**In the United Kingdom, the Bank of England by means of The Financial Services Act 2012 established an independent Financial Policy Committee (FPC).** This new prudential regulator is a subsidiary of the BoE, and houses new responsibilities for the supervision of financial market infrastructure. This new regulatory framework resulted in the BoE being entrusted with significant new responsibilities. The FPC has the responsibility to monitor and respond to systemic risks. The legislation transferred responsibility for significant micro-prudential regulation to a focused new regulator, the Prudential Regulation Authority (PRA), established as a subsidiary of the BoE; and created a new conduct of business regulator, the Financial Conduct Authority (FCA). The FPC contributes to the achievement of the BoE’s financial stability objectives. It is charged with taking action to remove or reduce systemic risks with the view to protecting and enhancing the resilience of the UK financial system. The secondary objective of the FPC is to support the economic policy of the Government. The FPC has ten voting members: the Governor (who chairs the FPC); the Deputy Governors of the BoE for financial stability, monetary policy and prudential regulation (the latter is also the Chief Executive Officer, or CEO, of the PRA); the BoE’s Executive Director responsible for Financial Stability; the CEO of the FCA; and four external members appointed by the Chancellor of the Exchequer. In addition, a representative of HM Treasury is a non-voting member of the FPC and the BoE’s Executive Director responsible for Markets routinely attends FPC meetings. If a consensus cannot be reached, then a decision will be taken by a vote of those voting members present at the meeting. In the event of a tie, the Chair of the FPC has a second, or tie-breaking, vote. The nature of the vote on any decision, whether unanimous or otherwise, is reflected in a formal record of the meeting.

**In Singapore, the Monetary Authority of Singapore (MAS) is the macroprudential authority.** According to Section 4 of the MAS Act one of the principal objects and functions of the MAS is to foster a sound and reputable financial center and to promote financial stability. One function of the MAS, amongst others, is to conduct integrated supervision of the financial services sector and financial stability surveillance. The financial stability mandate is therefore explicitly enshrined within Section 4 of the MAS Act. To assess financial stability, potential risks and vulnerabilities are identified, and the ability of the financial system to withstand potential shocks is reviewed. The macroprudential framework focuses on the financial system as a whole and on links with the real economy. Macroprudential policies target potential financial system vulnerabilities arising from capital flows, credit growth, and asset prices. In order to identify systemic risks, MAS analyses developments in the global and domestic financial systems and traces their transmission channels and potential impact on macroeconomic and financial

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stability. In the design of policy instruments, MAS seeks to target the specific risk factor or transmission channel. The Financial Stability Report is coordinated by the Macroeconomic Surveillance Department of the Monetary Authority of Singapore and incorporates contributions from the different departments. MAS has formalized internal governance arrangements to better serve its financial stability mandate. The Chairman of MAS presides over the Board-level Chairman's Meeting (CM), which is the designated forum for major policy decisions relating to the objective of financial stability, in addition to its oversight of major changes to microprudential policies. CM, in its macroprudential policy role, is supported by the MAS Management Financial Stability Committee (FSC). The FSC is chaired by the Managing Director of MAS, with members comprising senior management overseeing the surveillance, supervisory, prudential policy, markets and investments, and economic policy functions. Day to day supervisory matters such as licensing and inspection remain the responsibilities of another forum, the Management Financial Supervision Committee (MFSC).

**The Hong Kong Monetary Authority (HKMA) is Hong Kong's central banking institution.** One of the HKMA main functions is promoting the stability and integrity of the financial system (HKMA, 2013). The powers, functions and responsibilities of the HKMA are set out in the different ordinances. The Exchange Fund Ordinance establishes the Exchange Fund under the control of the Financial Secretary. Central banking functions and banking supervision are housed under the same roof within the HKMA and the responsibility of maintaining banking stability rests with one single authority, namely the Chief Executive of the HKMA. This would help avoid problems associated with information sharing between the lender of last resort and the banking supervisor. Within the HKMA, coordination of financial stability issues that cut across different departments is handled by the Macro-Surveillance Committee. In view of the increasing linkages across markets and their importance to financial stability, the Hong Kong Government has strengthened the framework for managing and coordinating cross-sector issues by establishing the Council of Financial Regulators (CFR) chaired by the Financial Secretary and the Financial Stability Committee (FSC) chaired by the Secretary for Financial Services and the Treasury. The CFR focuses on cross-sector regulatory matters and the FSC is responsible for monitoring the functioning of the financial system. The monetary Authority sits on both Committees. Hong Kong's approach to financial stability has two broad elements. Firstly, macro prudential measures to lean against credit growth and the buildup of leverage in the upswing phases of financial cycles. Secondly, contingency planning and stress testing to ensure that participants in the financial system would be able to survive as going concerns in the downswing phases of financial cycles. The financial Stability framework in Hong Kong includes an emphasis on the consistency and transparency of policy frameworks and strict enforcement of rules. Regulatory authorities strive not to impose too heavy a regulatory burden.

**In Canada, responsibility for financial stability is shared by the Central Bank, the Department of Finance, the Office of the Superintendent of Financial Institutions, and the Canada Deposit Insurance Corporation.** The Minister of Finance is ultimately responsible for financial stability. Together these institutions participate in the Financial Institutions Supervisory Committee (FISC). The Bank of Canada's overall goal is to promote a stable and efficient financial system in Canada. The responsibilities of the Bank of Canada stemming from the financial stability mandate are threefold. The Bank of Canada:

- i. Conducts macroprudential risk assessment: research and analysis on financial stability issues to inform policy advice and share with the public;

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- ii. Provides liquidity to Canadian financial institutions and the financial system (lender of last resort role);
  - iii. Oversees systematically important payment and other clearing and settlement systems (also called financial market infrastructures or FMIs).

The Bank's work on financial stability is shared between the Financial Stability Department (FSD) and the Financial Markets Department (FMD). FSD has a number of divisions which have distinct roles, including systemic risk assessment, institutional analysis, financial infrastructure oversight, regulatory policy, and financial studies. The FMD collects market intelligence and analyses trends in domestic and international financial markets. It balances work pertaining to financial stability with other responsibilities: promoting the efficiency of markets, implementing monetary policy and conducting financial transactions on behalf of the government (auctions, foreign reserves). The Financial System Review Committee is the key committee within the Bank which deals with issues and decisions pertaining to the financial system. This committee is made of Governing Council as well as Advisors and Chiefs of various departments within the Bank.

## **2.3 A mandate for financial stability**

**The CBA plays an important role in fostering financial stability.** Considering the foregoing international developments, and in reflecting on the current and future mandate for financial stability by the CBA, several key observations and conclusions are noteworthy.

**The principal tasks of the CBA, as stipulated in the Central Bank Ordinance (A.B. 1991 No. GT 32), are to:**

- Conduct monetary policy;
- Supervise the financial system;
- Issue bank notes;
- Issue coins on behalf of the government;
- Act as the banker for the government; and,
- Be the central foreign exchange bank and, as such, to regulate the flow of payments to and from other countries; and to advise the Minister of Finance on financial matters.

**The CBA performs these tasks through a variety of activities, which include:**

- Formulating and implementing monetary policy and related measures through, among other things, regulating bank credit and liquidity;
- Supervising the activities of the commercial banks and other financial institutions by, inter alia, monitoring their liquidity and solvency to protect the interests of depositors and policyholders, and to maintain monetary and financial stability and integrity in Aruba;
- Managing Aruba's official gold and foreign exchange reserves;

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- Regulating international payments according to the State Ordinance on foreign exchange transactions (A.B. 1990 No. GT 6);
  - Bringing bank notes into circulation to meet the needs of businesses and the general public;
  - Issuing treasury bills and government bonds as an agent for the government; and,
  - Monitoring economic and financial developments.

**The combination of these responsibilities makes financial stability a natural extension of the CBA's responsibilities.** Financial stability is, however, *not explicitly* stated in the Central Bank Ordinance as a mandate of the CBA. Currently, the Central Bank Ordinance incorporates only a mandate concerning microprudential supervision. International standard setting bodies, such as the IMF and the BIS, recommend, however, a formalized mandate by setting out in law the primary objective of the macroprudential authority – to safeguard systemic stability.

**An explicitly formalized inclusion of a financial stability mandate by the CBA depends on the requisite responsibilities and resources.** With regard to the latter, the CBA supervises financial institutions for microprudential purposes and thus has access to institutional information to measure and monitor systemic risks and financial stability. In addition, financial stability requires macroeconomic as well as financial competences and capabilities, both of which are readily present at the CBA. Considering the availability of required resources and the extant microprudential regulation responsibilities, it is recommended that CBA also be assigned as the macroprudential authority, in addition to a monetary authority, with the provision to adapt the Central Bank Ordinance to include an explicit financial stability objective *to promote the stability of the financial system*.

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*Recommendation I: It is recommended that CBA be assigned as the macroprudential authority with the provision to adapt the Central Bank Ordinance to include an explicit financial stability objective to promote the stability of the financial system. In executing this mandate, it is advisable to institutionalize a new department specialized in financial stability.*

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## CHAPTER 3

# MACROPRUDENTIAL POLICY

### 3.1 Introduction

The field of macroprudential policy development remains ‘under construction’ and international best practices are nascent (Claessens & Kodres, 2014). This chapter reviews the perspectives of international standard setting bodies (including the IMF, the BIS, and the FSB) with regard to macroprudential policy<sup>2</sup>. The following questions are examined:

- What is macroprudential policy?
- Which body or institution should be assigned as the macroprudential authority?
- What should be the mandate and powers of the macroprudential authority?

### 3.2 What is Macroprudential Policy?

**Macroprudential policy refers to the use of primarily prudential tools to limit systemic risks and thus foster systemic stability.** IMF (2013) defines systemic risk as the risk of disruptions to the provision of financial services that are caused by an impairment of all or parts of the financial system, which may cause serious negative consequences for the real economy. Macroprudential policy concentrates on the soundness of the financial system as a whole and focuses on the interactions between financial institutions, markets, infrastructure, and the wider economy (Committee on the Global Financial System, 2010). It complements the microprudential focus on the risk position of individual institutions, which largely takes the rest of the financial system and the economy as given.

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*A fundamental concern of macroprudential policy is that the interconnectedness of financial institutions and markets, and their common exposure to economic variables, may increase the riskiness and fragility of the whole financial system in ways, and to an extent that will not be dependably captured by regulatory focus on individual institutions (G30, 2010).*

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**Macroprudential policy and regulation aim to achieve several objectives.** Several international authorities elaborate on the suitable objectives for macroprudential policies, including:

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<sup>2</sup> The FSB, established in 2009, coordinates the work of national financial authorities and standard setting bodies at an international level. Under the guidance of FSB, many reforms have been finalized as a response to the global financial crisis. Claessens & Kodres (2014) contend, however, that regulations and other requirements are largely designed from a micro-prudential perspective. They argue that a system-wide view is not just needed for supervision, but also for the design of regulations. Important is to have a better understanding of the dimensions of systemic risks and associated (early) warning signals.

- The *Committee on the Global Financial System* distinguishes two objectives of macroprudential policy: (i) to strengthen the financial system's resilience to economic downturns and other adverse aggregate shocks, and (ii) to actively limit the build-up of financial risks;
- The *Basel Committee on Banking Supervision* notes that the reforms in Basel III also have a macroprudential focus, which is addressing system-wide risks that can build up across the banking sector as well as the procyclical amplification of these risks over time (BCBS, 2010).
- The *International Monetary Fund* argues that the three objectives of macroprudential policy are (IMF, 2013):
  - 1) To increase resilience of the financial system to aggregate systemic shocks by building buffers that absorb their impact and help maintain the ability of the financial system to provide credit to the economy;
  - 2) To contain the build-up of systemic vulnerabilities over time, by reducing procyclical feedback between asset prices and credit and containing unsustainable increases in leverage and volatile funding;
  - 3) To control the build-up of vulnerabilities within the financial system that arises through interlinkages between financial intermediaries and the critical role played by institutions in key markets.
- FSB & IMF & BIS (2011a & 2011b) notes that macroprudential policy aims to limit systemic risk.

### 3.3 Who is responsible for macroprudential policy?

**Macroprudential regulation requires strong rule of law and sound institutional arrangements.** IMF (2011) notes that the presence of a well-identified authority (an institution or a policy committee) that has a clear macroprudential mandate and a mechanism promoting consistency across policies to preserve financial stability is one basic element of an institutional framework for macroprudential policy. However, as discussed in the previous chapter (Chapter 2), there is no “one size fits all” model for the macroprudential authority. Contingent on the exigencies of the (domestic) financial ecosystem, authorities design and develop macroprudential regulation accordingly.

Nevertheless, there is an increasing prevalence of three models for macroprudential policymaking (IMF, 2013). Depending on the country specific characteristics, one model is preferred above the others (See Figure 3.1). Each model assigns an institution or body as the macroprudential authority, implying that this institution should be held accountable for limiting systemic risk.

- **Centralized Model:** The macroprudential mandate is assigned to the central bank, with macroprudential decisions ultimately made by its Board. This model is mostly used when the relevant regulatory and supervisory functions are within the central bank (IMF, 2013);
- **Committee Model:** The macroprudential mandate is assigned to a dedicated committee within the central bank structure. In general, this committee doesn't have the same composition as the Board or the monetary policy committee. Therefore, this model helps counter the risk of dual mandates for the central bank (IMF, 2013);
- **Participatory Model:** The macroprudential mandate is assigned to a committee outside the central bank, with the central bank participating in this committee. This model can more easily accommodate a desire for a strong role of the Ministry of Finance (IMF, 2013). This model is desirable when multiple bodies have a financial stability mandate, or where there is separation between bodies with decision-making and policy implementation powers (FSB, IMF, & BIS, 2011a; IMF, 2011).

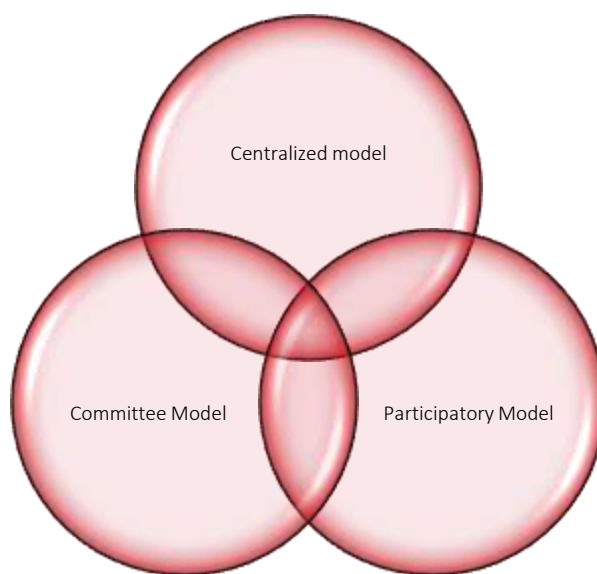


Figure 3.1. Institutional models for macroprudential policy (Adapted from IMF, 2013).

The consensus in the literature is that the central bank should play a central role in macroprudential policy (IMF, 2013). Central banks are always part of the macroprudential authority and often play a leading role (FSB, IMF & BIS, 2011a). Nier et al. (2011) argue that when the central bank is also the supervisory agency, assigning the central bank as the macroprudential authority has a number of strengths, among others:

- (i) The decision maker has access to relevant prudential information;
- (ii) Use is made of existing expertise;

- (iii) A single agency is held accountable for achieving the objectives;
- (iv) The central bank has clear incentives to act because of its price stability goal and the increased risk of needing to act as a lender of last resort;
- (v) Improved coordination across monetary and financial regulatory functions, and;
- (vi) Central bank independence reduces the risk of delayed action due to political pressure of lobbying.

There are, however, a number of disadvantages, such as: (i) the concentration of power in hand of the central bank, and (ii) the risk that failure in prudential policy can affect the credibility of the monetary policy maker. Therefore, independent and separate accountability frameworks for monetary and prudential decision-making are essential for promoting financial (and price) stability.

### 3.4 The mandate of the macroprudential authority

**Macro-prudential regulation requires explicit governance mechanisms to coordinate prudential oversight, market intelligence and aggregate (macro-economic) information.** For intervention, several regulatory agencies may have to be involved if measures are imposed across broad classes of financial intermediaries. Though the macroprudential authority does not necessarily have to be the central bank, there are strong reasons for assigning macroprudential policy to the central bank or giving it a leading role in a multi-agency arrangement. Central banks are typically independent from the political process, they have an established role in market monitoring and participation (including the lender of last resort function), they provide a valuable source of market intelligence, and they already have the analytical resources needed to inform prudential policy with system-wide analysis. Having the central bank in a key role also facilitates monitoring of the interaction between macroprudential and monetary policy interventions, both of which have impacts on financial stability and economic activity, and which need to respond to generally different signals about financial and business cycle developments (CGFS, 2011).

**Macroprudential authorities require legal mandates.** Though views differ among central banks with respect to an explicit mandate for macroprudential policy (BIS, 2010), IMF (2011) notes that the macroprudential authority needs a strong mandate by setting out in law the primary objective of the macroprudential authority - to safeguard systemic stability -, so as to reduce the probability and severity of financial crises. FSB, IMF & BIS (2011a) indicate that a formal mandate can improve the clarity of decision making, help contain the incentives for inaction, and avoid policy paralysis when views differ.

**Macroprudential authorities need distinct powers.** According to IMF (2011), the macroprudential authority should have three types of powers, i.e., (i) information collection powers, (ii) rulemaking and calibration powers, and (iii) designation powers. The latter refers to the regulate all individually systemic institutions, irrespective of the legal form (including nonbanks and financial infrastructure providers) that may generate risks related to the procyclicality and that may therefore be collectively systemic.

**Macroprudential authorities are independent.** To ensure the independence and accountability of the macroprudential authority, it is necessary that this authority has a strong operational independence from the

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political process. The accountability framework should include a well-defined objective of macroprudential policy (IMF, 2013). Moreover, transparency and the clear communication of policy decisions to the public are central elements of accountability (including ex ante statements of strategy, publication of records of meetings, Financial Stability Reports, and annual performance statements with an ex post assessment of policy effectiveness) (IMF, 2011; FSB, IMF, & BIS (2011a). Also, public accountability can be further increased by creating transparency of internal decision-making processes.

### 3.5 Concluding remarks

Developing macroprudential policy is still a work in progress and international best practices are yet to emerge. Nevertheless, a number of general conclusions can be drawn from the viewpoints of the international standard setting bodies:

- Macroprudential policy aims to limit systemic risk.
- There is no “one size fits all” model for the macroprudential authority.
- Central banks should play an important role in macroprudential policy and always form part of the macroprudential authority.
- The macroprudential mandate should be anchored in law.
- The macroprudential authority should be operationally independent and accountable for achieving the objective of the macroprudential policy.

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*Recommendation II: It is recommended that CBA be assigned as the macroprudential authority with the provision to (i) adapt the Central Bank Ordinance to include an explicit financial stability objective to promote the stability of the financial system, and (ii) institutionalize a committee model with corresponding regulatory and supervisory duties.*

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## **CHAPTER 4**

### **POLICY INSTRUMENTS FOR MACROPRUDENTIAL REGULATION**

#### **4.1 Introduction**

**Macroprudential regulation entails targeted policy instruments to mitigate systemic risks and foster financial stability.** Macroprudential policies can address financial imbalances building up in specific sectors or in the economy as a whole and, as such, are geared at enabling financial stability, by using targeted instruments. This chapter addresses macroprudential policy instruments, and is organized as follows. The macroprudential tools are briefly described (section 4.1), followed by a summary of best practices of macro-prudential tools employed by select countries (section 4.2). This chapter concludes by presenting recommendations for a macro-prudential toolkit for the Centrale Bank van Aruba (section 4.3).

#### **4.2 Macro-prudential tools**

The FSB together with the IMF (2011a) and the BIS (2011) recommend developing macro-prudential tools and frameworks. Macro-prudential policy is defined by the FSB, IMF, and BIS as the use of primarily prudential tools to limit systemic risk. Macro-prudential policy uses primarily macro-prudential tools to achieve its objectives which includes, but are not limited to, countercyclical capital buffers and provisions, sectoral capital requirements, measures to contain liquidity and foreign exchange (FX) mismatches, and caps on loan-to-value and debt-to-income ratios.

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*Macro-prudential policy is defined as the use of primarily prudential tools to limit systemic risk.*

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**In order to mitigate the causes of systemic risk, a number of policy instruments is recommended.** There is, however, no agreement about which one, or a combination of some instruments, should play a primary role in the implementation of a macroprudential policy. Most of these instruments are aimed at mitigating the impact of the pro-cyclicality of the financial system on the asset and liability side of the financial reporting (See Table 4.1).

Table 4.1. The Macro-Prudential Policy Toolkit.

	<i>Restrictions related to borrower, instrument, or activity</i>	<i>Restrictions on financial sector balance sheet (assets, liabilities)</i>	<i>Buffer based policies</i>	<i>Taxation, levies</i>	<i>Other (including institutional infrastructure)</i>
<b>Expansionary phase</b>	Time varying caps/limits/rules on: - Debt-to-Income (DTI), Loan-to-Income (LTI), Loan-to-Value (LTV) - Margins, hair-cuts - Lending to sectors - Credit growth	Time varying caps/limits on: - Mismatches (FX, interest rate) - Reserve requirements	Countercyclical capital requirements, leverage restrictions, general (dynamic) provisioning	Levy/tax on specific assets and/or liabilities	- Accounting (e.g. varying rules on mark to market) - Changes to compensation, market discipline, governance
<b>Contractionary phase: fire-sales, credit crunch</b>	Adjustment to specific loan-loss provisioning, margins or hair-cuts (e.g., through the cycle dynamic)	Liquidity limits (e.g., Net Stable Funding Ratio, Liquidity Coverage Ratio)	Countercyclical capital requirements, general (dynamic) provisioning	Levy/tax (e.g., on non-core liabilities)	- Standardized products
<b>Contagion, or shock propagation from SIFIs or networks</b>	Varying restrictions on asset composition activities (e.g., Volcker, Vickers)	Institution-specific limits on (bilateral) financial exposures, other balance sheet measures	Capital surcharges linked to systematic risk	Tax/levy varying by externalities size, network)	- Institutional infrastructure - Resolution (e.g., living wills) - Varying information, disclosure

*Enhancing resilience*  
 *Dampening the cycle*  
 *Dispelling gestation of cycle*

The following macro-prudential tools may serve the same purpose (i.e., systemic risk), but are distinguished based on the following additional specific functions:

- *Countercyclical capital requirement* to avoid excessive balance-sheet shrinkage from banks in trouble. The Basel III countercyclical capital buffer will be phased in starting in 2016, with the rate increasing in equal increments each year so that it is in full force on January 1, 2019. The level of this buffer ranges between 0 percent and 2.5 percent of risk-weighted assets (RWA) and must be met by the minimum Common Equity Tier 1 (CET1) capital. For example, if the buffer is set at 2.5 percent of RWA, mandatory reciprocity would be 0.625 percent on January 1, 2016; 1.25 percent on January 1, 2017; 1.875 percent on January 1, 2018; and 2.5 percent on January 1, 2019;
- *Cap on leverage (finance)* to limit asset growth by tying banks' assets to their equity (finance). The banks are expected to maintain a leverage ratio in excess of 4 percent under Basel III;

- *Levy on non-core liabilities* to mitigate pricing distortions that cause excessive asset growth;
- *Time-varying reserve requirement* as a means to control capital flows with prudential purposes.

Furthermore, the largest and most globally active banks are required to hold more and higher-quality capital. In addition, the following macro-prudential instruments are also employed by some countries in order to prevent the accumulation of excessive short-term debt:

- *Liquidity coverage ratio (LCR)*<sup>3</sup>, which is an essential component of the Basel III reforms, promoting the short-term resilience of a bank's liquidity risk profile by ensuring that a bank has an adequate stock of high quality liquid assets that can easily and immediately be converted into cash in private markets to meet its liquidity needs for a 30-calendar day liquidity stress scenario;
- *Liquidity risk charges* that penalize short-term funding paid to the regulator who is able to provide emergency liquidity during systemic crisis;
- *Capital requirement surcharges* proportional to the size of maturity mismatch implying that the aforementioned requirement should be increasing in the maturity mismatch of assets and liabilities, and should be applicable to all institutions with access to safety net guarantees;
- *Minimum haircut*<sup>4</sup> *requirements on asset-backed securities*<sup>5</sup>, which are set in a wide variety of ways. However, some markets have tended to converge on round numbers between 2 – 5 percent for the securities.

In the case of the CBA, several macroprudential tools are used (See Table 4.2). including capital adequacy, asset quality, earning and profitability, in addition to liquidity and sensitivity to market risks.

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<sup>3</sup> The LCR is calculated as follows =  $\frac{\text{HIGH QUALITY LIQUID ASSETS}}{\text{TOTAL NET CASH FLOWS 30D.}} > 100 \%$ .

<sup>4</sup> Haircuts are expressed as the percentage difference between the market value of the collateral security and the cash to be loaned through a, e.g., repo (the 'purchase price' of the repo).

<sup>5</sup> Asset-backed securities are bonds and notes backed by financial assets. Typically, these assets consist of receivables, other than mortgage loans.

Table 4.2 Core set of macroprudential tools in Aruba.

I) Capital adequacy	a. Risk-weighted capital asset ratio (= <i>Regulatory capital to risk-weighted assets</i> )
	b. Tier 1 capital ratio
II) Asset Quality	a. Nonperforming loans to gross loans
	b. Nonperforming loans (net of ALLP) to gross loans
	c. Nonperforming loans (net of ALLP) to regulatory capital
	d. Large loans to regulatory capital (all loans or lines of credit in excess of 15 percent of the institution's test capital)
III) Earnings and profitability	a. Return on assets (after taxes)
	b. Return on equity (after taxes)
	c. Net interest margin to gross income
	d. Noninterest expenses to gross income
IV) Liquidity	a. Loans to deposits ratio
	b. Prudential liquidity ratio
	c. Liquid assets to short-term liabilities
V) Sensitivity to market risk	a. Interest rate margin (weighted averages related to transactions)

## 4.3 Best practices

Over the past decade, macroprudential policies and practices have matured substantially. Macro-prudential policies have evolved significantly and are used more actively since the global financial crisis (Akinci & Olmstead-Rumsey, 2015). The lack of macroprudential responsiveness during the pre-crisis asset build-up, and the subsequent great recession, have indeed spawned macroprudential policy discussions and initiatives across the world (See Table 4.3).

Table 4.3. Cross-country summary of difficulties encountered and key measures taken.

	Financial difficulties	Key macroprudential measures
USA	Lack of adequate government regulation	- The Dodd–Frank Wall Street Reform and Consumer Protection Act.
The Netherlands	Housing boom and household indebtedness	- Limits on LTV and LTI; - Tax reform of the MID regime making the tax treatment of mortgage interest payments less generous.
Sweden	Increase of household indebtedness and house price	- Limits on LTV; - Increased central bank liquidity and approved legislation enabling the government to intervene with, inter alia, guarantees and capital injections; - Adoption of the Basel III LCR for credit institutions and investment firms; - Imposed higher capital requirements than Basel III, while systematically important banks should hold an additional capital buffer of 3 percent.
Canada	Housing boom and household indebtedness	- Tightening LTV ratios; - Introduction of a maximum debt service ratio; - Formalization of the Protection of Residential Mortgage Hypothecary Insurance Act; - Limits on government-backed mortgage insurance and CMHC securitization.
Hong Kong	Sharp fluctuations in property prices	- Adjustments of LTV ratios; - Maximum debt service ratio; - DSTI in combination with applied taxes to real estate transactions; - Adoption of the Basel III phase-in countercyclical capital buffer.
Singapore	Substantial growth in house prices and increase in household debt	- Caps on LTV as well as DSTI, together with loan tenor rules; - Introduction of LTV ceilings on car loans and unsecured credit, including credit cards; - Broadened access to its liquidity facility; - Currency swap arrangement with the US Federal Reserve.

### 4.3.1 USA

In the United States of America (USA), the invention of mortgage-backed securities completely revolutionized the housing, banking and mortgage business by letting borrowers enter into mortgages they couldn't afford. Mortgage lenders pursued aggressive, if not, unethical practices to lure borrowers. In addition to considering higher-risk borrowers, lenders offered progressively riskier loan options and borrowing incentives ultimately causing massive defaults due to the lower credit quality. This created an asset bubble, which ruptured with the mortgage crisis. Many of the investors that bought those mortgage-backed securities were international investors, pension funds, and financial institutions, which expected that these type of securities would be secure, under the assumption that the U.S. had been overseeing the financial sector. Notwithstanding the exuberance, in 2008 the financial crisis erupted. One of the key weaknesses that contributed to the financial crisis in the US was the lack of a mechanism to coordinate the efforts of various US regulatory and supervisory agencies and take responsibility for monitoring

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and mitigating systematic risk to protect the overall stability of the US financial system. In response to the credit crisis in 2008, the Dodd–Frank Wall Street Reform and Consumer Protection Act (commonly referred to as *Dodd-Frank act*) was signed into federal law on July 21, 2010. This brought significant changes to financial regulation in the United States since the regulatory reform that followed the “Great Depression”. It made changes in the American financial regulatory environment that affected all federal financial regulatory agencies and almost every part of the nation's financial services industry.

#### 4.3.2 The Netherlands

**The Netherlands, which has a large financial sector consisting of complex financial institutions, experienced a significant hit by the global financial crisis.** The house prices experienced a boom in the decades preceding the global financial crisis, reaching an all-time high in 2007. During this period, the average mortgage LTV ratios were well over 100 percent, and LTV ratios on new mortgages averaged 114 percent in 2007 (and over 120 percent in 2010). The existing buffers and vulnerability indicators were less worrisome than in other jurisdictions, due to the fact that the Dutch authorities did not adopt stricter measures to dampen the growth of household debt. In light hereof, the housing prices and household debt continued persistently to rise until mid-2008 since the Dutch authorities took no actions.

**The crisis sparked a sharp correction causing the real house prices to decline by 20 percent due to the considerable contraction in transactions.** The boom and subsequent plunge in house prices, combined with the generous Mortgage Indebtedness Deductibility (MID) regime<sup>6</sup> allowing homeowners to deduct its mortgage interest from its taxable income left households with very high levels of indebtedness. As a result, the household debt-to-disposable income grew further and exceeded 270 percent in 2010.

**The aforementioned crisis called for a more pro-active deployment of macroprudential instruments.** In 2012, the Dutch government was responsible for, amongst others, setting maximum LTV and Loan-to-Income (LTI) limits, imposed an LTV cap for new lending of 106 percent. All new loans could not exceed a threshold LTV ratio of 105 percent, and the limit has been set to be reduced 1 percentage point per year until January 2018. The aforementioned limits have been introduced through primary legislation, based on a proposal by DNB, in line with the Financial Sector Assessment Program (FSAP)<sup>7</sup>.

**Maximum LTI ratios were imposed on mortgage loans in January 2013 through the Ministry of Finance.** These LTI ratios are based on gross household income and the maximum financing cost allowed as a percentage of gross income. The National Institute for Family Finance Information (Nationaal Instituut voor Budgetvoorlichting) provided the financing cost limits, which are updated annually. Moreover, the MID regime was also reformed in 2013. The following measures were taken to make the tax treatment of mortgage interest payments less generous:

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<sup>6</sup> The Dutch government introduced the MID back in the late 19<sup>th</sup> century. The estimated benefit of homeowners each year in 2014 was approximately €12 billion (about 2 percent of the GDP).

<sup>7</sup> The Netherlands underwent an FSAP update in 2010 that included assessment of the Basel Committee on Banking Supervision's (BCBS) *Core Principles for Effective Banking Supervision*, the International Association of Insurance Supervision (IAIS) *Insurance Core Principles*, and the International Organization of Securities Commissions (IOSCO) *Principles and Objectives of Securities Regulation*.

- The marginal tax rate for MID on both existing and new mortgages would be gradually reduced from 52 percent to 38 percent;
- New mortgages are only eligible for MID if the new mortgage is fully amortized within 30 years on an annuity basis. As a result, new interest-only mortgages are no longer eligible for MID; however, existing mortgages are excluded from this requirement. It should be noted that the impact of this change on the housing market will only show over time.

**In 2014, DNB announced supplementary capital buffer requirements for systemic banks.** The additional capital buffer would be imposed on four systemic banks, and would be phased in during the period 2016 - 2019. The systemic buffer will be 3 percent of the risk-weighted assets for ING Bank, Rabobank, and ABN Amro Bank, and 1 percent for SNS Bank. DNB is also considering the adoption of counter cyclical capital buffers and leverage ratios, which will be in line with Basel III and EU wide implementation. DNB plans to assess (4 times a year) whether credit growth calls for the imposition of counter cyclical buffers. The authorities have announced their intention to impose a higher minimum leverage ratio of 4 percent for systematically important financial institutions (SIFIS), which is higher when compared with the 3 percent as recommended under Basel III. Against this background, DNB asked the above-mentioned 4 largest banks to submit capital migration plans showing compliance with the new requirement by 2018.

**The Dutch government is currently setting up a National Mortgage Institution (NHI) that is expected to fund National Mortgage Guarantee (NHG) mortgages by issuing state-guaranteed bonds collateralized by pools of mortgages.** In contrast to other measures, the NHI will not lead to a scaling down of the NHG. The intention of this institute is to make these products (mortgages) more attractive for new investors, being the pension funds and foreign banks, to invest in the Dutch housing market by purchasing state-guaranteed bonds, which in fact are again collateralized pools of mortgages. This would help to diversify sources of funding for the Dutch mortgage market. The 3 largest banks would assume a combined market share of approximately 70 percent.

#### *4.3.3 Sweden*

**The banking system of Sweden is large, concentrated and regionally interconnected.** Its aggregated assets comprise more than 400 percent of the GDP, while the 4 biggest banks consist of approximately 85 percent of the system's assets (Darbar & Wu, 2015).

**Household indebtedness and house prices increased steadily since mid-1990s, while no LTV ratio on mortgages existed until 2010.** The ratio of household-debt-to-personal-disposable income reached 174 percent in 2013 and was largely due to increases in mortgage debt (similar to the Netherlands). The aforementioned increase was mainly due to the low interest rate environment (i.e., the benchmark yield on Sweden Government Bonds-10 years trading at 1.80 percent in 2013) and strong economic growth in Sweden, as well as its tax regime allowing homeowners to deduct mortgage interests from the taxable income.

**The global financial crisis also had a significant impact on Sweden's financial sector.** However, the concerning Swedish authorities took the necessary steps to help restore confidence in its financial system, by increasing

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central bank liquidity and approving legislation enabling the government to intervene with, inter alia, guarantees and capital injections. Following the financial global crisis, the Swedish Financial Stability Authority (FSA) took the following measures:

- An LTV cap of 85 percent was introduced and was applied as of 2010 to all new mortgages or extensions to existing mortgages that used the house as collateral.
- Furthermore, an enhanced reporting requirement was introduced for credit institutions and investment firms, which enabled the FSA to monitor Basel III type liquidity indicators in 2011.
- Based on the Basel III guidelines, the FSA adopted the liquidity coverage ratio (LCR) requirement in 2013, which measures the amount of liquid assets a bank can rely on for a stress period lasting 30 days assuming no other source of funding is available.
- Additionally, the FSA imposed higher capital requirements than those stipulated in Basel III, and the systematically important banks should hold an additional capital buffer of 3 percent (May 2014).

#### **4.3.4 Canada**

**The single most important domestic risk to financial stability in Canada was its long housing boom during the period of 2002-2007.** The Canadian authorities have extraordinary powers to affect housing finance through the key role of government-backed securities insurance, and can influence both the credit and housing price growth through:

1. Micro prudential measures, for example prudential guidelines on mortgage lending; and
2. Structural measures such as the oversight of the government-owned Canadian Mortgage and Housing Corporation (CMHC).

**The Canadian mortgage market is relatively simple and conservative when compared with its peers.** Nevertheless, mortgage insurances are extensively used in not only Canada, but also in countries like Australia, France, Hong Kong SAR, the Netherlands, and the United States (Joint Forum, 2013). The government participation in the mortgage insurance provisioning occurs, however, only in a few countries, such as Canada, Hong Kong SAR, the Netherlands, and the United States.

**Since banks are the main source of housing finance in Canada, all federally regulated lenders (which includes all banks) with an LTV ratio above 80 percent are required to be insured** (Krznar & Morsnik, 2014). However, lenders with low LTV ratios (below 80 percent) may nevertheless be insured, but, mainly on a portfolio basis and securitized afterwards (mortgage-backed securities and are not recorded on the lenders' balance sheets). The CMHC and two other private companies provide the aforementioned government-backed mortgage insurances. It should be noted that the CMHC is a federal government-owned corporation and has a market share of about three quarters.

**Insurance rules are an important macroprudential tool, which can be used in a countercyclical manner, taking into account the central role of the government-backed mortgage insurance in the Canadian housing finance.** Measures taken with regard to mortgage insurance rules in the mid-2000s, which made insured mortgage more affordable while supporting a boom in mortgage credit include inter alia:

- Broadening of the eligible sources of funds for the minimum down payment;
- Increasing the maximum LTV ratio that triggers mandatory insurance to 80 percent, and increasing the maximum LTV ratio for any new government backed insured loans to 100 percent;
- Increasing the maximum amortization period from 25 years to 40 years; and
- Providing insurance on interest-only mortgages and on mortgages to the self-employed.

However, as both house prices and mortgage credit grew, the federal government undertook four rounds of measures since 2008, besides tightening mortgage insurance rules in order to alter the then growing imbalances in the housing market. The undertaken measures included:

- Reducing the maximum amortization periods back to 25 years;
- Imposing a 5 percent minimum down payment;
- Introducing a maximum debt service ratio of 44 percent;
- Tightening LTV ratios on refinancing loans and on loans to purchase properties not occupied by the owner; and
- Withdrawing government insurance backing on lines of credit secured by homes.

In addition to the above, the Canadian authorities took the following policy actions:

- *Micro prudential measures:* The Office of the Superintendent of Financial Institutions (OSFI)<sup>8</sup> introduced a guideline for residential mortgage underwriting practices in 2012;
- *Oversight of private mortgage insurers and government of CMHC:* The rules for government-backed mortgage insurance and other arrangements with private mortgage insurers were formalized in the Protection of Residential Mortgage Hypothecary Insurance Act;
- *Limits on government-backed mortgage insurance and CMHC securitization:* The government has announced plans to prohibit the use of government-backed securities programs, plans to limit the insurance of low-LTV mortgage to those that will be used in CMHC securitization programs, and limits on CMHC securitization programs.

**The above-mentioned actions illustrate that the Canadian authorities used their exceptional power to make use of macroprudential measures to dampen the housing boom.** The aforementioned macroprudential measures were supported by empirical evidence and international experience. In conclusion, tightening of LTV ratios, DTI ratios, and risk weights lead to a reduction in credit growth, whereas LTV ratios and risk weights appear to have a significant effect on house price growth.

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<sup>8</sup> The primary regulator of banks and other federally chartered financial institutions.

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#### 4.3.5 Hong Kong

**The financial sector of Hong Kong is one of the largest financial sectors in the world.** Its banking system, which assets only are equivalent to 750 percent of the GDP, is highly capitalized, profitable, and liquid, and the securities markets are liquid and efficient.

**The Hong Kong Monetary Authority (HKMA), which is the regulator of deposit-taking institutions, has made extensive use of macroprudential instruments to address risks in the property sector since the 1990s.** The LTV cap and the debt service-to-income (DSTI) cap were the most frequently used macroprudential instruments during this period, and have been adjusted at different phases of the credit cycle to achieve a countercyclical effect.

**During the Asian financial crisis, Hong Kong's property prices fell significantly, i.e., by more than 40 percent during the period of September 1997 - September 1998.** The subsequent mortgage delinquency ratio, however, never exceeded 1.43 percent. This is rather low when compared to international practices, due to the fact that the HKMA issued guidelines recommending a maximum LTV ratio of 60 percent to be applied for "luxury" properties with a value of more than HK\$ 12million. This fact alone suggest that the LTV policy is effective in reducing the credit risks that banks face and assuring the quality of bank's mortgage loan portfolios. The LTV policy was restored up to 70 percent of the current market value of the mortgaged property in the late 1990s because of the sharp decline in property prices after the Asian financial crisis that was also accompanied by a significant decline in household income causing significant obstacles for perspective homebuyers. As a result, the Hong Kong Mortgage Corporation (HKMC)<sup>9</sup> launched a Mortgage Insurance Program (MIP) aimed at promoting wider homeownership in Hong Kong, allowing mortgage loans of up to 90 percent of the LTV ratio. Mortgage loans were reduced for homebuyers based on certain eligible criteria, which include a maximum debt-to-income ratio, maximum loan amount, and maximum term of maturity at origination.

**Property prices increased sharply since 2009, resulting from strong capital inflows and unusually low interest rates amid unprecedented quantitative easing by major central banks.** As a result, the HKMA issued guidelines during the period of October 2009 – August 2010 to safeguard its financial stability and help banks manage credit risks more prudentially. Maximum LTV ratio to 60 percent for properties for homeowners, as well as for properties not intended to be occupied by the owners. Banks located in Hong Kong managed to withstand the impact of the global financial crisis partly because:

- They were not exposed to the securitized products during of the aforementioned crisis;
- They had strong internal risk management systems;
- They were highly liquid; and
- They had low loan-to-deposit ratios.

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<sup>9</sup> The primary mission of the HKMC, which is owned by the Hong Kong Government, include the following (1) to enhance the stability of the banking sector by offering a reliable source of liquidity, thereby reducing the concentration and liquidity risk of mortgage lending by banks; (2) to promote wider home ownership in Hong Kong; and (3) to facilitate the growth and development of the debt securities and mortgage-backed securities markets in Hong Kong.

Besides the LTV policy, there were other policies implemented in Hong Kong during that period that had similar macroprudential elements, such as maximum debt servicing ratios<sup>10</sup> for mortgages and maximum exposure to property lending by Authorized Institutions (AIs) in Hong Kong. In 2015, the HKMA announced a new macroprudential tool, which is the Basel III phase-in countercyclical capital buffer of 0.625 percent (effective, January 2016) to further safeguard financial stability following renewed concerns about the above-trend credit-to-GDP ratio and house price growth. A high credit-to-GDP ratio signals significant leverage in the non-bank private sector and, therefore, implying vulnerability to negative shocks due to increases in interest rates or a fall in income. Furthermore, the HKMA announced further that the countercyclical capital buffer ratio for Hong Kong would increase to 1.25 percent, effective, January 1, 2017.

Overall, Hong Kong made use of multiple tools to help the effectiveness of the macroprudential measures taken. The macroprudential measures include, e.g., DSTI in combination with applied taxes to real estate transactions along with the LTV ratio, and also additional capital requirements. While these measures go beyond the property sector, their implementation should enhance banks' overall resilience and reduce their vulnerability to property sector shocks.

#### *4.3.6 Singapore*

The financial system of Singapore is one of the world's largest financial centers and is built around a core of domestic and international banks, while offering a wide range of financial services. Its real estate market is dominated by public housing accounting for almost 80 percent of the housing stock (Darbar & Wu, 2015). The Singapore government's Housing and Development Board (HDB) builds apartments or flats on government-allocated land and sells them at subsidized prices to eligible Singapore citizens.

House prices almost doubled in Singapore since 2003, together with a robust growth in mortgages during the period 2010-2013. The aforementioned growth in mortgages fueled an increase in household debt as a percent of disposable income, thereby posing an increasing risk to the Singapore's banking sector. Its money market experienced liquidity pressures from the global financial crisis in 2008, while interbank rates spiked with rising counterparty risks. However, its markets remained resilient. The Monetary Authority of Singapore (MAS) implemented the following measures to support the stability of its financial system, inter alia:

- It adopted a temporary blanket deposit guarantee (similar to other in the region);
- It also agreed to a currency swap arrangement with the US Federal Reserve; and
- It broadened access to its liquidity facility.

In terms of macroprudential policy instruments, the MAS tightened its macroprudential policy in the aftermath of the global financial market to cool down the housing market. Macroprudential policy measures included caps on the LTV ratio as well as DSTI, together with loan tenor rules (often accompanied by stamp duties - ABSD<sup>11</sup>), e.g.

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<sup>10</sup> The debt servicing ratio is defined as monthly repayment obligations as a percentage of monthly income.

<sup>11</sup> A Buyer's Stamp Duty (ABSD) was imposed at a rate of 15 percent on foreigners and corporate entities buying any residential property, 10 percent on permanent residents buying second or subsequent residential property and Singapore citizens buying their third and subsequent

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the maximum tenure of all new residential property loans would be capped at 35 years. In addition, loans exceeding 30 years tenure would face significantly tighter LTV limits, often between 40 and 60 percent. At the same time, the authorities introduced LTV ceilings on car loans and unsecured credit, including credit cards, to limit excessive increases in household leverage. Financial institutions were required to review a borrower's total debt and credit limits aggregated across all financial institutions before granting a new credit card, unsecured credit, or credit limit increases, to disclose to borrowers the potential cost of rolling over credit card debts and revolving credit.

#### 4.3.7 Caribbean region

**Financial instability remains one of the key inhibitors to building economic resilience in the Caribbean.** Credit risk is a major financial stability issue in the Caribbean and manifests itself through relatively high and oftentimes increasing non-performing loan ratios, rapid credit growth, and distorted credit concentration. As concluded in the Caribbean Financial Stability Report 2015, the Caribbean region is not *actively* using macroprudential tools/instruments to mitigate key risks. However, the regional central banks and other important stakeholders have long recognized the need for a more comprehensive and regional approach to financial supervision and regulation and have continued to build up the financial stability architecture in the region, which led to upgrades of the financial stability framework in the Caribbean. At the moment, the focus is on performing stress testing on the financial institutions in order to estimate the resilience of domestic financial systems, while assessing the impact of an individual failure on the whole region in order to determine the domestic risks that are regionally systemic in magnitude. The ongoing enhancements to the architecture for financial stability in the Caribbean reflect the commitment of regional stakeholders to continue improving the resilience of the financial system in the region.

## 4.4 Concluding remarks

Based on the best practices of the selected countries, the primary macroprudential tool used to address risks in the real estate sector are: (i) the LTV caps, (ii) DTI/DSTI caps, (iii) other mortgage requirements, and (iv) loan-loss provisioning requirements. A number of macroprudential authorities have activated three types of capital buffers: (a) the buffer for global systemically important institutions (G-SIIs), (b) one for other systemically important institutions (O-SIIs), and (c) the systemic risk buffer (SRB). Such buffers are intended to address the problems stemming from 'too-big-to-fail' institutions, complex (large and interconnected) financial institutions, as well as specific structural risks deriving from, e.g., exposures to areas affected by geopolitical tensions.

The authorities of the selected countries adopted an institutional framework for macroprudential policy suited to their own circumstances, which should also be the case for a macroprudential policy for Aruba.

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residential property, 5 percent on permanent residents purchasing their first residential property, and 7 percent on Singapore citizens purchasing the second residential property.

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Considering the predominance of commercial banking in the Aruban financial ecosystem, and reflecting on the previous international experiences and best practices, a macro-prudential toolkit for the CBA should - in the medium-term future - include, in addition to existing policy measures:

1. *Liquidity Coverage Ratio (LCR) in order to avoid liquidity difficulties of commercial banks in the near future (to promote short-term resilience);*
2. *Net Stable Funding Ratio (NSFR), which is a longer term structural ratio designed to reduce funding risk over a longer time horizon and requires banks to fund their activities with sufficient stable sources of funding;*
3. *Loan-to-Value (LTV) ratio and strict loan loss provisions rules on mortgages, which should be monitored continuously, and adjusted when deemed necessary;*
4. *Loan-to-Income (LTI) limits;*
5. *Stringent capital buffers and liquidity of, respectively, 20 percent and 17 percent, which is higher than those imposed by Basel III capital requirement, for the countercyclical capital requirement purposes.*

Additionally, it is highly recommended to not only implement a macro-prudential toolkit, but also assess the (intended and unintended) impacts of foregoing macroprudential measures.

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*Recommendation III: The CBA should adopt a macroprudential toolkit consisting of complementary tools to promote financial stability.*

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## CHAPTER 5

# INDICATORS OF SYSTEMIC RISK

### 5.1 Introduction

Macro prudential regulation aims at mitigating systemic risks. In this chapter, the concept and measurement of systemic risks is delineated, and several international best practices are described. More specifically, Financial Soundness Indicators (FSI) are discussed and results of a CBA benchmark are provided.

### 5.2 What is Systemic Risk?

The financial crisis of 2008 vividly illustrates the relevance and significance of systemic risk. In general, systemic risk refers to the risk that financial instability becomes so widespread that it impairs the functioning of a financial system to such a degree that economic growth and welfare suffer materially (ECB, 2009). This financial instability can stem from large and interconnected institutions, from endogenous imbalances that add up over time, or from a substantial unexpected event.

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*Systemic risk refers to the risk that financial instability becomes so widespread that it impairs the functioning of a financial system to such a degree that economic growth and welfare suffer materially.*

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**Systemic risks vary according to a continuum of narrowness.** A distinction can be made between a narrow perspective of systemic risk, which includes only the financial system, and a broader perspective of systemic risk where the two-sided interaction between the financial system and the real economy is considered. Ideally, the severity of systemic risks is assessed by taking into account the effect that they have on consumption, investment, and growth or economic welfare broadly speaking.

**The BIS (2011) defines financial systemic risk as the risk of disruption to financial services that results from an impairment of the financial system, with the potential to harm the real economy.** This risk can occur anywhere in the financial ecosystem and may be amplified due to the over- and/or irresponsiveness of market participants to incomplete or incorrect information (i.e., information asymmetry or principal agency). The distribution of this risk across entities and sectors is determined by the structure of balance sheet linkages.

**The ECB defines three main forms of systemic risks.** These systemic risks vary according to their interspatial (i.e., concentrated vs. distributed) and intertemporal (slow vs. fast) nature, and include (ECB, 2009):

- a) **The contagion risk:** Contagion usually involves a supposedly idiosyncratic problem that becomes more widespread in the cross-sectional dimension, often in a sequential fashion. An example is one bank failure causing the failure of another bank. In severe crisis, risks spread from the financial sector to the real economy;
- b) **The disruption risk:** The second form of systemic risk refers to a *widespread exogenous* shock that negatively affects a range of intermediaries and/or markets in a simultaneous fashion. An example of this is when banks are affected by an economic downturn.
- c) **The slow-burn risk:** the risk of the unravelling of imbalances that have built up over time with severe implications that remain latent within the financial system.

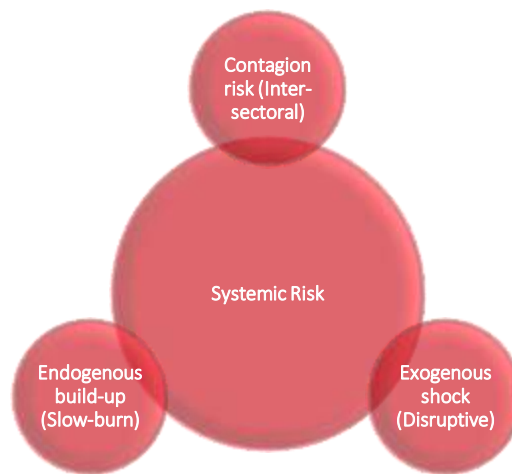


Figure 5.1 Systemic Risks (Adapted from ECB, 2009).

The three forms of systemic risk are explained by several market imperfections, such as asymmetric information, externalities and the public-good character of systemic stability, and incomplete contracts. These imperfections cause greater instability in financial systems, compared to other economic sectors, because of (i) the information intensity and inter-temporal nature of financial contracts; (ii) the balance sheet structures of financial intermediaries (frequently showing high leverage and maturity mismatches); and (iii) the high degree of

interconnectedness of wholesale financial activities. Contagion and disruptive risks are especially predominant in the pro-cyclicality of financial systems<sup>12</sup>.

### 5.3 Manifestations of systemic risk

Within the European Union, macro-prudential oversight is entrusted to the European Systemic Risk Board (ESRB), which has among its responsibilities the task of identification, surveillance and limitation of systemic risk. As part of its identification and measuring of systemic risk, the ESRB publishes a Risk Dashboard. This is a set of quantitative and qualitative indicators to identify and measure systemic risk in the EU financial system. Systemic risks are categorized in six categories:

- i. Interlinkages and imbalances;
- ii. Macro risks;
- iii. Credit risks;
- iv. Funding and liquidity
- v. Market risks
- vi. Profitability and solvency.

The Bank of England distinguishes between two distinct manifestations of systemic risk (Bank of England, 2011):

- a. The amount of risk that the financial system takes at a point in time relative to its capital and liquidity resources ('time-varying' or 'cyclical' risk); and
- b. For a given amount of time-varying risk, structural features of the financial system, such as, its connections and the distribution of risk across different participants, create or exacerbate vulnerabilities ('cross sectional' or 'structural' risk).

The financial system contains various amplifiers that underlie these manifestations of risk, such as mispriced lending terms and excessive leverage, interconnectedness, concentration, complexity and opacity (Bank of England, 2011). These amplifiers may be caused by imperfections in financial markets. These include incentive distortions, which can may be triggered by contracts that reward short-term performance excessively. Also, information asymmetry, such as that linked to buyers doubting the quality of assets (adverse selection) or less than fully-rational processing of information. Finally, market imperfections include co-ordination problems, where collective action, for example to step away from lending in a boom, may be in the interests of individual banks but there is no way to co-ordinate this outcome.

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<sup>12</sup> Financial behavior tends to be pro-cyclical in that, in good times, consumption and/or investment increase, generating income which fuels the financing of more consumption and/or investment, with increasing risks being neglected.

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## 5.4 Indicators of systemic risk

According to the IMF (2013), **an effective framework for monitoring systemic risk** should take into consideration:

- i. Total credit growth and macroeconomic drivers of imbalances;
- ii. Financial linkages between the financial sector and domestic households and corporations (the real sector), and between each sector and the rest of the world; and
- iii. The structure of the financial system and linkages within and across key categories of intermediaries and market infrastructures.

The assessment is based in large part on supervisory and statistical data, and employs empirical methods. It should also make full use of market intelligence and supervisory information on trends and market developments.

According to the FSB, the IMF, and the BIS (2011), the **main measurement approaches of systemic risk** can be categorized as follows (See Figure 5.2):

- *Aggregate indicators of imbalances* (also referred to as quantity based indicators): these use macroeconomic data or balance sheet indicators (e.g., bank credit, liquidity and maturity mismatch, currency risk, and sectoral or external imbalances) to signal the build-up of risks in the financial system and the economy at large. Imbalances manifest themselves in the coexistence of unusually rapid cumulative growth in private sector credit and asset prices.
- *Indicators of market conditions*: these indicators focus on developments in financial markets that may lead to generalized distress. E.g., low long-term real interest rates and falling risk premia can reflect a 'search for yield' environment and relaxed credit supply in financial markets.
- *Metrics of concentration risk within the system*: these metrics relate to the cross sectional dimension of systemic risk and focus on the channels of contagion and amplification. Market or institutional concentrations of activity in important areas, such as credit provision, interbank markets or payment systems, could indicate structural vulnerabilities.
- *Macro stress testing tools*: national authorities and international institutions are improving tools to stress test the financial system as a whole. Tools that were originally developed to test the resilience of individual institutions are being adapted to stress test financial systems by augmenting the methodology in order to (a) incorporate market dynamics under extreme scenarios and the amplification arising from network effects; and (b) better assess the interactions between financial system distress and the real economy, including through multi-round adverse feedback effects. The importance of conducting top-down and bottom-up stress tests simultaneously to cross-check results is increasingly recognized by macro prudential authorities.

- *Integrated monitoring systems*: combination of metrics and approaches into comprehensive monitoring systems (dashboards, heatmaps etc.), and sometimes into composite indicators. An example of a composite indicator is the Systemic Risk Diagnostic developed by the European Central bank, which assesses the probability of a systemic event based on both macroeconomic and financial conditions. Another example is the indicator of liquidity conditions produced by the Bank of England, which combines bid-ask spreads, liquidity premia and market depth measures into a single measure.

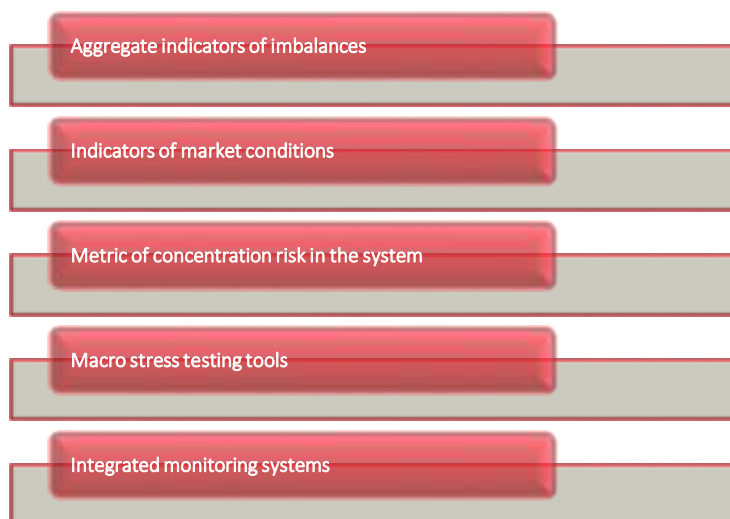


Figure 5.2 Measurement approaches of systemic risk.

The ratio of private sector credit to Gross Domestic Product (GDP) is one of the best leading indicators for predicting a financial bubble and subsequent crisis. Previous studies suggest that the increase in the ratio of private sector credit to GDP is the best single indicator of an increase in the probability of a crisis over a horizon of 1 to 3 years (Drehmann et al., 2011; Drehmann & Juselius, 2012; IMF, 2011b; Lund-Jensen, 2012). This indicator is further improved when broad measures of credit are used, including e.g., credit from non-banks, cross-border credit, and exposures between financial intermediaries. The inclusion of credit from non-banks and cross-border credit is in line with Basel III guidelines. The credit-to-GDP gap is adopted as a common reference point under Basel III to guide the buildup of countercyclical capital buffers. However, this indicator seems to be more useful in the upswing, but more of a lagging indicator during the bust phase of the credit cycle (Bank of England, 2011).

Indicators are also intended to detect the coexistence of asset price misalignments with a limited capacity of the system to withstand the asset price reversal (price based indicators). Research suggests that property price inflation is a consistent forward-looking indicator of borrower distress. Both credit growth and asset prices are measured based on deviations of variables from their trends ('gaps'). Asset price misalignments are often measured in terms of an asset price gap (ideally property prices, otherwise stock prices).

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**Indicators for systemic risk should be analyzed from a holistic perspective, i.e., systemically within the macro-economic context.** The IMF (2011) indicates that it is essential to measure and monitor the indicators for systemic risk in combination with the macroeconomic environment. For instance, the analysis of credit growth can be combined with other indicators. Besides the price of assets used as collateral like mentioned earlier, these indicators include (Drehmann & Juselius, 2012):

- The leverage taken by borrowers in asset markets (assets that are used as collateral for secured lending), on average as well as on new loans. The leverage on assets in new loans will be a more timely measure of credit conditions;
- Changes in lending standards, as can be viewed by decreases in lending margins and increases in household and corporate leverage;
- Measures of balance sheet stretch in the household and corporate sectors that can be captured by debt-service to income ratios for each sector;
- Increases in exposure of the household and corporate sectors to interest rate and currency risks that create vulnerabilities to aggregate shocks;
- External imbalances, as reflected in current account deficits and an appreciation of the real exchange rate, which can increase the likelihood of crises.

The Bank of England mentions additional indicators that may be useful in signaling emerging risks. A simple indicator, pointing to the resilience of lenders, would be the leverage of major banks. Moreover, the terms and conditions in financial contracts, such as the loan to value and margin requirements could also indicate rising risk appetite.

**Quantitative indicators of systemic risk need to be complemented by qualitative indicators.** While quantitative indicators are important, they do not always capture the complete spectrum of leading and lagging risks. Quantitative indicators are often combined with qualitative information and intelligence gathered through regular contacts with market participants. Qualitative information can include risks related to collateralized debt obligations or surveys on market participants' perceptions of financial stability risks, including risk appetite, investment climate, and business confidence. It may also refer to the nature of government subsidies and taxes, payment culture and insolvency regime, credit and deposit guarantees, the quality of supervision and regulation, moral hazard, corporate governance, and management quality. Qualitative information can thus provide timely insight into latent trends and point to areas that deserve a more systematic and richer investigation.

## 5.5 Reviewing systemic risk indicators in practice

In the following subsections, a review of systemic risk indicators used in Hong Kong, Singapore, and Canada is presented.

### 5.5.1 Indicators of systemic risk in Hong Kong

The monetary authority in Hong Kong, in line with the “Basel Common Reference Guide” uses information from two main indicators to assess the extent of systemic risk. These are (a) the size of the deviation of the credit-to-GDP ratio and (b) the residential property price-to-rent ratios from their respective long-term trends (HKMA, 2015). The rationale is that a high credit-to-GDP gap signals significant leverage in the non-bank private sector and, consequently, vulnerability to such negative shocks as an increase in interest rates due to income degeneration. Additionally, a high residential property price-to-rent gap indicates potentially unsustainably high property valuations and therefore vulnerability to a major market correction.

Table 5.1 Systemic risk indicators in Hong Kong (HKMA, 2015).

Aggregate / average banking indicators
Credit growth (total / sectoral)
Bank leverage (Basel III Leverage Ratio, CET1 / RWA)
Bank maturity mismatch (Net Stable Funding Ratio, core funding ratio, loan / deposit ratio)
Currency mismatch (net FX position / equity)
Average risk weight (total and IRB)
Liquidity (LCR, LMR, other Basel III metrics)
Profitability (ROA, ROE)
Interbank market spreads in non-HKD currencies
Hong Kong property sector
Property price growth
(Real) mortgage interest rate
Average DSR
Average LTV ratio
Commercial property price / rent ratios
Non-financial sector leverage
Household debt / GDP ratio
Financial leverage of listed local corporations (debt / equity, debt / EBITDA)
Imputed private sector DSR
Macroeconomic imbalances
Current account deficit / GDP
Gross or net external liabilities / GDP
Fiscal deficit / GDP
External factors (indirect impact on HK economy)
Credit / GDP gap in globally / regionally important economies
Property valuation indicators (price / rent, price / income, average LTV ratios, etc.) in globally / regionally important economies

In addition to the indicators mentioned above, the monetary authority also assesses indicators such as the interbank market spread and average loan quality. A significant increase in the interbank market spread could be a good early indicator of banking system stress, while a deterioration in loan quality could provide early signals of impending credit losses. The monetary authority measures on an ongoing basis the current reading and the forecasted short-term path of each indicator (HKMA, 2015). Moreover, the monetary authority in Hong Kong monitors on an ongoing basis a broad set of aggregate indicators of systemic risk (See Table 5.1).

### 5.5.2 Indicators of systemic risk in Canada

The Bank of Canada has designed a comprehensive system for fostering financial stability, and thereto the surveillance of systemic risks (See Figure 5.3). The Bank of Canada regularly evaluates vulnerabilities of the Canadian financial ecosystem, such as (i) the degree of leverage, (ii) funding and liquidity issues, (iii) the pricing of risk, and (iv) opacity (Bank of Canada, 2015). The evaluation of these vulnerabilities is conducted in four main sectors, namely (a) financial sector entities, (b) shadow banking, (c) asset markets and (d) the non-financial sector. The assessment of vulnerabilities and risks is based on the amplification mechanisms and contagion within the financial ecosystem, and focuses on both cyclical and structural vulnerabilities.<sup>13</sup>

The main focus is on the following **cyclical vulnerabilities**:

- (i) *Leverage* refers to the degree to which debt is used to finance assets;
- (ii) *Funding and liquidity* reflect mismatches of liquidity and maturity between the liabilities and assets of entities. The Bank of Canada also includes the degree of illiquidity in asset markets;
- (iii) *Pricing of risk* captures to which extent market valuations and compensation for risk taking are not appropriate;
- (iv) *Opacity* refers to the degree to which information is not available about institutions and markets, such as asset holdings, counterparty exposures, prices and volumes traded, and the characteristics of financial products.

The **structural vulnerabilities** that are monitored are as follows:

- (i) *Domestic interconnectedness* measures linkages across the financial system that could lead to contagion. These include common exposures as well as direct and indirect linkages across entities and activities;
- (ii) *External exposure* captures channels that could transfer shocks that occur outside of Canada;
- (iii) *Complexity* refers to complicated business models, organizational structures, technical systems, and financial products or relationships.

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<sup>13</sup> Vulnerabilities can have both cyclical and structural aspects. However, for analytical convenience and to facilitate regular monitoring, the Bank of Canada assigns vulnerabilities to one of these two groups, based largely on the frequency at which the vulnerabilities evolve (Bank of England, 2015).

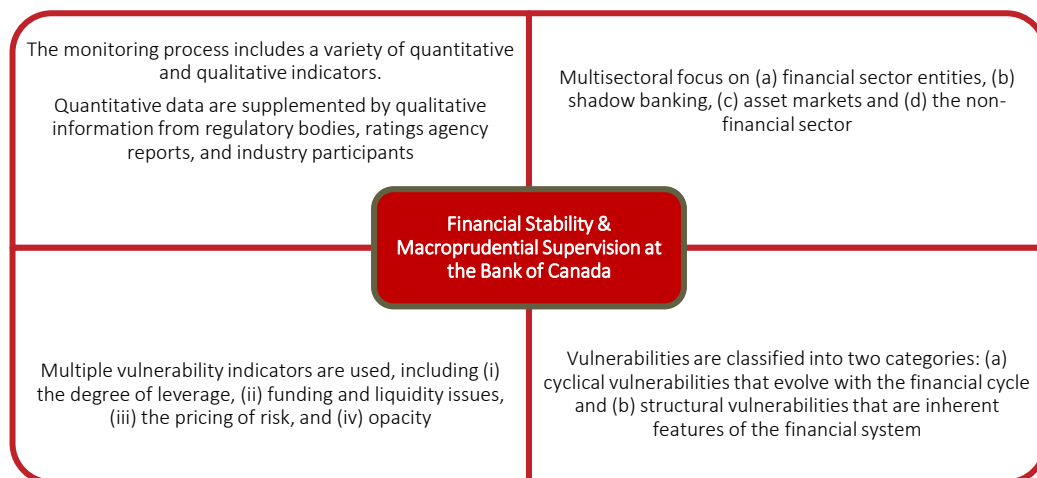


Figure 5.3 Designing financial stability at Bank of Canada (BoC, 2015).

Furthermore, the monitoring process of the Bank of Canada is formed by a variety of quantitative and qualitative indicators. An overview of the types of quantitative indicators that are used to assess the degree of cyclical vulnerabilities present in key sectors of the financial system are presented in Table 5.2. Quantitative data are supplemented by qualitative information collected from a number of sources, including regulatory bodies (both domestic and international), ratings agency reports, and industry participants. Moreover, the quantitative evidence is complemented by market intelligence, including market commentary, dialogues with buy-side and sell-side industry participants, and surveys.

Table 5.2 Typical quantitative indicators used to monitor cyclical vulnerabilities in the Canadian financial system (Bank of Canada, 2015).

Cyclical Vulnerability Indicators				
Sectors	Leverage	Funding and liquidity	Pricing of risk	Opacity
Financial sector entities	Ratio of assets to equity Regulatory leverage ratio	Regulatory liquidity measures Ratio of loans to deposits Liquidity of investments	Return on equity Underwriting standards	Amount of risk disclosure
Shadow banking	Ratio of assets to equity	Terms of assets and liabilities	Underwriting standards Haircuts Concentration of risk	Financial innovation (new products, new practices)
Asset markets		Market liquidity metrics (e.g., bid-ask spreads)	Asset valuation Implied and realized volatility Risk premiums	Over-the-counter trading volumes
Non-financial sector	Ratio of debt to income Debt-service costs Composition of debt	Holdings of cash and liquid assets		Proportion of unlisted corporations

### 5.5.3 Indicators of systemic risk in Singapore

Similar to the Bank of Canada, the MAS considers a range of indicators to assess the build-up of systemic risk in the financial system (MAS, 2015). These indicators include the credit-to-GDP gap and property price inflation as well as other indicators relating to the economy, the banking sector and asset markets. Table 5.3 gives a non-exhaustive overview of the indicators used by the MAS.

Table 5.3: Selected macro financial indicators of the Monetary Authority of Singapore.

Economy	Banking sector	Asset markets
Output gap	Credit-to-GDP gap	Equity prices
Unemployment	Liquidity	Bond yields
Inflation	Leverage	Credit spreads
Household debt	Asset quality	Property indicators
Corporate debt		

## 5.6 Financial Soundness Indicators

An alternative framework for measuring and monitoring systemic risk is through Financial Soundness Indicators (IMF, 2006). Financial Soundness Indicators (FSIs) are typically levels and trends of capital adequacy, asset quality, profitability, liquidity, and exposure to market risk, and the linkage between these indicators and changes in the macroeconomic environment (IMF, 2006).

The IMF together with the IASB, the BIS, the BCBS, and other international organizations drafted the initial guiding framework for the FSIs compilation. In 2006, the FSI compilation guide was published containing concepts, definitions, data sources, and techniques for compilation. In response to developments thereafter, such as the global financial crisis and the adoption of the Basel III Accord, the list of FSIs presented in the FSI compilation guide were amended. Some indicators that were difficult to compile or were considered irrelevant have been deleted from the list (five indicators), while nineteen indicators have been added. The current list of FSIs amount to fifty-two and covers deposit takers, money market funds, insurance corporations, pension funds, other financial corporations, nonfinancial corporations, households, and real estate markets (see Annex B for the complete list of FSI).

Currently, there are approximately 100 countries that report FSIs to the IMF on a quarterly or monthly basis. IMF continues to endorse the FSI compilation guide by providing courses and technical assistance to countries to ensure that data collected is in accordance with the guide. This will in turn improve the cross-country comparability of these indicators and enhance quality of financial system surveillance.

With respect to the status of FSIs at the CBA, a benchmarking assessment was conducted in order to identify the gap between the list of FSIs endorsed by the IMF and the indicators currently compiled by the CBA. The findings indicate that the CBA is currently able to compile thirty-four FSIs, which is 65 percent of the total list provided by the IMF (See Table 5.4). The FSIs for the insurance corporations and other financial corporations are fully covered. However, the remaining sectors are not completely covered due to different factors, including, a lack of more

detailed information, changes in definitions of underlying series, or due to the non-applicability and irrelevance of indicators to Aruba's financial ecosystem.

Table 5.4 Status and gaps in FSI by CBA across sectors.

Sectors	FSI Gaps
<i>Deposit Takers</i>	The CBA currently compiles twenty-two (79 percent) indicators for the deposit takers. The remaining six indicators that are not yet compiled is due to lack of data and change in definitions based on international developments. For instance, Common equity Tier 1 to risk-weighted assets (I03) and net stable funding ratio (I15) are based on latest requirements of Basel III. The CBA's reporting requirements for the credit institutions are based on Basel I. With the introduction of Chart of Accounts (CoA), the commercial banks will have to comply with Basel II requirements. There are three indicators that we are currently not able to compile due to insufficient detailed information of the income statement. These are the gross asset position in financial derivatives to capital (I20), gross liability position in financial derivatives to capital (I21) and trading income to total income (I22). However, the CoA will provide the underlying series for the calculation of the aforementioned indicators. The spread between highest and lowest interbank rates (I25) is not compiled as there is no interbank lending market and thus is currently not applicable for Aruba.
<i>Money Market Funds</i>	There are two indicators for money market funds, involving sectoral and maturity distribution of investments in percent of total investments. However, Investment companies are not under the CBA's supervision. Hence, we do not have the necessary data to monitor this sector or to compile these ratios.
<i>Pension Funds</i>	There are two indicators for pension funds. The CBA does not compile the liquid assets to estimated pension payments in the next year (I38), due to lack of information.
<i>Non-Financial Corporations</i>	For the nonfinancial corporations, we are currently only able to compile one out of the seven indicators. The compilation of key figures from the nonfinancial corporations (businesses) is a bit more challenging as we do not have these figures "in house" but would have to rely on sources outside of the CBA. The information needed from the nonfinancial corporations can be traced from their financial statements, such as total assets, profits and equity. The Central Bureau of Statistics, the tax department and chamber of commerce are other organizations that could support data collection from this sector.
<i>Households</i>	Based on data from the financial sector, the CBA could compile one out of three FSIs for the household sector. Information concerning household debt service and principal payments, and disposable income are not regularly available through the CBA's current channels. Whereas the Research Department conducts a study on the financial position of households, this survey is not conducted on a regular basis. The Central Bureau of Statistics could also provide some of this information through the system of national accounts.
<i>Real Estate Markets</i>	There are four indicators that cover real estate markets. Two of the indicators (I51 & I52) can be calculated based on the information we collect from the financial sector. The Research Department has been collecting data from different websites to construct a residential real estate price index. With this information we could start monitoring the residential real estate prices (I17). At present, we do not have any information for commercial real estate prices (I50), but a similar approach to the residential price index could possibly be used in the future to capture the development in commercial real estate prices as well.

## 5.7 Concluding remarks

Financial systemic risk is the risk of disruption to financial services that results from an impairment of the financial ecosystem, with the potential to adversely impact the real economy. Systemic risks differ in their inter-spatial and inter-temporal nature, and are often caused by market and institutional failures. The preceding review demonstrates the institutional diversity to measuring systemic risks. Indeed, a multiplicity of indicators are used to assess systemic risks across different countries and institutions. However, two commonly used indicators, which are recommended by all institutions, are (a) *the deviation in credit growth from its trend* and (2) *the deviation of the growth of property prices (mainly housing) from its trend*. The indicator of property prices can also be measured as the deviation of the residential property price/rent ratio from its long term trend. These indicators have proven to be the best precursors of financial distress and crises latency in financial systems.

Considering the state of FSI at CBA, it is recommended that the CBA design a comprehensive system for measuring and monitoring systemic risks to foster financial stability. Furthermore, it is recommended specific indicators for credit growth and property price growth be monitored by the CBA (See Table 5.5). Hereto, measures of credit should be sourced across different sectors, including, credit from non-banks, cross-border credit, and exposures between financial intermediaries. With regard to property price growth, systematic efforts are required to collect and analyze data, including the quarterly assimilation and analysis of housing prices and rental prices from multiple sources covering real estate companies, notary offices and the tax department.

Table 5.5 Recommendations for improving systemic risk measurement.

Proposed indicators of systemic risk at the CBA
<ul style="list-style-type: none"> <li>• Monitor the deviation in credit growth from its trend.</li> </ul>
<ul style="list-style-type: none"> <li>• Monitor the deviation of the growth of property prices from its trend.</li> </ul>
<ul style="list-style-type: none"> <li>• Monitor the deviation of the residential property price/rent ratio from its trend.</li> </ul>
<ul style="list-style-type: none"> <li>• Use broad measures of credit (including credit from non-banks, cross-border credit, and exposures between financial intermediaries).</li> </ul>
<ul style="list-style-type: none"> <li>• Improve available data on property and rent prices through surveys at real estate companies, notary offices and the tax department.</li> </ul>
<ul style="list-style-type: none"> <li>• Expand FSI list to reflect risks inherent to Aruba's environment, such as tourism dependency and vulnerability to shocks.</li> </ul>
<ul style="list-style-type: none"> <li>• Combine the credit growth indicator with other indicators such as loan to value, debt-service to income ratios, and the increase in exposure of households and businesses to interest rates and currency risks.</li> </ul>
<ul style="list-style-type: none"> <li>• Take into consideration changes in lending standards, reflected through lending margins and increases in household and corporate leverage.</li> </ul>
<ul style="list-style-type: none"> <li>• Inquire with the commercial banks if data such as debt-service to income, loan to value and interest rate exposure can be obtained in a timely manner on a high frequency.</li> </ul>
<ul style="list-style-type: none"> <li>• Monitor indicators on a regular basis in shadow banking and the non-financial sector.</li> </ul>
<ul style="list-style-type: none"> <li>• Supplement quantitative indicators with qualitative information and intelligence gathered through regular contact with market participants.</li> </ul>
<ul style="list-style-type: none"> <li>• Monitor concentration risk within the system by looking at metrics for market or institutional concentration of activity in important areas such as credit provision and interbank payment systems.</li> </ul>
<ul style="list-style-type: none"> <li>• Stress test the system as a whole to assess its resiliency.</li> </ul>

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**The list of FSIs endorsed by the IMF is comprehensive and focuses on metrics to gauge risks arising from the financial sector, as well as their corporate and household counterparts.** It is recommended to use the FSI list as a starting point for monitoring systemic risk in Aruba. Hereto, the current gaps should be addressed in moving forward with designing financial stability. This list should, however, be expanded further to reflect risks that are inherent to Aruba's environment, such as tourism dependency (financial risks in the tourism and hospitality-related sub-sectors) and the macro-economic vulnerability of Aruba's tourism economy to external disruptions. Examples of tourism risk indicators include credit concentration and exposures of the banking sector to the tourism sector as well as financial performance indicators of the tourism industry.

**Designing financial stability is multi-dimensional and, consequently, requires multiple systemic risk indicators.** Concentration risk within the financial system, which could be a source of vulnerability, should be measured and monitored, especially in a small open and specialized economy. This can be achieved by looking at metrics for market or institutional concentration of activity in important areas such as credit provision and interbank payment systems (See Table 5.5.). This information should be readily available through the data received by the CBA from the financial institutions. It would also be useful to combine the credit growth indicator with other indicators such as the leverage taken by borrowers on assets in new loans (loan to value), household balance sheets (debt-service to income ratios), and the increase in exposure of the household and corporate sector to interest rate and currency risks. Changes in lending standards, reflected through lending margins and increases in household and corporate leverage, should also be considered. Other indicators such as loan to value and the exposure to interest rate risk should also be available through the commercial banks and other credit institutions. The CBA should inquire with the commercial banks and other credit institutions if this information can be obtained in a timely fashion and on a higher frequency.

**Designing financial stability is multi-sectoral and thus needs to span systemic risk indicators across several sectors.** It is important that the indicators are not just monitored in the financial sector, but also in shadow banking and the non-financial sector. It would also be useful to supplement quantitative indicators with qualitative information and intelligence gathered through regular contact with market participants and market surveys.

**Underscoring the multi-level of financial stability design, the monitoring and measuring of the macroeconomic environment are quintessential.** A macroprudential policy tool that has become more important for measuring systemic risk is macro stress testing<sup>14</sup>. It is recommend that the CBA stress test the system as a whole to assess its resiliency.

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*Recommendation VI: It is recommended that the CBA design a comprehensive system for measuring and monitoring systemic risks to foster financial stability. The indicators should include the standard Financial Soundness Indicators in addition to macro-economic indicators and macro stress testing. Quantitative data should be supplemented by qualitative information from authorities and (non-financial) industries.*

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<sup>14</sup> Stress tests for individual institutions are already carried out by the Prudential Supervision Department. The methodology used for these tests can be adapted and augmented to stress test the financial system on a macro level.



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## **CHAPTER 6**

### **COMPLEMENTARY POLICIES FOR FINANCIAL STABILITY**

#### **6.1 Introduction**

Integral to financial stability is the design embeddedness of financial ecosystems, i.e., multiple interdependent levels of macroeconomic conditions, macrofinancial linkages, and macroprudential policies (see Chapter 1). Consequently, endemic to fostering financial stability are alternative (central banking) policies, which are complementary to macroprudential regulation, including bank resolution regimes and the capacity of the central bank to be the lender of last resort (LLR). This chapter will elaborate on the definition of bank resolution regimes and the key elements of a resolution framework, including the main attributes, and resolution powers and tools. A comparative assessment of bank resolution regimes is presented. Secondly, based on a review of literature, the concept of LLR is discussed, and examples across different countries are illustrated. The chapter concludes by an analysis of the current situation in Aruba, followed by a synthesis of proposed steps to develop a bank resolution regime and enhance the current LLR facilities for Aruba.

#### **6.2 Resolution Regimes**

As a result of the financial crisis, a significant number of large banks were bailed-out with public funds as these were deemed ‘too big to fail’ (Narain et al., 2012). According to IMF estimates, crisis-related losses incurred by European banks between 2007 and 2010 were close to EUR 1 trillion or 8% of the EU GDP. It is estimated that from 2008 up to 2011, the European Commission approved EUR 4.5 trillion of state aid measures to financial institutions. This level of state support was necessary to prevent further disruption to financial markets and the economy. Nevertheless, a stable financial system implies, albeit implicitly, that that bail-outs by the government must be mitigated by means of resolution regimes (EC, 2012).

Resolution means the restructuring of an institution in order to ensure the continuity of its essential functions, preserve financial stability, and restore the viability of all or part of that institution (EC, 2012). It refers to the State’s power to resolve a failed bank in an orderly way in order for the financial market not to collapse. Examples of resolution powers are sale, bridge (establish a new entity to separate out good and bad assets) or recapitalization (bail-in), which includes the conversion of the bank’s debt to equity. Governments lacking resolution powers remain with the sole options of liquidation and bail-outs in case of failing banks. The term ‘too big to fail’ refers to the fact that governments have no choice but to bail-out large, interconnected financial institutions as their liquidation would be too costly for the real economy and disruptive to the entire financial system.

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*“When a financial institution fails, many parties have claims against it (...) depositors should be protected (...) shareholders should be the ones affected.”*

*“There is a conflict between efficiency and property rights in the design of bank resolution regimes (...) best to take over business before it fails even if there might be a chance that it will not fail (...).”*

*“One of the most important and challenging problems in designing a bank resolution mechanism is how to deal with multinational banks (...) subject to the resolution regime of the country in which the group is licensed (...). Conflicts between these regimes have the potential to be disastrous.”*

European Parliament (EP, 2012)

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**With robust and effective resolution regimes, systemically important institutions can fail without taking down the entire economy.** Resolution should be distinguished from recovery. According to the Association for Financial Markets in Europe (AFME), recovery means actions to stabilize a financial institution and restore its viability after it has come under severe stress (e.g. capital raising and restructuring), while resolution refers to the processes for authorities to deal with a failing financial institution, while preserving important functions and without causing severe systemic disruption and without exposing taxpayers to (significant) loss (Strub, 2013).

**Supervisory authorities have a duty to develop robust resolution regimes to foster financial stability.** The revised ‘Core Principles for Effective Banking Supervision’ (BCPs) state that one of the tasks and responsibilities of a supervisory authority is, in case of a troubled bank, to minimize the potential adverse impact on the troubled bank and the financial sector as a whole (Basel Committee on Banking Supervision, 2012). In order to do so, effective crisis management and the set-up of resolution frameworks are necessary<sup>15</sup>. Consequently, the supervisory authority must design a resolution framework and measures recovery, i.e., a resolution regime. Likewise, financial institutions must design contingency funding and recovery plans, which are assessed by the supervisory authorities for adequacy. Considering the interconnectedness of (global) financial ecosystems, cooperation and coordination between the foreign (correspondent) and domestic (local) country supervisors on crisis management and resolution are required. Therefore, a clear mandate, including a broad range of powers and appropriate tools provided in law for each relevant authority, is necessary for a sound institutional framework for crisis management and resolution.

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<sup>15</sup> Effective crisis management starts with pre-crisis preparedness.

## 6.3 Subject to resolution

The European Commission (EC, 2012) indicates that a financial institution is **subject to resolution** in the following cases:

- When a point of distress has been reached with no realistic prospects to recover over an acceptable timespan;
- No other intervention measures are viable;
- Liquidation under normal proceedings would risk financial stability.

The Basel Committee on Banking Supervision (2014) outlines supervisory guidelines for *identifying weak banks* (See Section 6.2.1) and *dealing with weak banks* (See Section 6.2.2). The committee describes different avenues that can be undertaken by the supervisory authority in case of escalations, which require measures for recovery, resolution, and the avoidance of contagion of other healthy financial institutions.

### 6.3.1 Identify weak banks

Through on-site examinations and ongoing off-site surveillance and activities weaknesses can be identified (See Figure 6.1). In case of identified weaknesses, a more intensive supervisory approach may be necessary. In case of serious weaknesses and/or deficiencies, formal actions may be necessary (See Section 6.2.2, 'Dealing with weak banks').

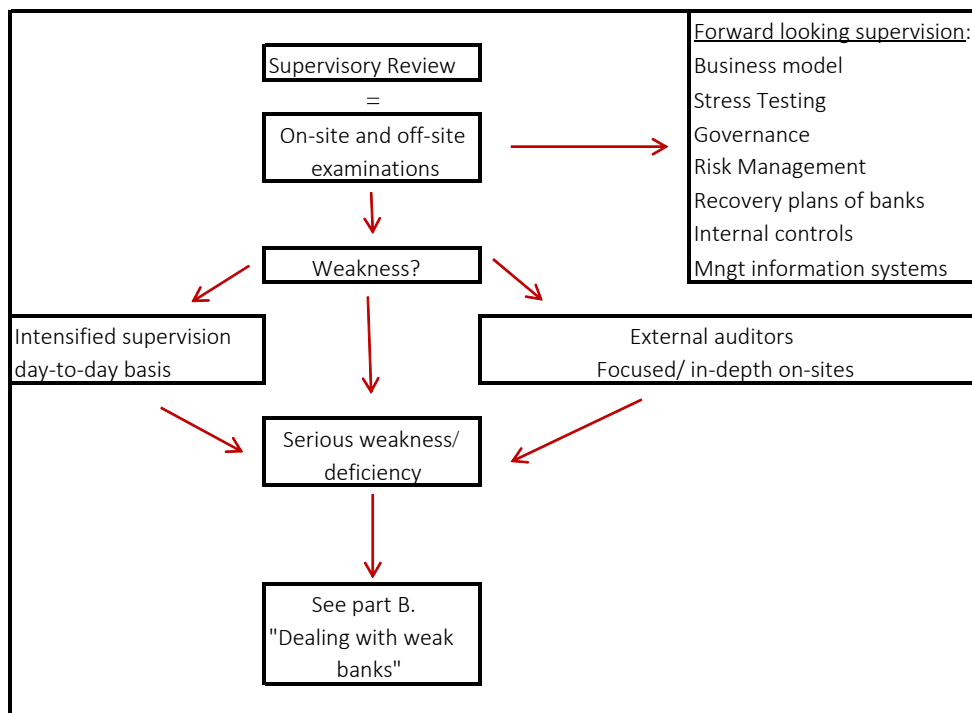


Figure 6.1 Identifying weak banks (Basel Committee on Banking Supervision, 2014).

### 6.3.2 Dealing with weak banks

In case of serious weaknesses and deficiencies, it must be determined whether these can lead to insolvency and/or illiquidity. If insolvency and/or illiquidity issues abound, then the resolution and exit of the financial institution must be prepared (See Figure 6.2). Examples of tools include, e.g., restructuring, bail-in, mergers and acquisitions, bridge bank, open bank assistance, and closure of the bank. If solvent, early corrective actions may be considered, including:

- Restrict concentration of operations, downsize operations and sales of assets, prohibit or limit certain activities, and immediate or enhanced provisioning;
- Capital injection by shareholders (in cash), rollover liabilities, new bond issuing;
- Enhance governance, internal controls and risk management, require corrective action plans, implementation of recovery plans, changes in legal structure, removal of directors and management, limitations on compensations, and supervisory approval for major capital expenditures;
- Suspension of certain rights, deferral of dividend distribution, and appointment of an administrator or conservator.

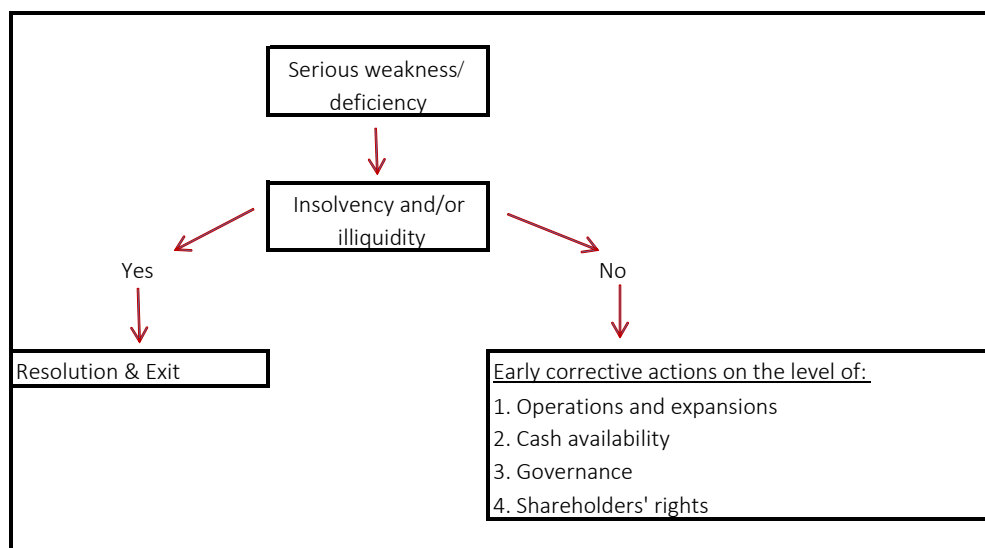


Figure 6.2 Dealing with weak banks (Basel Committee on Banking Supervision, 2014).

## 6.4 Designing a resolution framework

Designing an effective resolution framework is based on the purpose and functionality of the regime. According to the Financial Stability Board (FSB<sup>16</sup>), the **purpose of an effective resolution regime** is to:

- Ensure continuity of systematically important financial services, and payment, clearing and settlement functions;
- Protect depositors, insurance policy holders and investors and ensure rapid return of segregated client assets;
- Allocate losses to shareholders and unsecured and/or uninsured creditors;
- Avoid unnecessary destruction of value, and, therefore, seek to minimize the overall costs of resolution;
- Ensure that non-viable firms can exit the market in an orderly way;
- Provide for speed and transparency through legal and procedural clarity and advanced planning for orderly resolution;
- Provide a mandate in law for cooperation, information exchange, domestic coordination, and with foreign resolution authorities.

Hereto, the European Commission (2012) identifies the following **resolution functions** (See Figure 6.3), i.e.:

- *Prevention and preparation*: recovery and resolution plans on how to deal with financial disruption and failure need to be designed by the financial institutions and the resolution authorities, both on group level as on individual level;

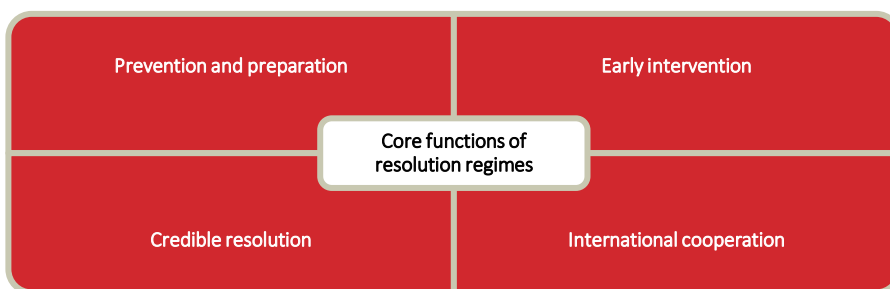


Figure 6.3 Functionality of resolution regimes (EC, 2012).

<sup>16</sup> FSB, located in Basel, Switzerland, was established to coordinate at the international level the work of national financial authorities and international standard setting bodies and to develop and promote the implementation of effective regulatory, supervisory and other financial sector policies. It brings together national authorities responsible for financial stability in significant international financial centers, international financial institutions, sector-specific international groupings of regulators and supervisors, and committees of central bank experts ([www.financialstabilityboard.org](http://www.financialstabilityboard.org)).

- *Early intervention*: the power of the authorities must be expanded in order to have available the necessary tools for timely intervention, at an early stage, before the financial situation deteriorates to a level that is unfixable (e.g. guardianship or require plans for restructuring debts);
- *Credible resolution tools*: e.g., power to sell or merge the business (effect private sector acquisitions), split clean from toxic assets via a bridge bank (transfer business to a temporary structure), convert debt into shares or write down debt (bail-in);
- *Cooperation between authorities of different countries*: cooperation is necessary when cross-border financial institutions are involved.

According to the IMF (2012), **effective resolution regimes contain key attributes** (See Table 6.1), which complement the purpose and functionality of the resolution regime. The FSB (2013) concludes that major legislative reforms have already been undertaken by many jurisdictions.

Table 6.1 Key attributes of an effective resolution regime (Adapted from IMF, 2012).

Attribute	Description
<i>Scope</i>	The regime must cover any financial institution that could be systemically significant.
<i>Resolution authority</i>	Mandate, roles and responsibilities must be designed for an independent authority.
<i>Resolution powers</i>	A resolution toolkit should be designed so that the resolution authorities have a broad range of powers to deal with a failing financial institution, without recourse to public funds.
<i>Set-off, netting, collateralization, segregation of client asset</i>	The arrangements should be kept, however the authorities should be able to suspend them, subject to adequate safeguards.
<i>Legal safeguards</i>	Resolution authorities might opt to depart from the hierarchy of claims, however, these decisions must be subject to judicial review.
<i>Funding of firms in resolution</i>	The use of public funds should be minimized at all times.
<i>Legal framework conditions for cross-border cooperation</i>	Authorities should be able to achieve cooperative solutions with cross-border resolution authorities.
<i>Crisis management groups (CMGs)</i>	Home and host country authorities should set up CMGs that review and report on the resolution planning process of Systemically Important Financial Institutions (SIFIs).
<i>Resolvability assessment</i>	Resolvability assessments should regularly take place for all SIFIs and provide the possibility to require changes to the organizational structure and practices.
<i>Access to information and information sharing</i>	Jurisdictions should share information, both in normal times and during crises.

However, the implementation of key attributes for effective resolution regimes remains nascent and in early stages of developments. Resolution regimes across jurisdictions include a range of practices in terms of scope, mandates, power, and authorities, yet multiple interpretations remain of what a ‘resolution regime’ is or means. Consequently, the FSB (2013) recommends:

- i. **Full implementation of key attributes:**
  - a) Review and revise bank resolution regimes to ensure that all powers are available to administrative resolution authorities;
  - b) Review adequacy and effectiveness of resolution regimes for non-bank financial institutions;

- c) Extend the scope of resolution regimes to FHCs;
  - d) Extend the mandate of the resolution authorities to cooperate and coordinate measures across borders;
  - e) Review policies on information sharing;
  - f) Introduce powers to impose a temporary stay on early termination rights;
  - g) Introduce a RRP (recovery and resolution plan) requirement;
  - h) Supervisory authorities must be mandated to require financial institutions to adapt changes to their structure, organization and business in view of resolution.
- ii. **Clarification and guidance on the application of the key attributes:**
- a) Clarify nature of resolution powers in comparison with the ordinary corporate insolvency regime powers;
  - b) Develop guidance on the features and the powers;
  - c) Develop guidance on identifying good practices for coordination where two or more resolution authorities are responsible for resolving the same group.
- iii. **On-going implementation monitoring:**
- a. The FSB will undertake monitoring and reporting on the implementation of the key attributes by jurisdictions. Peer reviews will be part of this undertaking.

With regard to **resolution powers**, the Financial Stability Board (FSB, 2011) recognizes the following authorities:

- Remove and replace senior management and directors, and recover monies from responsible persons (e.g. recovery of variable remuneration);
- Guardianship;
- Operate and resolve the institution;
- Ensure continuity of essential services and functions by requiring other companies of the same group to execute these essential tasks;
- Override rights of shareholders of particular transactions in order to permit a merger, acquisition, sale or substantial business operation, recapitalization or other measures to restructure and dispose of the firm's business or assets and liabilities;
- Acquisition or merger involving healthy banks;
- Open bank assistance;
- Transfer or sell assets and liabilities, legal rights and obligations;
- Establish a temporary bridge institution to take over and continue operating certain critical functions and viable operations;
- Establish a separate asset management vehicle and transfer to this vehicle non-performing loans or difficult-to-value assets;
- Carry out bail-in within resolution in order to achieve continuity or essential functions;
- Temporarily put on hold early termination rights that may otherwise be triggered upon as of the moment of resolution;
- Impose a moratorium with a suspension of payments to unsecured creditors;
- Effect the closure and orderly liquidation of the whole or a part of the failing firm.

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On the question of **financing bank resolution** tools, the FSB (2011) concludes that there are three viable scenarios, including:

- i. *Resolution fund (RF)*: costs should be borne by the respective sector as a whole. In this regard, finance arrangements in proportion to the liabilities and risk profile should be set up with the financial institutions. These funds should only be used to facilitate orderly restructuring or failure of an insolvent bank and not to bail it out (e.g., provide loans to bridge institutions, purchase specific assets under resolution or guarantee certain assets or liabilities);
- ii. *Deposit Insurance/guarantee scheme (DIS)*: costs can also be covered by DIS for which the funding is also born by the sector as a whole;
- iii. *DIS-Resolution fund*: the two aforementioned funds/schemes can be combined, taking in consideration all conditions for resolution funds, in terms of funding and responsibilities. In case the DIS would have to meet several claims at the same time, depositors must be protected before other claims can be honored.

## 6.5 Country cases of bank resolution regimes

**Legislative reforms for bank resolution regimes are integral to designing financial stability.** Different international jurisdictions have already implemented requisite reforms. To assess the state of bank resolution regimes, country case study analysis were conducted with regard to Singapore, Hong Kong (HK), Canada, the United Kingdom (UK), and the United States of America (USA). The main results are summarized in the following sections (See Figure 6.4). Furthermore, bank resolution regimes in the Netherlands (NL) and Curaçao and Sint-Maarten (CSM) were analyzed for their scope and functionality (See Annex A for a complete review countries).

In terms of **(1) scope and authority**, the analysis yields the following findings:

- All jurisdictions have specific powers and authority to restructure and/or wind up banks and insurers;
- Some countries (Canada, HK, and Singapore) have no powers for security firms and FMIs (Financial Market Infrastructure), while others (NL, UK, and USA) do;
- The selected countries, with exception of USA, have no powers over FHC (Financial Holding Companies);
- Canada and HK have no lead authority for resolution of entities of the same group, while NL, Singapore, UK and USA do.

In terms of **(2) powers**, the results indicate that controls are assigned to the respective authorities in view of bank resolution regimes. The following specific traits are noted:

- Most countries have the power to replace management and appoint an administrator, establish an AMC (Asset Management Company), transfer assets, impose a temporary stay on early termination rights that

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may otherwise be triggered upon entry of a firm into resolution or in connection with the use of resolution powers. In the case of a SIFI, the termination of large volumes of financial contracts upon entry into resolution could result in a disorderly rush for the exits that creates further market instability and frustrates the implementation of resolution measures aimed at achieving continuity. Should early termination rights nevertheless be exercisable, the resolution authority should have the power to stay temporarily such rights where they arise by reason only of entry into resolution or in connection with the use of resolution powers and provided that the substantive obligations under the contract, including payment and delivery obligations, and provision of collateral, continue to be performed. The stay is strictly limited in time (e.g., for a period not exceeding two business days);

- Some countries have the right to operate and resolve the firm and establish a bridge bank;
- Some countries have the right to exercise their powers without shareholders' consent;
- With the exception of the UK, there are no countries that have the power to enforce a bail-in resolution<sup>17</sup>. The selected countries have no right to require companies in the same group to continue to provide 'essential' services or functions<sup>18</sup>.

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<sup>17</sup> Bail-in involves shareholders of a failing institution being divested of their shares, and creditors of the institution having their claims cancelled or reduced to the extent necessary to restore the institution to financial viability. The shares can then be transferred to affected creditors, as appropriate, to provide compensation. Alternatively, where a suitable purchaser is identified, the shares may be transferred to them, with the creditors instead receiving, where appropriate, compensation in some other form. Bail-in will help to ensure that shareholders and creditors of the failed institution, rather than the taxpayer, meet the costs of the failure. Bail-in will also ensure that the failed institution can continue to operate and provide essential services to its customers, by recapitalizing it so that restructuring measures can then be implemented that address the cause of the failure. This will help to limit disruption to the institution's customers and maintains public confidence in the banking system.

<sup>18</sup> Ensure continuity of essential services and functions by requiring other companies in the same group to continue to provide essential services to the entity in resolution, any successor or an acquiring entity; ensuring that the residual entity in resolution can temporarily provide such services to a successor or an acquiring entity; or procuring necessary services from unaffiliated third parties.

1. Scope	2. Powers	3. Safeguards & Funding	4. International Cooperation
<ul style="list-style-type: none"> <li>• All jurisdictions have specific powers and authority to restructure and/or wind up banks and insurers;</li> <li>• Some countries have no powers for security firms and FMIs (Financial Market Infrastructure);</li> <li>• Most countries have no powers over FHC (Financial Holding Companies);</li> <li>• Select countries have lead authority for resolution of entities of the same group</li> </ul>	<ul style="list-style-type: none"> <li>• Most countries have the power to replace management and appoint an administrator, establish an AMC, transfer assets, impose a temporary stay on early termination rights;</li> <li>• Select countries have the right to operate and resolve the firm and establish a bridge bank;</li> <li>• Some countries have the right to exercise their powers without shareholders' consent;</li> <li>• Most countries do not have the power to enforce a bail-in resolution</li> </ul>	<ul style="list-style-type: none"> <li>• Mechanisms for recovery of public funds from shareholders, participants or creditors of the failed firm, or the wider financial industry, are less well developed.</li> <li>• Most countries have no separate resolution fund;</li> <li>• Select countries have the ability to depart from equal treatment of creditors of the same class;</li> <li>• Select countries have the right to compensate for creditors that suffer greater losses in resolution than in insolvency;</li> </ul>	<ul style="list-style-type: none"> <li>• Select countries have an explicit provision that regulates the cooperation between the domestic and foreign authorities;</li> <li>• Most countries do not have mechanisms for giving effect to foreign resolution actions;</li> <li>• All countries have the ability to share non-public information with foreign resolution authorities.</li> </ul>

Figure 6.4. Summary of country case studies on resolution regimes.

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With respect to **(3) creditor safeguards and funding**, the findings reveal the following main insights:

- Except for UK<sup>19</sup> and USA<sup>20</sup>, mechanisms for recovery of public funds from shareholders, participants or creditors of the failed firm, or the wider financial industry, are less well developed. Nevertheless, several jurisdictions do have facilities for appropriations or levies to recoup on an ex post basis any public funds used in resolution. In addition, conditions on the use of public funds (for example, a requirement that losses should be borne by shareholders and unsecured creditors) are largely absent. Funding arrangements differ greatly across sectors and jurisdictions. Most jurisdictions rely on privately funded protection funds to finance resolution actions, but it is not clear whether such arrangements are adequate or appropriate in terms of scale or scope. Public financial support, therefore, remains an important component of resolution funding arrangements for SIFIs;
- Most of the selected countries have no separate resolution fund;
- Some countries (Canada, UK, and USA) have the ability to depart from equal treatment of creditors of the same class;
- Some countries (Canada, UK, and USA) have the right to compensate for creditors that suffer greater losses in resolution than in insolvency, while others don't (HK, NL and Singapore).

Regarding **(4) cross-border cooperation and information sharing**, analysis yields the following insights:

- Canada, NL, Singapore, and UK have no explicit provision that regulates the cooperation between the domestic and foreign authorities; USA and HK do.
- Most countries (Canada, HK, NL, and UK) have no mechanisms for giving effect to foreign resolution actions.
- All countries have the ability to share non-public information with foreign resolution authorities.

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19 The FSCS is the UK's compensation fund of last resort for customers of authorized financial services firms. They pay compensation if a firm is unable, or likely to be unable, to pay claims against it. This is usually because it has stopped trading or has been declared in default (<http://www.fscs.org.uk/industry/funding/levy-information>).

20 The Federal Deposit Insurance Corporation (FDIC) preserves and promotes public confidence in the U.S. financial system by insuring deposits in banks and thrift institutions for at least \$250,000; by identifying, monitoring and addressing risks to the deposit insurance funds; and by limiting the effect on the economy and the financial system when a bank or thrift institution fails (<https://www.fdic.gov/>).

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**Reviewing the specific case of The Netherlands, the following observations on Dutch resolution regime are noteworthy.** On May 24, 2012, the “Intervention Act” was enacted in the Netherlands. This law gives DNB and the Minister of Finance (MoF) of the Netherlands the power to intervene in the case of financial difficulties at financial institutions. The Intervention Act is aligned with recent actions undertaken to strengthen the set of crisis instruments in several European countries and with announced policy measures by the European Commission (EC) and the Financial Stability Board (FSB).

**The Intervention Act gives DNB and the MoF a number of new powers** (DNB, 2012). These powers may only be exercised once the District Court has agreed to DNB’s judgment that the criterion for intervention have been met. The criterion are (a) clear and present signs of a dangerous development regarding the equity capital, liquidity, solvency or technical provisions of a bank or insurer must be present, and (b) it is reasonably to judge that the adverse development will not be reversed.

The *principal new powers assigned to DNB* include (i) the sale of the problem institution to a private party by transfer of shares; (ii) the transfer of the problem institution to a private party, by using funds from the deposit guarantee scheme; and (iii) the transfer of the problem institution’s assets and/or liabilities to a private party, allowing the split up of the problem institution into a good and a bad bank. Whence no private party is found, there is a possibility to transfer the institution (in whole or in part) to a bridge institution.

The *principal new powers assigned to the MoF* are (i) to intervene in the internal powers of a financial institution, and (ii) to expropriate assets and/or liabilities of or securities issued by a financial institution (only in case of a severe and immediate threat to the stability of the financial system). The Intervention Act also includes a provision called “inoperability of contractual trigger events”. Contractual trigger events are events by which, e.g., the institution’s counterparties decide to terminate contracts or withdraw funds which may lead to a disorderly or unsuccessful resolution and may detract the new powers of DNB and the MoF. As such, by giving the power to ensure that these events are disabled during the period of resolution, the actions taken to effect an orderly resolution of a financial institution is more likely to succeed.

**In the case of Curacao & St Maarten (IMF, 2011)**, the authorities are moving towards setting up an ex-ante funded Deposit Guarantee Scheme (DGS), but progress has been stalled by the discussions on dissolving the currency union. The IMF has urged that efforts be redoubled, and has also recommended that the DGS should be authorized to fund bank resolution operations (by financing the transfer of insured deposit books to assist “purchase and assumption” transactions) if they reduce costs, and enjoy depositor preference. The CBCS also indicated that there are robust understandings with parent banks on the financial support that would be forthcoming for distressed subsidiaries, and clear regimes governing the intervention and liquidation of banks. The CBCS emphasized that clear understandings should also be developed on the roles of the two governments in the event that public bailout is ever contemplated.

## 6.6 Lender of Last Resort

In (classical) LLR theory a country's central bank acts as a 'lender of last resort'. Thereto the central bank protects the bank-created money stock from contraction (and expand it to offset falls in velocity) in the face of bank runs and panics, a duty it performs through pre-announced lending, at a penalty interest rate so as to minimize moral hazard, to creditworthy borrowers offering good collateral. In other words, it refers to the central's banks duty to lend to solvent banks facing massive cash withdrawals when no other source of cash is available. However, traditionally, the LLR has no business bailing out unsound, insolvent banks. Its objective is to stop liquidity crisis. However, it can prevent liquidity crisis from deteriorating into solvency crisis, if the LLR acts swiftly, aggressively, and with sufficient resolve.

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*The LLR can prevent liquidity crisis from deteriorating into solvency crisis, if the LLR acts swiftly, aggressively, and with sufficient resolve*

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### 6.6.1 Principles of LLR

The classical LLR theory is based on several principles<sup>21</sup>. Humphrey (1989) summarizes the main principles as follows:

- i. *Protect the money stock instead of saving individual institutions*: the vital objective is to prevent sharp, sudden short-run shrinkages in the quantity of money, since hardship ensues from these rather than from bank runs or credit crisis.
- ii. *Rescue solvent institutions only* (let insolvent institutions default): the LLR has no duty to bail out unsound banks, no matter how big or interconnected, as such bailouts produce moral hazards and other banks could take excessive risks under the expectation that the LLR will rescue them if their risks turn sour. Nevertheless, its injections of liquidity can help temporarily cash-strapped banks avoid insolvency arising from the necessity of raising cash through sales of assets at fire-sale prices that would render banks insolvent. The LLR does not exist to stop initial shocks, but to block their secondary repercussions. The LLR's function is to engineer massive liquidity injections that prevent failure from spreading to the sound banks of the system.
- iii. *Charge penalty rates*: The LLR should charge an above-market or penalty interest rate for its accommodation. The rate should be high enough to discourage the unnecessary and too frequent recourse to the LLR facility, and overcautious hoarding of scarce cash – yet not as high as to bankrupt sound borrowers. The high rate also appeals to be fair that borrowers pay handsomely for the protection and security offered by the LLR. Also, the higher-than-market rate would give the borrowers an incentive

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<sup>21</sup> The principles were established by two Englishmen in the 19th century, i.e., the monetary theorist, Henry Thornton (1760 – 1815), and the economic historian Walter Bagehot (1826 – 1877), constitute the classical LLR model which is widely acknowledged in modern research and provides a suitable benchmark

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to exhaust all market resources of liquidity and to develop new sources before coming to the LLR such that resort to the latter is truly a last resort

- iv. *Require good collateral:* the LLR must be prepared to lend to all sound but temporarily illiquid borrowers offering good security of any kind. By accepting good collateral, commonly pledged and easily convertible assets deemed safe security in ordinary times, from any source whatsoever, the LLR avoids favoritism and the channeling of aid to privileged borrowers.
- v. *Pre-announce these conditions before a crisis so that the market knows exactly what to expect:* the LLR must not only act promptly, vigorously, and decisively to erase all doubts about its determination to forestall current panics, but must also pre-announce its commitment to lend freely in all future panics. The aforementioned pre-commitment dismisses uncertainty and promotes full confidence in the LLR's willingness to act.

### 6.6.2 The LLR in international perspective

**A variety of institutions may act as a lender of last resort.** The role of the LLR is common to central banks around the world. Nevertheless, central banks operate under different frameworks in conducting their LLR activities. These differences reflect various country-specific factors, such as historical experience, public policy objectives, the structure of the domestic financial system and the payment system, the prudential supervisory framework, and the laws that govern the central bank and various domestic financial institutions.

#### 6.6.2.1 United Kingdom

**In the United Kingdom, the Bank of England (BoE) functions as a lender of last resort.** BoE adhered to the traditional LLR doctrine by lending against high-quality and highly-liquid collateral at a penalty rate to individual illiquid but solvent banks through its Standing Lending Facility (SLF) equivalent to the discount window used in the United States, providing overnight repo transactions at a premium over the Bank Rate against high-quality and high-liquid collateral. In spite of BoE's explicit declaration of its LLR function, it did not respond immediately to the struggle of Northern Rock in 2007 and was unwilling to accept its high-quality mortgages as collateral and facilitate its takeover by Lloyds TSB through guarantee of Northern Rock's deposits. BoE only intervened when Northern Rock experienced a run by retail depositors and faced insolvency issues. In fact, BoE changed its attitude with regard to liquidity support for specific institutions after this bailout and initiated the one-off Special Liquidity Scheme (SLS) in April 2008.

**The BoE created liquidity insurance facilities primarily based on the SLS, including:**

- *Discount Window Facility (in October, 2008),* which operates as a collateral swap facility allowing participants to borrow highly liquid assets (e.g., UK government bonds and UK Treasury Bills) in return for less liquid collateral. This facility is a bilateral facility designed to be able to address short-term liquidity shocks without distorting bank's incentives for prudent liquidity management. It also provides 30-day

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loans, which can be extended up to 364 days for an additional fee, depending on the collateral put forward and the drawing size;

- *Asset Purchase Facility (in January, 2009)* or BoE's version of becoming buyer of last resort in order to improve the liquidity in, and increase the flow of, corporate credit by making purchases of high-quality private sector assets including commercial paper and corporate bonds. The BoE purchases these papers mainly from non-commercial banks, while the commercial banks and broker-dealers act as intermediaries in the process. As a result, the BoE pays for the assets purchased through the creation of reserves<sup>22</sup> by crediting the accounts of the intermediaries, which in turn will credit the accounts of the non-commercial banks from whom they obtained the assets. Hence, it can be concluded that these purchases were financed by the creation of central bank reserves and are regarded as BoE's quantitative easing.
- *Indexed Long-Term Repo Operations (in June, 2010)*, which are monthly and auction-based provisions (spread to Bank Rate) of a fixed amount of central banks reserves at a single maturity against wider collateral, such as gilts and government guaranteed bank debt;
- *Extended Collateral Term Repo Facility (in December, 2011)*, which is a contingent liquidity facility that is activated at BoE's discretion. It provides cash, targets market-wide liquidity, accepts a wider than Long-Term Repo Operations, similar to the Discount Window Facility collateral, and provides auction based 30-day borrowing.

#### 6.6.2.2 United States of America

**In the United States of America, the Federal Reserve (Fed) serves as a lender of last resort.** Its main purpose is to provide credit to depository financial institutions that are short of reserves, prevent their bankruptcy, and avoid negative impact on the economy. As a lender of last resort, the Federal Reserve encourages member banks to borrow funds from the so called 'discount window'. The term refers to loans granted to member banks. The banks may use these loans either to meet reserve requirements or for large withdrawals. The Federal Reserve System was established partly to serve as an LLR for the US banking system, but acts very differently and at least in some ways not in accordance with Bagehot's advice. When traditional monetary policy responses were ineffective and insufficient, the Fed turned to unconventional monetary policy tools in exercising and extending its LLR function. The actions taken and the facilities created by the Fed in exercising and extending its function of LLR during the crisis can be categorized in the following three phases:

- *Phase 1: Short-term liquidity provision*  
During the period of December 2007 to September 2008 when Lehman Brothers defaulted, the Fed used the traditional monetary policy tools, as well as the unconventional measures by injecting short-term liquidity into the banking system and supporting financial markets in general by providing liquidity to other than depository institutions in need.

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<sup>22</sup> Balances held by the Sterling Monetary Framework participants at the BoE which are the commercial banks, building societies, designated investment firms ('broker-dealers') and central counterparties.

- *Phase 2: Credit Easing and Support of Specific Institutions*

As the crisis proceeded, the Fed took on more unprecedented measures during the period of September 2008 till November 2008, such as the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF), the Commercial Paper Funding Facility (CPFF), the Money Market Investor Funding Facility (MMIFF), the Term Assets-Backed Securities Loan Facility (TALF), and the ad hoc credit facility to finance the nationalization of AIG, thereby preventing the collapse of AIG and the whole financial system. The Fed engaged in credit easing and became a market maker of last resort (supporting specific markets and assets prices), completely contradicting Bagehot's LLR criteria.

- *Phase 3: Quantitative Easing*

In this phase (end 2008/beginning 2009 until October 2014), the Fed followed the example of BoE and engaged in a modified version of quantitative easing. Through this quantitative easing, the Fed used its balance sheet to trigger economic recovery because standard monetary policy had become ineffective. The Fed bought assets that the market didn't want, becoming more of a "Buyer" rather than a "Lender" of last resort.

**The contemporary Fed, however, deviates from the classical rules in several ways** (Humphrey, 2013):

- i. *Emphasis on Credit (Loans) as Opposed to Money.* First was the Fed's shift of focus from money to credit. To classical writers, injections of base money to protect the broad money stock from contraction were the essence of LLR operations.
- ii. *Taking Junk Collateral.* The Fed's second departure from the classical model came when it violated to advance only on sound security and instead accepted questionable, hard-to-value collateral.
- iii. *Charging Subsidy Rates instead of Penalty Interest Rates.* Third, the Fed accommodated AIG and other borrowers at below-market or subsidy rates. The Fed's discount rate was even lower than its Funds rate in order to promote borrowing from the discount window.
- iv. *Rescuing Insolvent Firms Too Big and Interconnected to Fail.* Fourth, the Fed ignored the classical admonition never to accommodate unsound borrowers when it bailed out insolvent institutions (e.g., Citigroup and AIG).
- v. *Extension of Loan Repayment Deadlines.* Fifth, the Fed violated maturity constraints that classical analysts placed on LLR loans.
- vi. *No Pre-announced Commitment.* The sixth deviation from the classical principle was the Fed's failure to specify and announce a consistent LLR policy in advance of all future crises so that the market participants could form stabilizing expectations vital to ending crises.

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### 6.6.2.3 The Eurozone

**In the Eurozone**, the discount window is called Standing Facilities, which are used to manage overnight liquidity. The standing facilities are administered in a decentralized manner by the NCBs (national central banks of the Member States whose currency is the euro), such as De Nederlandsche Bank. Standing facilities are aimed at providing and absorbing overnight liquidity, signal the general stance of monetary policy, and bound overnight market interest rates against sufficient collateral.

**Two standing facilities are available to eligible counterparties on their own initiative.** These are subject to their fulfillment of certain operational access conditions:

- a. Counterparties can use the marginal lending facility to obtain overnight liquidity from the NCBs against eligible assets. Under normal circumstances, there are no credit limits or other restrictions on counterparties' access to the facility apart from the requirement to present sufficient underlying assets. The interest rate on the marginal lending facility normally provides a ceiling for the overnight market interest rate;
- b. Counterparties can use the deposit facility to make overnight deposits with the NCBs. Under normal circumstances, there are no deposit limits or other restrictions on counterparties' access to the facility. The interest rate on the deposit facility normally provides a floor for the overnight market interest rate.

**An institution may access the Euro system's standing facilities and open market operations based on standard tenders only through the NCB of the Member State in which it is incorporated.** If an institution has establishments (its head office or branches) in more than one Member State, each establishment has access to these operations through the NCB of the Member State in which it is established, notwithstanding the fact that the bids of an institution may only be submitted by one establishment (either the head office or a designated branch) in each Member State.

**Counterparties for Euro system monetary policy operations must fulfill certain eligibility** which are defined with a view to giving a broad range of institutions access to Euro system monetary policy operations, enhancing equal treatment of institutions across the euro area, and ensuring that counterparties fulfill certain operational and prudential requirements:

- a. Only institutions subject to the Euro system's minimum reserve system according to Article 19.1 of the Statute of the ESCB are eligible to be counterparties. Institutions that are exempt from their obligations under the Euro system's minimum reserve system (see Section 7.2) are not eligible to be counterparties to Euro system standing facilities and open market operations;
- b. Counterparties must be financially sound and should be subject to at least one form of harmonized Union/European Economic Area (EEA) supervision by national authorities. However, sound institutions that are subject to non-harmonized supervision by competent national authorities of a standard comparable to harmonized Union/EEA supervision can also be accepted as counterparties, e.g., branches established in the euro area of institutions incorporated outside the EEA.

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- c. Counterparties must fulfill any operational criteria specified in the relevant contractual or regulatory arrangements applied by the respective NCB (or the ECB), so as to ensure the efficient conduct of Euro system monetary policy operations.

Accepting collaterals that are perceived to be in default, such as government paper issued by Greece or Ireland, significantly battered the ECB's reputation with negative implications for monetary policy effectiveness. Therefore, the ECB has been very cautious in its LLR actions. However, the ECB used other means in its LLR actions, similar to Canada. Liquidity provisioning of banks in the periphery has been conducted via Target2 cross-border transactions (real-time gross settlement system owned and operated by the Euro system). In this case, the ECB acts as an intermediary agent by channeling the excess reserves, which have been accumulated by the liquidity rich-banks of Northern Europe as a result of capital flight from the periphery, back to distressed banks in question. The periphery banks have increasingly relied on the ECB's liquidity transfers and thus, Target2 can also be seen as an example of ECB's LLR actions.

#### *6.6.2.4 Canada*

**Similar to other central banks, one of the functions of the Bank of Canada (BoC) is to act as a LLR.** The BoC has distinct roles as LLR:

- The BoC facilitates the settlement of payments systems by routinely extending collateralized, overnight loans to direct participants in the Large Value Transfer System (LVTS) through the Standing Liquidity Facility (SLF), to cover temporary end-of-day shortfalls in the settlement balances that can arise in the daily settlement of payments in order to facilitate the safe and efficient operation of the payments system;
- For solvent deposit-taking institutions requiring more substantial and prolonged credit, the BoC can provide Emergency Lending Assistance (ELA). ELA is intended to overcome a market failure associated with deposit-taking institutions that have significant share of their liabilities as deposits (fixed-value promises to pay, redeemable at very short notice) and hold assets that are generally highly illiquid (e.g., commercial loans).
- In conditions where the Governor of the BoC is of the opinion that there is a severe and unusual stress on the financial system, the Governor has authority to provide liquidity through outright purchases of a wide variety of securities issued by any Canadian or foreign entities, including non-financial firms for the purpose of promoting the stability of the Canadian financial system.

**The BoC Act requires that lending be secured by collateral pledged by the borrowing institution.** Its policy is to lend only to institutions that are judged to be solvent in order to mitigate moral hazard that can arise from such potential intervention, and to avoid damaging the interests of unsecured creditors. However, the BoC is willing to take a broader range of collateral for ELA than it accepts for credit under the SLF. Under the BoC Act, the BoC is permitted to provide loans with a term to maturity not exceeding six months; the loans can be renewed for further periods up to six months each. The minimum interest rate charged on the LLR support on ELA is the Bank rate; however, the BoC has discretion to charge a higher rate if it sees fit.

### 6.6.2.5 Hong Kong

The Hong Kong Monetary Authority (HKMA) is a government controlled financial institution, which acts as the Central Bank of Hong Kong and serves as the lender of last resort to the banking system. Its objective is to provide some breathing space to an institution facing short-term funding problems to implement corrective measures. The aim is to prevent liquidity from precipitating a situation of insolvency, and to prevent the contagion effect of bank runs. The following *preconditions for the LLR support* apply:

- i. The institution has sufficient margin of solvency;
- ii. The LLR support will be adequately collateralized;
- iii. The institution has sought other reasonably available sources of funding before seeking LLR assistance;
- iv. The shareholder controllers of the institution have made all reasonable efforts to provide liquidity and/or capital support as a demonstration of their own commitment;
- v. There is no prima facie evidence that the management is not fit or proper, or that the liquidity problem is due to fraud, and
- vi. The institution must be prepared to take appropriate remedial action to deal with its liquidity problem.

The basic precondition for providing LLR support is the sole discretion of the HKMA. Because there is no large government debt market in Hong Kong, the range of collateral against which the LLR support would be provided, must necessarily be wider than in some other economies. The three basic instruments that could be used by the HKMA to provide LLR support to a troubled institution are:

- a. Purchase of the institution's placements with other banks, which are acceptable to the HKMA (the purpose would be to assist the institution to turn its existing liquid assets into readily available cash);
- b. Repos of eligible Hong Kong dollar securities, which would consist of:
  - i. Exchange Fund Bills and Notes;
  - ii. Other securities eligible for rediscount at the Discount Window;
  - iii. Other investment grade securities.
- c. Credit facility against the security of the institution's residential mortgage portfolio.

Liquidity support provided by way of repos or availability of a credit facility would be given only on a short-term basis, since the purpose is to grant the institution with a temporary breathing space to sort out its difficulties. The interest rate charged on the LLR support would be at a rate which is sufficient to maintain incentives for good management, but not at a level which would defeat the purpose of the facility i.e., to prevent illiquidity from precipitating insolvency.

## 6.7 Concluding remarks

With regard to the **current resolution regime at the CBA**, the State Ordinance on the Supervision of the Credit System (AB 1988 no. 16) (SOSCS) includes certain provisions that allow intervention by the CBA (e.g., silent trustee and emergency arrangements). However, it is advisable to expand the current intervention possibilities of the CBA, and strengthen the resolution regime by explicating the scope, powers, funding and cooperative mechanisms. In view hereof, several instruments and best practices are available, i.e., the Dutch intervention law, the Core Principles for effective banking supervision, as well as the Supervisory guidelines for identifying and dealing with weak banks.

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*Recommendation VII: It is recommended to strengthen the current resolution regime and expand the intervention possibilities of the CBA in line with international best practices and guidelines.*

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In terms of **the current LLR facilities**, the CBA has an advance facility in place since 1986, but the discount window facility was abolished in April 1, 1999 due to a lack of discountable paper. The Monetary Policy Committee of the CBA regularly publishes the advance rate charges to commercial banks. However, the framework for the advance facility has never been updated. The guidance for the current advance rate (See Annex C), providing the conditions for the CBA's function as LLR is indicated in the draft policy document of 1986 (Advances and rediscounts, April 8, 1986 CBA Office Memorandum), which is the only description available of the CBA's advance facility procedure. Based on the fact that the current CBA's framework for the advance facility has not been updated since 1986, the CBA is currently in the process of update the Lending Facilities and LLR framework.

In order to support financial institutions, in particular the commercial banks, that may experience temporary shortfalls in their liquidity position, the CBA is planning to introduce an *overnight advance facility*<sup>23</sup> by providing collateralized<sup>24</sup> overnight loans to direct participants in the clearing system that experience temporary shortfalls in their settlement balances. This arrangement could contribute to the secure and efficient operation of the clearing system, which is our systemically important payments system.

In line with previous CBA discussions, 'central bank advance and rediscount facility to commercial banks' (CBA Office Memorandum, October 15, 2013), the CBA could consider to *broaden its current advance facility* and implement a short-term advance facility (e.g., between 1 and 7 days) to sound institutions (*primary advance facility*) and an extended lending facility to financial institutions facing more structural liquidity pressures (*secondary advance facility*). The advance lending facilities should be well collateralized and priced in a way to make it unattractive under normal operational conditions in order to avoid the assumption that the CBA will always be willing to provide liquidity support, creating no incentive to manage their liquidity prudently. However, the pricing of these facilities should not stigmatize the facility causing that the commercial banks will not act upon it, even if it is in their interest to do so.

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<sup>23</sup> The suggested overnight advance facility is broadly based on the Bank of Canada Standing Liquidity Facility.

<sup>24</sup> The lending facilities and collateral policies will be tackled by the Lending Facility Framework Workgroup.

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*Recommendation VIII<sup>25</sup>: It is recommended that the CBA review its current advance facility, and subsequently the underlying LLR framework, which should be restricted to depository institutions. In order to support financial institutions experiencing temporary liquidity shortfalls, it is recommended that the CBA introduce an overnight advance facility by providing collateralized overnight loans to direct participants in the clearing system.*

*The CBA could also consider expanding its current advance facility and implement a short-term advance facility to sound institutions (primary advance facility) and an extended lending facility to financial institutions facing more structural liquidity pressures (secondary advance facility).*

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<sup>25</sup> The CBA is currently reviewing and adjusting the LLR framework (January, 2018).



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## CHAPTER 7

### PATHWAYS TO FOSTERING FINANCIAL STABILITY

#### 7.1 INTRODUCTION

**Fostering financial stability has emerged to the fore of contemporary central banking.** It is readily recognized that financial ecosystems are susceptible to the vulnerabilities and volatilities in contemporary economies. Increasingly, this exposure is amplified by the highly interconnected nature of financial institutions and markets, and the real economy. Since the financial crisis and the great recession that followed in its aftermath, policy discussions and studies have focused on identifying these systemic risks and developing appropriate policy responses, i.e., macroprudential regulation and supervision to foster the stability and strengthen the resilience of financial ecosystems. In addressing the latter need for macroprudential policy, this report reviewed three basic questions, i.e.,:

- *What is financial stability and how to design a suitable financial stability framework for the CBA to promote the stability and resilience of the (domestic) financial ecosystem?*
- *Within the context of macroprudential policies for fostering financial stability and mitigating systemic risks, what policy instruments and complementary policies can best be devised and deployed?*
- *What are the suitable institutional arrangements and governance mechanisms for implementing macroprudential policies in fostering financial stability?*

In the remaining sections of this chapter, a synthesis of answers and key lessons are provided (Section 7.2), and specific recommendations are submitted to the Executive Board of the CBA on designing a financial stability framework (Section 7.3.). In concluding, several potential pathways for advancing financial stability are presented (Section 7.4).

#### 7.2 LESSONS LEARNED

**Financial stability is defined as the capability of a financial system to enable and enhance economic processes, notwithstanding shocks and structural disruptions.** Financial stability underscores the ability of financial ecosystems to function smoothly and maintain viability under conditions of stress, i.e., reduce the risks of shocks, withstand and absorb the subsequent effects of disruptions, and recover from financial-economic distresses. A principle focus in designing financial stability, and thereto *macroprudential regulation*, is the manner in which the interconnectedness of financial institutions and markets, common exposures to economic variables, and procyclical behaviors create systemic risk. While monetary and financial authorities have recognized certain macroprudential issues in the past, it is clear that a robust macroprudential regime is necessary in framing and fostering financial stability.

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**Central Banks increasingly have a formalized financial stability mandate for their financial ecosystems.** Based on a comprehensive analysis of select central banks, several strategic developments in the financial stability mandate are discerned. Firstly, central banks increasingly demonstrate an *explicit* financial stability mandate for *the whole financial system*. The majority of central banks express their financial stability objective as *to promote* the stability of the financial system. In terms of governance mechanisms, most central banks have designed a multi-layered organization of intra-institutional and inter-institutional committees, with distinct authorities, responsibilities, and competencies.

**Within the context of formalizing financial stability mandates of central banking, macroprudential policy refers to the use of primarily prudential tools to limit systemic risks and thus foster systemic stability.** Macroprudential policy concentrates on the soundness of the financial system as a whole and focuses on the interactions between financial institutions, markets, infrastructure, and the wider economy. It complements the microprudential focus on the risk position of individual institutions. A fundamental concern of macroprudential policy is that the interconnectedness of financial institutions and markets, and their common exposure to economic variables, may increase the fragility of the financial ecosystem. An effective macro-prudential framework for monitoring systemic risk considers at least three basic elements: (1) total credit growth and macroeconomic drivers of imbalances; (2) financial linkages between the financial sector and domestic households and corporations (the real sector), and between each sector and the rest of the world; and (3) the structure of the financial system and linkages within and across key categories of intermediaries and market infrastructures.

**Macro-prudential regulation requires strong institutional and governance mechanisms to control and coordinate prudential oversight, market intelligence and aggregate (macro-economic) information.** For intervention, several regulatory agencies may have to be involved if measures are imposed across broad classes of financial intermediaries. Central banks should be assigned a leading role in macro-prudential regulation and supervision. Central banks are typically independent from the political process, and they have an established role in market monitoring and participation (including the lender of last resort function). Central banks provide a valuable source of market intelligence, and they already have the analytical resources needed to inform prudential policy with system-wide analysis. Having the central bank in a key role also facilitates monitoring of the interaction between macroprudential and monetary policy interventions, both of which have impacts on financial stability and economic activity, and which need to respond to generally different signals about financial and business cycle developments.

## 7.2 MACROPRUDENTIAL POLICY RECOMMENDATIONS

Based on the synthesis of macroprudential policy studies and the emerging best practices and guidelines for central banking on financial stability, and the subsequent comparative analysis of the Centrale Bank van Aruba, several macroprudential policy recommendations are put forward (See Figure 7.1).

**These recommendations cover the following aspects for designing a comprehensive financial stability framework:**

- i. The ultimate objective of macroprudential policy;
- ii. The macroprudential authority;
- iii. The role of the CBA in macroprudential policy and necessary changes in mandate/powers;

- iv. Governance mechanisms and decision-making arrangements;
- v. The internal organizational arrangements for macroprudential policy within the CBA;
- vi. Toolkit of financial soundness indicators for systemic risk;
- vii. The Lender of Last Resort function by the CBA;
- viii. The CBA resolution regime;
- ix. Staged implementation of financial stability; and
- x. Future studies on financial stability.

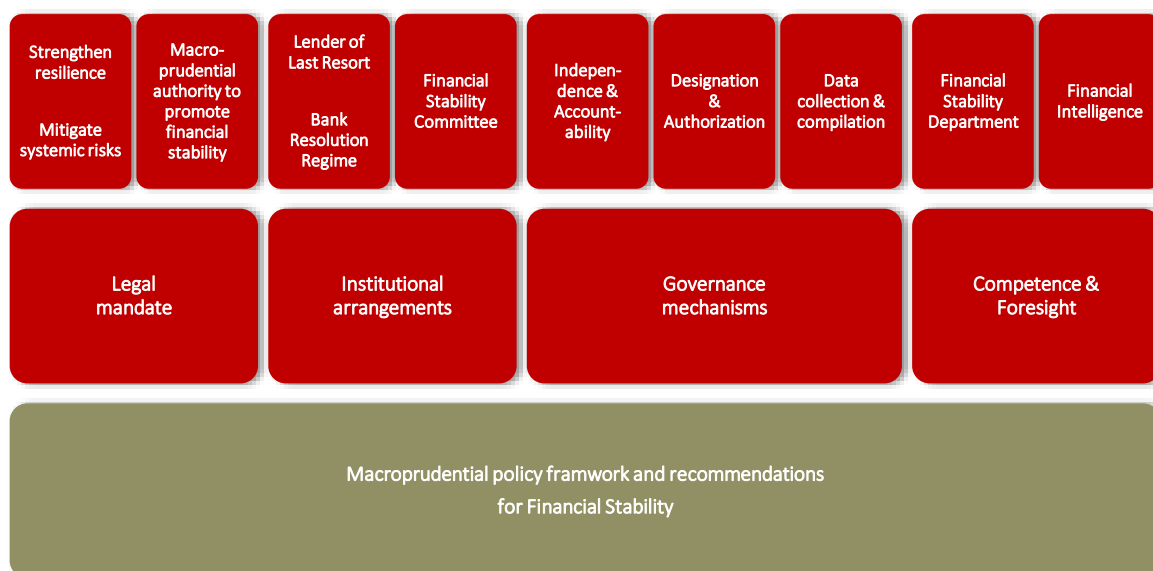


Figure 7.1 Macroprudential policy recommendations

### 7.2.1 The ultimate objective of macroprudential policy

Despite the increasing focus on financial stability, particularly following the global financial crisis, there is no single, widely accepted and used definition of financial stability. The core of the various definitions used in the literature is that financial stability is the ability of the financial system to facilitate and enhance economic processes, manage risks, and absorb risks. As previously discussed, within the delimitations of this report, *financial stability is defined as the capability of a financial system to enable and enhance economic processes, notwithstanding shocks and structural disruptions.*

Macroprudential policy refers to the use of primarily prudential tools to limit systemic risk, focusing on the soundness of the financial system as a whole and the interactions between financial institutions, markets, infrastructure, and the wider economy. It complements the microprudential focus on the risk position of individual institutions, which largely takes the rest of the financial system and the economy as given. Considering the international best practices based on a review of countries (the Netherlands, Curaçao and Sint Maarten, The Bahamas, Barbados, the United Kingdom, Singapore, Hong Kong, and Canada), international standard setting

bodies (including the International Monetary Fund (IMF), the Bank for International Settlements (BIS) and the Financial Stability Board (FSB)), following main objectives of macroprudential policy are proposed for the CBA:

- I. *To strengthen the resilience of the financial system to aggregate systemic shocks;*
- II. *To limit the build-up of financial risks over time and within the financial system.*

### 7.2.2 The macroprudential authority

Macroprudential supervision should be the responsibility of an institution or a policy committee that has a clear macroprudential mandate. In practice, three main models for macroprudential making has emerged. Central banks play a prominent role in all these models. This is because financial instability can have substantial consequences for economic activity, price stability and the monetary policy transmission process. Also, central banks are the ultimate source of liquidity for the economy, and appropriate liquidity provision is crucial to financial stability. Table 7.1 illustrates these models and discusses their applicability to Aruba.

Table 7.1 Models for Macroprudential Authority

Model	Main characteristic(s)	Applicability
1. <i>Board of the central bank</i>	Mostly used when the relevant regulatory and supervisory functions are within the central bank	This model could be applied in Aruba. Note that in Aruba's case the Board should be read as the Executive Committee.
2. <i>Committee within the central bank</i>	Mostly used when the relevant regulatory and supervisory functions are within the central bank. In general, this committee doesn't have the same composition as the Board or the monetary policy committee	This model may be applied in Aruba.
3. <i>Committee outside the central bank</i>	Mostly used when all the relevant regulatory and supervisory functions are not within the central bank. The Ministry of Finance plays a role in this committee.	This model appears not to be suitable in Aruba has two major disadvantages: (i) there is a risk of delayed action due to political pressure and (ii) information of individual systemic financial institutions cannot be shared with the Ministry of Finance. The latter may impede a sound assessment of systemic risks.

In lieu of the aforementioned scenarios, it is proposed to establish a Financial Stability Committee (FSC) within the CBA as the macroprudential authority. This committee would comprise the following executive functions: the President of the CBA and the two Executive Directors. The FSC is the decision making body with regard to macroprudential policy. Regular FSC meetings would involve the active participation and input from General Managers and the following Department Managers: Financial Stability, Research, Prudential Supervision, Statistics, and Operations Departments. In addition, the (senior) policy advisor of the Financial Stability department would be engaged. To keep the Minister of Finance updated on developments relevant for financial stability, it is also proposed to include financial stability as a recurring agenda point in the regular meetings with the Minister of Finance.

### *7.2.3 The role of the CBA in macroprudential policy and changes in its mandate/powers*

**In the case of Aruba, the CBA is, among others, responsible for monetary policy and the supervision of individual financial institutions.** The combination of these responsibilities makes financial stability a natural extension of the CBA's responsibilities, albeit not explicitly stated in the Central Bank Ordinance as a responsibility of the CBA. The fact that the CBA supervises financial institutions is an advantage because it has access to information about these institutions. In addition, financial stability requires macroeconomic expertise as well as financial know-how which are both at hand in the CBA.

**The role of the CBA in macroprudential policy is that of the macroprudential authority.** Currently, the Central Bank Ordinance doesn't include an explicit mandate with regard to financial stability. It only incorporates a mandate concerning microprudential supervision. International standard setting bodies, such as the IMF and the BIS, recommend a strong mandate by setting out in law the primary objective of the macroprudential authority – to safeguard systemic stability.

**Consequently, it is highly recommended to include an explicit mandate with regard to financial stability in the Central Bank Ordinance.** This mandate could be defined as follows: *to promote the stability of the financial system*. This mandate implies that the CBA is not guaranteeing financial stability, but that it fosters and works towards advancing financial stability in Aruba.

### *7.2.4 Governance mechanisms & decision-making arrangements*

**In terms of organizational arrangements, the following decision making authorities and structures should be designed and assured:**

*i. Financial Stability Committee (FSC)*

Within the CBA, a Financial Stability Committee should be installed. This committee will have the authority to decide on tools/instruments to be used and calibration of these tools/instruments. This committee may comprise the following functions: the President of the CBA and the two Executive Directors.

*ii. Independence of the FSC*

The FSC will have the full authority to decide on macroprudential policies. The Minister of Finance will be updated by means of regular informative meetings on relevant developments regarding financial stability.

*iii. Accountability of the FSC/CBA*

Policy decisions will be communicated to the public (i.e., press releases) unless disclosure should be omitted because of potential risks for financial stability. Moreover, Financial Stability Reports will be published on a yearly basis.

*iv. Legal powers:*

With respect to its powers, the CBA should have the following three powers:

- a. *Information collection powers:* The CBA should be given the authority to collect data not only from financial institutions, but all entities that may possess information that is relevant for macroprudential policy, such as the CBS and the 'Departamento di Impuesto'.
- b. *Designation powers:* The CBA should have the power to bring within the scope of its policies all individually systemic institutions. The major advantage is that the CBA is already the microprudential supervisor of all systemic financial institutions.
- c. *Rulemaking and calibration powers:* The CBA should have the power to establish the perimeter of regulation, and activation - as well as calibration - of instruments under its direct control.

### ***7.2.5 The organizational framework of macroprudential policy within the CBA***

In order to execute operational activities with regard to financial stability in an effective and efficient manner, it is recommended to cluster activities in a separate department. Given the fact that macroprudential policy is different from the current tasks of the existing departments, and as outlined in the strategic plan of the CBA 'Bela Yen', a separate department will be designed in charge of macroprudential supervision. This new (Financial Stability) department will ensure dedicated and concerted attention for macroprudential policy and research. Although closely related to micro-prudential policy, it is advisable to differentiate this department from the Supervision departments, as these are in charge with microprudential supervision.

Considering the macro-economic context and macro-financial linkages of financial stability, the Financial Stability department will be housed in the division Economic Policy. This department will be supported by the Statistics Department with respect to the collection of data, in addition to working closely on macro-economic and monetary policy with the Research Department. This department will be in charge of, among others, (i) monitoring and analysis of data/information about the macro-economy and the financial system, (ii) assessing risks, (iii) developing analytical and measurement tools, (iv) providing recommendations to the Executive Board on measures/policies to prevent and/or mitigate systemic risks or on crisis resolution and (v) evaluating the effectiveness of policy actions with regard to risk prevention, risk mitigation and crisis resolution.

### ***7.2.6 Toolkit of financial soundness indicators for system risk***

It is recommended that the CBA design a comprehensive system for measuring and monitoring systemic risks to foster financial stability. Considering the Aruban financial ecosystem with a relatively high degree of concentration on commercial banks, and reflecting on the international experiences and best practices, a macro-prudential toolkit for the CBA should include, in addition to existing policy measures,:

- i. *Liquidity Coverage Ratio (LCR) in order to avoid liquidity difficulties of commercial banks in the near future (to promote short-term resilience);*
- ii. *Net Stable Funding Ratio (NSFR), which is a longer term structural ratio designed to reduce funding risk over a longer time horizon and requires banks to fund their activities with sufficient stable sources of funding;*

- iii. *Loan-to-Value (LTV) ratio and strict loan loss provisions rules on mortgages, which should be monitored continuously, and adjusted when deemed necessary;*
- iv. *Loan-to-Income (LTI) limits;*
- v. *Stringent capital buffers and liquidity of, respectively, 20 percent and 17 percent, which are higher than those imposed by Basel III capital requirement, for the countercyclical capital requirement purposes.*

**Additionally, it is highly recommended to not only implement a macro-prudential toolkit, but also assess the (intended and unintended) effects and effectiveness of foregoing macroprudential measures.** Furthermore, it is recommended to adopt specific indicators for credit growth and property price growth be monitored by the CBA (See Table 7.2). Hereto, measures of credit should be sourced across different sectors, including, credit from non-banks, cross-border credit, and exposures between financial intermediaries. With regard to property price growth, systematic efforts are required to collect and analyze data, including the quarterly assimilation and analysis of housing prices and rental prices from multiple sources covering real estate companies, notary offices and the tax department. It is recommended to use the FSI list as a starting point for monitoring systemic risk in Aruba. Hereto, the identified FSI gaps should be addressed in moving forward with developing the requisite financial intelligence for macroprudential policy. This list should be expanded to reflect risks that are emic to Aruba's environment.

*Table 7.2 Recommendations for improving systemic risk measurement.*

Proposed indicators of systemic risk at the CBA
<ul style="list-style-type: none"> <li>• Monitor the deviation in credit growth from its trend.</li> </ul>
<ul style="list-style-type: none"> <li>• Monitor the deviation of the growth of property prices from its trend.</li> </ul>
<ul style="list-style-type: none"> <li>• Monitor the deviation of the residential property price/rent ratio from its trend.</li> </ul>
<ul style="list-style-type: none"> <li>• Use broad measures of credit (including credit from non-banks, cross-border credit, and exposures between financial intermediaries).</li> </ul>
<ul style="list-style-type: none"> <li>• Improve available data on property and rent prices through surveys at real estate companies, notary offices and the tax department.</li> </ul>
<ul style="list-style-type: none"> <li>• Expand FSI list to reflect risks inherent to Aruba's environment, such as tourism dependency and vulnerability to shocks.</li> </ul>
<ul style="list-style-type: none"> <li>• Combine the credit growth indicator with other indicators such as loan to value, debt-service to income ratios, and the increase in exposure of households and businesses to interest rates and currency risks.</li> </ul>
<ul style="list-style-type: none"> <li>• Take into consideration changes in lending standards, reflected through lending margins and increases in household and corporate leverage.</li> </ul>
<ul style="list-style-type: none"> <li>• Inquire with the commercial banks if data such as debt-service to income, loan to value and interest rate exposure can be obtained in a timely manner on a high frequency.</li> </ul>
<ul style="list-style-type: none"> <li>• Monitor indicators on a regular basis in shadow banking and the non-financial sector.</li> </ul>
<ul style="list-style-type: none"> <li>• Supplement quantitative indicators with qualitative information and intelligence gathered through regular contact with market participants.</li> </ul>
<ul style="list-style-type: none"> <li>• Monitor concentration risk within the system by looking at metrics for market or institutional concentration of activity in important areas such as credit provision and interbank payment systems.</li> </ul>
<ul style="list-style-type: none"> <li>• Stress test the system as a whole to assess its resiliency.</li> </ul>

### 7.2.7 The CBA should primarily act as a Lender of Last Resort (LLR) for the commercial banks

In developing a comprehensive framework for financial stability, two complementary policies/functions are recommended, i.e., (i) the lender of last resort (LLR) function of central banks and (ii) the bank resolution regimes. Both the LLR function and bank resolution regimes are financial stability safety nets. Hereto, the following recommendations are submitted. The traditional LLR principles entail that central banks should (1) lend freely to (ii) solvent banks which are illiquid, (iii) against good collateral, and (iii) at a penalty rate. During the recent financial crisis, the largest central banks deviated from these principles (e.g., bailouts of nonbanks) and resorted to innovative tools such as quantitative easing. Despite these developments, *it is proposed to restrict the access to the LLR facilities of the CBA to the commercial banks, considering their importance for financial stability.* According to the theory, the LLR facilities should be accessible to only solvent banks. However, it is recommended that all domestically systemic important banks (D-SIBs) facing serious liquidity pressures should be given access to the LLR facilities given their impact on the economy.

The following facilities should be part of the Lender of Last Resort (LLR) function of the CBA:

- a. Overnight lending facility.
- b. Primary advance facility: short-term advance facility (e.g. >1 to 7 days) for solvent but illiquid institutions.
- c. Secondary advance facility: An extended facility to solvent institutions facing more structural liquidity pressures.

The details of the LLR facilities should be outlined by the Lending Facility Committee.

### 7.2.8 The bank resolution regime

Resolution refers to the restructuring of a failing institution to ensure the continuity of its essential functions, while preserving financial stability and restoring the viability of all or part of that institution. The State Ordinance on the Supervision of the Credit System includes certain provisions which allow intervention by the CBA (e.g., silent trustee and emergency arrangements). However, it is *highly recommended to expand the current intervention possibilities of the CBA.* Currently, a technical working group is designing a comprehensive bank resolution regime for Aruba, which is aligned to the international standards and best practices in this area.

### 7.2.9 Staged implementation of financial stability

In designing financial stability and implementing the aforementioned recommendations, it is prudent to adopt a staged approach in building requisite conditions and capabilities. As outlined in previous chapters and discussions on implementing macroprudential regulation at central banks, financial stability is multi-dimensional, multi-faceted and multi-level. Its intricate complexity requires a phasing in of conditions and capabilities to realize its overall aim and purpose. Subsequently, *it is recommended to implement macroprudential regulation in a three-staged process* (See Figure 7.2), starting with (i) the expansion of the legal foundations and mandate, including the formalization as a macroprudential authority to promote financial stability, and subsequently, (ii) the institutionalization of requisite governance arrangements and decision-making procedures, covering the implementation of the Financial Stability Committee (FSC) and the establishment of the Financial Stability Department (FSD). The foregoing conditions are essential in executing and operationalizing the mandate for financial stability, i.e., the strengthening of systemic resilience and mitigation of systemic risk in the Aruban

financial ecosystem. Hereto, financial intelligence and competence to develop foresight (in mitigating systemic risk) are pivotal in the final stage of implementation.

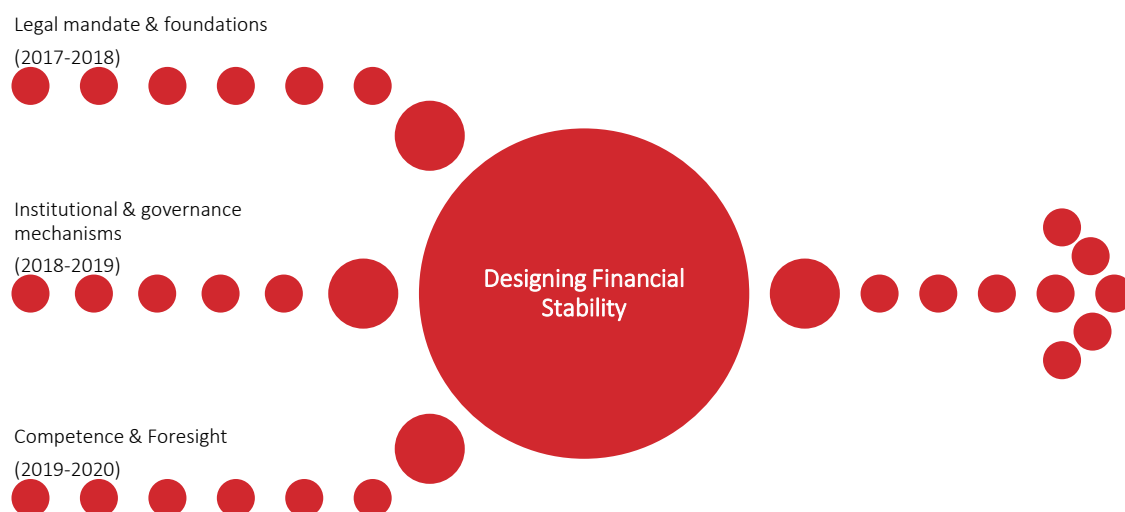
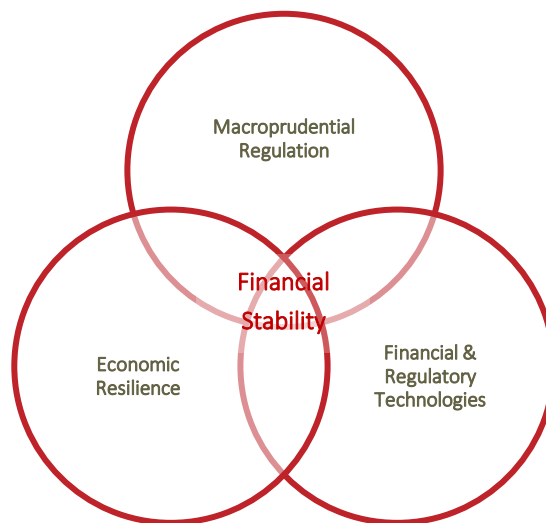


Figure 7.2 Pathways to Financial Stability.

#### 7.2.10 Future studies on financial stability

To build the requisite (knowledge) capabilities for fostering financial stability it is recommended to establish and conduct regular scientific and market studies for developing evidence-based macroprudential policies and fortifying macroprudential regulation. Future avenues for research include, but are not limited to (i) the interdependency and coordination of macro-economic, monetary and macroprudential policies; (ii) the interrelationships between financial stability and economic resilience in small island states; and (iii) the impact of financial technologies on financial stability (See Figure 7.2). While the former is a relatively long-standing debate in macro-economic research (Blanchard et al., 2015), its dynamics in small island economies with a fixed-exchange rate is less well understood. Likewise, the interrelationships between financial stability and economic resilience remain relatively unexamined (in scientific literature) and challenging (in economic policy development), especially in the case of the Caribbean and small island developing states (Commonwealth, 2016). The proposed Center for Financial Stability & Economic Resilience (CBA, 2016) would provide the preferred (regional) platform for policy research and development.

The impact of financial technologies on financial stability, although disputed in terms of systemic risk and resilience, is readily acknowledge. With respect to the latter research domain on the impact and interaction financial technologies and financial stability, (empirical) studies remain scant despite forthcoming policy discussion by the IMF (2017) and FSB (2017). While beyond the scope of this (first) Financial Stability report, it is a truism that financial technologies, including regulatory technologies, are shaping the financial ecosystem at an increasingly rapid and disruptive pace. The implications for financial stability and macroprudential are, however, less well understood (IMF, 2017).



*Figure 7.2 Future avenues and interdependent domains for research on financial stability.*

**As financial technologies and new financial intermediaries affect financial services (e.g., investments, credit, funding, payments), macroprudential regulation must adapt to remain effective.** With the evolution of financial services and market structures, regulation will need to complement its focus on entities with increasing attention to activities and the financial ecosystem (IMF, 2017). Thus, neither financial technology nor financial stability are exogenous (FSB, 2017). Macroprudential regimes may indeed need to be redesigned to bring new ‘challenger banks’ and digital service providers within the regulatory perimeter where suitable (FSB, 2017). More fundamentally, the ‘unbundling’ and migration of services from (traditional) intermediaries to (emerging digital) platforms (e.g., open banking, PSD2, API) may require authorities to also focus on activity-based regulation (e.g., PSD2).

**Financial stability is evolutionary, ever adapting and growing towards strengthening the financial ecosystem.** In summary, and in reflecting on the Odyssey by Homer, although ten years have transpired since the global financial crisis, and great strides have been made to foster financial stability and fortify macroprudential policies, much work remains undone. More than a fixed destination, financial stability engenders a prudent balancing act of efficiency and flexibility in an ongoing endeavor to foster and build resilience for the future.

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## ANNEX A – CASE STUDIES OF RESOLUTION REGIMES

Table A.1 Comparative analysis of resolution regimes across international jurisdictions.

Jurisdiction	Scope and authority	Powers for banks	Creditor safeguards and funding	Cross-border cooperation and information sharing
Canada	<ul style="list-style-type: none"> <li>Specific powers to restructure and/or wind up banks and insurers, but not for securities firms or FMIs<sup>26</sup></li> <li>No powers over FHCs<sup>27</sup> or significant non-regulated group entities</li> <li>Multiple authorities (CDIC: banks, OSFI/Assuris: no designated resolution authorities)</li> <li>No lead authority for resolution of entities of the same group</li> </ul>	<ul style="list-style-type: none"> <li>Powers to: <ul style="list-style-type: none"> <li>replace firm management</li> <li>appoint an administrator</li> <li>operate and resolve the firm</li> <li>transfer assets and liabilities in a temporary bridge institution</li> </ul> </li> <li>establish AMC<sup>28</sup></li> <li>impose temporary stay on early termination rights</li> <li>effect closure/liquidation</li> <li>Powers exercisable without shareholder or creditor consent</li> <li>No power to: <ul style="list-style-type: none"> <li>Require companies in same group to provide services</li> <li>Bail-in</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Ability to depart from equal treatment of creditors of the same class</li> <li>Right to compensation for creditors that suffer greater losses in resolution than in insolvency</li> <li>No separate resolution fund</li> <li>Privately funded protection fund for banks, insurers and securities firms</li> <li>No mechanism for recovery of public funds (2)</li> </ul>	<ul style="list-style-type: none"> <li>Implicit policy to encourage cross-border cooperation</li> <li>No differential treatment by location of claim</li> <li>No mechanisms for giving effect to foreign resolution actions (requires court order)</li> <li>Ability to share non-public information with foreign resolution authorities (except for Bank of Canada in the case of FMIs)</li> </ul>
HK	<ul style="list-style-type: none"> <li>Specific powers to restructure and/or wind up banks and insurers (through appointed manager), but not for securities firms or FMIs (1)</li> <li>No powers over FHCs</li> <li>No powers over non-regulated group entities</li> <li>Multiple authorities (HKMA: banks; IA: insurers)</li> <li>No lead authority for resolution of entities of the same group</li> </ul>	<ul style="list-style-type: none"> <li>Powers to: <ul style="list-style-type: none"> <li>remove, but not appoint, senior management</li> <li>appoint an administrator</li> <li>operate bank through appointment of manager (no direct power)</li> <li>transfer assets</li> <li>establish AMC</li> </ul> </li> <li>Missing powers: <ul style="list-style-type: none"> <li>transfer liabilities</li> <li>bridge bank</li> <li>bail-in</li> <li>Impose temporary stay on early termination rights</li> <li>Require group companies to provide services</li> </ul> </li> <li>Regime does not provide for exercise of powers without shareholder consent</li> </ul>	<ul style="list-style-type: none"> <li>No power to depart from equal treatment of creditors of the same class</li> <li>No right to compensation where creditor is worse off than in liquidation</li> <li>No separate resolution fund</li> <li>Privately funded protection fund for deposits, certain statutory insurance policies, and specified securities or futures contracts</li> <li>Temporary public ownership is not possible as part of resolution action</li> <li>No mechanism for recovery of public funds (2)</li> </ul>	<ul style="list-style-type: none"> <li>Legal provision to require cooperation with both domestic and foreign authorities</li> <li>No mechanisms for giving effect to foreign resolution actions</li> <li>Authorities able to share non-public information with foreign resolution authorities (subject to certain preconditions)</li> </ul>
NL	<ul style="list-style-type: none"> <li>Specific powers to restructure and wind up banks and insurers, and</li> </ul>	<ul style="list-style-type: none"> <li>Powers available: <ul style="list-style-type: none"> <li>Remove and appoint senior management</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>No power to depart from equal treatment of creditors of the same class</li> </ul>	<ul style="list-style-type: none"> <li>No explicit legal provision to encourage cross-border</li> </ul>

<sup>26</sup> Financial Market Infrastructure

<sup>27</sup> Financial Holding Company

<sup>28</sup> Asset Management Company

	<p>investments firms and FMIs legally defined as “financial undertakings” (1)</p> <ul style="list-style-type: none"> <li>• DNB has no powers over FHCs (powers limited to holding companies that are banks) but MoF<sup>29</sup> has such powers</li> <li>• No powers over non-regulated group entities</li> <li>• Multiple authorities (DNB and MoF)</li> <li>• MoF lead authority where stability of the financial system is at risk. Otherwise, DNB is the lead authority (but requires consent of MoF for a transfer of ownership of the bank in resolution)</li> </ul>	<ul style="list-style-type: none"> <li>- Appoint ‘silent’ administrator</li> <li>- Transfer A &amp; L and ownership</li> <li>- Establish and operate bridge bank</li> <li>- Transfer assets to AMC</li> <li>• Powers exercisable without shareholder consent</li> <li>• Missing powers: <ul style="list-style-type: none"> <li>- Power to require group companies to provide services</li> <li>- Operate a firm (except via bridge bank)</li> <li>- Bail-in within resolution</li> <li>- Impose temporary stay on early termination rights</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• No right to compensation where creditor is worse off than in liquidation (because transfer not permitted in those circumstances)</li> <li>• No separate resolution fund</li> <li>• Privately funded protection fund for banks</li> <li>• No mechanism for recovery of public funds (2)</li> </ul>	<p>cooperation (other than within EU)</p> <ul style="list-style-type: none"> <li>• No mechanisms for giving effect to foreign resolution actions</li> <li>• Powers to share non-public information with foreign (non-EEA<sup>30</sup>) resolution authorities (with the exception of finance ministries) in emergency situations, subject to confidentiality arrangements of receiving authority. Powers more restricted when not an emergency.</li> </ul>
Singapore	<ul style="list-style-type: none"> <li>• Specific powers to restructure and/or wind up banks and insurers, but not for securities firms or FMIs (1)</li> <li>• No powers over FHCs</li> <li>• No powers over non-regulated group entities</li> <li>• Single authority (MAS)</li> </ul>	<ul style="list-style-type: none"> <li>• Powers available: <ul style="list-style-type: none"> <li>- Remove and replace senior management</li> <li>- Appoint (and give binding directions to) administrator</li> <li>- Operate and resolve firm (either directly or through statutory manager)</li> <li>- Require regulated group companies to provide services</li> <li>- Transfer A &amp; L</li> <li>- Establish and operate a bridge institution</li> <li>- Transfer assets to an AMC</li> <li>- Effect closure and liquidation (through application to court)</li> </ul> </li> <li>• Powers exercisable without shareholder consent</li> <li>• Missing powers: <ul style="list-style-type: none"> <li>- Bail-in within resolution</li> <li>- Require non-regulated group companies to provide services</li> <li>- Impose temporary stay on early termination rights</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• No power to depart from equal treatment of creditors of the same class</li> <li>• No formal right to compensation where creditor worse off as than in liquidation</li> <li>• Privately funded protection fund for insurers</li> <li>• No mechanism for recovery of public funds (2)</li> </ul>	<ul style="list-style-type: none"> <li>• No explicit legal provision to encourage cross-border cooperation (but MAS cooperates as a matter of policy)</li> <li>• MAS has power to give due consideration to support or implement to foreign resolution actions taking into account the financial stability and other interests in Singapore</li> <li>• MAS able to share non-public information with foreign resolution authorities</li> </ul>
UK	<ul style="list-style-type: none"> <li>• Specific powers to restructure and/or wind up</li> </ul>	<ul style="list-style-type: none"> <li>• Powers available:</li> </ul>	<ul style="list-style-type: none"> <li>• Departure from equal treatment of creditors of</li> </ul>	<ul style="list-style-type: none"> <li>• No explicit legal provision to encourage cross-border</li> </ul>

<sup>29</sup> Ministry of Finance

<sup>30</sup> European Economic Area

	banks, insurers (but limited to wind-up), investment firms and Central Counterparties (CCPs) (1) (3) <ul style="list-style-type: none"> <li>• Powers over FHCs (3)</li> <li>• Continuity provisions in relation to non-regulated group entities (in a resolution)</li> <li>• Multiple authorities (BoE and HMT, but HMT's powers are limited to cases that involve temporary public ownership)</li> <li>• Lead authority for resolution of entities of the same group (HMT for temporary public ownership, BoE in other cases)</li> </ul>	<ul style="list-style-type: none"> <li>- Remove and replace senior management</li> <li>- Appointment of administrator (through application to court)</li> <li>- Operate/resolve the firm</li> <li>- Require group companies to provide services</li> <li>- Transfer A &amp; L to bridge bank or purchaser</li> <li>- Establish and operate a bridge institution</li> <li>- Effect closure and liquidation (through application to court)</li> <li>• Powers exercisable without shareholder consent</li> <li>• Missing powers:             <ul style="list-style-type: none"> <li>- Establish AMC</li> <li>- Impose temporary stay on early termination rights</li> </ul> </li> </ul>	the same class possible (where necessary for purposes of resolution objectives) <ul style="list-style-type: none"> <li>• Right to compensation where creditor worse off as a result of partial property transfer than in liquidation</li> <li>• No separate resolution fund</li> <li>• Privately funded protection fund for deposits, insurers and investment firms</li> <li>• Mechanism for recovery of public funds: industry levies by compensation scheme (FSCS- see footnote 15 of this memorandum)</li> </ul>	cooperation (but encouraged as a matter of policy) <ul style="list-style-type: none"> <li>• No mechanisms for giving effect to foreign resolution actions (requires court order)</li> <li>• UK authorities able to share non-public information with foreign resolution authorities</li> </ul>
USA	<ul style="list-style-type: none"> <li>• Specific powers to restructure and/or wind up banks, insurers, securities firms and FMIIs (1)</li> <li>• Powers over systemically important FHCs and non-regulated group entities</li> <li>• Single authority (FDIC for all systemically significant non-bank FIs that at the time of failure meet the requirements of section 203 of the Dodd-Frank Act)</li> </ul>	<ul style="list-style-type: none"> <li>• Powers available:             <ul style="list-style-type: none"> <li>- Operate a firm</li> <li>- Require continued essential services</li> <li>- Override shareholder rights where FDIC has jurisdiction</li> <li>- Transfer A &amp; L</li> <li>- Establish a bridge institution</li> <li>- Establish an AMC</li> <li>- Impose a moratorium</li> <li>- Impose temporary stay on early termination rights</li> <li>- Bail-in within resolution (4)</li> </ul> </li> <li>• Powers exercisable without shareholder or creditor consent</li> </ul>	<ul style="list-style-type: none"> <li>• Authority to depart from equal treatment of creditors of the same class</li> <li>• Safeguards for creditors with greater losses than in liquidation</li> <li>• Privately funded resolution fund</li> <li>• Privately funded protection funds for banks, insurers and securities firms</li> <li>• Temporary public ownership is not possible as part of resolution action</li> <li>• Mechanism for recovery of public funds spent in resolution (FDI – see footnote 16 of this memorandum).</li> </ul>	<ul style="list-style-type: none"> <li>• Resolution authority must work with foreign authorities when possible</li> <li>• Mechanisms exist for giving effect to foreign resolution actions</li> <li>• Possible differential treatment of creditors by location</li> <li>• Central bank, supervisors, and resolution authorities can share information with foreign counterparts</li> </ul>

(1) Refers to powers to restructure and/or wind up failing financial institutions that are distinct from the ordinary corporate insolvency process.

(2) This does not include recovery of public funding used in resolution from the proceeds of the sale of the firm or a bridge institution, or as a claim in the liquidation of the failed firm. Similarly, it does not include recovery of amounts used from protection funds through premiums.

(3) The provisions of the Financial Services Act extending the resolution regime to investment firms, clearinghouses and related group companies (including those of banks) in the UK will take effect once the secondary legislation has been finalized.

(4) Although not set forth in a single statutory provision, the write-down of debt and conversion to equity in the USA can be achieved through a combination of powers.



## ANNEX B – FINANCIAL SOUNDNESS INDICATORS APPLIED BY THE CENTRALE BANK VAN ARUBA

FSI Code	Core FSIs for Deposit Takers	Covered by CBA
I01	Regulatory Capital to risk-weighted assets	yes
I02	Regulatory Tier 1 Capital to risk-weighted assets	yes
I03 (NEW)	Common equity Tier 1 to risk-weighted assets	no
I04	Capital to assets	yes
I05	Non-performing loans net of provisions to capital	yes
I06	Non-performing loans to total gross loans	yes
I07 (NEW)	Provisions to non-performing loans	yes
I08	Sectoral distribution of loans to total loans	yes
I09	Return on Assets	yes
I10	Return on Equity	yes
I11	Interest margin to gross income	yes
I12	Noninterest expenses to gross income	yes
I13	Liquid assets to total assets	yes
I14	Liquid assets to short-term liabilities (to be replaced by LCR)	yes
I15 (NEW)	Available amount of stable funding to required amount of stable funding (Net stable funding ratio)	no
I16	Net open position in foreign exchange to capital	yes
	Core FSIs for Real Estate Markets	Covered by CBA
I17	Residential real estate prices (Percentage change/ last 12 months)	yes

FSI Code	Additional FSIs for Deposits Takers	Covered by CBA
<b>I18</b>	Large exposures to capital	yes
<b>I19</b>	Geographical distribution of loans to total loans	yes
<b>I20</b>	Gross asset position in financial derivatives to capital	no
<b>I21</b>	Gross liability position in financial derivatives to capital	no
<b>I22</b>	Trading income to total income	no
<b>I23</b>	Personnel expenses to noninterest expenses	yes
<b>I24</b>	Spread between reference lending and deposit rates (base points)	yes
<b>I25</b>	Spread between highest and lowest interbank rates (base points)	no
<b>I26</b>	Customer deposits to total (non-interbank) loans	yes
<b>I27</b>	Foreign-currency-denominated loans to total loans	yes
<b>I28</b>	Foreign-currency-denominated liabilities to total liabilities	yes
<b>I29 (NEW)</b>	Credit growth to private sector	yes
	<b>Additional FSIs for Other Financial Corporations (OFCs)</b>	<b>Covered by CBA</b>
<b>I30 (NEW)</b>	OFC assets (Percent of total financial system assets)	yes
	- MMF assets	no
	- IC assets	yes
	- PF assets	yes
	- Other OFC assets	yes
<b>I31 (NEW)</b>	OFC assets (percent of GDP)	yes
	- MMF assets	no
	- IC assets	yes
	- PF assets	yes
	- Other OFC assets	yes

FSI Code	Additional FSIs for Money Market Funds (MMFs)	Covered by CBA
<b>I32 (NEW)</b>	Sectoral distribution of investments (percent of total investments)	no
	- Central Bank	
	- Deposit Takers	
	- other financial corporations	
	- General government	
	- Nonfinancial corporations	
	- Nonresidents	
<b>I33 (NEW)</b>	Maturity distribution of investments (percent of total investments)	no
	- 1-30 days	
	- 31-90 days	
	- >90 days	
	Additional FSIs for Insurance Corporations (ICs)	
<b>I34 (NEW)</b>	Shareholder equity to invested assets	yes
<b>I35 (NEW)</b>	Total premium income minus premium ceded by primary insurers to total premium income	yes
<b>I36 (NEW)</b>	Return on assets	yes
<b>I37 (NEW)</b>	Return on equity	yes
	Additional FSIs for Pension Funds (PFs)	
<b>I38 (NEW)</b>	Liquid assets to estimated pension payments in the next year	no
<b>I39 (NEW)</b>	Return on assets	yes
	Additional FSIs for Non-financial Corporations (NFCs)	
<b>I40</b>	Total debt to equity	no
	- external debt to equity	
	- foreign currency debt to equity	
<b>I41 (NEW)</b>	Return on assets	no
<b>I42</b>	Return on equity	no
<b>I43</b>	Earnings to interest and principal expenses	no
<b>I44 (NEW)</b>	Earnings to interest expenses	no
<b>I45 (NEW)</b>	Liquid assets to total assets	no
<b>I46 (NEW)</b>	NFC debt to GDP	yes

Additional FSIs for Households (HHs)		Covered by CBA
I47	Household debt to GDP	yes
I48	Household debt service and principal payments to income	no
I49 (NEW)	Household debt to household disposable income	no
Additional FSIs for Real Estate Markets		
I50	Commercial real estate prices (Percentage change/last 12 months)	no
I51	Residential real estate loans to total gross loans	yes
I52	Commercial real estate loans to total gross loans	yes

## **ANNEX C - CENTRAL BANK ADVANCE AND REDISCOUNT FACILITY TO COMMERCIAL BANKS**

Referring to the CBA Memorandum of the Research Department entitled: Central bank advance and rediscount facility to commercial banks, October 15, 2013, the CBA has the following procedures in place, based on the CBA Office Memorandum: Advances and rediscounts, April 8, 1986.

Here in the following procedures are described:

1. The CBA may at its discretion decide, upon application made to it, either
  - (1) To rediscount eligible paper under Article 13 (a) of the Central Bank Ordinance (CBO), or
  - (2) To grant a secured advance under Article 13 (f) of that Ordinance.<sup>31</sup>(It should be noted that under Article 16 of the CBO, the CBA may not grant an advance that is not secured except as provided in Article 15).
2. For the time being any transaction under paragraph 1 above shall normally be confined to a transaction with a commercial bank in Aruba.
3. The CBA shall announce, by notification in writing to the banks and otherwise, its current rediscount rate and its current interest rate for secured advances.
4. The CBA shall determine what paper is eligible for rediscount or is eligible as security, subject to the provisions of Article 13 of the CBO.
5. For the time being a bank may pledge to the CBA as security or collateral for an advance under Article 13 (f) of the CBO a time deposit with a fixed term held by it with CBA. Any other form of collateral offered shall be equivalent in total market value to at least 110% of the advance required.
6. The CBA shall determine the market value of the collateral offered in each case.
7. The term of the advance shall be for a period of at least seven (7) days. It shall not normally exceed a period of thirty (30) days. In any event it shall not exceed the period of maturity of the item of collateral with the shorted maturity.

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<sup>31</sup> In the original version of this Memorandum this point mentions "Article 13 (b)" of the CBO, upon review by the Legal Department of the CBA this was corrected to read "Article 13 (f)".

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8. Any application for a rediscount operation or an advance shall be made to the CBA in writing, stating the amount and terms of the advance required and given details of the paper to be rediscounted or the collateral to be pledged, as the case may be.
  9. Before making a decision on the application, the CBA may require further information, and it may make its decision to rediscount eligible paper or grant a secured advance conditional on actions or undertakings by the applicant bank.
  10. The CBA may decide to accept for rediscount only part of the paper offered.
  11. The CBA may decide to grant an advance of a smaller amount or of a shorter term (or both) than those requested.
  12. The CBA's decision shall be notified to the applicant bank in writing.
  13. The proceeds of any paper rediscounted or the amount of any advance granted shall be credited in full to the current account of the bank concerned as soon as possible after the paper to be rediscounted or the collateral has been delivered to and checked by the CBA.
  14. Shortly before the due date of paper rediscounted the CBA shall present the paper to the bank from which it was acquired; and that bank shall be responsible for ensuring that payment is made to the CBA in full on the due date.

On the due date of any advance the amount to be repaid, together with interest, shall be debited to the borrowing bank's current account with the CBA, and the relative collateral shall be released.

