



IMF-FSB-BIS Elements of Effective Macroprudential Policies

Lessons from International Experience

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Lessons from International Experience

Experience with macroprudential policy is growing. A large number of countries have put in place dedicated institutional arrangements. Progress is being made also with the design and implementation of macroprudential tools, and an increasing body of empirical research is available that evaluates the effectiveness of macroprudential policy.

Responding to an existing G20 mandate¹, this joint work takes stock of the experiences gained so far regarding elements and practices that can be useful for effective macroprudential policy making. It builds on the 2011 joint progress report to the G20 on macroprudential policy tools and frameworks ([FSB/IMF/BIS 2011](#)) and other IMF², FSB³ and BIS⁴ documents, taking into account more recent country and international institutions' experience as well as empirical evidence from academic and other studies.

While macroprudential policy tools have been in use in a number of emerging market economies well before the global financial crisis, their broader use is more recent and the establishment of dedicated macroprudential policy frameworks has often been prompted by the crisis experience. Accordingly, the experience gained in many countries does not yet span a full financial cycle, and lessons and empirical evidence based on that experience remain tentative. The wide range of institutional arrangements and policies being adopted across countries suggests that there is no “one-size-fits-all” approach. Nonetheless, accumulated experience highlights – and this paper documents – a number of elements that have been found useful for macroprudential policy making.

The remainder of this document is structured as follows. Section I discusses the definition, objectives, and scope of macroprudential policy. Section II covers institutional arrangements, including mandates and governance, powers, and arrangements for domestic cooperation.

¹ The Seoul Summit in 2010 called on the FSB, IMF, and the BIS “to work on macroprudential tools” and looked forward to “a joint report elaborating on the progress achieved in identification of best practices, which will be the basis for establishing in the future international principles or guidelines on the design and implementation of the frameworks.” The G20 Finance Ministers and Central Bank Governors, at their February 2016 meeting, welcomed “the planned work by the FSB, IMF and BIS to take stock of experiences and potential lessons with macro-prudential frameworks and tools, and report back to us by our meeting in July.”

² In addition to the 2013 “[Key Aspects of Macroprudential Policy](#)”, there is the 2014 “[Staff Guidance Note on Macroprudential Policy](#)”, which elaborates on the principles set out in the “Key aspects” document. It also offers “[Detailed Guidance on Instruments](#)” and “[Considerations for Low Income Countries](#)”. Based on these, advice on macroprudential policies and frameworks is being provided by the IMF in the context of the *Financial Sector Assessment Program* (FSAP), and regular Article IV consultations with IMF members.

³ See, for example, the [peer reviews](#) of China (2014), Germany (2013), India (2016), the Netherlands (2014), Russia (2014), Saudi Arabia (2015), Turkey (2015), the UK (2013), and the US (2013). See also the responses of FSB jurisdictions on [establishing a regulatory framework for macroprudential oversight](#) and on [enhancing system-wide monitoring and the use of macroprudential instruments](#) in the 2015 FSB IMN survey.

⁴ This includes the seminal contributions by [Crockett 2000](#), [Borio 2003](#) and [Knight 2006](#), subsequent BIS research on various technical aspects of macroprudential policy, the Committee on the Global Financial System (CGFS) reports on “[Macroprudential instruments and frameworks: A stocktaking of issues and experiences](#)” of 2010, “[Operationalising the selection and application of macroprudential instruments](#)” of 2012 (including the broad principles established therein), and the 2011 report on “[Central bank governance and financial stability](#).”

Section III reviews operational considerations, such as the selection of policy tools and how they are employed. Section IV looks into issues related to international consistency of macroprudential policy.

1. Definition, objectives and scope

Macroprudential policy is defined as the use of primarily prudential tools to limit systemic risk ([Crockett 2000](#), [FSB/IMF/BIS 2011](#), [IMF 2013](#)). A central element in this definition is the notion of systemic risk – namely, the risk of widespread disruption to the provision of financial services that is caused by an impairment of all or parts of the financial system, and which can cause serious negative consequences for the real economy ([IMF/BIS/FSB 2009](#)). Fundamental to the definition is the notion of negative externalities from a disruption or failure in a financial institution, market or instrument. Systemic risk is generally recognised as having two dimensions: vulnerabilities related to the build-up of risks over time (“time dimension”), and vulnerabilities from interconnectedness and the associated distribution of risk within the financial system at any given point in time (“cross-sectional” or “structural” dimension). In addressing these vulnerabilities, the macroprudential policy orientation complements the microprudential focus on the safety and soundness of individual institutions ([Committee on the Global Financial System \(CGFS\) 2010](#)).⁵ By mitigating systemic risks, macroprudential measures ultimately aim to reduce the frequency and severity of financial crises.

Macroprudential policy pursues the following interlocking intermediate objectives ([FSB 2009](#), [CGFS 2010](#), [IMF 2013](#)): (1) increase the resilience of the financial system to aggregate shocks by building and releasing buffers that help maintain the ability of the financial system to function effectively, even under adverse conditions; (2) contain the build-up of systemic vulnerabilities over time by reducing procyclical feedback between asset prices and credit and containing unsustainable increases in leverage, debt stocks, and volatile funding; and (3) control structural vulnerabilities within the financial system that arise through interlinkages, common exposures, and the critical role of individual intermediaries in key markets that can render individual institutions “too-big-to-fail”.

Macroprudential policy aims at containing risks across the financial system as a whole ([Knight 2006](#), [IMF 2011a](#), [FSB/IMF/BIS 2011](#))⁶. Since banks are significant providers of credit to the economy, macroprudential policy typically applies its policy levers to the banking system. However, as capital market activity and market-based financing expand, macroprudential policymakers also need to be able to monitor systemic risks from activities outside the banking system, as well as to develop and implement policy responses to contain those risks ([FSB 2011a](#), [CGFS 2012](#), [IMF 2013](#)).

⁵ Views still vary as to whether macroprudential policy is a policy area in its own right or an orientation of prudential policy that calls for a calibration of regulation and supervision from a system-wide perspective ([Crockett 2000](#) and [Borio 2003](#)). The difference between these two views, however, is largely semantic *as long as* existing prudential policy frameworks address explicitly systemic risk, adopt a system-wide analytical perspective, and target tools at systemic risk.

⁶ The [2011 Progress Report](#) characterises macroprudential policy by its objectives, its scope, and its tools and associated governance. In order to qualify as such, macroprudential tools need to have a systemic orientation in terms of objective, calibration and governance.

Macroprudential policy interacts with a range of other policies that also have a bearing on systemic risk. This includes microprudential regulation and supervision, crisis management and resolution, as well as monetary and fiscal policies. Boundaries and interactions between policies are complex and can give rise to both complementarities and tensions that may need to be resolved – for example, via suitable institutional arrangements (see below) – to ensure appropriate instrument use and policy mix (see [Caruana 2011](#), [Viñals 2011](#), and [IMF 2013](#) for a more detailed discussion).

Macroprudential policy can easily be overburdened with objectives it is not suited to achieve ([CGFS 2012](#), [IMF 2013](#)). Rather than managing the level and composition of aggregate demand or the business cycle, macroprudential policy aims to strengthen the financial system’s defenses in the face of economic and financial shocks, thereby contributing to the continued supply of credit and other financial services through adverse economic conditions. By building and releasing buffers as appropriate, macroprudential policy can then help reduce the frequency of financial crises or moderate the sharp contraction in economic output generally associated with them.

Macroprudential policy and capital flow management measures (CFMs) have different objectives, but can potentially overlap ([FSB/IMF/BIS 2011](#), [IMF 2013](#), [OECD 2015](#)). CFMs are designed to limit capital flows by influencing their size or composition. Macroprudential measures are designed to limit systemic risks (see above). This can include, but is not limited to, vulnerabilities associated with capital inflows and exposure of the financial system to exchange rate shocks. Hence, if macroprudential policy measures are designed to limit systemic risks by limiting capital flows, they would be considered CFMs as well, and common principles would apply (as discussed further in [IMF 2012](#), [IMF 2015](#)).⁷ Neither macroprudential policy nor CFMs should substitute for warranted macroeconomic adjustment or appropriate microprudential regulation and supervision.

2. Institutional arrangements

Adequate institutional foundations for macroprudential policy frameworks are essential. Institutional arrangements need to suit country-specific circumstances and institutional backgrounds. Considerable differences across countries suggest that there is no “one-size-fits-all” approach. Notwithstanding this, a number of countries have come to the conclusion that effective macroprudential policy is well-served by providing the relevant authorities with a clear mandate that sets out well-defined objectives as well as adequate powers, matched with strong accountability ([BIS 2011](#), [CGFS 2012](#), [IMF 2013](#)). Macroprudential policy can be subject to biases toward inaction or insufficiently timely action when the benefits are uncertain while the costs are often more immediate ([Knight 2006](#), [IMF 2011a](#)). As noted below, many institutional arrangements have therefore been designed to foster *willingness to act* in the face of those biases and to legitimize macroprudential policy action. They have also sought to ensure policymakers’ *ability to act* in the face of evolving systemic threats, by assigning an appropriate range and reach of powers, and to promote *effective cooperation* in risk assessments and

⁷ CFMs are part of a separate G20 workstream and, hence, not the subject of the discussion of this note. In addition, the OECD is reviewing the treatment of measures with stated prudential objectives in its Code of Liberalisation of Capital Movements ([OECD 2016](#)).

mitigation in a manner that preserves the autonomy of separate policy functions ([BIS 2011](#), [IMF 2011a](#), [CGFS 2012](#), [IMF 2013](#)).

2.1 Mandate, governance and accountability

Existing arrangements suggest that a clear mandate forms the basis of the assignment of responsibility for taking macroprudential policy decisions. Many of the observed institutional designs provide the main mandate to an influential central body with substantial convening power and the ability to take a broad view of the entire financial system. Such a mandate can be assigned to an existing authority, or a policymaking committee or inter-agency council, as documented in [IMF 2011b](#) (see also Annex 1).

- In many jurisdictions, the **central bank** plays an important role, in order to harness its expertise, incentives to take action, and independence. This can be achieved in a variety of ways, such as making the central bank board (or governor) the decision-making body (as in Ireland, and New Zealand), having the governor chair the policymaking committee (as in Malaysia, South Africa, and the United Kingdom (UK)), providing the central bank with a clearly defined role to provide its analysis of systemic risk and proposals for policy action to the attention of the decision-making body (as in France and Germany), or assigning it a leading role in the regulation and supervision of designated systemically important financial institutions (SIFIs) (as in the United States (US)).
- Existing arrangements typically also involve the relevant **regulatory and supervisory authorities**, in order to garner their expertise and information and because the implementation of any policy measures often rests with those authorities. Many supervisory authorities are also incorporating a macroprudential perspective in the supervision of individual firms (e.g. in the case of intensified supervision of SIFIs). A potential for conflicts may arise when the macro- and microprudential perspective on the course of policy action diverges, both in buoyant times and in times of stress ([BIS 2011](#), [IMF 2013](#), [Alessandri and Panetta 2015](#)). Where the supervisory authority is the macroprudential decision-maker, coordination with other relevant authorities may be facilitated through the establishment of a coordinating or advisory body (as in Australia or Sweden), or by attributing a strong role to the central bank on its decision-making board (as in Finland).
- The **Ministry of Finance** also participates in some countries. In a committee setup, this can be as a non-voting member (as in the UK), a voting member (as in Poland), or chair (as in France, Germany and the US). Such involvement can be useful to create political legitimacy of macroprudential policy, and enable the committee to discuss policy choices in other fields. In some jurisdictions, arrangements have also been introduced to mitigate against political economy risks (such as delayed-action) and to protect the independence of other participating authorities, including the central bank. These include providing the central bank with a strong voice (Mexico, Netherlands) or veto powers (Germany) in these committees.
- Some arrangements include independent **external experts** as voting members in the decision-making structure (France, UK), or in the form of an advisory committee to the main body (European Systemic Risk Board (ESRB)). Another approach is to invite

such experts on an ad-hoc basis to share their views as needed (Germany, Netherlands). Outside expertise can reduce groupthink on the part of officials and inject an independent perspective ([BIS 2011](#), [IMF 2011b](#), [IMF 2013](#)).

Well-defined policy objectives can foster both the ability and willingness to act ([BIS 2011](#), [CGFS 2012](#), [IMF 2013](#), [IMF 2014](#)). Setting out clear objectives can enable policymakers to use their policy tools in the pursuit of financial stability, and forms the basis for a framework to hold the designated authority accountable for achieving its objective, thereby reducing the risk of inaction. Well-defined policy objectives may also help counter pressures to use macroprudential policy as a substitute for policy action in other areas ([IMF 2011a](#), [Viñals 2011](#)). Secondary objectives have also been included to ensure that policymakers recognise the need to consider costs and trade-offs (e.g. [ESRB](#), [UK](#)).

In addition to well-defined objectives, transparency and accountability mechanisms can establish legitimacy and create commitment to take action ([BIS 2011](#), [CGFS 2012](#), [IMF 2014](#), [ESRB 2014](#)). Accountability is typically to the legislature and to the public at large. A range of communication tools (such as financial stability and other periodic reports, policy statements and meeting records) can help inform the public of the policy stance and create a commitment to take action, thereby fostering the effective pursuit of the objective. In some cases, these tools have been required by law as accountability devices (France, Germany, UK). The aim of macroprudential policy communication strategies is to convey financial stability assessments clearly, link them logically to any policy actions taken, and manage public expectations about what can be achieved with those policies.

The decision-making body usually establishes a set frequency of formal meetings (often quarterly or semi-annually), so as to foster a timely and focused engagement. Where the board of the central bank is the decision-maker, it can be useful to introduce the practice of dedicated meetings on macroprudential policy issues (European Central Bank (ECB), Norway). Voting on policy measures tends to be based on simple or qualified majority, rather than unanimity, to avoid the potential for paralysis, even if the authorities may often in practice strive for consensus (e.g. Germany, Ireland, and the UK).

A dedicated unit can support the macroprudential policy process and is increasingly common across countries. A dedicated financial stability unit within the central bank (or standing subcommittees or other authorities) can be charged with the analysis of systemic risks, the development and monitoring of systemic risk indicators appropriate for the jurisdiction, and the preparation of analysis and proposals for policy responses for consideration by the macroprudential decision-makers (Germany, India, Netherlands, UK, US). In some cases, such units also function as the secretariat for the macroprudential body.

2.2 Powers

Country practices indicate that macroprudential policy requires powers that ensure the ability to act. Such powers are found important to ensure policymakers can obtain information from other authorities and to fill data gaps (information powers); influence the activation and calibration of regulatory constraints (calibration powers); influence the designation of individual institutions as systemically important (designation powers); and initiate changes in the regulatory perimeter to capture financial institutions whose activities may give rise to financial stability risks ([IMF 2011a](#), [CGFS 2012](#), [FSB 2013a](#), [FSB 2013b](#)).

The strength of such powers can vary and be “hard (direct)”, giving policymakers direct control over macroprudential tools or the ability to direct other regulatory authorities; “semi-hard”, enabling policymakers to make formal recommendations to other regulatory authorities, coupled with a ‘comply or explain’ mechanism; or “soft”, enabling policymakers to express an opinion, or warning, or a recommendation that is not subject to comply or explain ([IMF 2013](#)). Each type of power can be useful and the effectiveness of the policy framework may benefit from a combination of these powers (as in the UK and the US), given that soft powers alone are unlikely to be sufficient to ensure effectiveness ([CGFS 2010](#), [IMF 2013](#)).

Where a macroprudential policymaker has hard (direct) powers, they have usually been established with respect to a well-defined set of tools. These tools can be used to help control the build-up of risks over time (as in New Zealand and across the EU member states through the Capital Requirements Directive and Regulation CRD IV/CRR and national laws), as well as to effect the designation of systemically important institutions (as in the US). Hard powers avoid delay and other frictions that may arise when implementation relies on other policymakers. Direct powers can also increase effectiveness of other policies since they provide a ‘stick’ that macroprudential policymakers can credibly threaten to use. Direct powers may be useful also as a ‘backup’, in the event that other regulatory authorities are unwilling or unable to act (e.g. the ECB’s [top-up powers](#)), and can extend to the power to collect information directly from firms (e.g. Germany, UK, US).

The advantage of a power to recommend actions, coupled with a ‘comply or explain’ mechanism, is that it can be broad in scope ([BIS 2011](#), [IMF 2013](#)). Such powers have become very common (e.g. ESRB, Germany, UK, US), including to publicly propose actions that can be taken by other supervisory and regulatory authorities (and who may be vested with hard powers). The ‘comply or explain’ mechanism can increase the chance of action being taken and ensures transparency and accountability of the relevant actors, while at the same time maintaining the operational independence of the recipient authority. A recommendation by the macroprudential authority may also help the recipient authorities to overcome industry opposition or political pressure. Even where not subject to ‘comply or explain’, a recommendation can gain additional force where a macroprudential authority is mandated by law to publicly issue periodic recommendations (e.g. Norway).

Soft powers can complement stronger powers, and may be useful to extend the influence of macroprudential policymakers beyond prudential tools or the existing regulatory perimeter. Soft recommendations can be appropriate when the macroprudential policymakers aim to initiate the establishment of new macroprudential tools or changes in the legal framework to extend the regulatory perimeter (e.g. the UK). Soft powers can also be appropriate when effective mitigation of systemic risk requires cooperation beyond the regulatory authorities, for example in cases where tax distortions fuel the build-up of debt ([IMF 2013](#)). Communications, finally, can be targeted directly at the financial industry to influence behaviour or to reduce policy uncertainty and guide agents’ expectations with respect to the likely policy path ([CGFS 2012](#), [IMF 2014](#), [ESRB 2014](#)).

2.3 Domestic cooperation

Explicit mechanisms for cooperation and information-sharing between domestic authorities can help the attainment of the policy objective ([BIS 2011](#), [IMF 2011a](#)). A range

of such mechanisms have been found useful to provide clarity about authorities' roles and responsibilities and to ensure cooperation in system-wide risk assessment and mitigation, while preserving the operational autonomy of separate policy functions. They include: legal obligations (as in Germany and Turkey) or memoranda of understanding (as in Australia, Ireland and Switzerland) to share information between supervisory and regulatory authorities for financial stability purposes; standing subcommittees and ad hoc working groups to promote staff-level collaboration (as in India); and overlapping memberships of the boards of the member authorities of the macroprudential body (as, for example, in France and Poland). The inclusion of financial stability among the objectives of member agencies can also contribute to cooperation, and enable these authorities to use their powers in pursuit of financial stability (as in Australia and the UK).

3. Operational considerations

3.1 Analysing and monitoring systemic risk

A comprehensive framework for monitoring systemic risk is important for operationalising macroprudential policy. To assess the build-up of risks over time (“time dimension”), authorities are typically examining a number of areas, including: (1) economy-wide vulnerabilities from an excessive growth in total credit or asset prices; (2) sectoral vulnerabilities arising, for example, from growing credit to the household sector or from increasing exposures to the corporate sector; and (3) vulnerabilities from a build-up of maturity and foreign currency mismatches in the financial sector. To assess vulnerabilities related to the distribution of risk within the financial system at any given point in time (“cross-sectional” or “structural” dimension), risks from linkages within and across key classes of intermediaries and market infrastructures are being monitored, as well as the impact of the failure of any of these institutions on the system as a whole.

A number of early warning indicators are considered useful to assess vulnerabilities well before the emergence of stress. For instance, based on BIS research ([Drehmann and others 2011](#)), the Basel Committee has identified the “credit-to-GDP gap” as a useful early warning indicator of an excessive growth in total credit ([BCBS 2010](#)). Similarly, strong growth in mortgage debt, combined with increases in house prices can together form a powerful signal of a procyclical build-up of risks in housing markets ([Borio and Drehmann 2009](#), [IMF 2014](#)), and further indicators have been proposed for risks from corporate sector vulnerabilities as well as liquidity and foreign exchange risks ([CGFS 2012](#), [ESRB 2014](#), [IMF 2014](#)). Since the signaling performance of any one single indicator is imperfect, multiple indicators are generally used to assess the extent of systemic risk for a given potential source of vulnerability (e.g. [New Zealand](#), [Norway](#), [Sweden](#), [Switzerland](#), [UK](#), and also [IMF](#)).

Early warning indicators can be combined with additional indicators that help gauge resilience. This can include measures of leverage, as well as the debt-service burden of households and the interest coverage ratio of firms ([Drehmann and Juselius 2012](#)), including their evolution under stress (such as increases in interest rates or deterioration in corporate earnings). Appropriately designed macroprudential stress tests can help assess the ability of the system to continue to function under a range of adverse economic and financial conditions, thereby complementing the use of early warning indicators (as in the euro area, UK and US).

Supervisory information, such as on changes in loan underwriting standards, can also inform the analysis. Yet these metrics, including the early warning indicators, cannot be used mechanically, and hence tend to form part of a broader risk assessment to inform judgments about the need for macroprudential action, thereby giving rise to a “guided discretion” approach (see [IMF 2013](#), [Swiss National Bank 2014](#)).

3.2 Identifying and establishing macroprudential policy tools

Experience suggests that a broad range of tools may be needed to attain macroprudential policy objectives (see section I), and in a manner that can address the range of potential vulnerabilities in both the time and structural dimensions set out just above (section III.A) ([CGFS 2010](#), [CGFS 2012](#), [IMF 2013](#), [IMF 2014](#), [IMF 2014a](#)). In the time dimension, such calibration usually calls for building up buffers as systemic risk accumulates in order for them to be drawn down in times of stress, so as to help constrain the boom and dampen the bust. In the structural dimension, in turn, various prudential tools can be calibrated to address the externalities that SIFIs are imposing on the financial system, by enhancing their resilience to shocks, and to lower the potential for contagion, by improving resolvability and reducing interlinkages within the financial system ([Borio 2010](#), [FSB/IMF/BIS 2011](#), [FSB 2011](#), [IMF 2013](#)).

Access to a comprehensive macroprudential policy toolkit on an ex ante basis allows the timely application of the relevant tools if the need arises. The experience is that establishing the legal and operational basis for macroprudential tools can take time, and may require prior political debate and consensus. Hence, it is useful for macroprudential authorities to work towards the establishment of a comprehensive toolkit, well before systemic vulnerabilities become acute. In practice, this is often at the initiative of the relevant macroprudential authorities (e.g. Germany, Ireland, and the UK). In addition, tools familiar from microprudential practice (such as supervisory guidance) can be modulated also for macroprudential purposes.

A range of tools may be used to address systemic risk in the time dimension, by increasing resilience to shocks and containing the pro-cyclical build-up of vulnerabilities ([CGFS 2012](#), [ESRB 2014](#), [IMF 2014a](#)). These include: (1) capital-based tools (both broad-based and sectoral);⁸ (2) asset-side-tools/loan restrictions; and (3) liquidity-related tools. Since the crisis, increasing use has been made across many of them (Figure 1).

- **Broad-based capital tools.** Risks from a broad-based credit boom may be addressed by a range of capital tools, including dynamic provisioning requirements, the countercyclical capital buffer (CCyB) and time-varying leverage ratio caps. Repeated macro-supervisory stress tests that target a given level of resilience against prospective vulnerability scenarios and that result in restrictions on institutions (for example, the US [Comprehensive Capital Analysis and Review](#) (CCAR)) also fit into this category. These tools aim primarily to increase resilience and, thereby, to help maintain the

⁸ Broad-based tools are defined as tools that apply to all exposures, while sectoral tools apply to particular types of exposures, or loan segments ([IMF 2013](#), [IMF 2014](#)). Nonetheless, the boundary between them can sometimes be fuzzy, for instance, when a countercyclical capital buffer is applied to particular exposures (as the Swiss CCyB for mortgages). Likewise, the boundary between capital tools and asset side tools is fuzzy since capital tools are calibrated to exposures on the asset side.

supply of credit through adverse conditions, but some of them can also have a moderating effect on credit in buoyant times (Annex 2).

- **Sectoral capital and asset-side tools.** Where vulnerabilities arise from lending to specific sectors and a deterioration of lending standards for such loans, sectoral capital tools, such as sectoral capital requirements and risk-weight floors, can help maintain lenders' resilience. Caps on the share of exposures to specific sectors, such as foreign currency loans to corporates, can be aimed more directly at reducing overly strong common exposures to such risky segments. Loan restrictions, such as caps on loan-to-value (LTV), debt-service-to-income (DSTI) or loan-to-income (LTI) ratios, aim primarily to increase the resilience of borrowers to asset price and income shocks, and can thereby indirectly increase the resilience of lenders. They are often targeted at mortgages, but can also be applied to other segments, including credit cards, commercial property or leveraged loans to corporate sector. These tools have been found to have a relatively strong impact on the volume of credit, thereby helping to moderate procyclical feedback between asset prices and credit (Annex 2).
- **Liquidity-related tools** aim primarily at addressing the build-up of liquidity and foreign exchange risks associated with lending booms, but some of these tools can also be expected to affect loan growth. They include tools that build up a stock of highly liquid assets, such as (differentiated) reserves requirements, and the Basel III Liquidity Coverage Ratio (LCR) (potentially calibrated by currency), as well tools to contain maturity mismatch (such as core funding ratios), price-based tools (such as a levy on volatile funding), and simpler designs (such as caps on the loan-to-deposit ratio).

Structural risks of contagion within the financial system may also be addressed by a range of policy tools ([IMF 2013](#), [IMF 2014a](#)). To improve resilience of those institutions whose failure poses systemic risks to the system, prudential requirements such as capital surcharges for global and domestic systemically important banks (G-SIBs and D-SIBs) and insurers (G-SIIs) have been introduced ([BCBS 2013](#), [IAIS 2013](#)). In addition, to reduce contagion from the failure of such institutions, additional loss absorbency requirements are being put in place to facilitate orderly resolution of G-SIBs ([FSB 2015](#)). Other prudential measures to reduce contagion include increases in risk-weights and large exposure limits, which can be used to discourage large exposures to such institutions or within the financial system more generally ([UK](#), [BCBS 2014](#), [ESRB 2014](#)).

Policies are also being developed to address financial stability risks arising from non-bank activities and interconnectedness in market infrastructure. G20 initiatives for central clearing of over-the-counter derivatives ([FSB 2010](#)) are now complemented by a comprehensive work plan to promote central counterparties' resilience, recovery planning and resolvability ([FSB/BCBS/CPMI/IOSCO 2015](#)). Policy development to control risks from non-bank activities and in securities lending markets is also ongoing ([FSB 2015b](#), [ESRB 2016](#)).

3.3 Operationalising the use of tools

Operationalising macroprudential policy involves translating the assessment of systemic risks to policy action to contain these risks. Key elements of this mapping, based on country experiences in a range of countries, include: (i) the design and calibration of the policy response in a manner that targets well-identified risks while avoiding unnecessary costs; (ii) assessing

and addressing ex ante the potential for leakage of macroprudential tools; (iii) evaluating ex post the impact of macroprudential intervention and re-considering the selection and calibration of tools; (iv) considering the potential for macroprudential tools to be relaxed; and (v) improving the information base for macroprudential policy across all areas noted above. In practice, all of these elements will tend to be considered jointly, rather than in sequence.

Calibrating policy responses to risks

The policy approach should be commensurate with the profile of risks. This involves choices along the following dimensions ([CGFS 2012](#), [IMF 2013](#)).

- **Gradual versus more forceful approaches.** When multiple indicators signal elevated risks, or risks are rising sharply, this may call for a more forceful approach to the tightening of the available tools to mitigate the risks. Conversely, if indicators show only moderate readings, the response can be more gradual, involving targeted communications ahead of the implementation of macroprudential tools. Where the tool seeks to address time-varying risks, such as for the CCyB, there can also be a partial activation of the tool (e.g. Hong Kong SAR, Sweden). More generally, early and gradual action can be used to manage uncertainty with regard to the effects of the selected policy instruments. For instance, some countries have chosen to calibrate LTV and LTI constraints in such a manner that they were not immediately binding on the majority of borrowers, but on the expectation that they would slow the build-up of imbalances were such a build-up to arise (e.g. Ireland, UK).
- **Broad-based versus targeted action.** Where there is a broad-based build-up of vulnerabilities, this will in general call for the activation and tightening of broad-based tools that affect all exposures, potentially including the tightening of capital and liquidity buffers. When specific (e.g. sectoral) vulnerabilities are building in the absence of a broad-based credit boom, more narrowly targeted approaches may be able to address the specific concern more efficiently. For instance, when systemic risk arises from households borrowing in foreign currency, tight LTV and DSTI caps for such borrowing can help to address this specific risk in a targeted manner (as in Poland).
- **Single versus multiple tools.** The marginal benefit of tightening any one tool will eventually decrease due to increased distortions and incentives for circumvention. The use of complementary tools may mitigate such effects, by addressing risks from several angles ([CGFS 2012](#), [IMF 2013](#)). For instance, LTV, LTI, and DSTI limits can address the demand for credit and promote resilience on the part of borrowers, and thereby complement capital tools that act on the supply side and promote the resilience of banks. Indeed, for this reason, many countries are using a combination of both sets of tools. In addition, DSTI limits enhance the effectiveness of an LTV cap, by tying debt burdens to income and containing the use of unsecured loans to meet the minimum down payment ([IMF 2014a](#)).
- **Rules versus discretion.** The main advantage of rules is that, once in place, they do not require recurring justification or explicit decisions (“set and forget”; see [CGFS 2010](#)). If well-designed, they can act as automatic stabilisers and effective pre-commitment devices, helping to reduce inaction bias. However, rules can also be prone to arbitrage, and an attempt to target predefined ranges of indicators can lead risks to

shift in unintended ways ([Borio 2010](#)). The design of rules is also often hampered by a lack of reliable indicators that could help automate instrument use. Discretionary measures, in turn, avoid the difficulties inherent in designing effective rules, and make it easier to tailor macroprudential action to the specific profile of risks prevailing at any point in time. In practice, most countries rely on a ‘guided discretion’ approach, combining indicators with judgment (see above). Some countries are also using tools that are calibrated based on an ex ante rule, most notably dynamic provisioning requirements, e.g. Peru, Spain, Uruguay ([IMF 2014a](#)).

In practice, accurate calibration of tools will tend to suffer from a lack of data and uncertainties over the transmission process. Country experience suggests that macroprudential policymaking increasingly relies on quantitative analysis, but judgement retains an overriding role. One reason is that the influence of policy on market participants’ behaviour and expectations is an area in which quantitative approaches so far offer limited guidance ([CGFS 2016](#)). In addition to a heavy reliance on judgement, this often implies a gradual approach to the tightening of tools (see above), and a tendency to start any policy action with less intrusive tools. The benefits of such an approach have to be balanced against the need to take more decisive action when risks are elevated.

Considering costs and benefits (ex ante perspective)

Ex ante consideration of costs and benefits can inform the design and calibration of macroprudential tools but are difficult to quantify. Formal cost-benefit analyses are important, but difficult to conduct, since the costs and benefits of macroprudential measures are hard to quantify, and model-based welfare analyses not yet well-developed ([CGFS 2016](#)). Nonetheless, in addition to targeted benefits, calibration can consider a range of potential costs ex ante, such as: (i) adjustment costs to the financial industry; (ii) efficiency costs; and (iii) costs to output growth ([IMF 2014](#)).

- **Adjustment costs.** Capital and liquidity tools that impose minimum ratios on the balance sheet of intermediaries may create adjustment costs for financial firms. These costs can be mitigated through phase-in, or a step-wise tightening. For instance, the BCBS recommends that authorities give a notice period of up to 12 months to provide banks time to meet a CCyB requirement. [Korea](#) announced a ceiling on the loan-to-deposit ratio in December 2009, which banks were expected to meet by the end of 2013, while [New Zealand](#) implemented a core funding ratio in a number of steps. By contrast, when measures affect only the flow of new lending or new funding (as is the case for LTV constraints or marginal reserve requirements), they do not require phase-in. Indeed, where such measures are pre-announced too long in advance, this can lead to frontloading, as borrowers and banks rush to take action before the measure takes effect ([IMF 2014](#)).
- **Efficiency costs.** To reduce the potential for distortions, it may be desirable to first introduce tools that affect lender behaviour, such as capital-based tools that can alter bank’s incentives to lend, before introducing quantitative constraints on borrowers, such as LTV, LTI and DSTI limits (as in Israel). Yet there may also be cases where elevated risk points to the need to introduce both sets of tools simultaneously or even give preference to asset-side tools ([IMF 2014a](#)). The way LTV, LTI and DSTI limits are designed can also seek to contain efficiency costs. For instance, caps on the

exposure to particular types of borrowers, such as caps on the share of loans at high LTV ratios (as in New Zealand), or high LTI multiples (as in the UK) do not prohibit, but only constrain the provision of such credit. To mitigate efficiency costs, countries have also sought to introduce less stringent constraints for first-time buyers (e.g. Finland, Ireland, Israel and Singapore) or differentiated by type of property and region (e.g. Malaysia, Korea, and New Zealand).

- **Output costs.** Implementation may result in temporary costs to output growth. Empirical evidence, for example, suggests that balance sheet constraints (such as capital and liquidity tools) can have some adverse impact on output in the short-run. However, these effects are likely to be weak and overcompensated by beneficial effects over the longer term, due to a reduced likelihood and cost of crises ([BIS 2010](#), [IMF 2013d](#)). However, the short-run effects are uncertain and they can be greater when an aggressive tightening forces intermediaries to cut lending, or when tightening occurs in periods of financial stress, when it is more difficult for intermediaries to raise new equity or other stable funding. To avoid undesirably strong effects on output, balance sheet constraints are best tightened well ahead of the emergence of stress. Since the impact on output of tools that address the flow of new credit, such as LTV and DSTI, is in general expected to be greater ([IMF 2013d](#)), this can call for a more gradual tightening, especially when the economy is weak (e.g. the Netherlands post crisis).

Assessing and addressing leakage

The potential for leakages poses challenges to the effective implementation of macroprudential policy tools. Leakages refer to the migration of financial activity outside the scope of application and enforcement of the macroprudential tool, potentially undermining its effectiveness. Leakages can be *domestic*, where activity migrates to domestic providers of financial services outside the initial scope of application of macroprudential tools. They can also be *cross-border*, where activity moves to foreign-owned providers of financial services outside the scope of enforcement of the national measures. Strategies to address leakages will tend to expand the scope of application of macroprudential policy tools to non-bank and foreign providers of credit, for example through jurisdictional reciprocity agreements ([BCBS 2010](#)) or greater host control over foreign affiliates ([CGFS 2014](#), [IMF 2014](#)). While limited thus far, the experience is that the scope for and the practical challenges in addressing leakages differ across macroprudential tools.

- **Capital-based tools.** Experience and evidence suggests that broad-based capital tools may be subject to domestic leakages (Annex 2). For instance, capital tools can lead to increased provision of credit by non-bank companies, including by bank affiliated ones (e.g. bank-affiliated leasing companies, as in Croatia) if consolidated supervision ([BCBS 2012](#)) is not effective, or simply to credit provision by non-banks, such as finance companies. Similarly, cross-border leakages can pose major challenges for capital-based tools, especially where foreign affiliates are established as branches, as opposed to subsidiaries, and for measures that aim to address excessive credit to the corporate sector, when local corporations are able to borrow directly from abroad and in international markets. In such cases, additional measures targeting corporate borrowers themselves, such as recommendations for the fiscal authorities to address

any tax distortions that encourage corporate borrowing, may then also be considered ([IMF 2014](#), [FSB 2015](#)).

- **Household sector loan restrictions.** For tools that constrain the availability of bank credit to households, such as LTV and DSTI limits, experience suggests that leakages can be more easily contained (Annex 2). This is because, in principle (but depending on the effective scope of regulation and supervision), such loan restrictions can be enforced on all regulated financial institutions, including non-banks and foreign branches ([BoE 2011](#)). The Dutch, Hungarian and Korean examples suggest that LTV and DSTI constraints can be expanded to non-bank providers of credit, especially when these are already within the regulatory perimeter, and they can also typically be applied to foreign branches (as in Estonia, Ireland, Romania and the UK). However, there may be scope for direct cross-border provision of mortgage credit in closely integrated regions, which has prompted authorities to seek reciprocity of mortgage-related measures in a number of cases (e.g. Belgium and the Netherlands).
- **Liquidity-related tools.** Where liquidity tools are applied to the banking system, maturity transformation can migrate to non-banks. If such migration is sizable and occurs in parts of the system that remain connected to the banking system, actions can be taken to consolidate such activity on the balance sheet of the core system, thereby subjecting it to regulation (e.g. China). Liquidity tools can also be extended to nonbank providers of maturity transformation directly, even though this may require the cooperation of the relevant supervisory authorities. An example is US money market mutual funds, where liquidity requirements have been tightened significantly since the crisis.

Evaluating effectiveness (ex post perspective)

Evaluating the impact of macroprudential policy intervention ex post is useful to gauge the need for recalibration or additional measures ([CGFS 2012](#), [ESRB 2014](#), [IMF 2014](#)). Clarity about the policy target is a key condition for the effective calibration and communication of macroprudential measures. Implementation can then iterate between taking measures, observing and assessing their impact, and taking additional or corrective action as necessary. In particular, in addition to assessing leakage and other unintended side effects (see above), ex post evaluation would seek to assess; (i) the extent to which measures have had the desired impact on resilience; and (ii) effects on behaviour and impacts on credit dynamics and asset prices. Such assessments can be useful to help improve the design and calibration of tools going forward, even as measuring the benefit of macroprudential policy on the ultimate objective – reducing systemic risk – is inherently difficult.

- **Assessing effects on resilience.** If enhancing resilience is the main policy objective, it can be useful to assess whether the macroprudential tools used have had the desired effect, by defining one or more measures of resilience and assessing whether resilience has improved after the imposition of the tool (event study approach). For instance, it is feasible to assess whether the imposition of LTV and LTI constraints has led to changes in the distribution of actual LTV and LTI ratios for both new borrowers and the stock of existing borrowers, as well the extent to which this may have reduced the probability of default and loss given default (e.g. [Euro area](#), [Hong Kong SAR](#)). Repeated stress testing of the system offers another way of assessing increases in resilience, and is

increasingly being conducted systematically by central banks and national supervisors in a number of jurisdictions (see above).

- **Assessing the effects on behaviour and credit dynamics.** It can also be useful to assess whether the policy change had an impact on the credit or risk indicators that may have prompted the policy intervention, or, more broadly, whether the policy had led to the desired response of market participants. However, it is generally difficult to tell the extent to which any observed changes in behaviour are policy-induced or driven by other forces. One way this issue can be addressed is by constructing a counterfactual path for the relevant indicator, based on historical relationships and in the absence of a policy intervention, and to compare the actual path to the counterfactual (e.g. [Canada](#), [Korea](#), [New Zealand](#)).

Considering the potential for tools to be relaxed

Effective policy implementation involves ex ante consideration of the conditions under which macroprudential tools would be relaxed ([CGFS 2012](#), [IMF 2013](#), [IMF 2014](#)). Even though some tools can be designed to allow for automatic relaxation (e.g. dynamic provisions), policymakers will typically need to take an active decision on the appropriateness, timing and speed of any relaxation in light of circumstances.

This can be guided by the objective of macroprudential policies: to prevent disruptions to the provision of credit that can have serious adverse effects on the real economy. In particular, when systemic risks *recede* with time, this may allow for a *gradual* relaxation of some macroprudential constraints. Yet, macroprudential buffers may also be relaxed when risks *materialise*, that is, in periods of financial stress. In this case, a *prompt* and decisive relaxation may best serve macroprudential objectives, especially where macroprudential measures are binding on the provision of credit to the economy ([CGFS 2012](#), [IMF 2014](#)). However, decisions to relax macroprudential constraints need to maintain confidence and ensure an appropriate degree of resilience against future shocks. Moreover, experience with the relaxation of macroprudential tools is still limited and uncertainty remains over how effective their relaxation can be in times of stress ([CGFS 2012](#), [IMF 2014](#)).

Indicators that can guide a decision to relax macroprudential constraints can differ from those useful for the activation and tightening phase. While slow-moving stock variables and ratios, such as the credit-to-GDP gap, are useful tools for detecting the build-up of risks, market-based indicators and flow variables (such as credit growth and changes in default rates) are better at capturing turning points in the financial cycle and at predicting an imminent materialisation of systemic risk ([Drehmann and others 2010](#), [IMF 2013](#)). The set of useful indicators can also differ across the sources of stress and the corresponding set of tools. For instance, indicators of stress in interbank markets can provide useful signals for the relaxation of macroprudential liquidity tools ([CGFS 2012](#), [IMF 2014](#)).

Improving the information base for macroprudential policy

Effectiveness of macroprudential policy benefits from a sustained effort to close information gaps ([FSB/IMF/BIS 2011](#), [IMF 2013](#)). Data gaps can hinder the assessment of risks, impede the effective calibration of tools, or hinder the evaluation of the impact of measures ex post. Data needs may differ in all three of these areas and in the tightening and

release phases of macroprudential instruments. For instance, micro-data on the distribution of actual LTV and DSTI ratios across existing borrowers can be helpful to calibrate the impact of constraints on these ratios (as in [Ireland](#), [Singapore](#), [Sweden](#), [UK](#)), and such data is usefully collected prior to the imposition of the tool. The same applies to data on bilateral exposures between financial institutions and data to assess the systemic vulnerability of nonbanks, which do not tend to be readily available in most countries. Adequate information sharing arrangements and data collection powers are important to address data gaps ([IMF 2013](#)).

Data collection can be enhanced by leveraging existing sources of information, but may also call for new investment. In either case, a sound analysis of the costs and the benefits of enhancing data collection is crucial. Data gaps can be filled by improved sharing of existing sources of supervisory and statistical data, by requiring banks to report an expanded set of supervisory data, and by investing in infrastructure (e.g. establishment of credit registers, initiation of new statistical survey data) that enables the systematic collection and sharing of the relevant data. The closing of data gaps can also be helped by international initiatives, such as the FSB-IMF-BIS Data Gaps Initiative and the FSB’s work on monitoring shadow banking risks ([FSB 2015d](#) and [FSB 2016](#)). For instance, data on the bilateral exposures and funding between the G-SIBs are now collected and shared among the home country supervisors of these institutions. Work has also started to investigate the possibility of a common data template for global systemically important non-bank financial institutions, beginning with insurance companies ([FSB/IMF 2015](#)).

4. International consistency of macroprudential policy

In financially integrated economies, macroprudential policy is subject to a range of potential cross-border effects ([IMF 2013](#), [Caruana 2016](#)). These include: *positive externalities* from appropriate macroprudential action, *leakages* that can undermine the effectiveness of domestic action, potentially undesirable *spillovers* of action for other countries, and *migration* of activities from uneven strength of action across countries.

Effective domestic macroprudential policy that helps to contain risks in one country can support financial stability elsewhere, creating *positive externalities*. Lowering the probability of a financial crisis in one country through sound macroprudential policies reduces the scope for negative trade and financial spillovers at the regional or international level. To help harness these effects, international arrangements can be used to buttress national macroprudential frameworks and strengthen “enlightened self-interest.” Existing mechanisms include IMF surveillance and Financial Sector Assessment Program (FSAP) assessments, FSB peer reviews, and regular meetings of senior central bank officials at the BIS, as well as regional arrangements, such as the “[top-up](#)” powers assigned to the ECB.

National policies that are designed to contain risks from a rapid build-up of domestic credit can be subject to *leakage* from an increase in cross-border borrowing. These leakage effects are relatively well documented empirically (see Annex 2) and may have complicated macroprudential policies in a number of countries prior to the global financial crisis (e.g. [Bulgaria and Croatia](#)). One possible approach that may be used for addressing such leakage is agreement among countries on ‘reciprocity’ in the imposition of macroprudential

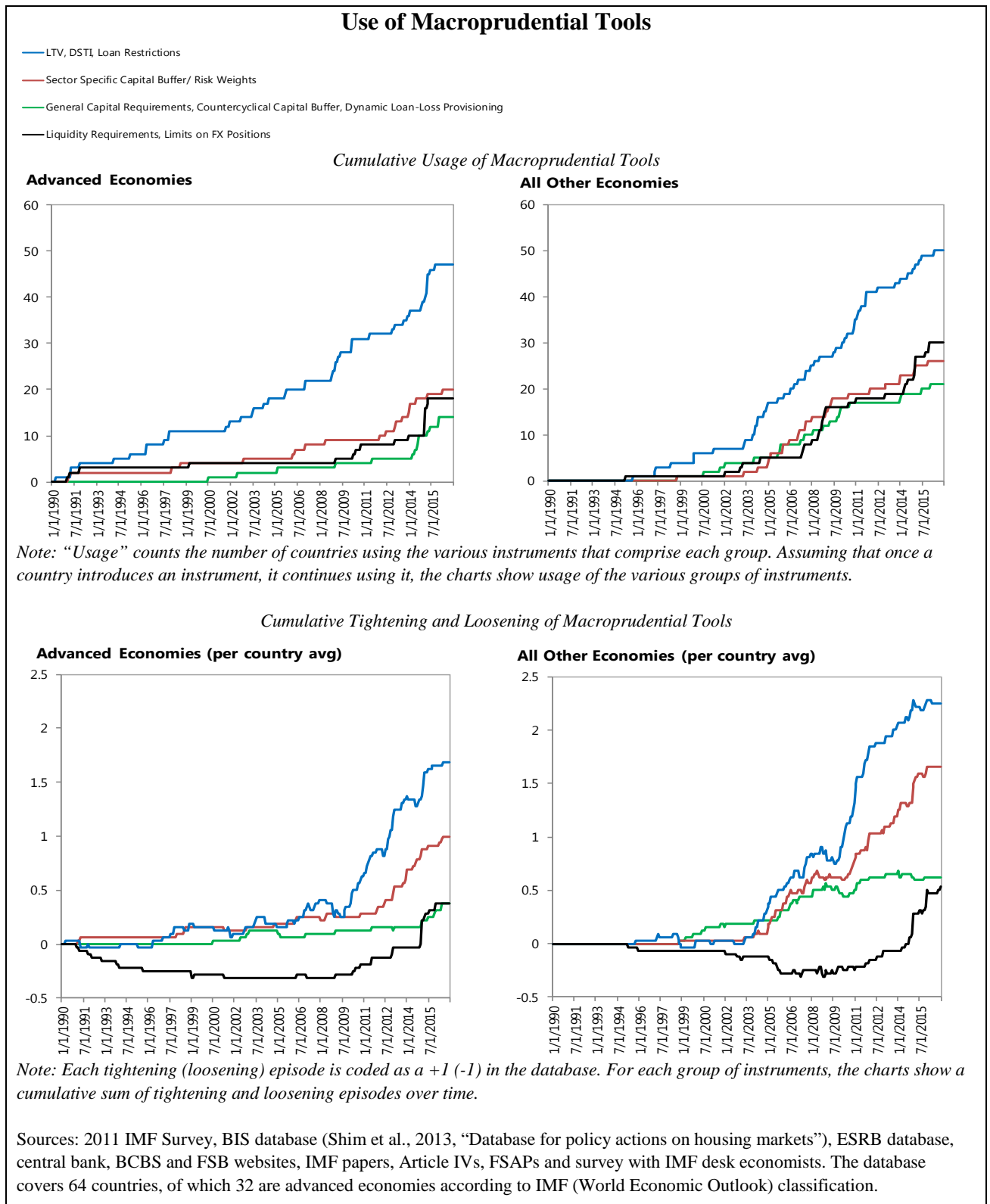
measures targeting domestic exposures, so that the same constraint is imposed on all relevant credit exposures to borrowers in a given country, whether credit is provided by domestic or foreign entities. An example of this approach can be found in the Basel III agreement on the CCyB; EU authorities have developed a similar, voluntary approach aimed at all measures targeting exposures ([ESRB 2015a](#)). Guidance is also provided to EU countries on how to treat exposures into third countries that fail to take macroprudential measures ([ESRB 2015b](#)).

Macroprudential actions taken by one country can also affect cross-border lending by that country's domestic banks, potentially creating undesirable *spillovers* for other countries ([IMF 2014](#)). A *reduction* in lending into other countries can arise when macroprudential measures are tightened that have more than just a domestic scope (for example, if targeting the balance sheets of international banking groups). Such action is more likely to lead to retrenchment when it is ill-timed and occurs in periods of financial stress, when it is more difficult for groups to find the required additional capital or liquidity. This puts a premium on the timely use of macroprudential tools also from an international perspective. Moreover, it may be possible to modify the design or calibration of tools in a manner that seeks to minimise any adverse effects for other jurisdictions, while still achieving the domestic objective ([IMF 2014](#)). *Expansionary* effects, in turn, may arise when global or regional banking groups respond to a tightening of domestic constraints (such as LTV caps) by increasing their lending abroad. Such effects may not always be undesirable, such as when increased lending is to countries with lower vulnerabilities, but can also call for counterbalancing macroprudential action in the recipient economy if increased foreign lending contributes to a credit boom or other financial imbalances.

Policies to strengthen the resilience of financial institutions in one country may cause their activities to *migrate* to other countries. As a result, there may be a risk that countries refrain from taking policy measures in the structural dimension, such as imposing appropriate capital surcharges for SIFIs. Uneven implementation may then lead to a greater concentration of risky activities in relatively lightly regulated jurisdictions ([Viñals and Nier 2014](#)). These migration effects can be addressed by minimum standards, as well as supplementary agreements and guidance. Examples include the BCBS framework for dealing with domestic systemically important banks ([BCBS 2015](#)) and the minimum internal TLAC requirements to be applied to each resolution entity within each G-SIB ([FSB 2015](#)). Further work is in train to ensure the resilience and resolvability of systemically important central counterparties ([FSB/BCBS/CPMI/IOSCO 2015](#)). A key complement to such guidance is the international monitoring of implementation.

The scope for positive and negative externalities highlights the potential usefulness of cross-border coordination of macroprudential policies. While cross-border effects may not always be undesirable or material, the usefulness of such coordination is already recognised in international and regional mechanisms, such as the reciprocity agreed for the Basel III countercyclical capital buffer ([BCBS 2010](#)). There is thus a question as to whether to consider additional regional and international consultation (e.g. on issues such as leakages from macroprudential tools) or coordination, so as to more fully reap the benefits of macroprudential action for national and global stability.

Figure 1



Annex 1: Institutional models for macroprudential policymaking

Institutional arrangements adopted by a country are shaped by country-specific circumstances, such as political and legal traditions, as well as prior choices on the regulatory architecture. While there can therefore be no “one size fits all” approach, in practice, there has been an increasing prevalence of models that assign the main macroprudential mandate to a well-identified authority, committee, or interagency body, generally with an important role of the central bank. An illustrative, non-exhaustive typology of models is presented below (Table).⁹ While each of these models has pros and cons, any one model can be buttressed with additional safeguards and mechanisms ([IMF 2011b](#)).

- **Model 1:** The main macroprudential mandate is assigned to the *central bank*, with its Board or Governor making macroprudential decisions (as in the Czech Republic, Ireland, New Zealand and Singapore). This model is the prevalent choice where the central bank already concentrates the relevant regulatory and supervisory powers. Where regulatory and supervisory authorities are established outside the central bank, the assignment of the mandate to the central bank can be complemented by coordination mechanisms, such as a committee chaired by the central bank (as in Estonia and Portugal), information sharing agreements, or explicit powers assigned to the central bank to make recommendations to other bodies (as in Norway and Switzerland).
- **Model 2:** The main macroprudential mandate is assigned to a *dedicated committee within the central bank* structure (as in Malaysia and the UK). This setup creates dedicated objectives and decision-making structures for monetary and macroprudential policy where both policy functions are under the roof of the central bank, and can help counter the potential risks of dual mandates for the central bank (see further [IMF 2013a](#)). It also allows for separate regulatory and supervisory authorities and external experts to participate in the decision-making committee. This can foster an open discussion of trade-offs that brings to bear a range of perspectives and helps discipline the powers assigned to the central bank.
- **Model 3:** The main macroprudential mandate is assigned to an interagency *committee outside the central bank*, in order to coordinate policy action and facilitate information sharing and discussion of system-wide risk, with the central bank participating on the committee (as in France, Germany, Mexico, and the US). This model can accommodate a stronger role of the Ministry of Finance (MoF). Participation of the MoF can be useful to create political legitimacy and enable decision makers to consider policy choices in other fields, e.g. when cooperation of the fiscal authority is needed to mitigate systemic risk.

⁹ While not included here as separate models, some other jurisdictions have opted for a setup under which the central bank plays a more limited role (e.g. Sweden), the mandate is distributed across several authorities (e.g. Canada), or the prudential authority has the main macroprudential responsibility (e.g. Australia, Japan).

Table 1
Illustrative Macprudential Policy Institutional Framework Models

Selected Country Examples

	Central Bank Model		Separate Committee Model
	Model 1 (Board or Governor)¹	Model 2 (Internal Committee)	Model 3 (Committee outside the central bank)³
Countries	Argentina, Belgium, Brazil*, Cyprus, Czech Republic, Estonia*, Hong Kong (SAR)*, Hungary, Indonesia, Ireland, Israel, Italy*, Lebanon, Lithuania, Netherlands*, New Zealand, Norway ² , Portugal*, Russia, Singapore, Slovakia and Switzerland ² .	Algeria, Malaysia*, Morocco, Saudi Arabia, South Africa, Thailand, and the UK.	Austria (M), Chile (M), Denmark (C), France (M), Germany (M), Iceland (M), India (M), Korea (M), Malta (C), Mexico (M), Poland (C), Romania (C), Turkey (M), and the US (M).

¹ Jurisdictions with an “*” have an additional council including other supervisors (e.g. insurance supervisory authorities and financial market authorities) that plays a coordinating role.

² In Norway and Switzerland, the central bank is mandated to issue recommendations on the countercyclical capital buffer (CCyB), with ultimate decisions on the buffer rate made by the Ministry of Finance and the Swiss Federal Council, respectively.

³ “(C)” or “(M)” indicates whether the council is chaired by the central bank or by a government minister (usually the Minister of Finance), respectively.

Annex 2: Effectiveness of macroprudential tools

The conduct of macroprudential policy can be informed by a growing body of research on the effectiveness of macroprudential tools. With the use of these tools having intensified globally since 2009 in both advanced and emerging market economies, empirical evidence on their effectiveness has been expanding apace. While the literature has not yet reached a consensus on which instruments are effective and under which circumstances (e.g. [Akinci and Ohmstead-Rumsey 2015](#), [Claessens 2015](#) and [Cerutti and others 2015](#)), a number of patterns are emerging that can guide policymakers.

Capital-based tools can support resilience and credit growth during cyclical downturns, but appear to have limited effects in the upswing. Capital tools (e.g. SIFI surcharges) can reduce the likelihood of crises by enhancing resilience ([BCBS 2010](#), [BIS 2015](#)). While a few studies suggest a dampening effect of such tools on credit growth in the short-term, the longer-run impact appears to be limited ([Dagher and others 2016](#)). Cross-country analysis suggests that these tools help contain credit contraction ([IMF 2013a](#)) as better-capitalised banks can continue lending more easily during downturns or in a crisis ([Nier and Zicchino 2008](#)). Likewise, [Buchholz 2015](#) finds faster post-crisis credit growth in countries with caps on banks' leverage. [Jiménez and others 2012](#), in turn, show that dynamic provisioning can help smooth post-crisis credit supply.

Sectoral capital requirements increase resilience via additional buffers, but evidence of the effects on credit growth varies. Some studies show that sectoral capital requirements or risk weights can limit loan growth of targeted sectors ([BoE 2014](#) and [IMF 2013](#)). Leakage effects may, however, prevent sectoral tools from containing credit booms ([Crowe and others 2013](#)). Sectoral CCyBs, in turn, appear to have limited effects on loan growth, but succeed in shifting loan supply towards better-capitalised institutions ([Basten and Koch 2015](#)).

Borrower-based tools can support the resilience of borrowers and contain procyclical feedback between asset prices and credit. Limits on LTV and DSTI ratios have been found to enhance borrower resilience ([Hallissey and others 2014](#)) and moderate lending growth ([Igan and Kang 2011](#), [Akinci and Ohmstead-Rumsey 2015](#)). However, their effects on house price growth appear to be limited ([Kuttner and Shim 2013](#)).

Changes in reserve requirements may help moderate credit growth, but experience with other liquidity-related tools remains limited. A number of studies suggest that raising reserve requirements can moderate credit growth ([IMF 2013a](#); [Lim and others 2011](#)). That said, other studies find no or only weakly significant impact ([Kuttner and Shim 2013](#), [Bruno and others 2015](#)) and experience with other liquidity-related tools is still evolving.

Various studies show evidence of leakage. Macroprudential tools appear to be less effective in reducing credit growth in economies with more developed or open financial systems ([Cerutti and others 2015](#)), with studies documenting leakage to non-bank providers of credit ([Cizel and others 2016](#)). Cross-border leakages appear strong for capital requirements, especially in countries where affiliates are established as branches, but weaker for loan restriction tools, such as LTV and DSTI ([Reinhardt and Sowerbutts 2015](#)). Evidence on the effects of macroprudential policies on cross-border spillovers is summarised, e.g. in [Buch and Goldberg 2016](#).