INTERNATIONAL MONETARY FUND

IMF POLICY PAPER

September 2017

INCREASING RESILIENCE TO LARGE AND VOLATILE CAPITAL FLOWS: THE ROLE OF MACROPRUDENTIAL POLICIES

IMF staff regularly produces papers proposing new IMF policies, exploring options for reform, or reviewing existing IMF policies and operations. The following documents have been released and are included in this package:

- A **Press Release** summarizing the views of the Executive Board as expressed during its June 28, 2017 consideration of the staff report.
- The **Staff Report**, prepared by IMF staff and completed on June 2, 2017 for the Executive Board's consideration on June 28, 2017.

The documents listed below have been or will be separately released.

- Increasing Resilience to Large and Volatile Capital Flows—The Role of Macroprudential Policies—Case Studies.

The IMF's transparency policy allows for the deletion of market-sensitive information and premature disclosure of the authorities' policy intentions in published staff reports and other documents.

Electronic copies of IMF Policy Papers
are available to the public from
http://www.imf.org/external/pp/ppindex.aspx

International Monetary Fund
Washington, D.C.

INTERNATIONAL MONETARY FUND

COMMUNICATIONS DEPARTMENT

Press Release No. 17/260
FOR IMMEDIATE RELEASE
July 5, 2017

International Monetary Fund
700 19th Street, NW
Washington, D.C. 20431 USA

IMF Executive Board Discusses Increasing Resilience to Large and Volatile Capital Flows—The Role of Macroprudential Policies

On June 28, 2017, the Executive Board of the International Monetary Fund (IMF) discussed a staff paper on "*Increasing Resilience to Large and Volatile Capital Flows: the Role of Macroprudential Policies.*"

Capital flows can bring substantial benefits for countries, but the experience is that large and volatile capital flows can also give rise to systemic financial risks. Post-crisis financial regulatory reforms have therefore focused on increasing the resilience of financial systems, and the development and mainstreaming of macroprudential policies (MPP) has been an important element of these efforts.

To provide clear and consistent advice on policies related to capital flows and MPP, the Fund adopted an Institutional View (IV) on the liberalization and management of capital flows and also developed a macroprudential framework (Key Aspects of Macroprudential Policy and Staff Guidance Note on Macroprudential Policy). Still, the task of building resilience in the face of large and volatile capital flows can be difficult for much of the Fund's membership.

Against this background, in the recent Capital Flows—Review of Experience with the Institutional View, the IMF Executive Board supported further work in these areas, especially on the role of the macroprudential framework in addressing systemic financial risks arising from capital flows, taking into account countries' financial and institutional development.

The paper analyzes the relationship between capital flows and systemic risk by presenting five channels through which capital flows can increase systemic risk, and discusses the scope for macroprudential measures (MPMs) to help limit the systemic risk arising from capital flows, including factors that might influence the effectiveness of MPMs in this regard. The paper also explores the complementarities between the Fund's macroprudential framework and the IV, and identifies principles for distinguishing between MPMs and capital flow management measures (CFMs), to help ensure the Fund provides consistent advice. Finally, the paper lays out considerations for the settings of MPPs in the event of capital outflows, and discusses the role of MPPs in building resilience to facilitate the liberalization of capital flows.

Executive Board Assesment[1]

Executive Directors welcomed the discussion on the role of macroprudential policies in increasing resilience to large and volatile capital flows and a conceptual framework for identifying and assessing macroprudential measures (MPMs), which in some cases may also be capital flow management measures (CFMs). They appreciated the detailed country case studies, which provide a valuable insight from international experience in this policy area. Directors recognized that capital flows deliver significant benefits but also have the potential to contribute to a build-up of systemic financial risk, especially if they are large and volatile. They also reiterated that macroeconomic policies, including exchange rate flexibility, need to play a key role in managing risks associated with capital flows, and that MPMs and CFMs should not be used to substitute for warranted macroeconomic adjustment.

Directors agreed that macroprudential policies, in support of sound macroeconomic policies and strong financial supervision and regulation, can play an important role in helping countries harness the benefits of capital flows. MPMs can help mitigate systemic financial risks and improve the capacity of the financial systems to safely intermediate cross-border flows. Specifically, Directors noted that the use of MPMs can increase countries' resilience to aggregate shocks, including those associated with capital flows, and can contain the build-up of systemic vulnerabilities over time. The proposed conceptual framework does not modify the Institutional View on the liberalization and management of capital flows as agreed in 2012, and Directors did not suggest changes to it. A number of Directors suggested an in-depth discussion of the question of whether CFMs can be used preemptively to manage systemic risks that may arise from capital flows. The Institutional View does not support the preemptive use of CFMs—a point reiterated by a few Directors at the meeting—although a few others saw merit in reconsidering the case. Directors also noted that the strengthening of macroprudential policy frameworks can usefully form part of broader efforts to enhance risk management, and prudential regulation and supervision so as to support capital flow liberalization.

Directors highlighted that capital outflows should be handled primarily by macroeconomic policies. Nevertheless, where sufficient buffers are in place, a relaxation of MPMs may assist in countering financial stress from outflows. Directors emphasized the need to carefully calibrate decisions on relaxing particular MPMs, mindful of the need to preserve market confidence and the financial system's resilience to future shocks.

Directors concurred that the conceptual framework laid out in the staff paper provides a helpful basis for guiding staff assessment of measures with the goal of providing consistent, evenhanded, and well-targeted policy advice to member countries in the context of surveillance. They stressed that the context, calibration of the measure, and other country-specific circumstances should be taken into account in applying the framework. Noting the degree of judgment involved, Directors considered that a well-documented justification would be useful to understand how staff has reached a particular judgment and help inform

[1] At the conclusion of the discussion, the Managing Director, as Chairman of the Board, summarizes the views of Executive Directors, and this summary is transmitted to the country's authorities. An explanation of any qualifiers used in summings up can be found here: http://www.imf.org/external/np/sec/misc/qualifiers.htm

efforts to ensure consistent and evenhanded application of the framework, as well as greater clarity regarding the basis for assessment. Some Directors urged staff to proceed with caution in categorizing measures and avoid prescriptive advice that may trigger an adverse market reaction.

Directors observed that, while experience in the use of MPMs is growing, policymakers are still learning how best to calibrate them, with a view toward maximizing their benefits and minimizing costs to financial institutions, borrowers, and economic growth. Gauging the effectiveness of specific MPMs, notably in terms of the reduction in risk and severity of crises, remains challenging. Accordingly, Directors emphasized the need to progressively build up expertise and allow the macroprudential framework to evolve over time to incorporate new experience and insights.

Directors encouraged staff to continue deepening the understanding of macroprudential policies and their effectiveness, as well as how to apply the conceptual framework appropriately, drawing lessons from country experiences. They supported the plans to compile a database of MPMs reported by member countries and to integrate staff findings into Fund surveillance and technical assistance. Directors also called for continued close engagement with member countries and relevant international institutions in this area, including on use of MPMs to address risks from cross-border capital flows. They encouraged staff to provide further opportunity to follow up on these and other issues related to capital flows, including the issues requested by the Board.

INTERNATIONAL MONETARY FUND

June 2, 2017

INCREASING RESILIENCE TO LARGE AND VOLATILE CAPITAL FLOWS—THE ROLE OF MACROPRUDENTIAL POLICIES

EXECUTIVE SUMMARY

Capital flows can deliver substantial benefits for countries, but also have the potential to contribute to a buildup of systemic financial risk. Benefits, such as enhanced investment and consumption smoothing, tend to be greater for countries whose financial and institutional development enables them to intermediate capital flows safely.

Post-crisis reforms, including the development of macroprudential policies (MPPs), are helping to strengthen the resilience of financial systems including to shocks from capital flows. The Basel III process has improved the quality and level of capital, reduced leverage, and increased liquid asset holdings in financial systems. Drawing on and complementing such international reforms at the national level, robust macroprudential policy frameworks focused on mitigating systemic risk can improve the capacity of a financial system to safely intermediate cross-border flows.

Macroprudential frameworks can play an important role over the capital flow cycle, and help members harness the benefits of capital flows.

- Introducing macroprudential measures (MPMs) preemptively can increase the resilience of the financial system to aggregate shocks, including those arising from capital inflows, and can contain the build-up of systemic vulnerabilities over time, even when such measures are not designed to limit capital flows.

- While the risks from capital outflows should be handled primarily by macroeconomic policies, a relaxation of MPMs may assist, as long as buffers are in place, in countering financial stresses from outflows.

- Capital flow liberalization should be supported by broad efforts to strengthen prudential regulation and supervision, including macroprudential policy frameworks.

The Fund has two frameworks to help ensure that its advice on MPPs and policies related to capital flows is consistent and tailored to country circumstances. The frameworks (the Macroprudential framework and the Institutional View on capital flows) are consistent in terms of key principles, including avoiding using MPMs and capital flow management measures (CFMs) as a substitute for necessary macroeconomic adjustment.

The appropriate classification of measures is important to ensure targeted advice consistent with the two frameworks. The conceptual framework for the assessment of measures laid out in this paper will assist staff in properly identifying MPMs and measures that are designed to limit capital flows and to reduce systemic financial risk stemming from such flows (CFM/MPMs), and thereby ensure the appropriate application of the Fund's frameworks, so that staff policy advice is consistent and well targeted. The Fund will continue to develop and share expertise in using MPMs, and integrate these findings into its surveillance and technical assistance, which should contribute to building international understanding and experience on these issues.

Approved By
Tobias Adrian and Siddharth Tiwari

Prepared by MCM and SPR in consultation with LEG and RES. The team comprised Chikako Baba, Ivo Krznar, and Thorvardur Tjoervi Olafsson (all MCM), Diego Cerdeiro, Alexandre Chailloux, Ghada Fayad, Patrick Gitton, Shakill Hassan, Yinqiu Lu, Pablo Morra, Gabor Pula and Jiemin Ren (all SPR), with guidance on capital flow issues provided by Varapat Chensavasdijai and Annamaria Kokenyne. The paper was led by Erlend Nier (MCM) and Gavin Gray (SPR) under the overall guidance of Dong He, Petya Koeva Brooks, Gaston Gelos, Mary Goodman, and Martin Kaufman.

CONTENTS

FIGURES

Glossary

BCBS	Basel Committee on Banking Supervision
BIS	Bank for International Settlements
CCAR	Comprehensive Capital Analysis and Review
CCyB	Countercyclical capital buffer
CESEE	Central, Eastern and Southeastern Europe
CFM	Capital flow management measure
CFM/MPM	A measure that is both a CFM and an MPM
DPR	Dynamic loan loss provisioning requirements
DSTI	Debt-service-to-income
DTI	Debt-to-income
EU	European Union
ESRB	European Systemic Risk Board
FDI	Foreign Direct Investment
FSAP	Financial Sector Assessment Program
FSB	Financial Stability Board
FX	Foreign Exchange
GFC	Global financial crisis
HNB	Croatian National Bank
IMFC	International Monetary and Financial Committee
IV	The Liberalization and Management of Capital Flows: An Institutional View
LCR	Liquidity coverage ratio
LTD	Loan-to-deposit
LTI	Loan-to-income
LTV	Loan-to-value
MPM	Macroprudential measure
MPPs	Macroprudential policies
NSFR	Net stable funding ratio
TA	Technical Assistance

CONTEXT

1. Capital flows can deliver substantial benefits for countries, including via financial deepening, but also have the potential to contribute to a build-up of systemic financial risk.[1] Greater efficiency, strengthened financial sector competitiveness, and enhanced investment and consumption smoothing are key benefits of capital flows, which tend to be greater for countries whose financial and institutional development enables them to intermediate capital flows safely (Box 1). The risks from capital flows, including heightened macroeconomic volatility and vulnerability to crises, are well known from the experiences of emerging markets and other open economies, and they came into sharp focus again around the global financial crisis (GFC): vulnerabilities in financial systems built up in tandem with increasing cross-border interconnectedness and spillovers from source countries' policies, which sowed the seeds for large adverse effects once markets seized up, capital flows reversed, and balance sheets unwound.

2. Post-crisis regulatory reforms have therefore focused on increasing the resilience of financial systems to cope with shocks, including from capital flows. The goal has been to create systems that are more transparent and less complex, with institutions that are better capitalized, less leveraged, and hold more liquid assets, and are thus better able to absorb losses and manage liquidity risks, including those arising from cross-border flows. Such systems would encourage risks to be properly priced and help avoid large disruptions to economic activity or tax-payer funded bailouts. Significant progress has been made in this direction through the Basel III process, and implementation of the new standards is underway.

3. The mainstreaming of macroprudential policies has been an important element of these reforms. Macroprudential policy is the use of primarily prudential tools to limit systemic risk. Macroprudential measures (MPMs) can help increase the resilience of financial systems to aggregate shocks and mitigate the pro-cyclical build-up of risks over the financial cycle. Systemic risk can be driven by capital flows as well as domestic factors, and MPMs can thus help countries harness better the benefits of capital flows while managing the risks. Many Fund members have established macroprudential frameworks or are in the process of doing so.

4. The Fund has developed two frameworks to guide staff advice on MPMs and issues related to capital flows (Box 2). While developed separately, the frameworks are consistent in terms of their fundamental principles, including that measures should not substitute for warranted macroeconomic adjustment:

- The Fund's macroprudential framework (IMF, 2013a; and IMF, 2014a) lays out the institution's thinking on the use of primarily prudential tools to limit systemic risk, with the aim of ensuring that its advice in this area is consistent and well adapted to country circumstances.
- The Fund has also developed an Institutional View (IV) on capital flows to help countries harness the benefits of capital flows, while containing the possible macroeconomic and financial stability

[1] The terms systemic risk and systemic financial risk are used interchangeably in this paper to denote the risk of disruptions to the provision of financial services which is caused by impairment of the financial system, leading to serious negative consequences for the real economy (IMF, 2013a; and IMF, FSB and BIS, 2016).

risks (IMF, 2012a; and IMF, 2015). According to the Institutional View, capital flows should be handled primarily with macroeconomic policies, including exchange rate flexibility, FX intervention, and monetary and fiscal policy adjustment, supported by robust institutions and sound financial supervision and regulation as well as appropriate structural policies. In some circumstances, introducing capital flow management measures (CFMs) can be appropriate, including when a capital inflow surge raises risks of financial instability, but this should not substitute for warranted macroeconomic adjustment.

5. While the development of these frameworks has helped the Fund provide consistent advice, the task of building resilience in the face of large and volatile capital flows can be operationally difficult for much of the membership. The channels of transmission from capital flows to systemic risk can be hard to disentangle and adequately assess in real time, as the impact of external shocks on specific countries will be conditioned by their circumstances including the structure of the financial system and private-sector balance sheets, as well as institutional and policy frameworks. Countries can also face constraints on policy responses arising, for example, from the presence of large cross-border financial institutions, weaknesses in supervisory frameworks that may limit the scope to establish a robust macroprudential framework, and information gaps that may complicate the design and calibration of effective macroprudential instruments. All these considerations underscore the benefits of exploring and sharing how a diverse range of countries have sought to build resilience in the face of capital flows.

6. Against this backdrop, the IMFC and the IMF Executive Board have called for further work on the interaction between macroprudential policies and policies related to capital flows.[2] The impact of capital flows on systemic risks, including the channels of transmission, could be examined in greater depth, along with the role of MPMs in limiting systemic financial risk—and therefore macroeconomic risks—arising from capital flows, taking into account countries' financial and institutional development. Moreover, a more detailed articulation of the Fund's two frameworks, as laid out in the section of this paper covering their complementarities, would help the Fund provide consistent and well-targeted advice to its membership. To address these points, the paper draws on a range of country experience, including eight background case studies.[3]

7. The remainder of the paper is organized as follows. It starts with an analysis of the relationship between capital flows and systemic risk, and presents five distinct aspects of systemic risk that can arise from capital flows. Based on this analysis, the paper discusses the potential for macroprudential tools to help limit the various dimensions of systemic risk during capital inflow

[2] See Communiqué of the Thirty-Fifth Meeting of the IMFC and Communiqué of the Thirty-Fourth Meeting of the IMFC. In the recent Capital Flows—Review of Experience with the Institutional View, the IMF Board supported follow-up work on the interaction between macroprudential and capital flow policies, especially the role of macroprudential policy frameworks in addressing systemic financial risks arising from capital flows, taking into account countries' financial and institutional development.

[3] The case studies cover Cambodia, Colombia, Croatia, Iceland, Korea, Peru, Sweden, and Turkey. These countries are diverse in terms of income group and the structure of the financial system, have faced large and volatile capital flows, and have actively used MPMs as part of a strategy to address the associated risks.

Box 1. The Benefits of Capital Flows

Capital flows can have substantial benefits. Their risks are discussed in detail in the remainder of the paper. The benefits can be both direct and indirect (IMF, 2012a).

Direct potential benefits from capital flows can include:

- *Consumption smoothing and investment, diversification of risks, and more efficient global allocation of resources*. Capital flows allow countries with excess savings to obtain the highest possible rates of return on their savings and reduce risks by diversifying their lending and investments. They also provide opportunities for countries with limited savings to attract financing for productive investment at lower costs, helping finance their current account deficits. Capital flows thus benefit both source and recipient countries, enhancing global economic growth and welfare.

- *Benefits associated with foreign direct investment (FDI)*. FDI may facilitate the transfer of new technologies, and management and corporate governance practices, while also contributing to human capital development via employee training. The entry of foreign direct investors may also lead to increased competition and efficiency. In addition, profits and employment generated by FDI boost tax revenues in recipient countries.

Capital flows can also produce indirect benefits, including:

- *Financial sector development*. Capital flows can help increase the depth and liquidity of securities markets, promoting the development of domestic capital markets. They may also increase the amount of funds intermediated by the banking system, improving access to finance.

- *Promotion of trade*. FDI and financial sector development may increase opportunities for cross-border trade in goods and services. Opportunities to increase trade may arise from increased access to trade credit lines, higher imports and exports associated with FDI, and indirectly through greater financial sector development and access to credit.

- *Greater macroeconomic policy discipline and improvements in the business environment*. Capital flows may increase incentives for the adoption of prudent macroeconomic policies and the establishment of strong legal and institutional frameworks to help ensure that recipient countries remain attractive for foreign investment.

The empirical evidence on the relationship between overall capital account openness and long-run growth is mixed. A number of studies find a clearer relationship between capital flows and growth for FDI and other non-debt flows, than for debt-creating flows (e.g., Aizenman and Sushko, 2011; Edwards, 2007; Henry, 2007; Kose et al., 2008; and Jeanne et al., 2012). The mixed evidence in the empirical literature could stem from incorrect hypothesis specification (Henry, 2007), lack of recognition of the indirect benefits of financial openness, such as through greater macroeconomic discipline and financial development (Kose et al., 2009), and lagged effects of capital flow liberalization on growth. Several studies also point to certain "threshold" levels of financial and institutional development that are required before an economy can harness the benefits and reduce the risks of financial openness (Edwards, 2001; and Prasad et al., 2003). Fundamental economic reasons may also play a role. For example, Rodrik and Subramanian (2009) argue that a key reason for the mixed empirical evidence is that developing countries are investment-opportunity constrained instead of saving-constrained, and inflows, by overvaluing the domestic currency, inhibit investment in the crucial tradable sector, thereby undercutting growth.

surges, and examines factors that might influence the effectiveness of macroprudential tools**.** Next, the paper explores the complementarity between the Fund's macroprudential framework and the Institutional View, and identifies principles for classifying MPMs that may also be CFMs to help ensure the Fund provides appropriate and consistent advice. Finally, the paper lays out considerations for the settings of macroprudential policies in the event of capital outflows, and discusses the role of macroprudential policies in building resilience as countries embark on the path of capital flow liberalization.

Box 2. Policy Frameworks—Macroprudential Policies and Institutional View on Capital Flows

The Fund's two policy frameworks provide comprehensive guidance in their respective areas:

Macroprudential Framework (IMF, 2013a; and IMF, 2014a)

Macroprudential policies are primarily prudential measures designed to limit systemic risk. The core notion of systemic risk is the risk of disruptions to the provision of financial services which is caused by impairment of the financial system, and can cause serious negative consequences for the real economy. Macroprudential policies can help limit systemic risk by pursuing three "tasks": (i) increase the resilience of financial systems to aggregate systemic shocks, by building buffers that help maintain the ability to provide credit; (ii) mitigate the pro-cyclical feedback between asset prices and credit, and contain unsustainable increases in leverage and volatile funding over the financial cycle; and (iii) contain structural vulnerabilities in the financial system that arise through interlinkages between financial intermediaries, and when individual institutions become "too important to fail."

The tools used are primarily prudential. They can include, for example, countercyclical capital buffers and provisions, sectoral capital requirements, measures to contain liquidity and foreign exchange (FX) mismatches, and caps on loan-to-value (LTV) and debt-to-income (DTI) ratios. They can also include tools traditionally associated with other policy fields, such as monetary (e.g., reserve requirements) and fiscal policy (e.g., levies imposed on wholesale funding).

Several conditions need to be met for macroprudential policy to be effective. Macroprudential policy should focus on containing systemic vulnerabilities and should not be overburdened with broader objectives, such as the management of the level and composition of aggregate demand. Macroprudential policy also needs to build on strong microprudential supervision, must be guided by a continuous assessment of evolving risks rather than being rules-based, and it should consider systemic risks in the whole financial system beyond banks.

The Institutional View on Liberalization and Management of Capital Flows (IMF, 2012a)

Managing capital flows:

- Countries can better absorb capital flows and reap their benefits by implementing sound macroeconomic policies, deepening financial markets, strengthening financial regulation and supervision, and improving institutional capacity.
- Inflow surges or disruptive outflows can give rise to macroeconomic and financial stability risks. In order to manage these risks, a key role needs to be played by macroeconomic policies,

Box 2. Policy Frameworks—Macroprudential Policies and Institutional View on Capital Flows (concluded)

including monetary, fiscal, and exchange rate policies, as well as by sound financial supervision and regulation, and strong institutions.

- CFMs should not be used to substitute for or avoid warranted macroeconomic adjustment. In certain circumstances, introducing CFMs can be useful for supporting macroeconomic policy adjustment and safeguarding financial system stability. It is generally preferable that CFMs not discriminate between residents and non-residents, and that the least discriminatory measure that is effective be preferred.

For managing inflow surges:

- The appropriate policy mix depends on a variety of country-specific conditions, including macroeconomic and financial stability, financial development, and institutional capacity.
- In certain circumstances, introducing CFMs can be useful, particularly when underlying macroeconomic conditions are highly uncertain, the room for macroeconomic policy adjustment is limited, or appropriate policies take undue time to be effective.
- CFMs could also be appropriate to safeguard financial stability when inflow surges contribute to systemic risks in the financial sector.
- CFMs should be targeted, transparent, and generally temporary—being lifted once the surge abates, in light of their costs.
- Policy tools designed to limit capital flows and to reduce systemic financial risks stemming from such flows are considered both CFMs and MPMs (CFM/MPMs). The economic usefulness of maintaining such measures over the longer term for managing systemic financial risks needs to be evaluated against their costs on an ongoing basis, and consideration given to alternative measures that directly address systemic risks but are not designed to limit capital flows.

For responding to disruptive outflows:

- When responding to disruptive outflows, CFMs should generally be used only in crisis situations or when a crisis may be imminent. CFMs are more effective when they are implemented as part of a broad policy package that includes sound macroeconomic policies as well as financial regulation. They should be temporary, being lifted once crisis conditions abate, and may need to be adjusted on an ongoing basis in order to remain effective.

Capital flow liberalization:

- Countries are better placed to benefit from capital flow liberalization if they have achieved certain thresholds of financial and institutional development.
- Countries with extensive and long-standing CFMs would likely benefit from careful further liberalization in an orderly manner. There is, however, no presumption that full liberalization is an appropriate goal for all countries at all times.
- Capital flow liberalization needs to be well planned, timed, and sequenced, especially to ensure that its benefits outweigh the costs, as it could have significant domestic and multilateral effects.

CAPITAL FLOWS AND SYSTEMIC RISK

8. Systemic risk is the anchoring concept for assessing the impact of capital flows on the stability of a country's financial system. It is a multi-dimensional concept encompassing risks building up over time, for instance through financial accelerator effects or volatile funding, as well as cross-sectional vulnerabilities from the structure of the financial system, including those arising from linkages within and across classes of financial intermediaries.[4]

9. The literature has found that large and volatile capital flows can give rise to systemic risk through a number of channels. One strand of research has emphasized how capital inflow surges exert upward pressure on exchange rates (and other asset prices), leading to a rise in collateral values and net worth, increasing borrowing capacity and lending through financial accelerator effects (Cesa-Bianchi, Ferrero, and Rebucci, 2017; and Kiyotaki and Moore, 1997).[5] Another pattern associated with capital inflow surges is rising cross-border non-core liabilities,[6] allowing banks to extend credit beyond the availability of domestic retail deposits, and leading both to credit booms and rising maturity and currency mismatches on banks' balance sheets (Hahm, Shin, and Shin, 2013). The buildup of gross debt positions can also raise contagion risks through leverage chains, as counterparty obligations proliferate (Acharya and Schnabl, 2010). Reflecting these and other channels, recent empirical research has generally found a close association between capital inflow surges and financial crises.[7]

10. Drawing on the literature, it is helpful to distinguish five stylized transmission channels through which capital inflows can lead to systemic risks. The remainder of this section draws on evidence and country examples to explore the drivers and features of: (i) credit booms; (ii) asset price booms; (iii) unhedged foreign currency exposures; (iv) non-core funding of the banking system; and (v) interconnectedness. These should not be seen as independent processes, as it is common for two or more of them to reinforce each other through feedback effects—especially credit booms, asset price booms and non-core funding (see Figure 1). Articulating and analyzing them separately is nevertheless important to inform choices on tools to manage risks (see the next section of the paper).

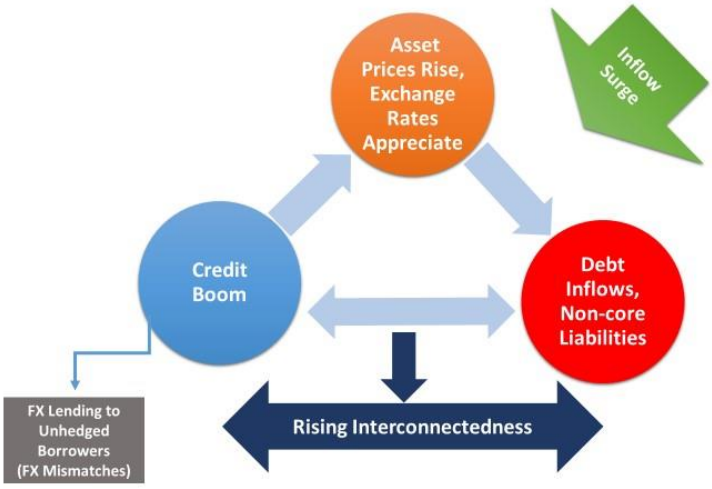
[4] There are numerous approaches to proxy different dimensions of systemic risk, including financial cycles (see Box 3) and some can be tracked via regulatory ratios such as the loan-to-deposit ratio. See also Bisias et al., (2012).

[5] See also Brunnermeier and Oehmke, 2013; Bruno and Shin, 2015a, and 2015b; and Korinek and Sandri, 2016.

[6] Non-core funding includes more volatile funding sources, such as short-term funding sourced on wholesale markets (Hahm, Shin and Shin, 2013). See paragraphs 19 and 20.

[7] Ghosh, Ostry, and Qureshi (2016) find that around one-fifth of inflow surge episodes in emerging markets end in banking or currency crises, while Gourinchas and Obstfeld (2012) find the combination of sharp appreciation and rising leverage to be a robust predictor of financial crises.

Figure 1. Transmission Channels of Capital Flows



11. Both country circumstances and the composition of capital flows will have a major impact on whether and how systemic risk may build up—or whether capital flows promote healthy financial deepening (Box 1)—and which of the channels will come into play. Key factors include the depth of capital markets, the presence of dollarization, the strength of microprudential supervision, and the settings of monetary policy and structure of macro-prudential policies.[8] The relationship between capital inflows and systemic risk appears to be stronger for gross inflows (i.e., net purchases of domestic assets by non-residents), although net inflows matter as well. For instance, in the case of Korea, prior to the 2008–09 GFC, gross debt inflows to Korean banks increased considerably while the country had been running current account surpluses. Surges dominated by debt inflows are more likely to end in crises. This is especially the case with bank inflows, which have been found to have a robust effect on credit growth (Blanchard et al., 2016).

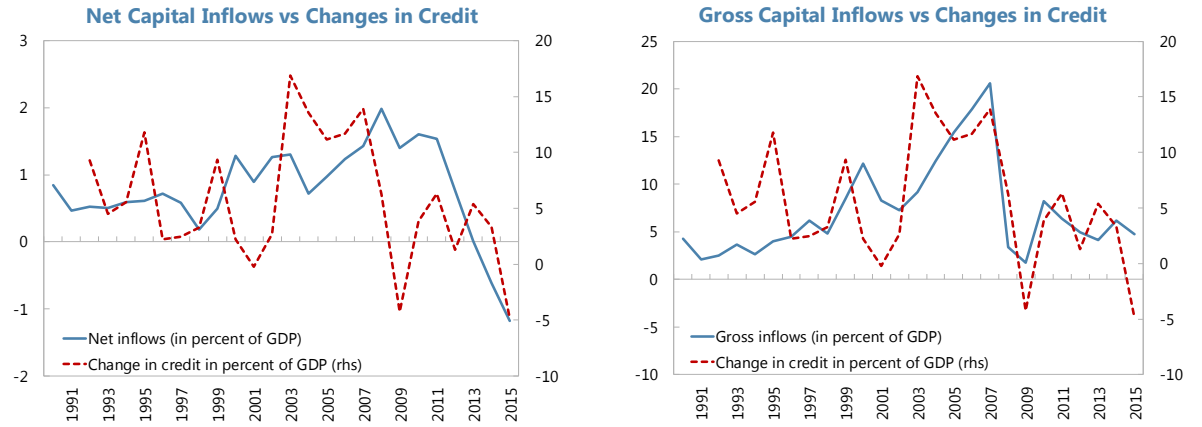
12. Inflow surges can be a significant driver of credit booms through multiple channels including via financial accelerator effects (see below). The financial cycle is a helpful conceptual framework for considering the magnitude of credit booms (see Box 3). Both gross and net inflows are correlated with credit growth (see Figure 2), while capital inflow surges have also been found to be good predictors of credit booms (Reinhart and Reinhart, 2009; Mendoza and Terrones, 2008).[9] This has been the case in Turkey, for example, where episodes of ample capital inflows including 2002–07 and 2010, intermediated by local banks, led to rapid credit growth. In Colombia, credit was highly and positively correlated with capital flows in the 1990s and the early 2000s, but not more recently. While recent credit booms tended to be preceded by inflow surges, not all inflow surges

[8] While the empirical literature and the examples cited in this paper largely focus on advanced and emerging markets, similar risks can occur in frontier markets and low-income countries (IMF, 2014c).

[9] The joint occurrence of an inflow surge with a lending boom also increases substantially the probability of banking crisis (Caballero, 2016).

result in credit booms (Amri et al., 2016). This reflects the scope for domestic policies to limit systemic risk, as well as the importance of the composition of inflows (IMF, 2012a).

Figure 2. Net and Gross Flows, and Credit Expansions



Note: The database covers 141 countries: 37 advanced, 65 emerging, and 39 low-income economies. The ratios are calculated using aggregates across countries.

Sources: IMF Financial Flows Analytics; WB World Development Indicators; and IMF staff calculations.

13. The literature establishes the strongest relationships between non-FDI flows, particularly gross debt flows, and credit booms (Figure 3):

- ***Other investment inflows***—which include direct foreign lending to banks and corporates—have the most robust positive relationship with domestic credit growth. Blanchard et al. (2016) report that a one percent of GDP increase in other investment flows leads to an increase of 0.6 percentage points in credit to GDP. Such flows have similar positive effects on credit growth for households and corporates (Igan and Tan, 2015), which can support healthy financial deepening. The likelihood that a credit boom is of the "bad type" (i.e. followed by a financial crisis) seems to be higher when funded by other investment flows (Calderón and Kubota, 2012). This was particularly pronounced in central and eastern Europe before the GFC, where a large share of flows involved flows from large global banks to their local subsidiaries for domestic on-lending.[10]
- ***Portfolio debt inflows*** have a positive but less well understood effect on credit growth (Blanchard et al., 2016; Lane and McQuade, 2013; and Igan and Tan, 2015).[11] Investor inflows into domestic government bond markets exert downward pressure on yields, generally also compressing lending spreads, and boosting domestic liquidity. Inflows to corporate bonds have an ambiguous effect: they could substitute for bank intermediation, or alternatively they might

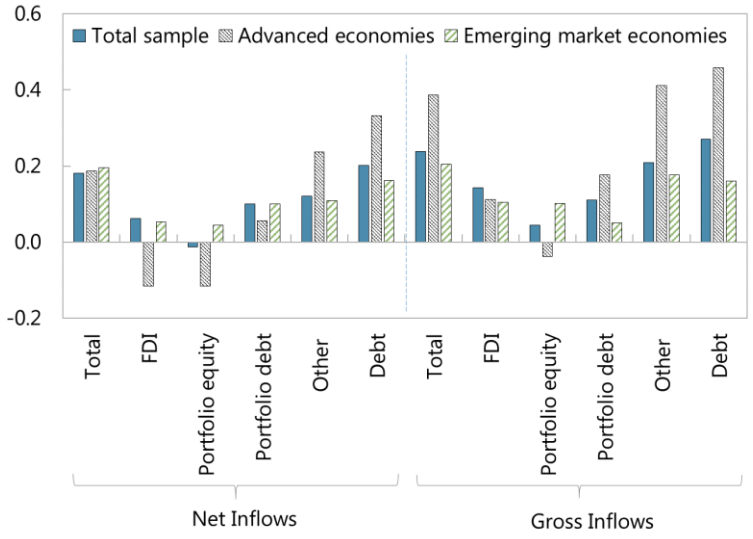
[10] In a similar vein, large European banks' cross-border direct lending to non-financial corporations created large vulnerabilities in many central, eastern and southeastern European (CESEE) countries prior to the GFC.

[11] Lane and McQuade (2013) find, for a sample of European countries, a strong relation between (gross and net) debt flows and credit growth. Debt flows, however, are defined to include not only portfolio debt, but also other investment, and reserve assets.

spur domestic credit booms if the issuers do not spend the proceeds, and redeposit them in the domestic banking system.

- ***Portfolio equity flows*** are also positively associated with credit expansions, but the effect seems to be weak.
- ***FDI inflows*** have been found to have either no significant effect on credit growth (Igan and Tan, 2015), or a *negative* effect, depending on the extent to which FDI substitutes for domestic intermediation (Blanchard et al., 2016).[12]

Figure 3. Correlations Between Various Types of Capital Flows and Changes in Credit



Sources: IMF Financial Flows Analytics; WB World Development Indicators; and IMF staff calculations.

Notes: Debt includes portfolio debt and other investment flows (mainly bank loans). All variables are measured as percent of GDP. Correlations are calculated for the 1990–2015 period, across time for each individual country, and then aggregated by using simple (unweighted) average. The relative strength of correlations across types of capital flows are robust to alternative aggregation methods (e.g., using GDP and the size of capital flows as weights). Correlations vary across time, and they tend to be stronger between 2003–09 (during the run-up to the GFC and during the crisis).

[12] There could, however, be cases where a large share of FDI comes from foreign banks capitalizing their local subsidiaries, which as in central and eastern Europe before the GFC was a driver of domestic lending booms.

A. Effects Through Asset Prices

14. Capital inflow surges often exert upward pressure on asset prices, with the potential to magnify credit booms via financial accelerator effects.[13] Appreciated currencies and inflated asset prices raise collateral values and borrowers' net worth. The capital inflow surge into emerging markets in the aftermath of the GFC helped propel stock and bond prices in some countries (IMF, 2010; and IMF, 2011). A strong positive relationship has also been found between net capital inflows and real estate prices (Aizenman and Jinjarak, 2009; Kim and Yang, 2011; Tillmann, 2013; and Sa and Wiedalek, 2015).[14] In Colombia, for example, a capital inflow surge in the 1990s and resulting credit boom drove a large increase in real estate prices. A dilemma for some countries is that monetary policy tightening in order to contain the build-up of asset price bubbles could attract further inflows.

15. Direct purchases of real estate by foreigners may also lead to a build-up of systemic risk. This could occur if foreign demand is strong enough to fuel a generalized increase in real estate prices, compelling domestic buyers to leverage up. However, asset price booms that are not associated with rapid increases in borrowers' leverage do not seem to pose significant threats to financial stability (Jorda, Schularick, and Taylor, 2012; and Brunnermeier and Schnabel, 2016).

16. The reversal of capital inflows triggered by a tightening of global financing conditions may reduce asset prices and weaken balance sheets. While some financial systems can cope with these effects, in other cases lower asset prices could substantially erode net worth and reduce borrowing capacity (Brunnermeier and Oehmke, 2013; and Dávila and Korinek, 2016). Balance sheet repair may require selling assets at depressed values and curtailing investments, which could further erode firms' valuations by affecting domestic activity, with fire sales in the worst cases. Since inflows need not have been intermediated by banks, the reversal in asset prices may increase the likelihood of a crisis even if domestic credit growth had not been excessive (Caballero, 2016).

[13] Increases in credit associated with rising real estate prices could reflect high rates of return on capital, and need not necessarily imply an increase in systemic risk.

[14] In a study that also covers the post-GFC period, Favilukis et al. (2013) find a smaller effect of capital flows on real estate prices, a result they rationalize based on the observation that after the crisis real estate prices plummeted in several countries (including the US) even in the absence of a reversal of net inflows.

Box 3. Role of Financial Cycles and Systemic Risk

The financial cycle provides a useful conceptual framework for assessing the evolution of systemic risk over time and relating it to capital inflows. The rationale for using the financial cycle as a way of thinking about systemic risk relies on the empirical observation that systemic risks build up when credit and asset prices rise; and when they eventually materialize, credit falls sharply, and/or asset price bubbles burst (Borio, 2012).[1/] However, this does not capture all dimensions of systemic risk, and it is hard to integrate currency mismatches or interconnectedness in this framework.

Source country policies have an impact on global capital flows, and therefore can affect the financial cycle in open economies. As financial liberalization and cross-border capital flows increased in recent decades, financial cycles have become more synchronized with surges and troughs in capital flows, and their amplitude (the difference between financial cycles' peaks and troughs) increased (IMF, 2016a). There is also some indication that financial cycles across countries are becoming increasingly more synchronized, as suggested by rising correlation among financial asset prices across countries (Rey, 2015). Financial and business cycles are generally positively correlated, although financial cycles can have longer duration (systemic risks may continue to build up during output contractions) and deeper contractions than business cycles (IMF, 2017)

A credit gap is one useful summary indicator for the position in the financial cycle. It captures the deviation of credit from its long-term trend, and is commonly used by regulators and standard-setting bodies in designing and calibrating prudential regulations, including the countercyclical capital buffer (CCyB). An unusually rapid expansion of credit has been found to be one of the best predictors of subsequent financial turbulence (Drehmann, Borio and Tsatsaronis, 2012). Credit gaps have generally been estimated through univariate filters of credit-to-GDP, or more recently by multivariate model-based approaches (IMF, 2017).

The financial cycle, like other measures of systemic risk, is subject to statistical and methodological challenges. A significant amount of data is required, especially for model-based approaches, which are therefore more difficult to specify. Some also argue that the credit gap concept is flawed, because it compares a stock variable (credit) with a flow (GDP), and advocate instead comparing the change in the stock of credit (a flow variable) with GDP (IMF, 2017), which is an approach used in this paper.

[1/] While there is no consensus on the definition of the financial cycle, it is generally used to denote self-reinforcing interactions between perceptions of value and risk, attitudes towards risk as well as financing constraints, which translate into booms followed by busts (Borio, 2012).

B. Unhedged Foreign Borrowing

17. Credit risk from unhedged foreign currency borrowing is a common byproduct of credit booms during inflow episodes. This occurred in the run-up to the Asian crisis in the late 1990s, and remains a feature in many emerging markets. Unhedged foreign currency borrowing by corporates and households tends to increase when domestic interest rates are materially above global rates and the local currency is expected to appreciate, as is generally the case during inflow surges. There is thus a strong statistical correlation between capital flows and the share of foreign-currency lending (Basso et al., 2007; and Ostry et al., 2012). Corporates and banks may also resort to foreign borrowing during periods of low exchange rate volatility (Avdjiev et al., 2012).

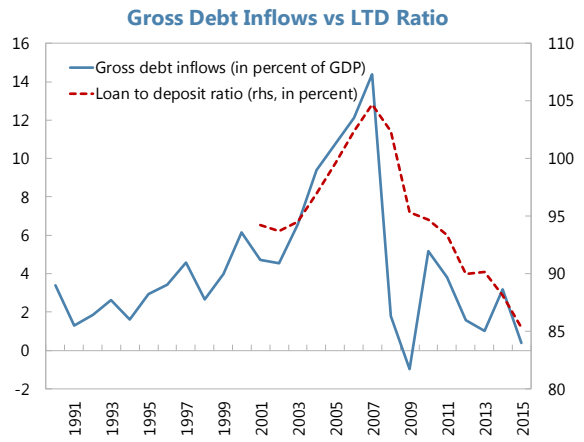
18. Risks may materialize once capital flows reverse and the exchange rate depreciates. A sharp depreciation may leave unhedged borrowers unable to service foreign currency loans, causing

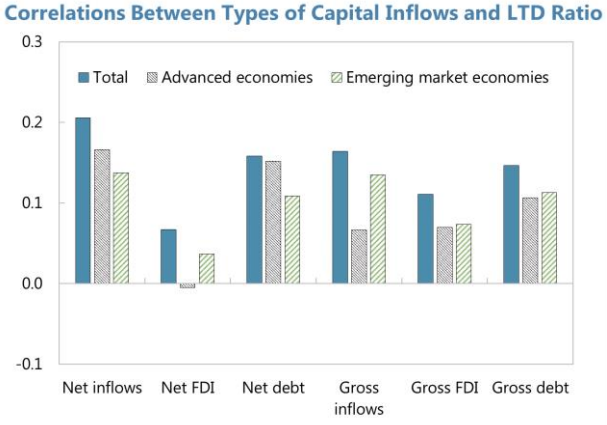
defaults and ultimately posing risks to intermediaries (IMF, 2016d). The ensuing increase in nonperforming loans erodes banks' capital and therefore their capacity to lend. The association between FX borrowing and crisis risk is well-established (Bordo et al., 2010). For instance, in Colombia, the depreciation of the peso in the late 1990s hit the corporate sector, which had accumulated large unhedged foreign exchange exposures. The deterioration of the corporate sector's balance sheets in turn reduced the credit quality of banks' loan portfolios.

C. Effects Through Banks' Non-Core Funding

19. Under favorable external conditions, domestic banks may raise funding through "non-core" liabilities—including funding in FX—with feedback effects in the presence of credit booms. Rapid credit expansions generally outpace the steady accumulation of domestic deposits, and the loan-to-deposit ratio is a useful proxy for this dimension of risk (Figure 4). Merrouche and Nier (2017) find that not only are capital inflows associated with an increase in wholesale-funded credit, but that the impact on financial sector vulnerabilities was amplified when the supervisory and regulatory environment was weak. Moreover, when external conditions are favorable, financing can be obtained internationally at low cost. Foreign financing through cross-border interbank loans or debt issuance can give banks further room to extend credit, and may also increase maturity mismatches, making banks vulnerable to funding risks, especially if borrowing at arms' length (i.e., not through parent banks). For instance, Turkish banks' external wholesale FX funding has been a key support for loan growth, exposing them to rollover risk in case of a reversal of market sentiment. Peruvian banks' rapid increase in non-core liabilities in the late 1990s left them exposed to a sudden stop in debt inflows.

Figure 4. Capital Flows and Loan-to-Deposit Ratios





Sources: IMF Financial Flows Analytics and International Financial Statistics, and IMF Staff Calculations.

Notes: Debt includes Portfolio debt and other investment flows (mainly bank loans). Correlations are calculated for the 1990–2015 period, across time for each individual country, and then aggregated by using simple (unweighted) average.

20. Rollover risks may materialize when external conditions worsen. This can occur even in countries with strong external positions, such as Korea, whose banking system relied on cross-border wholesale funding in the run-up to the GFC and was vulnerable to the loss of foreign funding

once global liquidity conditions turned. Similarly, parent banks that rely on wholesale funding can also transmit liquidity shocks to subsidiaries that borrowed from them (Bruno and Shin, 2015b). In the most severe shocks, reliance on non-core funding and subsequent episodes of wholesale runs, either through a drastic reduction of the maturity of interbank funds or the loss of access to the bond market, have been identified as key sources of vulnerability in the run-up to banking crises in the 1990s and 2000s (Lane and McQuade, 2013).

D. Effects Through Interconnectedness

21. Gross debt flows can increase systemic risk, even in the absence of significant net flow imbalances, by making the financial system more interconnected. Gross positions have increased very rapidly since the 1990s (Gourinchas and Rey, 2014), with cross-exposures between residents and non-residents being pro-cyclical (Broner et al., 2013). Under inadequate regulation and supervision frameworks, these flows can be associated with a significant build-up of risk (Borio and Disyatat, 2011). For example, European global banks' pre-GFC activity included funding the purchase of US mortgage-backed securities by selling short-term paper in U.S. money markets—raising gross assets and liabilities in both the US and Europe, with no net flow—which was widely advanced as an explanation for the larger impacts of the subprime crisis on financial systems in Europe than on emerging markets even though Europe, as a whole, had a current account surplus (e.g., Bayoumi and Bui, 2011; Shin, 2012; and McGuire and von Peter, 2012).

22. The presence of global systemically important institutions poses additional challenges. While increased interconnectedness can contribute to resilience under certain conditions, it can also become a source of systemic risk under large negative shocks (Acemoglu et al., 2015). In particular, distress or disorderly liquidation of large and highly connected financial institutions can potentially lead to wider instability.

MAPPING MACROPRUDENTIAL INSTRUMENTS TO RISKS

23. The post-crisis financial sector reforms have ushered in a broad range of measures, including microprudential reforms, that should make financial systems more resilient to the systemic risks associated with capital flows. The Basel III process has strengthened the quality and level of capital across banking systems. Heightened standards have been introduced to improve risk management and supervision of liquidity risks, which supports the goal of enhancing resilience. In tandem, the authorities in many countries have taken steps to monitor risks, and strengthen supervision. In some countries, microprudential reforms have accompanied or preceded the establishment of macroprudential frameworks (see Colombia and Peru case studies).

24. To complement microprudential measures, a robust macroprudential framework focused on mitigating systemic risk can improve the capacity of a financial system to safely

intermediate cross-border flows.[15] Macroprudential policy measures, including tools developed as part of the Basel III framework, can help bolster the defenses of the financial system and thereby increase the ability of the financial system to handle capital flows safely. They can also contain the transmission of capital flows to increases in systemic risks. These benefits can be achieved even though the objective of macroprudential measures is not to restrict such flows.

25. Macroprudential policy can make two key contributions to reducing systemic risks from capital flows.

- **First, it can increase the resilience of the financial system to aggregate shocks**, **including shocks associated with a reversal of capital flows**. By building buffers, macroprudential policy helps maintain the ability of the financial system to provide credit to the economy even under adverse conditions. The increased resilience can help the system (i) weather domestic economic shocks; and (ii) withstand a bust in asset prices or a sharp depreciation of the exchange rate that might arise from a reversal of capital flows.
- **Second, it can aim at containing the build-up of systemic vulnerabilities over time** by reducing procyclical feedback between asset prices or exchange rates and credit, and containing unsustainable increases in leverage and volatile funding.[16] Such cyclical build-up of risk can arise in a purely domestic setting. However, for open economies, this can also be driven by global financial conditions, or surges of capital inflows that can contribute to an increase in domestic asset prices, credit, leverage and volatile funding.

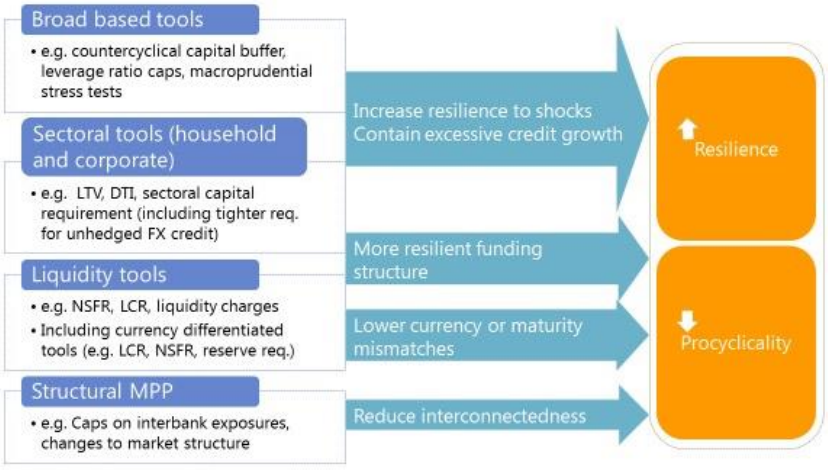
26. A number of macroprudential policy tools are useful to address the range of transmission channels that are described in the previous section (IMF, 2014a; and IMF–FSB–BIS, 2016).[17] These include (i) broad-based tools; (ii) sectoral and asset side tools; and (iii) liquidity tools (Figure 5).

[15] For a broader discussion of interactions between macroprudential policy and other policies, including monetary policy settings and frameworks, see IMF, 2013b; and IMF, 2014a.

[16] However, macroprudential policy should not be used to control asset prices, including the prices of securities (stocks and bonds), or interest and exchange rates (IMF, 2013a).

[17] In the remainder of this section, measures comprising part of the Basel framework will be discussed alongside other measures based on the way in which they help to limit systemic risk.

Figure 5. Macroprudential Policy Tools and Transmissions



27. ***Broad-based tools*** **increase resilience against a range of shocks and help address vulnerabilities from credit booms which can be induced by capital inflows**. Broad-based tools affect all credit exposures of the banking system, and aim primarily to increase resilience, but some of them may also have a moderating effect on credit in buoyant times. These include countercyclical capital buffers (CCyB) and dynamic loan loss provisioning requirements (DPR), both of which help build buffers to absorb losses, and a static or dynamic leverage ratio.[18] A static leverage ratio limit, such as the one envisaged in Basel III, can be useful in constraining the build-up of excessive leverage that may arise in the context of an inflow surge.[19] Repeated macroprudential stress tests that target a given level of resilience against prospective vulnerability scenarios and that result in restrictions on institutions (e.g., the Comprehensive Capital Analysis and Review, "CCAR", in the US) also fit into this category. A few open economies already activated positive buffer requirements under their CCyB frameworks (e.g., Sweden, and Norway in 2015, Hong Kong in 2016, and the Czech Republic, Iceland, and Slovakia in 2017). The DPR was first introduced by Spain in 2000, and adopted by many Latin American countries (e.g., Colombia and Peru case studies). Some countries (e.g., Croatia in the 2000s) have also used caps on credit growth where capital tools were not available or effective in reducing excessive credit growth.

[18] These tools are complementary (IMF, 2014b). The DPR covers losses that are expected to arise over an average economic cycle, while the CCyB covers additional unexpected losses that arise in times of financial stress. The leverage ratio is intended to complement risk-based capital requirements, including CCyB, by constraining banks' ability to increase the overall size of their exposures relative to their capacity to absorb losses.

[19] Ahead of the global implementation of the Basel III leverage ratio in 2018, the UK implemented the minimum requirement, as well as a countercyclical leverage buffer, for major banks and building societies in 2016. A number of other advanced economies announced a higher leverage ratio requirement than the Basel III minimum (e.g., Switzerland and US).

28. *Sectoral tools* targeted at specific credit categories help mitigate systemic risk arising from excessive credit growth and asset price appreciation that may be induced by capital inflows. In particular, sectoral capital requirements (risk weights) on specific loans, such as mortgage credits in FX, can be raised to induce banks to hold extra capital and protect against unexpected losses arising when default rates increase as a result of an economic downturn or a depreciation of the exchange rate. Constraints on household lending, such as limits on loan-to-value (LTV) ratios and debt-service-to-income (DSTI) ratios, increase the resilience to asset price and income shocks, and reduce demand for housing loans. Loan restrictions and guidance on underwriting standards are often targeted at mortgages, but can also be applied to other segments, including commercial property or loans to the corporate sector (IMF, 2014b; and IMF–FSB–BIS, 2016). Constraints can be tighter for lending in FX, which carries additional risks. For instance, Central, Eastern and Southeastern European (CESEE) countries applied measures on FX denominated or indexed mortgage loans. Examples include higher risk weights on FX mortgage loans in Serbia (2008) and Poland (2008); stricter caps on DSTI and/or LTV ratios on FX mortgage loans in Poland (2011), Hungary (2010), and Romania (Box 2 of IMF, 2014b). Higher risk weights can also extend to lending to unhedged corporates. For instance, Croatia implemented higher risk weights on FX or FX-linked loans to corporate firms during the boom of the 2000s (case study). More recently, Russia imposed higher risk weights on certain FX exposures in 2016 (IMF, 2016b), and such measures were also recommended to Belarus (IMF, 2016c). Where asset prices are driven up by capital inflows these prudential measures can also be complemented by targeted fiscal measures, which should preferably be non-discriminatory.

29. *Liquidity tools* can help contain vulnerabilities related to volatile funding structures. The Basel III liquidity tools—minimum standards for the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR)—can play an important role in improving resilience to liquidity shocks.[20] Liquid asset requirements (such as the LCR) make banks (i) increase holdings of liquid assets; (ii) reduce holdings of illiquid assets; or (iii) lengthen funding maturities, thereby reducing the scope for funding pressure to result in fire sales. Similarly, stable funding requirements (including the NSFR, a core funding ratio as in New Zealand, a loan-to-deposit ratio as in Korea (see case study), or liquidity charges) contain reliance on more volatile funding sources, thereby reducing the vulnerability of the system to a drying up of such funding.

30. When the funding additionally carries FX risks, certain *currency differentiated liquidity tools* can be helpful in addressing currency and maturity mismatches. Policy measures to limit excessive currency exposure in the funding profile could take the form of separate and potentially tighter liquidity requirements in foreign currency. For example, in Sweden the LCR applies separately to EUR and USD as well as to all currencies, and Iceland imposed both LCR and NSFR ratios differentiated by currency.[21] These requirements generate a pot of liquid FX assets that are available in the case of a FX liquidity shortage, and hence are useful in building the resilience to FX shocks. An

[20] Under the Basel III framework, the minimum standard for the LCR is being phased-in beginning in 2015 and steadily increasing to 100 percent by January 2019. The NSFR will become a minimum standard by January 2018.

[21] The Basel III framework includes LCR by significant currency as a monitoring tool.

alternative to quantitative constraints are price-based liquidity measures. For instance, Korea introduced liquidity charges on banks' non-core foreign currency liabilities (see case study). Some countries—especially those with high levels of domestic dollarization—maintain differentiated reserve requirements on FX liabilities (e.g., Peru and Turkey), in order to contain risks from such funding by building liquidity buffers, and to provide disincentives to funding in FX. More direct measures targeting FX denominated funding would include constraints on banks' gross open foreign exchange positions (spot or forward) in addition to net open position limits, or a cap on foreign currency borrowings.

31. These tools generally have twin benefits in inducing greater resilience and in helping contain procyclical dynamics among asset prices, credit, and wholesale funding. During inflow surges, macroprudential tools can help reduce the scope for capital inflows to generate procyclical dynamics between asset prices or exchange rates and credit, by constraining bank leverage or by curbing excessive credit to local borrowers in local or foreign currency. When the cycle turns, macroprudential tools help reduce the scope for capital outflows to result in financial stress. Capital buffers built in good times would protect against losses from indirect credit risk that can materialize from borrowing in FX whose local currency value would increase as a currency depreciates. Liquidity requirements would mitigate susceptibility to funding pressure in the context of capital outflows.

32. Macroprudential policy can also contribute to reducing systemic risks from interconnectedness within the global financial system. It can play a role in mitigating risks of contagion that might arise from cross-border exposures and interlinkages within the global financial system. Potential measures would include caps on interbank exposures to contain funding dependencies, as well as capital surcharges on global or regionally systemically important institutions. Such measures can complement changes to the market infrastructure and increases in the transparency of transactions, including by strengthening payment, settlement, and clearing arrangements to reduce the build-up of credit exposures arising from transactions within the global financial system.

EFFECTIVENESS OF MACROPRUDENTIAL TOOLS

33. The literature supports the notion that macroprudential policies have the potential to attain their desired benefits, although experience is still to be gained and policy conclusions are subject to caveats. While macroprudential policies are not all-powerful, the findings of the literature support the notion that macroprudential policies can be effective when used appropriately, even if effectiveness can also be limited by circumvention (leakage), and use of macroprudential tools needs to consider both benefits and costs. At the same time, actual experiences are still limited and evidence on the effectiveness of specific tools is only slowly accumulating and subject to caveats (Claessens, 2014).[22]

[22] Data availability constrains the scope of empirical work on the effectiveness of macroprudential measures. Econometric studies have generally used dummy variables indicating whether a macroprudential measure was either introduced (+1), left unchanged (0) or relaxed—an approach that does not account for the intensity of measures.

34. A growing literature is examining the general effectiveness of macroprudential policy in achieving its objectives (IMF–FSB–BIS, 2016). This includes studies conducted by central banks and the BIS, as well as contributions by IMF staff. Several studies looked at effects of a range of tools across countries and time (e.g., Akinci and Ohmstead-Rumsey, 2015; and Cerutti et al., 2017). Other studies focus on effects of the use of instruments for a given country, often using more granular data for identification (e.g., Basten and Koch, 2015; Jiménez et al., 2012; and Igan and Kang, 2011). With few exceptions (e.g., Cesa-Bianchi, Ferrero; and Rebucci, 2017) the literature has not specifically explored the usage of macroprudential measures in the context of capital inflow surges, even though country cases prepared for this paper take a step in this direction.

35. Existing evidence supports the effectiveness of macroprudential tools in building resilience (IMF-FSB-BIS, 2016). Capital tools, such as the countercyclical capital buffer, are found to increase resilience, by reducing the probability and impact of a crisis, especially when they are designed to allow capital buffers to be used to absorb losses, so that they can help maintain the provision of credit to the economy in the event of adverse shocks (e.g., Jiménez et al., 2012). The existing evidence on liquidity tools suggests that they tend to achieve the desired changes in the funding profile of financial intermediaries, thereby contributing to greater resilience (see Banerjee and Mio, 2014 for the UK; and Bonner, 2012 for the Netherlands). There is also evidence that sectoral tools, such as LTV and DTI constraints, increase the resilience of borrowers to asset price and income shocks, thereby reducing both the likelihood of default and the loss given default for lenders in the event of a downturn in housing markets (e.g., Hallissey et al., 2014).

36. Most existing studies also find that macroprudential policies can help contain procyclical dynamics between asset prices and credit, although effectiveness differs across tools (IMF-FSB-BIS, 2016). Studies generally find economically sizable effects when examining the potential for macroprudential tools to reduce the procyclicality of credit or contain excessive credit growth. However, the strength of the effects depends on capital market openness and financial market development (e.g., Lim et al., 2011; and Cerutti et al., 2017). It also differs across tools, with loan restrictions and borrower eligibility tools (such as LTV and DTI) having stronger effects on credit, based on their historical calibration, than capital or liquidity tools (e.g., Akinci and Ohmstead-Rumsey, 2015). In particular, the evidence suggests that a variation of the countercyclical capital across typical ranges of between 0 and 2.5 per cent, will have limited effect on credit growth when it is imposed in buoyant times, such as in the context of a capital flow surge, when it is easy for intermediaries to generate extra capital through retained earnings or issuing capital (e.g, Basten and Koch, 2015; and Jiménez et al., 2012). On the other hand, borrower-based tools are generally found to have measurable effects on credit, based on past calibrations. Tools that impose limits relative to borrower income, such as DTI ratios, are more powerful in containing increases in credit than limits relative to asset prices (such as LTV ratios), since the latter constraints tend to ease when asset prices are going up (Kuttner and Shim, 2016).

37. A key factor limiting effectiveness is the potential for macroprudential policy tools to be circumvented, resulting in domestic or cross-border "leakage" (IMF-FSB-BIS, 2016). In the presence of leakage effects, the desired effects of macroprudential policy tools on the resilience of

key domestic intermediaries will generally be preserved (see Croatia case study). However, leakage can seriously undermine the ability of macroprudential tools to contain excessive growth in credit and leverage of the household and corporate sectors. Leakage can be domestic, when the provision of credit moves from banks to non-bank providers of credit, or cross-border, when macroprudential tools induce an increase in the provision of credit from across the border or through local affiliates of multinational intermediaries. A growing literature points to sizable leakage effects for both capital tools and liquidity tools. Some studies suggest smaller leakage effects for loan restrictions (such as caps on LTV and DTI ratios), which can be imposed on all lenders, including both domestic non-banks and branches of foreign banks (e.g., Reinhardt and Sowerbutts, 2015). Leakages are more likely to be an issue for tools that aim in part to contain increases in the leverage of the corporate sector, especially in the context of an overall shift from bank-based to market based funding and where corporates are able to borrow directly from abroad (e.g., Cizel et al., 2016; and Buch and Goldberg, 2017). Strategies to contain leakages generally amount to expanding the scope of application of macroprudential tools, as further discussed in IMF-FSB-BIS, 2016.[23]

38. Source country policies can also play an important role in increasing global effectiveness of macroprudential policies in containing systemic risks from capital flows. One example is policies to reduce redemption risk of investment funds, as proposed recently by the FSB (FSB, 2017). These policies seek to reduce the risk of disruptive fire sales from redemption pressures, including by seeking to align the redemption policies of investment funds with the liquidity profile of their assets. If implemented, such policies can also contribute to reduce the risk of disruptive capital outflows in emerging markets. Another example is reciprocity agreements for macroprudential tools agreed by the Basel Committee on Banking Supervision (BCBS) for the CCyB, and in the EU by the European Systemic Risk Board (ESRB) for a wide range of instruments. A further example is the imposition of capital surcharges by the home authorities of global or regionally systemically important banks. Such policies will contribute indirectly to the resilience of their affiliates in host countries, and reduce risks in host countries from the failure of these entities.

39. Efficient use of macroprudential policy requires a consideration of both benefits and costs of these policies. Costs to consider include *adjustment costs* to financial firms from tools that seek to affect their balance sheet; *efficiency costs* for borrowers, that may see their access to credit curtailed; and potential short-run costs to *output* from a tightening of macroprudential tools (IMF, 2014a; and IMF-FSB-BIS, 2016).

40. Adjustment costs are likely to arise from tools that seek to affect the balance sheet of financial firms, such as capital and liquidity tools. They can be mitigated by allowing sufficient time for new constraints to be met. 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. New liquidity requirements or more stringent loan to deposit ratio requirements are also typically brought in a

[23] IMF-FSB-BIS, 2016 contains further discussion of the range of cross-border effects of macroprudential measures, beyond the leakage effects that are the focus here.

manner that these constraints are announced well ahead of their date of enforcement, in order to avoid procyclical adjustments (IMF, 2014a; and IMF-FSB-BIS, 2016).

41. Efficiency costs can arise for borrowers from the application of sectoral tools, such as LTV or DTI requirements or higher capital requirements on FX exposures as borrowers can see access to credit to be curtailed or the price of credit to go up. These types of costs are to some extent unavoidable, and may even be part of the desired transmission. On the other hand, a careful design of macroprudential constraints can seek to avoid excessive 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. Similarly, the design of constraints on exposures in FX can seek to ensure that they are applied only to borrowers that are unhedged, rather than to all FX borrowing (IMF, 2014a; and IMF-FSB-BIS, 2016).

42. Output costs are likely to differ across tools and with the timing and calibration of the measure (IMF-FSB-BIS, 2016). For capital and liquidity tools, the short-run costs to output are generally assessed as small and outweighed by the longer run benefits from the reduction in output volatility from a reduced probability and cost of financial crises (BIS, 2010). However, these costs are also uncertain and likely larger when these tools are tightened aggressively, or tightening is ill-timed and occurs too late in the financial cycle, so that the tightening ends up having procyclical effects. For sectoral tools, such as LTV and DTI, the evidence is for larger short-run effects on output, based on historical calibrations, which are likely to arise from a reduction in both consumption and investment (IMF, 2013b). Such tools should therefore be tightened gradually, and ideally in times of robust economic growth.

43. To ensure an efficient and effective policy response the macroprudential policy approach should be commensurate with the profile of risks (IMF, 2014a; and IMF-FSB-BIS, 2016)**.** This involves evaluating indicators of the build-up of risks across several dimensions, including (i) vulnerabilities from a broad-based credit boom, affecting lending to all sectors, (ii) vulnerabilities from lending to specific sectors, such as the household or corporate sectors, including in FX, (iii) increased funding vulnerabilities for the financial system, including from wholesale funding in FX (CGFS, 2012; IMF, 2013a; and IMF, 2014a).

44. Use of multiple indicators can prepare a judgement on the appropriate policy response. For instance, 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 both capital and liquidity tools. 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).

COMPLEMENTARITIES OF THE TWO FRAMEWORKS

45. The MPP framework and the Institutional View have complementary roles in helping the Fund provide advice on policies to address the systemic financial risks that may arise from large and volatile capital flows. The Fund has generally advised countries to build capacity to manage systemic risk through MPP frameworks, complementing strong supervisory and regulatory systems. MPMs can help increase the resilience of the financial system and contain the procyclical build-up of systemic risk over time, thereby helping countries better weather capital flow volatility if and when it arises. The Institutional View recommends that the authorities adopt a broad policy package to address the macroeconomic and financial stability risks associated with capital flows, in particular during inflow surges.[24]

46. Both frameworks discuss policy instruments that can help safeguard financial stability. The MPP framework provides key operational advice on the use of MPMs; such measures can be helpful to limit systemic risk even when they are not designed to limit capital flows. The Institutional View notes that CFMs can have a role in supporting macroeconomic policy adjustment and safeguarding financial system stability in certain circumstances, such as in response to an inflow surge: (i) when the room for macroeconomic policy adjustment is limited; (ii) when the needed policy steps require time to take effect; and (iii) when the surge raises risks of financial system instability.

47. MPMs and CFMs can overlap (referred to as CFM/MPMs) when they are designed to limit capital flows and to reduce systemic financial risks stemming from such flows. The use of CFM/MPMs should be aligned with key principles that are common across both frameworks (IMF, 2012a). These are to: (i) avoid using CFMs/MPMs as a substitute for necessary macroeconomic adjustment; (ii) subject to the above, use the policy instruments that are the most effective, efficient, and direct, and the least distortive, in addressing the policy objective; and (iii) seek to treat residents and nonresidents in an evenhanded manner.

48. The appropriate application of the Fund's policy frameworks involves distinguishing between MPMs, CFMs, and CFM/MPMs. If a measure that is designed to limit capital flows (and therefore a CFM) is mislabeled as an MPM, there is a risk that it would be proposed or used in circumstances that are not considered appropriate under the Institutional View. Similarly, there may be cases where an MPM that aims to limit the build-up of systemic risk stemming from capital flows could be misclassified as a CFM only because it could directly or indirectly limit the scale or influence the composition of capital flows, even if it is not designed to do so. Such misclassifications are more likely to arise when capital flows are the source of systemic financial risk or when measures differentiate transactions on the basis of currency. Policy advice could then unintentionally constrain

[24] The Institutional View would not alter IMF members' rights and obligations under other international agreements. Conformity with obligations under other agreements would continue to be determined solely by the existing provisions of those agreements (IMF, 2012a).

the use of such MPMs even if they are appropriate. A proper assessment of measures would help staff provide consistent policy advice.

49. The assessment of a measure as an MPM depends on whether it is designed to contain systemic risk. The Fund's MPP framework does not identify a finite set of measures that are considered MPMs. This allows for new designs to be adopted that are tailored to contain systemic risks arising in the specific circumstances faced by the country. It also means that the Fund's assessment of a measure as an MPM needs to be based on judgement. The key principle is that for a measure to be assessed as an MPM, it needs to be geared towards containing systemic risk. This involves (i) the identification of a potential source of systemic risk that needs to be addressed; and (ii) the identification of a path of transmission of the measure along which the measure can reasonably be expected to contribute to a reduction in systemic risk. This means that when a measure is labeled by the authorities as an MPM, but the likely effects of the measure do not amount to a reduction in systemic risk, the measure would not be assessed as macroprudential in nature.

50. All relevant information should be considered to help guide the determination of whether an MPM is also a CFM. A CFM is defined as a measure that is designed to limit capital flows.[25] Regardless of the stated intent or motivation behind the adoption of the measure (IMF, 2013c), the determination of whether a measure is, in fact, designed to limit capital flows needs to take into account the context (e.g., whether the measure was adopted during an inflow surge), calibration of the measure (e.g., its scope and intensity), and other country-specific circumstances (e.g., structure of the financial system, and level of financial market development). In practice, this means that an MPM could be assessed to be a CFM/MPM depending on the context, calibration of the measure, and other country-specific circumstances. Thus, seemingly similar measures in different countries could be assessed differently and a measure that is initially an MPM may become a CFM/MPM over time. However, it is useful to note that the fact that an MPM may have an effect on capital flows is not enough for it to be assessed as a CFM/MPM.

51. The process of staff assessment can be described by a flow chart, guided by the two frameworks (Figure 6). The chart provides a conceptual approach that can guide staff in assessing measures in the context of capital inflows (issues arising in the presence of capital outflows are covered in the next section). The relevant starting point here is a case of a measure that is designed to limit systemic risk, and therefore is an MPM based on the MPP framework, and the operational question is whether it is also a CFM.[26] Staff's assessment would be based on the criteria and conditions set out in paragraphs 49 and 50. The assessment will ultimately rely on staff judgement,

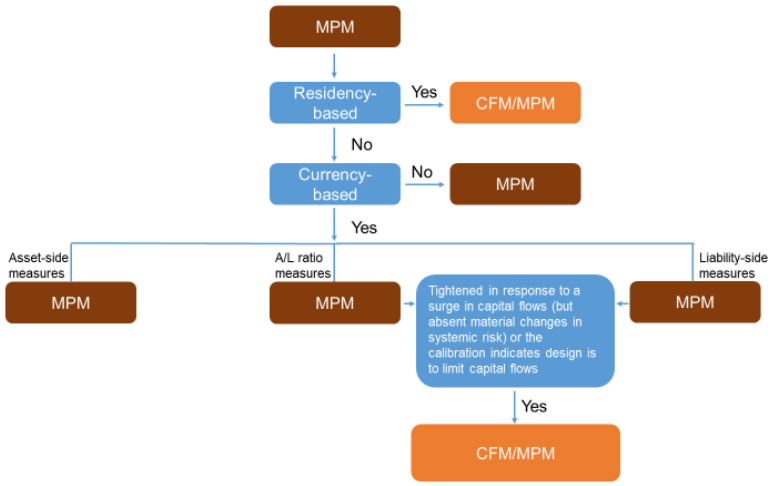
[25] CFMs comprise (i) *residency-based CFMs*, encompassing a variety of measures affecting cross-border financial activity that discriminate on the basis of residency; and (ii) *other CFMs*, which do not discriminate on the basis of residency, but are nonetheless designed to limit capital flows, including measures that differentiate transactions on the basis of currency as well as other measures that typically are applied to the non-financial sector (IMF, 2012a).

[26] In general, any measure that is designed to limit capital flows would be assessed as a CFM. There could be cases of CFMs where the operational issue is whether they are also MPMs, and staff will continue to provide further clarification on such measures consistent with the two frameworks.

also drawing on country experiences going forward. A separate assessment of the appropriateness of such measures is discussed in paragraphs 52 and 53.

- The first step is to determine whether the measure discriminates on the basis of **residency**. Measures that discriminate between residents and nonresidents are always considered to be CFMs by virtue of their design (IMF, 2013c). An example is a limit on banks' liabilities to nonresidents.

Figure 6. A Flow Chart to Guide the Determination of Whether an MPM is also a CFM



- If a measure is not residency-based, the second step is to assess whether it **differentiates transactions on the basis of currency**. Measures that are neither residency-based nor currency-based would more likely be classified as MPMs and less likely as CFM/MPMs. One example is the countercyclical capital buffer, which is a useful tool to increase the resilience of the financial system in the face of broad-based credit booms induced by capital flows, without being designed to limit capital flows.
- Currency-based MPMs usually fall into one of the three categories: (i) ***asset-side measures***, such as higher risk weights on foreign-currency denominated loans to unhedged borrowers; (ii) ***asset-liability ratio measures*** such as currency-differentiated liquidity coverage ratios (LCRs) and net stable funding ratios (NSFRs); and (iii) ***liability-side measures***, such as higher reserve requirements on FX deposits.
- Asset-side measures would usually not be considered CFMs, since they are not typically designed to limit capital flows; given their relative remoteness to the source of capital flows compared with measures on the liability side. For example, higher risk weights on foreign-currency denominated loans to unhedged borrowers could strengthen the resilience of lenders by ensuring they are adequately capitalized to handle the increased default risk by borrowers without FX income or assets that may arise from a sharp depreciation of the local currency.
- Asset-liability ratio measures or liability-side measures, given their closer proximity to addressing systemic risk arising from capital flows, could also be CFMs for example, when their

calibration is adjusted in response to capital flows, but such a determination is not automatic. Staff's assessment would be based on the criteria laid out in paragraph 50 above. The assessment will need to take into account the context, country-specific circumstances, and whether the calibration (scope and intensity) of a measure indicates that it is, in fact, designed to limit capital flows. For instance, if a reserve requirement ratio on FX deposits is raised in response to an increase in systemic risk, regardless of whether or not there is an inflow surge, it would still likely be considered an MPM (and not a CFM/MPM) as long as it is well-calibrated to the increase in systemic risk.[27] However, if the reserve requirement ratio is increased when there is no material change in systemic risk or the increase appears to go beyond what is needed to address the increase in systemic risk, the measure would more likely be assessed as a CFM/MPM. [28] Staff will be guided by the understanding that assessing systemic risk in real time and assessing whether policy responses are commensurate with the profile of risks will require careful judgements drawing on in-depth analysis in view of the complexities of many cases.

52. MPMs could be put in place pre-emptively and maintained to contain the buildup of systemic risk, while this is not the case for CFMs according to the Institutional View. MPMs can be introduced before an inflow surge occurs in order to build resilience, or introduced or tightened in tandem with the build-up of systemic risk arising from capital flows. To best support resilience, once implemented, MPMs should be maintained either until systemic risk has dissipated—or risks materialize and financial conditions tighten. On the other hand, CFMs should not be implemented pre-emptively before such surges. When there is a surge, macroeconomic policy adjustment needs to play a key role, and may be supported by CFMs under certain conditions. When CFMs are used, they should be temporary and be scaled back when capital flow pressures abate so as to minimize their distortions (although certain special considerations apply to CFM/MPMs, see paragraph 53 below).

53. There may be scope to maintain CFM/MPMs for longer even after capital inflow pressures have abated. Some CFM/MPMs may continue to be useful for managing systemic financial risks after the inflow surge is over. However, by limiting capital flows, they could impose unnecessary costs or may become ineffective. Therefore, their usefulness relative to their costs needs to be evaluated on an ongoing basis. A key part of that assessment is whether there are alternative measures to address the systemic risk that are not designed to limit capital flows. For instance, a CFM/MPM could be gradually relaxed and ultimately removed based on the capital flow cycle, or be replaced by an MPM that limits the systemic financial risk without limiting capital flows; or a measure that discriminates by residency could be replaced by one that treats residents and nonresidents in an even-handed manner while still achieving the same objective of containing systemic risk (e.g., a measure applied on external liabilities could be adjusted to be applied on FX liabilities).

[27] In some financial systems, such reserve requirements may be part of the monetary policy toolkit.

[28] Such measures will be monitored in the context of surveillance and re-evaluated when there are material changes in the context and/or calibration.

ROLE OF MPMs IN MITIGATING SYSTEMIC RISKS ASSOCIATED WITH OUTFLOWS

54. Generally, outflows are normal economic phenomena, allowing countries to reap the benefits of capital flows. For capital flows to provide sustained mutual benefits for providers and recipients of capital, investors need to be able to recoup their investment and diversify their portfolios and business operations across border. Policies should generally facilitate orderly outflows with warranted macroeconomic adjustment.

55. However, disruptive outflows may cause financial stress, or even an outright crisis. Outflows reflect funds being redirected abroad, which on the one hand, may put pressure on those losing funding, but may also cause more widespread distress due to the macro-financial reactions which may follow (e.g., through pressure on exchange rates, asset prices, and interest rates). When outflows are large, sustained, or sudden, they can become disruptive and even result in a crisis (see Iceland case study). Disruptive outflows can deplete foreign reserves, cause currency collapses, impair balance sheets, and jeopardize financial stability. Such episodes often reflect the failure of correcting macroeconomic and financial imbalances, in part fueled by inflows.

56. Building economic and financial resilience is important for mitigating the risks associated with capital outflows. An important aspect in mitigating the risk of outflows, even in the absence of a crisis, involves developing a strong institutional setup and sound macroeconomic, structural, and financial policies (including MPP) to safely absorb inflows, limit the extent to which they contribute to the build-up of systemic risk, and thereby create the economic and financial resilience to withstand capital outflows.

57. Capital outflows should be handled primarily with macroeconomic, structural, and financial sector policies (IMF, 2012a; and IMF, 2015). The macroeconomic policy response should address the domestic triggers and implications of outflows and foster orderly external adjustment, if warranted. The appropriate response will differ across countries, and depend on macroeconomic conditions, taking into consideration financial stability risks including balance sheet exposures in foreign currency, available policy space, and any need for the adjustment of policies that may have contributed to outflows in the first place. Exchange rate flexibility should be a key shock absorber, while foreign exchange intervention may be necessary to prevent disorderly market conditions, provided reserves are adequate. Monetary policy may need to be adjusted as necessary and feasible to maintain price stability, while fiscal policy will depend on public debt sustainability and cyclical considerations. In addition to macroeconomic policy adjustment, liquidity provision may be required to support orderly financial conditions. Relaxing CFMs on inflows that were introduced or tightened to address inflow surges may also be useful. In crisis situations, or when a crisis may be imminent, there could be a temporary role for CFMs on outflows, but they should not substitute for macroeconomic adjustment and should be lifted once crisis conditions abate.

58. The potential to relax MPMs can give countries an additional set of tools to respond to outflow-related risks, although decisions on relaxation will be inherently difficult in outflow episodes. While practical experience with relaxation is accumulating only slowly, given that many countries are in the phase of introducing macroprudential measures, in principle, a relaxation of macroprudential policies can be useful to help counter financial stresses arising from outflows, thereby maintaining the provision of financial services to the real economy. However, outflows do not mechanically call for a relaxation of macroprudential tools. Instead, an application of existing principles suggests that three conditions should be satisfied. (IMF, 2014a; and IMF-FSB-BIS, 2016): (i) buffers are in place; (ii) capital outflows are generating financial stress; and (iii) relaxation is expected to relieve stress and thereby contribute to containing adverse procyclical dynamics.

59. Relaxation relies on having sufficiently large buffers in place, so that settings remain consistent with regulatory minima and confidence is maintained after relaxation. In periods of financial stress, the macroprudential policymaker may want to relax those macroprudential constraints that impede the provision of credit to the economy and which could trigger fire sale dynamics or a vicious feedback between deteriorating economic and financial conditions. At the same time, the relaxation of macroprudential constraints needs to maintain confidence and ensure an appropriate degree of resilience against future shocks. To that end, the macroprudential authorities should establish minimum levels for macroprudential settings, based where relevant on international minimum standards, that are generally considered safe through downturn conditions. Building larger buffers ex ante can alleviate the trade-off and creates policy space. Where macroprudential buffers are not available to be used, the response must rely on other policies to an even greater extent.

60. Relaxation of MPMs may be appropriate if outflows are generating financial stress. If outflows are observed, but are not (yet) generating financial stress, there would not, in general, be benefit to relaxing macroprudential buffers. Indeed, in such a situation it may still be advisable to build macroprudential buffers, in anticipation of a potential for outflows to accelerate in the future, putting stress on the financial system. On the other hand, whether financial stress emerges from outflows may depend on other policy settings. For instance, where monetary policy is tightened in response to the depreciation of the exchange rate and to maintain confidence, this tighter policy may contribute to stress on the financial system, which may be countered by a relaxation of macroprudential buffers (see Box 4, case of Croatia). The assessment of financial stress can be informed by indicators, which can signal stress, including strains in funding markets, falling asset prices, and increases in default rates, but the decision to relax macroprudential buffers in the context of an outflow episode will ultimately need to be based on judgment (IMF, 2014a).

61. Relaxation must be expected to relieve financial stress. Relaxation should be considered only if there is an expectation that it will relieve financial stress, thereby reducing the risk of procyclical feedback between deteriorating financial and real economic conditions. Such an expectation is usually justified if stresses cause the macroprudential policy constraints themselves to become binding on the financial system (IMF, 2014a; and IMF-FSB-BIS, 2016). For instance, where outflows lead to a drying up of wholesale funding, macroprudential liquidity constraints are likely to

become binding on the banking system. In this situation, making available the macroprudential liquidity buffers, can help relieve that stress, and thereby maintain the functioning of interbank markets and provision of credit to the economy.

62. The decision to relax any one macroprudential tool needs to consider the source of stress (IMF, 2014a). For instance, where the outlook for corporate or household solvency weakens substantially without outflows triggering liquidity stress, this would point to the relaxation of broad-based capital or housing related tools rather than liquidity tools. Conversely, where liquidity stress emerges before there are signs of weakening domestic solvency, the relaxation of liquidity tools rather than other tools would be more appropriate. Indeed, where liquidity stress arises from global shock to investor confidence, it could be appropriate to relax liquidity tools while at the same time maintaining or even increasing capital buffers, or tightening other macroprudential measures, in a bid to increase overall resilience and restore investor confidence.

63. Experience with the relaxation of MPMs is still scarce and staff advice in this area is only just emerging. A few countries have gained experience with the relaxation of housing–related tools (e.g., Korea), and the relaxation of macroprudential reserve requirements is also common among emerging market economies. However, since more widespread use of macroprudential policy tools is recent, country experiences with relaxation are still relatively scarce and not all situations have featured capital outflows as key drivers (Box 4). This means that staff advice will likely evolve as countries gain more experience in the use of macroprudential tools, and as staff learns from this experience.

64. In sum, tradeoffs need to be considered carefully before relaxing MPMs in the context of an outflow episode. In periods of financial stress, policy makers are concerned about both maintaining resilience and preventing fire sale dynamics or negative feedbacks between deteriorating economic and financial conditions. Tradeoffs depend on the nature and the size of the available macroprudential buffers. They also pertain to the timing of relaxation whereby the imperative of preventing a disruption of credit needs to be weighed against the risk that the policy action could undermine financial stability in a context of heightened uncertainty. Careful judgement is therefore needed when assessing the benefits and costs of relaxing macroprudential tools.

Box 4. Country Experiences with Relaxing MPMs

Country experience with the relaxation of macroprudential tools is still rare, since many countries are only just introducing these tools. However, some insights can already be obtained from recent episodes or from countries that had implemented MPMs already ahead of the GFC. It should be noted that in some of these cases (e.g., UK), capital outflow pressure was not a primary factor.

Croatia implemented several MPMs in the run-up to the global financial crisis and subsequently made active use of relaxing them when large inflows tapered off and financial stress emerged. The Croatian National Bank (HNB) used MPMs to limit the build-up of systemic risk and increase resilience of the financial sector to shocks, as sizable macroeconomic and financial imbalances built up. A relaxation of macroprudential constraints allowed the HNB to provide substantial liquidity to the banking system, in large part in foreign currency. The HNB lowered the required FX liquidity buffers, removed the marginal and special reserve requirements, and lowered the general reserve requirement, as well as allowing banks to fulfill a larger share of the requirement in domestic currency. The measures were binding when they were relaxed and are assessed to have released over EUR6 billion, or more than 14 percent of GDP, to the banking system over the course of 2008–2012 (Bokan et al., 2009; Rohatinski, 2009; and Vujcic and Dumicic, 2016). The relaxation played an important role in preserving financial stability and defending the exchange rate, which are tightly connected in such a highly euroized economy. A systemic banking crisis was averted, even as the country underwent a deep economic recession.

The Bank of England also relaxed an MPM as part of its response to the Brexit referendum. The CCyB was released from 0.5 to 0 percent on July 1, 2016, a week after the Brexit referendum. This relaxation was not implemented in response to specific outflow distress but against the backdrop of general risks to financial stability, in order to prevent excessive tightening of credit conditions and its associated negative economic impact. As part of the contingency planning ahead of the referendum, supervisors also engaged with banks to ensure they had sufficient short-term liquid assets in each material currency in case of severe wholesale stress. The authorities have also been mindful of risks of disruptions in capital flows as both UK private and public sectors are net borrowers from abroad and rely on external funding (Bank of England, 2016).

ROLE OF MACROPRUDENTIAL POLICY IN THE PROCESS OF CAPITAL ACCOUNT LIBERALIZATION

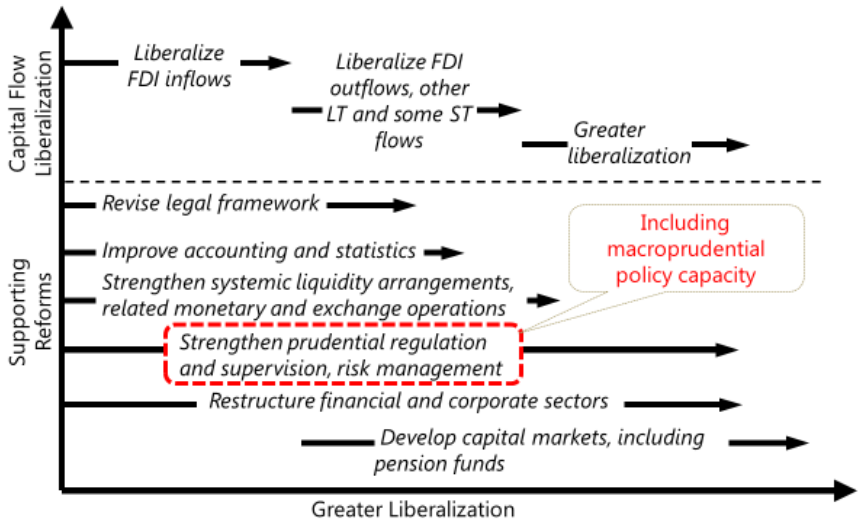
65. Capital flow liberalization is likely to continue to bring important benefits (IMF, 2012a). At the macroeconomic level, capital flows contribute to a more efficient global allocation of savings and investments, risk diversification, and reduction in financing costs. At the micro-level, capital flows, FDI in particular, promote competition and the transfer of knowledge and technologies across countries. Capital flow liberalization is also considered to facilitate financial development, which in turn contributes to economic growth (IMF, 2012a). Countries with long-standing and extensive CFMs

would therefore likely benefit from further liberalization, although there is no presumption that full liberalization is an appropriate goal for all countries at all times.

66. However, poorly managed capital account liberalization can lead to a buildup of systemic risks. Historically, capital account liberalization has often been followed by rapid credit expansion and financial crises (IMF, 2012a).[29] However, there are also many cases of successful liberalization (IMF, 2012b).[30]

67. The IMF's integrated approach to capital account liberalization suggests the removal of CFMs in a manner that is properly paced and sequenced (Figure 7). Capital account liberalization is generally more beneficial and less risky if countries have achieved certain levels of financial and institutional development (IMF, 2012a). The pace and sequencing of liberalization should also take account of other policies and conditions, notably macroeconomic and financial sector prudential policies (IMF, 2012a). In recent years, countries have continued to gradually liberalize capital flows, broadly following the sequence envisaged in the Institutional View's integrated approach (IMF, 2016e).

Figure 7. Macroprudential Policy and Capital Flow Liberalization



[29] Experiences include Mexico (1994–95 crisis), Turkey (1994 and 2000 crisis), Korea (1997 twin crisis), Russia (1998 crisis), the Asian crisis of 1997–98, and Estonia, Iceland, Ireland, Latvia, Lithuania, and others during the GFC (IMF, 2012a).

[30] Examples include Korea in the 2000s, Austria, UK, South Africa ((IMF, 2012b). The liberalization in Central and Eastern European countries was initially successful until financial instability arose from weak prudential regulation and supervision and a deterioration in macroeconomic management (IMF, 2012b).

68. To mitigate systemic risks from larger and more volatile flows, it is important to strengthen risk management and prudential regulation and supervision. Liberalization should be supported by reforms to deepen and strengthen financial markets, to bolster the ability to absorb flows and manage exchange rate risks, as well as to improve prudential regulation and supervision to ensure adequate risk management (IMF, 2012a). At the same time, a country could make progress towards greater capital flow liberalization before fully developing its financial and institutional capacity provided adequate progress is being made in these dimensions.

69. Greater liberalization should be supported by a progressive strengthening of capacity to deploy macroprudential tools along the sequence of steps envisaged under the integrated approach. Where capital accounts are liberalized, this should proceed gradually and sequentially, starting with the types of flows, such as foreign direct investment, that are less likely to induce systemic risks more closely correlated with growth. The liberalization of flows that are more likely to create systemic risk, such as portfolio bond flows and short-term banking flows, needs to be managed carefully, and supported by a strengthening of macroprudential policy to address a potential build-up of financial stability risks as part of a range of progressively deeper and broader supporting reforms to the legal, accounting, financial and corporate frameworks. For instance, the potential for a build-up of systemic risks from increases in short-term wholesale funding of the banking system and increased FX exposures of the corporate sector may need to be managed using liquidity and FX-related macroprudential policy tools, while broad-based tools, such as the CCyB may need to be available to increase resilience more broadly.

70. The capacity to deploy such tools effectively requires adequate institutional arrangements and toolkits, as well as information to assess risks and calibrate policy tools appropriately. The legal basis for a range of relevant tools may need to be developed along with the ability to calibrate policy responses to risks in a manner that reduces systemic risk while avoiding unwanted side effects. This will typically require an investment in the capacity to analyze and monitor emerging systemic risks and in the collection of data; by expanding the scope of supervisory data collected from regulated firms, establishing data sharing mechanisms, such as a national credit register, and initiating new survey data on asset prices and debts of the household and corporate sector.

71. Where supervisory capacity or relevant data to operationalize macroprudential policy are lacking, this would argue for caution with further liberalization efforts. Supervisory capacity and the availability of data to analyze risks are important preconditions for effective financial regulation and use of macroprudential policy instruments (IMF, 2014a). If these foundations are weak, priority should be placed on developing them, and liberalization should be managed particularly cautiously. In countries where the scope for active use for macroprudential policy is limited, a more rules-based approach to macroprudential policy can rely on automatic stabilizers (e.g., dynamic provisioning regimes, and conservatively calibrated LTV and DSTI ratios), with calibration still guided by judgment. To prepare for external shocks and to strengthen balance

sheets, these can usefully be complemented by permanent capital buffers that would be relaxed only in the event of a large external shock (IMF, 2014a).[31]

72. An investment in macroprudential policy capacity will be useful across a range of countries, independent of economic development. Countries with longstanding restrictions that are looking to liberalize their capital account should invest in establishing the capacity to take macroprudential action to respond to systemic risks that may arise from larger and more volatile flows. Countries that suffered a financial crisis and imposed CFMs as a crisis management tool, may want to develop a macroprudential toolkit in tandem with the lifting of such measures to prepare to manage the systemic risks that may arise in the context of a resumption of capital inflows (e.g., Iceland). And the global financial crisis has brought home the need to deploy new macroprudential instruments and establish or upgrade institutional arrangements also for small open economies whose capital account has long been fully open (e.g., Sweden and Korea case studies).

73. In sum, macroprudential policy, as part of a broad range of policies, can help countries reap the benefits of capital flows more safely, by containing the systemic risks from larger and more volatile capital flows. Establishment of macroprudential policy frameworks and tools can thus help enable countries to harness the benefits of capital flow liberalization. The IMF is supporting this effort, both through its surveillance of macroprudential policy in its Article IV consultations, and by promoting institutional arrangements enabling effective macroprudential policy in Financial Sector Assessment Programs (FSAPs) and Technical Assistance (TA).

CONCLUSIONS

74. The analysis in this paper points to the potential benefits of macroprudential policies for countries facing large and volatile capital flows. Establishing macroprudential frameworks and introducing measures preemptively can help increase the resilience of the financial system to aggregate shocks, including those arising from capital inflows, and contain the build-up of systemic vulnerabilities over time. Building up buffers in this way can support financial systems, helping them to remain stable and continue to provide services in the face of capital outflows. Moreover, while the risks arising from capital outflows should be handled primarily by macroeconomic policies, if buffers are in place, a relaxation of macroprudential measures may assist in countering financial stresses arising from outflows. Finally, capital flow liberalization should be supported by broad efforts to strengthen prudential regulation and supervision, and macroprudential policy frameworks should be developed in this context.

75. While experience in the usage of macroprudential policies is growing, country authorities are still learning how best to calibrate measures so as to reap their benefits while avoiding unnecessary costs. Large and volatile capital flows can contribute to systemic vulnerabilities, and their impact should be taken into account in determining the settings of macroprudential policies. However, gauging the benefits of macroprudential measures, notably in terms of the reduced risk and severity of crises, relative to their costs for countries exposed to large

[31] For further discussion of how macroprudential policy can take account of country circumstances and be adapted for low-income countries (see IMF, 2014c).

and volatile capital flows is challenging, and further work will be useful in this area. These considerations underscore the Fund's longstanding advice that decisions on macroprudential policy be taken through "guided discretion," where key indicators can help signal when adjustments might be appropriate, but the ultimate decision is a judgment drawing on all available information and expertise (IMF, 2014a).

76. In providing advice on these issues, staff will continue to be guided by the macroprudential framework and the Institutional View. Although they were developed separately, both frameworks are consistent in terms of their fundamental principles, including that measures should not substitute for warranted macroeconomic adjustment. Staff sees the conceptual framework laid out in this paper as a helpful basis for assessing measures, especially in cases when MPMs and CFMs potentially overlap, which will thus aid staff in providing consistent policy advice that helps economies better harness the benefits of capital flows by building resilience to large and volatile capital flows.

77. Looking forward, the Fund can play a role in continuing to develop and share expertise to support the growing understanding of these issues, and integrating these findings into Fund surveillance and technical assistance. Work is underway to compile a comprehensive database of macroprudential measures, which can help inform further research on the usage and effectiveness of macroprudential policies, including in the presence of capital flows. The Fund's engagement with the membership will continue to yield a rich evidence base of the experiences of a diverse range of countries in assessing systemic risks and using MPMs to limit systemic risk.

ISSUES FOR DISCUSSION

- Do Directors agree that establishing sound macroprudential policy frameworks can help countries build resilience—without necessarily restricting capital flows—thereby helping them safely harness the benefits of capital flows?
- Do Directors find the conceptual framework for staff assessment of country measures laid out in the section of the paper on the complementarities of the IMF's two existing frameworks (for macroprudential policies and the Institutional View) a helpful basis to guide sound policy advice?
- Do Directors agree that the Fund should continue to draw on country experiences to increase the understanding of the benefits, costs, effectiveness, and calibration of macroprudential measures in Fund surveillance?

References

Acemoglu, Daron, Asuman Ozdaglar, and Alireza Tahbaz-Salehi, 2015, "Systemic Risk and Stability in Financial Networks," American Economic Review, Vol. 105, No. 2, pp. 564–608.

Acharya, Viral, and Philipp Schnabl, 2010, "Do Global Banks Spread Global Imbalances? Asset-Backed Commercial Paper During the Financial Crisis of 2007–09," IMF Economic Review, Volume 58, Issue 1, pp. 37–73 (Washington, DC: International Monetary Fund).

Aizenman, Joshua, and Vladyslav Sushko, 2011, "Capital Flows: Catalyst or Hindrance to Economic Takeoffs?" NBER Working Paper No. 17258, July, (Cambridge, MA: National Bureau of Economic Research).

Aizenman, Joshua, and Yothin Jinjarak, 2009, "Current Account Patterns and National Real Estate Markets," Journal of Urban Economics, Vol. 66, pp. 75–89.

Akinci, Ozge, and Jane Olmstead-Rumsey , 2015, "How Effective are Macroprudential Policies? An Empirical Investigation," International Finance Discussion Papers, Number 1136, May.

Amri, Puspa D., Greg M. Richey, and Thomas D. Willet, 2016, "Capital Surges and Credit Booms: How Tight is the Relationship?" Open Economies Review, Vol. 27, pp. 637–670.

Avdjiev, Stefan, Robert McCauley, and Patrick McGuire, 2012, "Rapid Credit Growth and International Credit: Challenges for Asia," BIS Working Papers No. 377.

Avdjiev, Stefan, Robert McCauley, and Hyun Song Shin, 2016, "Conceptual Challenges in International Finance," VoxEu column, September.

Banerjee, Ryan Niladri, and Hitoshi Mio, 2014, "The Impact of Liquidity Regulation on Banks," Bank for International Settlements, October.

Bank of England, 2016, Financial Stability Report, Issue No. 40, November 2016.

Basso, Henrique S., Oscar Calvo-Gonzalez, and Marius Jurgilas, 2007, "Financial Dollarization. The Role of Banks and Interest Rates," ECB Working Paper No. 748.

Basten, Christoph, and Catherine Koch, 2015, "Higher Bank Capital Requirements and Mortgage Pricing: Evidence from the Countercyclical Capital Buffer (CCB)," Bank for International Settlements, September.

Bayoumi, Tamim, and Trung Bui, 2011, "Apocalypse Then: The Evolution of the North Atlantic Economy and the Global Crisis," IMF Working Paper, WP/11/212 (Washington, DC: International Monetary Fund).

BCBS, 2013, "Global Systemically Important Banks: Updated Assessment Methodology and The Higher Loss Absorbency Requirement," Basel Committee on Banking Supervision, Bank for International Settlements, July.

BIS, 2010, "Assessing the Macroeconomic Impact of the Transition to Stronger Capital and Liquidity Requirements," Bank for International Settlements, December.

Bisias, Dimitrios, Mark Flood, Andrew W. Lo, and Stavros Valavanis, 2012, "A Survey of Systemic Risk Analytics," Office of Financial Research, Working Paper #0001, January.

Blanchard, Olivier, Jonathan Ostry, Atish Ghosh, and Marcos Chamon, 2016, "Capital Flows: Expansionary or Contractionary?" American Economic Review (Papers and Proceedings), 106(5), 565– 569.

Bokan, Nikola, Lovorka Grgurić, Ivo Krznar, and Maroje Lang, 2009, "The Impact of the Financial Crisis and Policy Reponses in Croatia," Croatian National Bank Working Papers No. W-22, December 2009.

Bonner, Clemens, 2012, "Liquidity Regulation, Funding Costs and Corporate Lending", DNB Working Paper, No. 361, December (The Netherlands: De Nederlandsche Bank).

Bordo, Michael D., Christopher M. Meissner, and David Stuckler, 2010, "Foreign Currency Debt, Financial Crises and Economic Growth: A Long-run View," Journal of International Money and Finance, Vol. 29, pp. 642-665.

Borio, Claudio, and Piti Disyatat, 2011, "Global Imbalances and The Financial Crisis: Link or No Link?" BIS Working Paper No. 346.

Borio, Claudio, 2012, "The Financial Cycle and Macroeconomics: What Have We Learnt?" BIS Working Paper 395.

Broner, Fernando, Tatiana Didier, Aitor Erce, and Sergio L. Schmukler, 2013, "Gross Capital Flows: Dynamics and Crises," Journal of Monetary Economics 60, 113–33.

Brunnermeier, Markus, and Martin Oehmke, 2013, "Bubbles, Financial Crises, and Systemic Risk," In George Constantinides, Milton Harris and Rene Stulz (eds), Handbook of the Economics of Finance, Vol.2B, Ch.18, 1221–1288.

Brunnermeier, Markus, and Isabel Schnabel, 2016, "Bubbles and Central Banks: Historical Perspectives," In Central Banks at a Crossroads: What Can We Learn from History? Cambridge: Cambridge University Press.

Bruno, Valentina, and Hyun Shin, 2015a, "Cross-Border Banking and Global Liquidity," Review of Economic Studies, 82, 535–564.

Bruno, Valentina, and Hyun Shin, 2015b, "Capital Flows and the Risk-Taking Channel of Monetary Policy." Journal of Monetary Economics, 71, 119–132.

Buch, Claudia, and Linda Goldberg, 2017, "Cross-Border Prudential Policy Spillovers: How Much? How Important? Evidence from the International Banking Research Network." International Journal of Central Banking, 13 (S1), 505–558.

Caballero, Julian, 2016, "Do Surges in International Capital Inflows Influence the Likelihood of Banking Crises?" Economic Journal, 126(591), 281–316.

Calderón, César, and Megumi Kubota, 2012, "Gross Inflows Gone Wild: Gross Capital Inflows, Credit Booms and Crises," WB Policy Research Working Paper 6270, November (Washington, DC: The World Bank).

Cerutti, Eugenio, Stijn Claessens, and Luc Laeven, 2017, "The Use and Effectiveness of Macroprudential Policies: New Evidence," Journal of Financial Stability, 28, 203–224..

Cesa-Bianchi, Ambrogio, Andrea Ferrero, and Alessandro Rebucci, 2017, "International Credit Supply Shocks," (Forthcoming)

CGFS, 2012, "Operationalising the Selection and Application of Macroprudential Instruments," Committee on the Global Financial System Papers No 48, December.

Cizel, Janko, Jon Frost, Aerdt Houben, and Peter Wierts, 2016, "Effective Macroprudential Policy: Cross-Sector Substitution from Price and Quantity Measures," IMF Working Paper, WP/16/94 (Washington, DC: International Monetary Fund).

Claessens, Stijn, 2014 "An Overview of Macroprudential Policy Tools," IMF Working Paper WP/14/214 (Washington, DC: International Monetary Fund).

Crowe, Christopher, Giovanni Dell'Ariccia, Deniz Igan, and Paul Rabanal. 2011. "Policies for Macrofinancial Stability: Options to Deal with Real Estate Booms," IMF Staff Discussion Note 11/02. Washington, DC: International Monetary Fund.

Dávila, Eduardo, and Anton Korinek, 2016", Pecuniary Externalities in Economies with Financial Frictions," The Review of Economics Studies.

Drehmann, Mathias, Claudio Borio, and Kostas Tsatsaronis, 2012, "Characterising the Financial Cycle: Don't Lose Sight of the Medium Term!" BIS Working Papers No 380, Bank for International Settlements, June.

Edwards, Sebastian, 2001, "Capital Mobility and Economic Performance: Are Emerging Economies Different?" NBER Working Paper No. 8076, (Cambridge, MA: National Bureau of Economic Research).

Edwards, Sebastian, 2007, "Capital Controls, Sudden Stops and Current Account Reversals in International Capital Flows" (Chicago, IL: University of Chicago Press).

Favilukis, Jack, David Kohn, Sydney C. Ludvigson, and Stijn Van Nieuwerburgh, 2013, "International Capital Flows and House Prices: Theory and Evidence," in E. Glaeser and T. Sinai (eds), Housing and the Financial Crisis, National Bureau of Economic Research.

FSB, 2017, "Policy Recommendations to Address Structural Vulnerabilities from Asset Management Activities," Financial Stability Board, January.

Ghosh, Atish R., Jonathan D. Ostry, and Mahvash S. Qureshi, 2016, "When Do Capital Inflow Surges End in Tears?" American Economic Review Papers & Proceedings, Vol. 106, No. 5, pp. 581–585.

Gourinchas, Pierre-Olivier, and Hélène Rey, 2014, "External Adjustment, Global Imbalances, Valuation Effects," Handbook of International Economics, Vol. 4, Amsterdam: North Holland, pp. 585–646.

Gourinchas, Pierre-Olivier, and Maurice Obstfeld, 2012, "Stories of the Twentieth Century for the Twenty-First," American Economic Journal: Macroeconomics, 4 (January): 226–65.

Hahm, Joon-Ho, Hyun Song Shin, and Kwanho Shin, 2013, "Non-Core Bank Liabilities and Financial Vulnerability," July.

Hallissey, Niamh, Robert Kelly, and Terry O'Malley, 2014, "Macroprudential Tools and Credit Risk of Property Lending at Irish banks," Economic Letter, Vol. 2014. No. 10 (Dublin: Central Bank of Ireland).

Henry, Peter Blair, 2007, "Capital Account Liberalization: Theory, Evidence, and Speculation," Journal of Economic Literature, Vol. XLV, pp. 887–935, December.

Igan Deniz, and Heedon Kang, 2011, "Do Loan-to-Value and Debt-to-Income Limits Work? Evidence from Korea," IMF Working Paper, WP/11/297 (Washington, DC: International Monetary Fund).

Igan, Deniz, and Zhibo Tan, 2015, "Capital Inflows, Credit Growth, and Financial Systems." IMF Working Paper, WP/15/193 (Washington, DC: International Monetary Fund).

IMF, 2010, "Global Liquidity Expansion—Effects on "Receiving" Economies and Policy Response Options," Global Financial Stability Report, April (Washington, DC: International Monetary Fund).

_____, 2011, "Recent Experiences in Managing Capital Inflows–Cross-Cutting Themes and Possible Guidelines," (Washington, DC: International Monetary Fund).

_____, 2012a, "The Liberalization and Management of Capital Flows—An Institutional View," IMF Policy Paper, November (Washington, DC: International Monetary Fund).

_____, 2012b, "Liberalizing Capital Flows and Managing Outflows—Background Paper," (Washington, DC: International Monetary Fund).

_____, 2013a, "Key Aspects of Macroprudential Policy," (Washington, DC: International Monetary Fund).

_____, 2013b, "The Interaction of Monetary and Macroprudential Policies – Background Paper," (Washington, DC: International Monetary Fund).

_____, 2013c, "Guidance Note for the Liberalization and Management of Capital Flows," (Washington, DC: International Monetary Fund).

_____, 2014a, "Staff Guidance Note on Macroprudential Policy," (Washington, DC: International Monetary Fund).

_____, 2014b, "Staff Guidance Note for Macroprudential Policy – Detailed Guidance on Instruments," (Washington, DC: International Monetary Fund).

_____, 2014c. "Staff Guidance Note on Macroprudential Policy – Considerations for Low-Income Countries," (Washington, DC: International Monetary Fund).

_____, 2015, "Managing Capital Outflows – Further Operational Considerations," (Washington, DC: International Monetary Fund).

_____, 2016a, "Strengthening the International Monetary System—A Stocktaking," (Washington, DC: International Monetary Fund).

_____, 2016b, "Russian Federation: Financial System Stability Assessment," (Washington, DC: International Monetary Fund).

_____, 2016c, "Republic of Belarus: Financial System Stability Assessment," (Washington, DC: International Monetary Fund).

_____, 2016d, "Asean-5 Cluster Report – Evolution of Monetary Policy Frameworks," IMF Country Report No. 16/176 (Washington, DC: International Monetary Fund).

_____, 2016e, "Capital Flows – Review of Experience with the Institutional View," (Washington, DC: International Monetary Fund).

_____, 2017, "Approaches to Macrofinancial Surveillance in Article IV Reports," (Washington, DC: International Monetary Fund).

IMF-FSB-BIS, 2016, "Elements of Effective Macroprudential Policies, Lessons from International Experience," August.

Jeanne, Olivier, Arvind Subramanian, and John Williamson, 2012, "Who Needs to Open the Capital Account?" April, (Washington, DC: Petersen Institute for International Economics).

Jiménez, Gabriel, Steven Ongena, Jose-Luis Peydro, and Jesus Saurina Salas, 2012, "Macroprudential Policy, Countercyclical Bank Capital Buffers and Credit Supply: Evidence From The Spanish Dynamic Provisioning Experiments," National Bank of Belgium Working Paper No. 231.

Jorda, Oscar, Moritz Schularick, and Alan M. Taylor, 2012, "When Credit Bites Back: Leverage, Business Cycles, and Crises," Federal Reserve Bank of San Francisco, October.

Kim, Soyoung, and Doo Yong Yang, 2011, "The Impact of Capital Inflows on Asset Prices in Emerging Asian Economies: Is Too Much Money Chasing Too Little Good?" Open Economies Review, Vol. 22, pp. 293-315.

Kiyotaki, Nobuhiro, and John Moore, 1997, "Credit Cycles," Journal of Political Economy, Vol. 105, No. 2, pp. 211–248, April.

Korinek, Anton, and Damiano Sandri, 2016. "Capital Controls or Macroprudential Regulation?" Journal of International Economics, 99, S27–42.

Kose, M. Ayhan, Eswar S. Prasad, Kenneth Rogoff and Shang-Jin Wei, 2009, "Financial Globalization: A Reappraisal," IMF Staff Papers, Vol. 56, No.1, pp.8–62, (Washington, DC: International Monetary Fund)

Kose, M. Ayhan, Eswar S. Prasad, and Macro. E. Terrones, 2008, "Does Openness to International Financial Flows Contribute to Productivity Growth?" NBER Working Paper No. 14558, December, (Cambridge, MA: National Bureau of Economic Research).

Kuttner, Kenneth N., and Ilhyock Shim, 2016, "Can Non-interest Rate Policies Stabilise Housing Markets? Evidence from A panel of 57 Economies," Journal of Financial Stability, vo 26, pp 31–44, October.

Lane, Philip, and Peter McQuade, 2013, "Domestic Credit Growth and International Capital Flows." ECB Working Paper 1566, (Frankfurt: European Central Bank).

Lim, Cheng Hoon, Francesco Columba, Alejo Costa, Piyabha Kongsamut, Akira Otani, Mustafa Saiyid, Torsten Wezel, and Xiaoyong Wu, 2011, "Macroprudential Policy: What Instruments and How to Use Them? Lessons from Country Experiences," IMF Working Paper, WP/11/238 (Washington, DC: International Monetary Fund).

McGuire, P. and G. Von Peter, 2012, "The US Dollar Shortage in Global Banking and The International Policy Response," International Finance, Vol. 15, pp. 155–78.

Mendoza, Enrique G., and Macro E. Terrones, 2008, "An Anatomy of Credit Booms: Evidence from Macro Aggregates and Micro Data," NBER Working Paper No. 14049, May, (Cambridge, MA: National Bureau of Economic Research).

Merrouche, Ouarda, and Erlend Nier, 2017, "Capital Inflows, Monetary Policy, And Financial Imbalances," Journal of International Money and Finance, (forthcoming).

Ostry, Jonathan D., Atish R. Ghosh, Marcos Chamon, and Mahvash Qureshi, 2012, "Tools for Managing Financial-Stability Risks from Capital Flows," Journal of International Economics, Vol. 88, pp. 407–421.

Prasad, Eswar, Kenneth Rogoff, Shang-Jin Wei, and M. Ayhan Kose, 2003, "The Effects of Financial Globalization on Developing Countries: Some Empirical Evidence," IMF Occasional Paper No. 220, (Washington, DC: International Monetary Fund).

Reinhart, Carmen M., and Vincent R. Reinhart, 2009, "Capital Flow Bonanzas: An Encompassing View of The Past and Present," in J.A. Frankel and C. Pissarides (eds.), NBER international seminar on macroeconomics, 2008.

Reinhardt, Dennis, and Rhiannon Sowerbutts, 2015, "Regulatory Arbitrage in Action: Evidence from Banking Flows and Macroprudential Policy," Bank of England Staff Working Paper No. 546, September.

Rey, Helene, 2015, "Dilemma not Trilemma: the Global Financial Cycle and Monetary Policy Independence," NBER Working Paper 21162, May.

Rodrik, Dani and Arvind Subramanian, 2009, "Why Did Financial Globalization Disappoint?" IMF Staff Papers, Vol. 56, 112–128, (Washington, DC: International Monetary Fund).

Rohatinski, Željko, 2009, "Recent Economic and Financial Developments in Croatia," Address at a press conference, Zagreb, February.

Sa, Filipa, and Tomasz Wiedalek, 2015, "Capital Inflows and the U.S. Housing Boom," Journal of Money, Credit and Banking, Vol. 47(S1), pp. 221–256.

Shin, Hyun Song, 2012, "Global Banking Glut and The Loan Risk Premium," 2011 IMF Mundell-Fleming Lecture, IMF Economic Review 60: 155–192 (Washington, DC: International Monetary Fund).

Tillmann, Peter, 2013, "Capital Inflows and Asset Prices: Evidence from Emerging Asia," Journal of Banking & Finance, Vol. 37(3), pp. 717–729.

Vujcic, Boris, and Mirna Dumicic, 2016, "Managing Systemic Risks in the Croatian Economy," BIS Paper No 86, Bank for International Settlements.