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Macroprudential Financial Market Regulation

Aims, Implementation, and Implications for
Developing and Emerging Economies

Birgit Schmitz

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Abstract

The global financial crisis has shown that financial market regulation focused on the liquidity and solvency position of individual financial intermediaries does not suffice to mitigate the overall risks to financial stability. Furthermore, the real economic costs of financial instability are considerably higher than expected. A core element of the international policy response to the crisis has been to strengthen the macroprudential orientation of financial market regulation. Macroprudential policy and regulation stand for enhanced regulatory focus on systemic risks in the financial system and their repercussions for the macroeconomy. Thus far, the debate on macroprudential regulation has mainly focused on the needs of developed economies and examined regulatory proposals against the background of advanced economies. However, empirical evidence shows that developing and emerging economies have suffered stronger and more costly economic cycles and disruptive financial crises than advanced economies – with less effective fiscal and monetary policy tools to mitigate and resolve them. In preparation for future shocks, policy makers in developing countries must urgently develop macroprudential policy frameworks to foster financial and macroeconomic stability. This paper presents the most important aspects of macroprudential policy making for developing and emerging economies. It explains the concepts of macroprudential regulation and introduces how macroprudential policy is currently being implemented. It then identifies the major sources of systemic risk and discusses the specific challenges to developing macroprudential policy frameworks for developing and emerging economies, and offers recommendations with regard to macroprudential policy choices for developing and emerging economies.

JEL Classification Numbers: E44, G28, G01, E58

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Abbreviations

BCBS	Basel Committee on Banking Supervision
BIS	Bank of International Settlements
CGFS	Committee on the Global Financial System
DTI	debt to income
EWI	early warning indicators
FSB	Financial Stability Board
FSOC	Financial Stability Oversight Council (US)
G20	Group of Twenty
G30	Group of Thirty
IMF	International Monetary Fund
LTV	loan-to-value
OTC	over-the-counter
SIFI	systemically important financial institutions
SME	small and medium-sized enterprise
VAR	vector autoregression

1 Motivation and introduction

The global financial crisis taught policy makers and academic researchers two things about financial market regulation. First, financial market regulation that focuses on the liquidity and solvency position of individual financial intermediaries does not suffice to curb the overall risks to financial stability. Second, the economic costs of financial instability are much higher than expected. In this crisis, advanced economies have suffered the largest output losses because the depth and complexity of their financial markets make any financial crisis highly disruptive. Not only have the direct costs of bank bailouts and liquidity provision for the financial sector burdened fiscal balances, but indirect costs such as fiscal stimulus packages and large output losses have also increased public debt and led to solvency crises in several euro-zone countries.

A debate is raging about how to prevent, or at least mitigate, financial crises that have serious consequences for the real sector. More attention is being paid to the notion of regulating the whole financial system and its link to the macroeconomy, and renewing interest in macroprudential policy and regulation.¹ Academics and national and international policy makers are heatedly discussing how to design financial market regulation in order to foster macroeconomic stability. The macroprudential orientation of current policy arrangements also received strong political backing from the Group of 20 (G20) Leaders, who prioritized further work on macroprudential frameworks at the Seoul Summit in November 2010 (FSB / IMF / BIS 2011a).

The experience of the advanced economies, the effects of the global financial crisis on their own economies, and the widespread discussion about macroprudential policy has reintroduced the topic of financial crises and financial market regulation to policy makers in emerging and developing countries. It is common knowledge that financial and macroeconomic stability are prerequisites for attracting long-term investment and ensuing sustainable economic development and growth in developing countries. However, empirical evidence shows that developing and emerging economies have experienced stronger and more costly economic cycles and disruptive financial crises than advanced economies. Claessens / Kose / Terrones (2011), who study the interaction of business and financial cycles, discover that business cycles often coincide with cycles in credit and housing prices. In emerging economies, business cycles tend to be significantly more pronounced than in advanced economies; as a consequence, their recessions cost three times more. Recessions that include financial disruptions tend to be longer and deeper than other recessions.

Many developing and emerging countries have less effective economic policy tools to mitigate and resolve macroeconomic and financial crises. Laeven and Valencia (2012) document how, in comparison with advanced economies, emerging and developing economies make much larger fiscal outlays when they intervene in their financial sectors and rely less on monetary and fiscal policies to resolve banking crises. Perhaps this is because in comparison with advanced economies, developing and emerging economies have worse financing options for counter-cyclical fiscal policy and generally less leeway for monetary

1 According to Clement (2010), since the term was coined in the late 1970s, it has denoted concerns about financial stability and the macroeconomy; over time, however, the focus of concerns has changed.

policy. Therefore, in preparation for future shocks, policy makers in developing countries should urgently develop macroprudential policy frameworks that foster financial and macroeconomic stability.

Furthermore, the financial sectors in emerging economies exhibit strong growth records both in scale and scope. But financial market regulation that is appropriate for the current state of development may prove insufficient for more complex financial market structures, leading to more increased systemic risks, like those found in advanced economies. The big challenge is how to allow continued financial development in the context of a solid financial system. However, since post-crisis reforms aim to ensure more stable and resilient financial systems, there might be trade-offs in terms of growth. Therefore, policy makers must assess the impact of macroprudential financial market regulation on the crucial drivers of economic growth and shape the macroprudential policy framework to address appropriately developing countries' needs and specific circumstances.

Because discussions of macroprudential regulation have so far focused mainly on the needs of developed economies, and the resulting regulatory proposals have primarily been examined against the background and needs of advanced economies, this paper aims to not only give a concise overview of the aims and scope of macroprudential financial market regulation and how it relates to other economic policies, potential indicators, available instruments, and institutional set-up, but also to evaluate its relevance and implications for emerging and developing economies. Finally, the paper strives to establish recommendations about macroprudential policy choices for developing and emerging economies.

Section 2 clarifies the aims and scope of macroprudential regulation and how it relates to microprudential regulation and other economic policies. Section 3 gives an overview of macroprudential indicators and instruments, explains how a macroprudential policy framework could be set up, and adds to the discussion about the need for international coordination and cooperation with regard to macroprudential regulation. Section 4 takes the perspective of emerging and developing economies, analyses the specific circumstances of macroprudential regulation and offers recommendations regarding their macroprudential policy options. It starts by ascertaining the financial markets and institutions that are sources of systemic risks and then examines specific challenges with regard to implementing macroprudential policies in emerging and developing economies. Section 5 concludes and offers suggestions about how development cooperation can support developing countries' participation in the changing global financial landscape.

2 Objectives of macroprudential financial market regulation

2.1 Aims and scope

The global financial crisis stimulated debate among government officials, policy makers at international institutions, and academics about how to design financial market regulation to foster macroeconomic stability.

Because the financial and the real sector are closely linked, it is assumed that as long as an economy enjoys financial stability, the macroeconomy will be unaffected, allowing for the

pursuit of long-term goals such as growth and equity. Macroprudential financial market regulation thus strives to ensure financial stability.

According to Bank of England (2009), financial stability is reached when financial markets enable the stable provision of financial intermediation services to the economy: payment services, credit intermediation and insurance against risk. This view advocates macroprudential policy that takes account of the entire financial system including interactions between the financial and real sector, regardless of the type of institution that provides the financial intermediation services to the economy. The basic processes of financial intermediation, including maturity transformation, leveraged finance, and risk transfer, are offered by a variety of enterprises. Macroprudential policy should cover the formal banking sector as well as the ‘shadow banking’ sector, i.e. hedge funds, money market funds, broker-dealer firms, structured investment vehicles, and insurance companies (Hanson / Kashyap / Stein 2011).

Financial stability is usually threatened by systemic risk in the financial sector. Systemic risk or system-wide financial risk is defined as a risk of disruptions to financial services caused by an impairment of all or parts of the financial system that negatively impact the real economy.² Systemic risk can either be triggered by an exogenous shock or an endogenous shock from the financial system.³ The global financial crisis has demonstrated that regulation focused solely on individual institutions does not adequately deal with system-wide financial risks, which are a major source of financial instability. Macroprudential policy has emerged to concentrate on systemic risks: it aims to make the financial system more resilient to external and internal shocks.

Systemic risk has two important dimensions to be addressed by macroprudential policy:

1. the time dimension and
2. the cross-sectional dimension.⁴

Systemic risks develop over time as a result of a cumulative, amplifying mechanism that operates within and between the financial system and the real economy. Economic agents exhibit pro-cyclical behaviour by increasing exposure during the boom of an economic cycle and becoming highly risk-averse during a bust-phase. This tendency creates excessive leverage in financial firms, corporations and households, which can lead to credit and liquidity cycles as well as excessive maturity mismatches. Procyclicality makes the financial and real sector more vulnerable to endogenous and exogenous shocks and more prone to financial distress.

The cross-sectional dimension of systemic risk describes the distribution of risk in the financial system at any point in time. This type of systemic risk originates at the level of individual institutions because of their size, interconnectedness, complexity and substitutability of their activities. Contagion can then result from intra-firm exposures and vulnerability to common shocks, triggering spillovers between institutions. Then a solvency or liquidity event in any one firm can be followed by cascading effects because of the linkag-

2 This definition is used by FSB / IMF / BIS (2011a) and (2011b) in their report to the G20.

3 See ECB (2009) and Galati and Moessler (2011) for a thorough discussion of the literature.

4 See the extensive coverage in Bank of England (2009) and IMF (2011b).

es between firms and can induce system-wide liquidity squeezes, bank runs as well as fire sales. The bankruptcy of one financial institution thus imposes unacceptable costs on the rest of the economy, often triggering bank rescues that can create a vicious circle between the financial and fiscal systems.

2.2 Sources of systemic risk: theoretical underpinnings

Understanding the sources of systemic risk should help determine the types of risk that macroprudential policy should focus on. In itself, risk is necessary and does not harm the economy; however, distortions can cause risk levels that are not socially optimal. Market failures typically come from three underlying sources: incentives, information or coordination.⁵ Figure 1 provides numerous examples of roles played by these types of market failure in the current and past crises.

Incentive problems can arise as unintended consequences of public policy, such as when insurance distorts risk-taking incentives. Insuring downside risk encourages an agent to engage in behaviour that is riskier than not having any insurance. Explicit or implicit guarantees of public sector support for state-regulated financial institutions can influence financial institutions' behaviour the way insurance does. Expectations of a public safety net can contribute to the practice of under-pricing risk among financial institutions, in particular by those that view themselves as too big or too important to fail. Incentive problems can also result from institutional reasons, such as limited liability. Financial contracts typically limit the downside risk borne by shareholders and managers due to limited liability. This asymmetry in pay-offs generates an incentive for both parties to take large risks in order to increase expected returns. Banks' pre-crisis business strategies, including higher leverage and larger trading books, reinforced the asymmetry of pay-offs and the incentives for risk-taking.

Information frictions cause markets to fail when buyers doubt the quality of assets. The 2007 freeze of the interbank and asset-backed commercial paper markets is a good example: investors bid down prices because they had imperfect information about the quality of underlying assets, while sellers of good assets were unwilling to sell at prevailing market prices. Information deficits can lead to network externalities because agents do not have the information needed to determine the risks to which they are exposed. Then the contagious consequences of one firm failing may be opaque to others in the financial network. A large body of evidence indicates that people may not process information in a fully rational way. Risk illusion, or disaster myopia, can occur when, after a period of relative stability, financial investors collectively underestimate the probability of adverse scenarios. Risk misperception is widely viewed as the reason for the historically low compensation that investors demanded for holding risky assets in the run-up to the crisis.

Coordination problems can hinder individuals acting in an optimal way. Although collective action may be in the interest of each group member, in the absence of a means of coordination, such equilibrium may be unachievable. Coordination problems can generate

5 The following section builds on Bank of England (2009). ECB (2009) states more generally that a variety of market imperfections (e.g. asymmetric information, externalities, incomplete markets) are behind the formation of systemic risk.

financial instabilities such as booms, bank runs, asset fire sales, credit crunches, and liquidity problems. For example, solvency concerns can cause banks to seek to shrink their balance sheets by constraining new lending or by selling assets. While individually rational, collectively this behaviour risks generating worse outcomes for everyone because restricting new lending generates a credit crunch for the real economy and a fire sale of assets reduces market liquidity and drives down asset prices. These outcomes can even aggravate the banking sector's solvency problems.

The frictions described here multiply within the financial system, affecting the real economy through two basic channels: leverage and maturity transformation. Leverage defines the degree to which assets are funded by debt, while maturity transformation determines the degree to which shorter-term liabilities are used to finance longer-term assets. Both leverage and maturity transformations are socially useful. Debt allows households to sustain consumption despite possible income disruptions, while maturity transformation permits smooth consumption over time for depositors and enable societies to fund long-term investments. Market failures such as incentive, information, and coordination problems can lead to excessive leverage and maturity mismatch. Furthermore, a high degree of interconnectedness of wholesale financial activities can spur contagion.⁶ Excessive leverage and maturity mismatches make the financial sector and the real economy more fragile in the face of adverse shocks because they act as amplifying mechanisms, magnifying the impact of liquidity and solvency shocks so that system-wide risk can develop.

2.3 Macroprudential vs. microprudential regulation and supervision

The difference between the macro- and microprudential focus of financial market regulation is best illustrated by the banking sector. Banks are traditionally financed through government-insured deposits. Deposit insurance helps prevent bank runs but also changes the incentives for bank managers to be willing to take excessive risks because they know that taxpayers will cover any losses. Microprudential regulation of bank capital forces banks to internalize these costs and protects the deposit insurance fund by lowering the probability of a bank default to an acceptable level (Hanson / Kashyap / Stein 2011). Microprudential policy aims at idiosyncratic risk and depositor protection, thereby ensuring the safety of individual financial institutions.

Since the financial system is made up of individual institutions, the goals of microprudential supervision and macroprudential policy often coincide.⁷ But the most recent financial crisis has shown that solving the incentive problem at each individual institution does not ensure the stability of the entire financial system. Interconnectedness and the collective behaviour of banks, other financial institutions and agents may generate externalities⁸ that can lead to

6 See also ECB (2009) for a discussion of important features of the financial system that lead to a greater fragility in comparison with other economic sectors.

7 See Group of 30 (2010) and compare with CGFS (2010).

8 See also De Nicolò / Favara / Ratnovski (2012) for a discussion of three sources of market failure that require macroprudential intervention: externalities related to strategic complementarities, externalities related to fire sales, and externalities related to interconnectedness.

Figure 1: The role of market failures in financial crises, past and present		
	Financial markets	Institutions
<p>Incentive problems</p> <p>Moral hazard and ‘too big to fail’</p> <p>Incomplete contracts</p>	<ul style="list-style-type: none"> • ‘The Greenspan Put’ – some argue that soaring equity prices earlier this decade reflected investors’ beliefs that the Federal Reserve would act to prevent the market from failing, but not to stop it rising (2000s). 	<ul style="list-style-type: none"> • Support for Fannie Mae, Freddie Mac, Bear Stearns and AIG (2008). • October 2008 recapitalisation plan and March 2009 Asset Protection Scheme offered to large UK Banks. • Continental Illinois (1984), US Savings and Loan crisis (1980s/90s). • Compensation structures that gave incentives to pursue unduly risky practices.
<p>Information frictions</p> <p>Network externalities</p> <p>Risk illusion</p> <p>Adverse selection</p> <p>Information cascades</p>	<ul style="list-style-type: none"> • Credit default swap market at time of Lehman Brothers and AIG stress (September/October 2008) – contagious consequences of default were unclear to others in the financial network. • The ‘search for yield’ – buoyed by illusory reductions in macroeconomic uncertainty, investors tried to maintain high returns in a low interest rate environment by purchasing ever-riskier products (2003-07). • The freeze of the interbank and asset-backed commercial paper markets (August 2007) – investors bid down prices as they had imperfect information on the quality of underlying assets, and sellers of ‘good’ assets were unwilling to sell at prevailing market prices. • Contagious currency devaluations during the Asian financial crisis (1997) 	<ul style="list-style-type: none"> • Widespread use of value at risk (VaR) models for risk management purposes, which were estimated over episodes of relative calm in financial markets, and so could not capture the possibility of extreme market volatility (1997 onwards). • Investors in Bernard L Madoff’s funds extrapolated apparent trends in profits (2008). • Short-selling of the shares of some UK banks (2008).
<p>Co-ordination problems</p> <p>Peer benchmarking</p> <p>Fire-sale externalities</p> <p>Credit crunch externalities</p> <p>Runs on retail or wholesale deposits</p>	<ul style="list-style-type: none"> • Condition of financial system in mid-2007, as described by Chuck Prince’s infamous quote. • Peer group comparison among investment managers. • Bank lending to households and corporate tightened significantly in 2008/09. • Runs on money market funds (2008), prompting the introduction of the Federal Reserve’s Money Market Fund facility 	<ul style="list-style-type: none"> • Series of bank mergers and rescues that followed failure of Lehman Brothers to prevent contagious fire sales, e.g. Bradford and Bingley and HBOS (2008). • Following the 2001 ‘dotcom’ equity correction, losses faced by UK life insurers could have led to a potential ‘asset price loss-spiral’ through equity sales – FSA intervened by relaxing solvency rules. • Runs on Lehman Brothers and Bear Stearns (2008) • Run on Northern Rock (2007), leading to the introduction of increased deposit insurance limit in the United Kingdom (2008).
<p>Source: Adopted from Bank of England (2009)</p>		

systemic risk with adverse effects on the real economy. Another problem of ‘traditional’ prudential policy is that actions that are appropriate for individual firms may collectively cause or aggravate system-wide problems⁹ that can be even more critical during crises. For example, a microprudentially-oriented regulator who pushes a troubled bank to restore its capital ratio usually does not care whether banks adjust by raising new capital or by shrinking assets. But when a large proportion of the financial system is in difficulty, attempts by many institutions to simultaneously shrink their assets are likely to damage the macroeconomy (Hanson / Kashyap / Stein 2011). Banks either decide to cut lending across the board, which can result in a credit crunch, or they try to sell financial assets simultaneously which can lead to price declines that damage the balance sheets of other institutions, as well as funding problems, fire sales, and cause the system’s liquidity to evaporate. When multiple financial institutions that have been hit by a common shock simultaneously shrink their balance sheets, they can destabilize the broader financial system and generate large social costs (Hanson / Kashyap / Stein 2011). Macroprudential financial market regulation strives to limit these social costs. So, a macroprudential approach to financial market regulation acknowledges the importance of general equilibrium effects, seeks to safeguard the financial system as a whole, and recognises the systemic importance of individual institutions. Macroprudential policy, which is understood as an ongoing task that is prospective and preventive, is distinct from other financial market regulation such as crisis management or resolution policy.¹⁰

2.4 Relation to other economic policies

Both monetary and fiscal policies have an impact on systemic risk and therefore affect macroprudential policy making. The relationship of macroprudential policy to these two macroeconomic policies is characterised by strong feedback effects and complementarity.

While fiscal policy and public debt levels can create vulnerability for the financial sector¹¹ macroprudential regulation or rather the absence of effective macroprudential policy can seriously strain public budgets. This becomes clear whenever bank rescues or crisis management instruments need to be financed. Recent examples include Ireland and Iceland, where Laeven and Valencia (2012) estimate that fiscal outlays for crisis management amounted to 40.7% and 44.2% of GDP, respectively.

Feedback effects between monetary and macroprudential policies are greater and more complex, particularly in three areas: risk-taking, asset price and credit booms, and transmission channels.

Representing one strand of literature, Borio and Zhu (2008) argue that the stance of monetary policy¹² affects risk perceptions and risk tolerance, thereby influencing risk-taking incentives and systemic risk. However, monetary stability reduces the financial system’s vulnerability to pro-cyclical tendencies, since risk-taking varies with the economic cycle and stable medium-term policy rates reduce up- and downswings.

9 See also IMF (2011b).

10 See also CGFS (2010).

11 This effect can be studied by examining the eurozone’s banking sector.

12 In the current crisis, this means very low policy rates over a long period.

In asset price and credit booms, monetary policy could more actively support macroprudential policy by restraining rapid growth in bank balance sheets during the upswings. Borio and White (2004) and Borio and Drehmann (2009a) argue that monetary policy should lean against the build-up of financial imbalances and the cycle of financial stability. But this can have several drawbacks.

First, monetary policy guides the aggregate price of goods and services in the economy by balancing the nominal demand and supply capacity of the economy. Monetary policy makers' focus on inflation can put them in a poor position to moderate movements in financial asset prices or emerging financial imbalances. To slow spending in the economy, a central bank would have to set interest rates above the level required to meet its inflation target – which could generate lower output and cause higher-than-expected unemployment. Second, monetary policy makers risk missing their inflation target and losing credibility (Group of 30 2010). Third, the main instrument of monetary policy, a short-term and risk-free interest rate, is not always very useful in impacting on financial prices and quantities due to uncertainty about its effect when risk premiums are rapidly adjusting, both up and down (Bank of England 2009).

However, macroprudential policy interventions have macroeconomic effects. For example, raising capital requirements in a credit boom could dampen aggregate demand and influence the monetary and fiscal policy environments.

With regard to monetary policy transmission, macroprudential policy measures strengthen the resilience of the financial system and can therefore reinforce monetary policy by shielding the economy from sharp financial disruptions. Macroprudential settings influence credit supply conditions, an important channel of monetary policy transmission. Monetary policy can have a greater effect on conditions once macroprudential policy has reduced the impact of financial frictions on credit supply.¹³

Successful monetary and macroprudential policies tend to reinforce each other. However, macroprudential policy cannot substitute for sound macroeconomic policies. Monetary and fiscal policies must continue to focus on correcting macroeconomic imbalances while macroprudential policy concentrates on containing systemic risk (FSB / IMF / BIS 2011b).

3 Implementation issues

3.1 Measurement of systemic risk and choice of indicators

Ideally, measuring systemic risk should provide information about its build-up in both time and cross-sectional dimensions, be accurate, have the least possible time lag, and be able to forecast financial instability and its consequences for the real sector (IMF 2011b). However, even FSB / IMF / BIS (2011b) acknowledges that “*the difficulty of this task should not be underestimated and this remains very much work in progress*”.

Measurements of the time dimension are needed in order to reveal the gradual build-up of imbalances and the likelihood and potential impact of shocks. Measurements must be found

¹³ See also CGFS (2010).

for the cross-sectional dimension to indicate not only the concentration of risk within the system but also the degree of interconnectedness, and the probability of contagion. Indicators of the systemic importance of individual institutions¹⁴ must also be identified.

Moreover, the measurement of systemic risk should be able to reliably distinguish between ‘normal’ fluctuations and trends, and profound imbalances or excesses. The latter call for macroprudential treatment that should not attempt to correct fundamentals-driven cyclical fluctuations and longer-term trends (CGFS 2010). Borio and Drehmann (2009b) emphasise another role of systemic risk measurement, arguing that it decisively influences the macroprudential framework because ex-ante measurement supports the strategy’s real time implementation while ex-post measurement helps to ensure regulatory authorities’ accountability.

The literature discusses several methodological approaches to measurement (Galati and Moessner 2011; Borio / Drehmann 2009b; IMF / FSB / BIS 2011b). First, there are measures dealing with the time dimension: aggregate indicators usually based on balance sheets or indicators of market conditions, early warning indicators (EWI), quantitative analysis based on vector autoregressions (VAR), and macro stress tests.

Aggregate indicators such as leverage, maturity, and currency mismatches¹⁵ are usually deducted from aggregate balance sheets. Regulatory authorities used these before the crisis.

Shin (2011) argues that aggregate systemic risk measurements derived from the liability side of balance sheets are particularly useful. In normal times, financial intermediaries mainly finance their assets with core funding in the form of retail deposits from households. However, in periods of excessive credit growth, financial institutions revert to non-core liabilities like securitised notes, financial commercial paper, repurchase agreements, and foreign exchange borrowing. Shin therefore proposes using the ratio of core-to-non-core liabilities as an indicator of aggregate systemic risk because it correctly reflects the financial cycle.

Rodriguez-Moreno and Pena (2011) test different systemic risk indicators for the United States and European banking systems, concluding that investors and regulators should rely on simple, robust indicators based on credit derivatives and market interest rate data. They warn that although indicators based on the liquid market prices of credit-sensitive instruments seem useful, it is not wise to make inferences based on the prices of financial products traded in thin markets.

However, aggregate indicators deducted from balance sheets are backward-looking, or at best contemporaneous and severely limit a macroprudential policy maker’s ability to react to systemic risks in a timely fashion.

Leading and early warning indicators that can help avoid this problem are combined in early warning models. Drehmann et al. (2010) discover that the deviation of the credit-to-GDP ratio from its trend serves as a quite reliable leading indicator of financial distress. Borio and Drehmann (2009a) extend earlier findings about how unusually strong increases in credit, equity and property prices indicate financial imbalances using the framework of a simple

14 See BCBS (2011) for details. Systemically important banks are characterised by their size, interconnectedness, complexity, and lack of substitutability or global scope.

15 More indicators are found in the IMF set of ‘financial soundness indicators’.

EWI model. But they point out that these measurements are less helpful when cross-border exposures play important roles.¹⁶ Galati and Moessner (2011) are more critical about using EWI models for macroprudential policy making. Since the analysis often does not reflect an underlying model that shows how the real economy and the financial sector interact, policy makers have difficulty relating the need and choice of specific regulatory steps to the results of an EWI model, which can reduce the transparency and accountability of macroprudential policy. In spite of this general critique, the IMF-FSB Early Warning Indicator Exercise offers a versatile toolkit for measuring systemic risks.¹⁷ Figure 2 gives an idea how the different indicators and models interact.

Different versions of VAR models are also used to measure financial instability and distress. They are flexible forecasting tools that can trace the transmission of shocks through the economy and reproduce the impact of endogenous shocks to the financial sector and the economy. Still, they offer only stylized descriptions of financial sector's dynamics and feedback to the macroeconomy.¹⁸

Macro stress tests can be used to trace responses to large exogenous shocks throughout the financial system and are forward-looking (Galati / Moessner 2011). Stress tests were originally developed to test individual institutions' resilience to financial market shocks, not to capture feedback effects between the financial and the real sector. More recent models also include macroeconomic shocks, take into account market dynamics in extreme scenarios, consider amplification effects from contagion and interconnectedness, and allow for multi-round adverse feedback effects. Van Lelyveld (2009) describes macro stress tests as a multi-stage process with four steps. First, the macroeconomic stress scenario must be designed. Then macroeconomic variables are mapped into microeconomic indicators of banks' credit risk. Next, the macroeconomic model is used to project the time path of the macroeconomic variables under stress conditions, and the estimates are fed into the credit risk model to determine the credit quality indicators under stress. Finally, an assessment must be made about whether the banks can withstand the potential shocks. Regulators should not only look at the credit loss distribution for the banking system as a whole but also investigate the risk distribution throughout the system to detect risks of contagion.

Measurement of systemic risk is less developed for the cross-sectional dimension. The literature discusses metrics of concentration risk within the system, network analyses on balance sheet cross-exposures, contingent claim analysis, joint probabilities of default based on equity returns or spreads of credit default swaps (CDS), and indicators of spill-over risks.¹⁹ In addition to the great efforts by international governance institutions and academia, the private sector has also developed measurements of systemic risks, such as Merrill Lynch's Global Financial Stress Index from or the Macro Prudential Indicators from Fitch Ratings.

16 In emerging markets the real exchange rate appreciation is an important indicator of financial crisis; see Galati and Moessner (2011).

17 See IMF (2010) for details.

18 A more elaborate version is a factor-augmented VAR, an example of which is presented by De Nicolò and Luchetta (2010), who model the joint dynamics of output growth and systemic risk.

19 Describing these different approaches in more detail is unfortunately beyond the scope of this paper.

Figure 2: Empirical models and indicators in the IMF–FSB Early Warning Exercise	
SECTORAL AND MARKET VULNERABILITIES	
<i>A. External sector risks and vulnerabilities</i>	
Cross-border capital flows External imbalances Exchange rate misalignments	External financing gaps Probability of an external crisis
<i>B. Fiscal risks and vulnerabilities</i>	
Rollover and financing risk Markets' perceptions of sovereign default risk The required scale of fiscal consolidation	Sensitivity of public sector debt to adverse shocks Contagion risk from fiscal distress Probability of a fiscal crisis
<i>C. Corporate sector risks and vulnerabilities</i>	
Leverage, liquidity, and profitability	Stock valuation and default probabilities
<i>D. Asset prices, market valuation and bubble spotting</i>	
Real estate bubbles Feedback loops between non-performing loans and macroeconomics performance	Equity market bubbles
<i>E. Financial market risk attitudes</i>	
Global financial stability map	Asset and market volatility
COUNTRY RISK MODELS	
Crisis risk models GDP-at-risk	Crisis duration models
DRAWING SYSTEMIC IMPLICATIONS	
<i>A. Spillover and contagion analysis</i>	
Contagion and spillover tools using financial market data Contagion and spillover tools using cross-border data	
<i>B. Analysis of Large Complex Financial Institutions (LCFI)</i>	
Vulnerabilities of individual LCFIs Systemic risk and distress spillovers	Country-level measures of bank vulnerabilities
<i>C. Global scenarios</i>	
The Global Projection Model (GPM) Monetary and fiscal business cycle model of the US economy (FISCMOD) Global Integrated Monetary and Fiscal Model (GIMF) A Panel Unobserved Components Model	
Source: Adopted from IMF (2010)	

So far there is no consensus about how to measure systemic risk. The best approach appears to be combining various measurements from diverse modeling efforts to produce a multi-faceted picture of systemic risk. The IMF systemic risk ‘dashboard’ (IMF 2011b, 21) is an integrated monitoring system that combines a number of approaches (see Figure 3).

Figure 3: An illustrative example of systemic risk monitoring (systemic risk ‘dashboard’)

The IMF “*systemic risk dashboard*” aims to cover key risk categories and approaches, distinguishing between the likelihood of shocks and their potential impacts, as well as between high and low frequency monitoring tools. For each dimension, it proposes to rely on one or two specific analytical tools that are identified as the most robust and useful from an early warning perspective. Importantly, such a system needs to be tailored to individual countries’ circumstances – reflecting aspects such as the degree of market development and data availability – and should be revisited and updated over time.

AGGREGATE MEASURE	
<i>Low frequency</i>	<i>High frequency</i>
Crisis risk models	Systemic CCA
LIKELIHOOD OF SHOCKS	
<i>From asset quality/price deviation</i>	
<i>Low frequency</i>	<i>High frequency</i>
Credit/GDP deviation	Regime shifts in financial market volatility (e.g., interest rate, currency, and equity markets)
House prices	
<i>From concentrations/connectedness</i>	
<i>Low frequency</i>	<i>High frequency</i>
Interbank exposures	Distress dependence (JPod, BSI)
Core/non-core liabilities (aggregate)	
POTENTIAL IMPACTS	
<i>Through balance sheet exposures</i>	
<i>Low frequency</i>	<i>High frequency</i>
Leverage measure	EDF measures for main SIFIs
Macro stress tests	
<i>Through interconnectedness</i>	
<i>Low frequency</i>	<i>High frequency</i>
Network models	CCA-related measures of joint losses
Cross-border exposures of banking systems	
Note: CCA stands for Contingent Claims Analysis; JPod = Joint Probability of Distress; BSI = Banking Stability Indicator; EDF = Expected Default Frequency; SIFI = Systemically Important Financial Institutions	
Source: Adopted from IMF (2011b)	

3.2 Instruments

Although many proposals have been made for macroprudential instruments, there is no consensus regarding their definition, mode of application, classification, and relevance. We start by defining macroprudential instruments and their mode of application, and attempt to classify the various instruments.

The IMF (2011b) defines macroprudential instruments as instruments that are either specifically tailored to mitigate the time-varying or cross-sectional dimensions of systemic risk, or are not specifically developed for systemic risk but explicitly and specifically target systemic risk. For the latter, the IMF requires that the institutional framework be underpinned by governance arrangements to prevent misuse. Other authors (Galati / Moessner 2011; CGFS 2010) point out that the macroprudential toolkit includes (micro)prudential instruments with a “macro lens”²⁰ as well as other complementary instruments from quite diverse policy fields, such as monetary and fiscal policy, capital account management, and market and infrastructure policies, and are used to support financial stability.

IMF (2011b) considers that a macroprudential tool should effectively mitigate systemic risks, allow for limited arbitrage across regulations and borders, aim at the roots of the systemic risk problem by changing the behaviour of economic agents, and distort the financial system and economy as little as possible.²¹

The literature intensively discusses the application of macroprudential instruments. Implementing an instrument as a rule²² enhances the accountability and transparency of macroprudential policy. Borio and Shim (2007) argue that “built-in stabilizers” leave less room for policy error and act as effective pre-commitment devices since they do not require continuous justification by the authorities. Automatic stabilizers can influence economic behaviour *ex ante* and encourage more prudent behaviour. However, when instruments are used as discretionary measures, they can be fine-tuned to specific financial imbalances, which by their very nature occur infrequently and vary in intensity and other characteristics. Temporary measures may also be less subject to avoidance.²³

The Group of 30 (2010) raise another interesting point by distinguishing between variable and fixed approaches to implementing macroprudential instruments. In a variable approach, macroprudential instruments have adjustable parameters that change depending on macroprudential indicators that fluctuate during the economic cycle. This approach is best for combating pro-cyclical tendencies and network risk resulting from the

20 Galati and Moessner (2011) present numerous fields of prudential regulation that can be used for macroprudential purposes: risk measurement methodologies, financial reporting, regulatory capital, funding liquidity standards, collateral arrangements, risk concentration limits, compensation schemes, profit distribution restrictions, insurance mechanisms, and resolution regimes.

21 Comparable views on desirable features are found in Bank of England (2009), G30 (2010), and CGFS (2010).

22 Galati and Moessner (2011) name loan loss provisions, capital requirements, loan-to-value ratios, contingent capital and risk management practices as rule-based macroprudential instruments.

23 Besides quantitative adjustments to various tools, Borio and Shim (2007) also categorized warnings from authorities and supervisory review pressure as discretionary instruments.

economic cycle. A ‘fixed approach’ to the development of macroprudential instruments helps the policy maker make the financial system more resilient to systemic risk at all times.

Besides these more general aspects, the literature further distinguishes instruments by policy field, type of institution or activity (e.g., banks, deposit taking, credit provision), type of regulation (e.g., quantity or price²⁴), the focus of regulation (e.g., leverage, liquidity, capital (Lim et al. 2011)) and many other criteria. Figure 4 presents a classification that focuses first on the dimension of systemic risk and then looks at the systemic risk problem to be tackled by macroprudential regulation, which appears to be a very reasonable approach. The literature commonly discusses two dimensions of systemic risk: the time and cross-sectional dimension. Since many financial transactions are cross-border, this dimension is also included.

When systemic risks develop over time, there are two main issues. On one hand, excessive credit expansion or asset price booms can lead to a build-up of systemic risk in the aggregate. On the other hand, amplification mechanisms fuel pro-cyclicality that can destabilise financial intermediation and increase system-wide risks.

In cases of excessive credit expansion and asset price booms, the literature suggests limiting credit quantity or credit growth by imposing respective ceilings or by reducing the demand for – or the supply of – credit. Caps on loan-to-value and debt-to-income ratios can lower demand. When asset prices are rising, loan-to-value ratios might be less effective than debt-to-income ratios, because collateral values (house prices) also rise. All measures that render credit extension more costly for financial intermediaries can decrease supply. These include reserve requirements and increases in minimum capital requirements (FSB / IMF / BIS 2011b; IMF 2011c; Crowe et al. 2011; Dell’Ariccia et al. 2012). If credit is mainly extended to one sector such as property investment and development, it could be helpful to use sector-dependent asset risk weights to calculate capital requirements.

Because the degree of procyclicality is one driving factor of systemic risk in the financial sector in the ongoing crisis, many of the proposed macroprudential instruments deal with differing approaches to reduce financial sector cyclicality. All of these instruments share to be calibrated on some measure of the financial cycle.

Since leverage influences the amplification mechanism and therefore cyclicality, many instruments aim to restrict leverage. This can either be done by increasing equity capital, especially countercyclically, or by reducing the cyclicality in the valuation of collateral. The literature suggests dynamic or forward-looking provisions, countercyclical capital surcharges²⁵ on the aggregate or sector level,²⁶ restrictions on profit distributions, higher

24 For a brief discussion see Galati and Moessner (2011) or CGFS (2010).

25 A variation of higher capital requirements is calculating the capital requirement with regard to the maximum of current and lagged assets; see Hanson / Kashyap / Stein (2011).

26 Bank of England (2009) notes that when specific capital surcharges are applied, flexibility is traded off for simplicity of application.

quality capital, contingent capital²⁷, and higher capital requirements for the trading book and off-balance-sheet positions. For the latter time-varying variations in margins and haircuts, through-the-cycle valuations of collateral, time-varying loan-to-value and debt-to-income ratios, and changed risk management practices (measuring risk through the cycle instead of at one point in time) are proposed.

Maturity mismatch is another driving force of cyclicalities whose proposed remedies include liquidity requirements to limit the underpricing of roll-over risks in funding markets and market liquidity risks in assets markets. Liquidity requirements can take the form of quantity and ratio restrictions or they render maturity mismatches more expensive. Among the former are minimum liquidity coverage ratios, limits on maturity mismatch, limits on net open currency positions, and core-funding ratios; examples of the latter are liquidity buffers tied to maturity mismatches, a levy on non-core liabilities, and capital surcharges for maturity mismatches.

From a cross-sectional perspective, there are contagion and fire-sale risks due to interconnectedness and common exposures, risks posed by SIFIs, and structural vulnerabilities caused by market conduct and the financial market infrastructure. Macroprudential instruments of the cross-sectional dimension can either target the size and balance sheet structure of financial institutions or change the framework of transactions to make the system more resilient. Because of large information deficiencies regarding cross-sectional systemic risk, there is much discussion about introducing broad disclosure requirements on common exposures, common risk factors, and interconnectedness.

With regard to interconnectedness risk, macroprudential liquidity surcharges aim to reduce the complexities of bank funding markets and shorten intra-financial-system lending chains, thereby reducing counterparty risk and liquidity hoarding in a crisis. Liability limits for example by introducing limits on interbank exposure or higher liquidity requirements for inter-financial sector exposures can be used to weaken interconnectedness. To reduce the risk of common exposures, Basel III already includes higher capital requirements for trading and derivative activities, complex securitisations, and off-balance-sheet exposures. Moreover, liquidity requirements for wholesale funding will be introduced.²⁸ A fire-sale externality emerges when a financial institution decides to mainly finance its assets with short-term debt. It fails to internalise its inability to roll-over short-term debt that forces it to liquidate assets in a crisis, thereby imposing fire-sale costs on other financial firms holding the same asset – that then have to watch their own collateral lose value. For such cases, Hanson / Kashyap / Stein (2011) recommend regulating debt maturity to reduce systemic risks and imposing similar standards for a given type of credit exposures, no matter who ultimately holds them. Another helpful tool requires posting higher margins for repo transactions in order to attenuate the forced-selling mechanism and the vicious spiral it unleashes.²⁹

27 Contingent capital can pre-wire a recapitalisation and take the form of contingent convertibles, capital insurance or bonus holdbacks; see Hanson / Kashyap / Stein (2011).

28 See FSB / IMF / BIS (2011a) and compare with IMF (2011b).

29 For the theoretical underpinnings of this suggestion, see also Kashyap / Berner / Goodhart (2011).

Figure 4: Macroprudential instruments

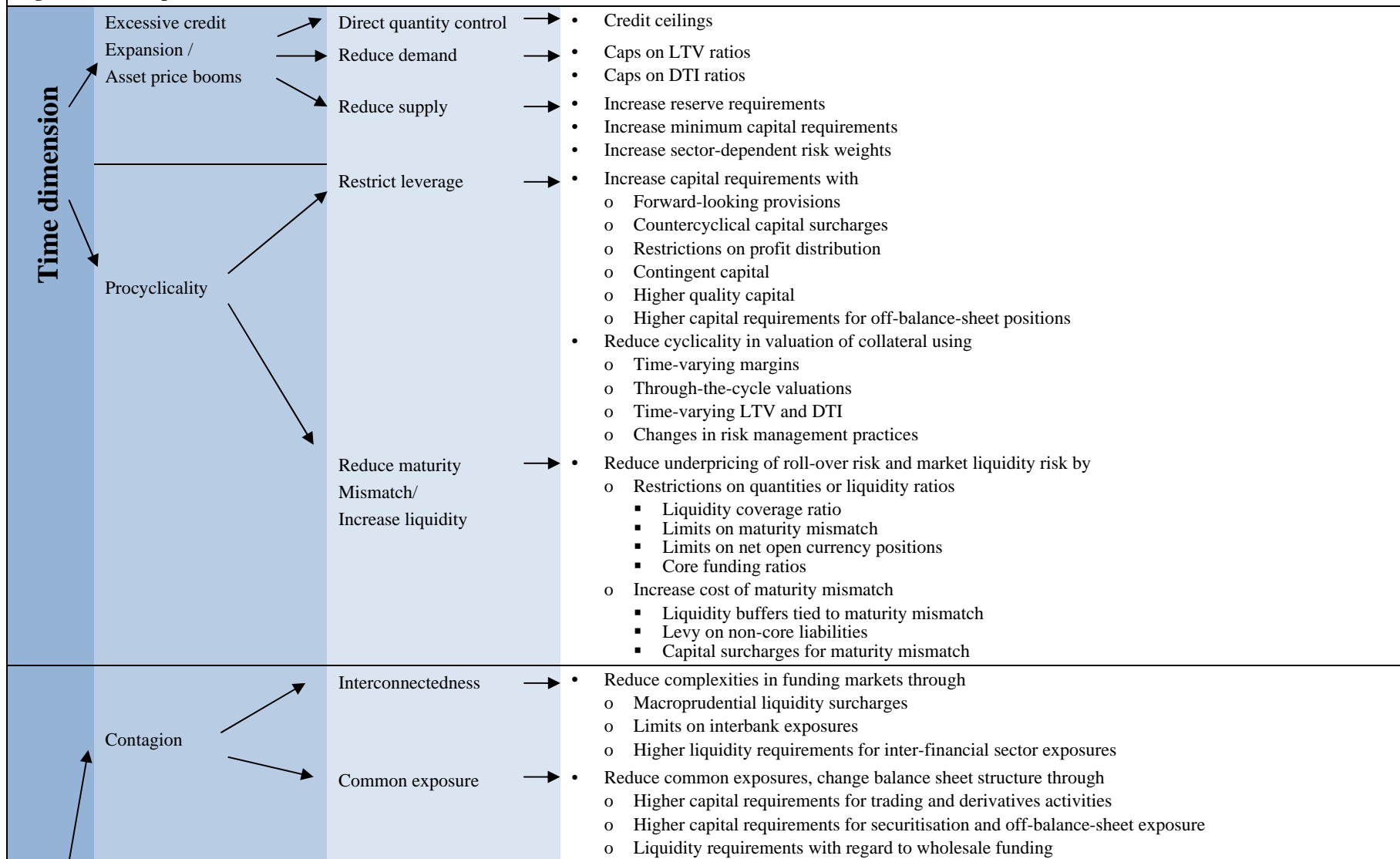
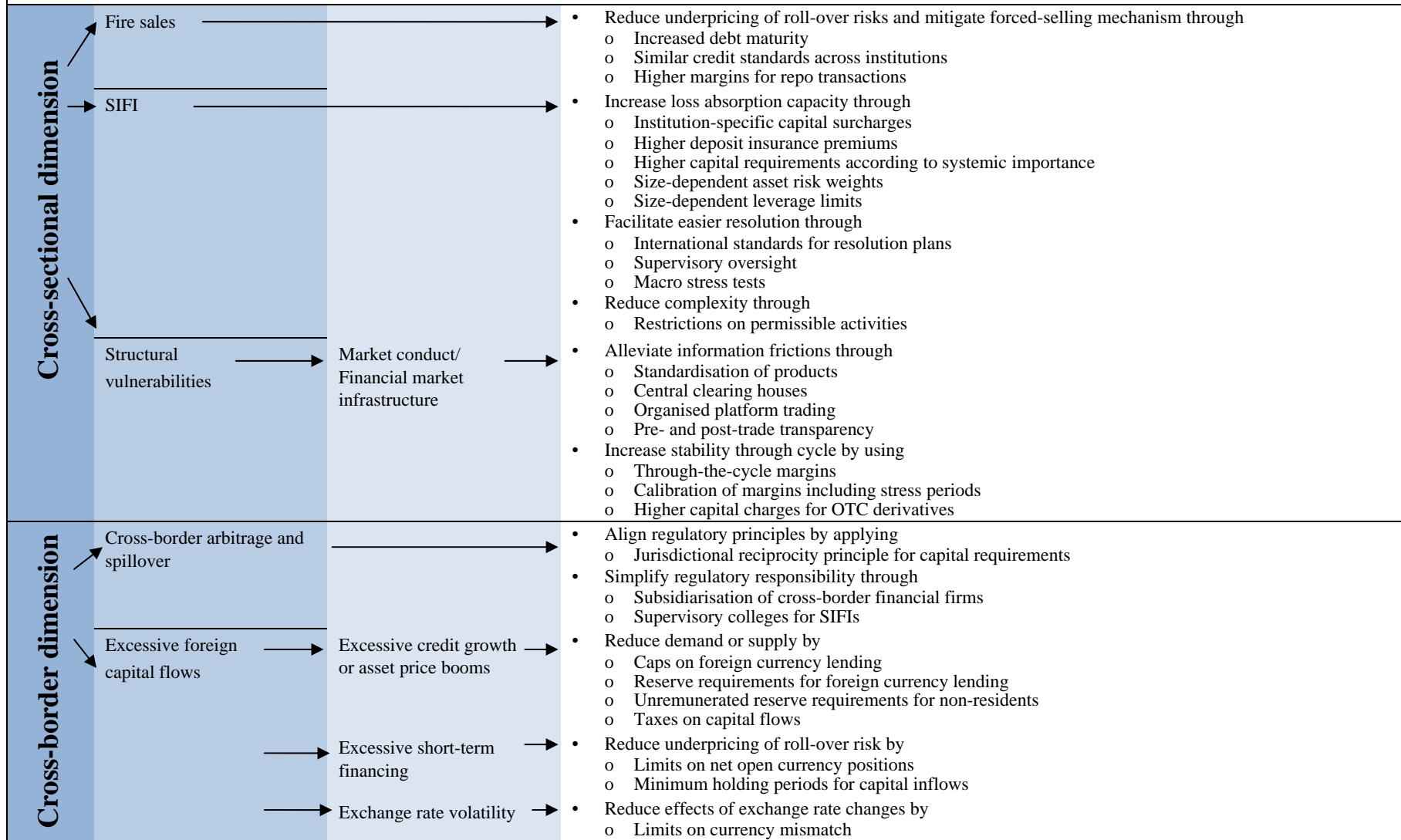


Figure 4 (cont.): Macroprudential instruments



Source: Author

The internationally agreed framework for SIFIs foresees regulatory changes to increase the loss absorption capacity by imposing institution-specific systemic capital surcharges,³⁰ calibrate deposit insurance premiums according to systemic risk, facilitate orderly restructurings, call for more intensive and effective supervisory oversight and international standards for resolution plans. Restrictions could also be made regarding permissible activities for systemic institutions (FSB / IMF / BIS 2011a; Bank of England 2009). In addition, the G30 (2010) proposes higher capital requirements in the form of multipliers with regard to systemic importance and macro stress tests for SIFIs. An alternative macroprudential instrument for dealing with SIFIs could be size-dependent leverage limits or size-dependent asset risk-weights.

During the global financial crisis, the market conduct regarding over-the-counter (OTC) derivatives and securities trading was blamed for liquidity freezes and problems caused by fire sales. Tools to alleviate information frictions include: increased product standardization, centralised clearing houses, organised platform-trading and greater pre- and post-trade transparency. Margining practices should be stable throughout the cycle and margins and haircuts should be calibrated to include periods of stressed markets. The IMF (2011b) argues for supporting the use of central counterparties through strong incentives: Higher capital charges for derivatives trading could be imposed if central counterparties were not used. The Bank of England (2009) stated that the creation of central counterparties for reasonably liquid market instruments should be complemented by centralised risk management and oversight because concentrating respective risk exposures within them could create a new source of systemic risk.

Macprudential regulations must be consistent across borders in order to limit cross-border spillover and arbitrage. One instrument for enhancing consistency is the principle of jurisdictional reciprocity. Basel III states that any banks exposed to several jurisdictions must hold a capital buffer that reflects the composition of a bank's domestic and international exposures. The host authority will activate the buffer for international exposures while the home authority has the option of imposing a higher buffer but may not impose a lower one (FSB / IMF / BIS 2011b). If such an international agreement is not in reach, the Bank of England (2009) proposes a subsidiarisation of different geographic branches of cross-border financial firms in order to reduce cross-country spillovers.

Since currency risks and capital flows create specific risks for the financial sector, the literature also discusses appropriate macroprudential instruments. Where foreign capital inflows cause excessive credit growth or asset price booms, instruments similar to those presented above for slowing credit extension are proposed – for example, caps on foreign currency lending, differentiated reserve requirements for foreign currency, unremunerated reserve requirements for non-residents, and taxes on capital flows. Where capital inflows are a source of short-term financing, various authors have proposed instruments similar to those for fighting maturity mismatch and leverage. These include limits on net open currency positions and minimum holding periods for capital inflows. Limits to currency mismatch could be useful where risk results from exchange rate volatility.

30 The IMF (2011b) makes similar suggestions.

3.3 Institutional arrangements and mandate

A very dynamic market environment challenges macroprudential financial market regulation. The urge to exploit profitable opportunities pushes the financial sector to continuously evolve – sometimes very rapidly. New types of financial institutions and financial activities develop from the constant search for returns, and these can create new sources of systemic risk. Macroprudential policy making must be able to respond flexibly to the changing financial market. According to Nier (2011) such a dynamic system requires macroprudential policy makers to have three types of powers:

- information collection,
- designation, and
- calibration.

In order to assess the entire financial sector, a macroprudential policy maker must have the right to collect information from all providers of financial intermediation services. Information of interest includes exposures to financial instruments or other institutions, business models, and levels of leverage. Such information can be requested directly from financial intermediaries. Alternatively, the macroprudential policy maker has must rely on available information from supervisors or commercial data warehouses.

Designation powers allow the macroprudential policy maker to vary the scope of regulation in order to ensure that all systemically important institutions are regulated and supervised. The G30 (2010) argue that the institutions and markets to be regulated by the macroprudential policy maker should be selected according to their potential to create systemic risks. Effective macroprudential regulation should ensure that risk flows to those institutions best equipped to bear it.³¹ Systemic risk has time and cross-sectional dimension. The build-up of systemic risks as a result of amplification mechanisms becomes a macroprudential concern when a large group of institutions is affected. Nier (2011) terms such groups of institutions “collectively systemic”, emphasising that they certainly need to be within the scope of macroprudential regulation irrespective of their legal form. Since single financial institutions can become of systemic concern because of their size, interconnectedness, complexity, lack of substitutability or global scope,³² individually systemic institutions also need to be brought within the scope of the macroprudential regulator.

Calibration powers enable the macroprudential policy maker to adjust regulatory instruments according to changing risk levels over time and across firms. Ideally, a macroprudential framework would calibrate the requirements conditionally based on the level of systemic risk, and set appropriate rules. Because of the dynamic nature of the financial sector and systemic risks and the resulting uncertainties, rules need to be complemented by judgement, using all available information.

Nier et al. (2011) discuss the main characteristics of institutional arrangements of macroprudential regulation: ownership of macroprudential policy, the separation of poli-

31 This approach would include regulating the ‘shadow banking sector’, as requested by many other authors, e.g., Bank of England (2009), FSB / IMF / BIS (2011b), and Hanson / Kashyap / Stein (2011).

32 See BCBS (2011) for how to assess systemically important financial institutions.

cy decisions from control over policy instruments, the existence of a separate body that coordinates policies to address systemic risk, the degree of institutional integration of central bank and financial regulatory functions. They also classify various institutional set-ups. See Figure 5 for a more detailed presentation of the characteristics.

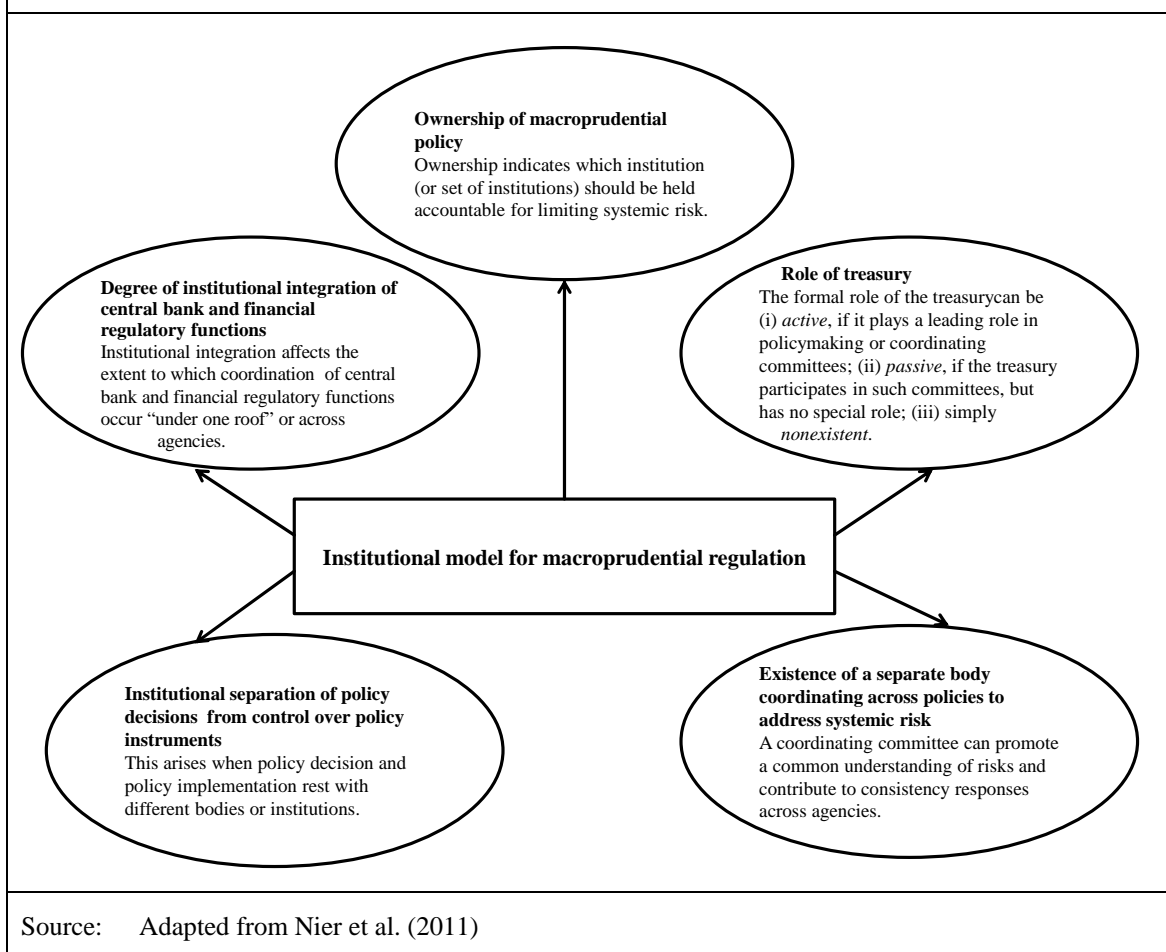
Macroprudential policy ownership, which includes appointing a specific institution and giving it a clear mandate, defining the objectives, and ensuring accountability, must be clarified. The strong powers needed to effectively implement macroprudential regulation entail the risks of misuse and excessive discretionary use, requiring a strong mandate to define the objectives and set the limits. The IMF (2011b) argues that the primary objective of macroprudential regulation is to safeguard financial stability. Any secondary objective should ensure that the macroprudential policy maker is aware of the possible costs to the economy of overly restrictive macroprudential regulation. Lowering the level of systemic risk in the economy increases the burden on financial services providers to comply with the regulations. Higher costs of regulatory compliance can result in a lower level of financial services being provided to the economy, so a useful secondary objective might be maintaining a level of financial services conducive to the economy's balanced growth.³³ Since the benefits of macroprudential policies – reductions in the probability and severity of financial crises – are long-term and not easily measured, while the costs of adverse effects on the profitability of financial intermediaries and the availability of financial services to households and firms are immediately visible, there is strong bias towards inaction. Financial market participants will try to lobby against macroprudential regulation and political interference is a given, but the regulator is shielded from these pressures by significant institutional independence. Mechanisms for accountability should guard against incompetence and abuses of power. Since the outcome of successful macroprudential regulation cannot be precisely measured, communicating decisions and their justifications to the public clearly helps insure accountability, which can be supported by annual reports and periodic reviews of the framework. The effectiveness and accountability of macroprudential policy can be enhanced through risk warnings and assessments; greater transparency of the internal decision-making processes can be ensured by publishing minutes or voting results.

Second, a decision must be made about whether policy making and policy implementation are to be combined under one roof or if it would be better to have an institutional separation of policy decisions from control over policy instruments. From a political economy perspective, the mandate and powers must be aligned to create a successful macroprudential policy, which means that the mandate holder has to have the tools (powers). Nier (2011) develops the notion that the macroprudential policy maker either has to have direct power (control) over specific regulatory instruments of macroprudential regulation or the power to direct other policy makers, such as the microprudential supervisory authority.

The macroprudential policy maker's influence over other authorities' actions (power to direct) could come from an informal exchange of views in a purely consensual approach. It can be further enhanced by the requirement for formal consultations.

33 Alternatively and additionally, other stakeholders can be taken into account should systemic risk mitigation conflict with their interests; see Nier (2011) and IMF (2011b).

Figure 5: Characteristics of institutional models for macroprudential policy



It could include the right to issue formal recommendations that can be reinforced by formal mechanisms to ensure follow-up, such as ‘comply or explain’. Ultimately, there could be a set-up where some prudential agencies could be held fully accountable to the macroprudential policy maker.

Since many policies influence financial stability, effective macroprudential policy is only possible by coordinating various regulatory agencies and policy areas.

To ensure a sufficient degree of coordination across policies and between different agencies and policy makers, a purely consensual approach could be formalised by setting up a council to act as a forum for policy discussion. Alternatively, or additionally, a law could require separate regulators to take the macroprudential policy maker’s recommendations into account when new rules and regulations could affect financial stability. A powerful incentive to coordinate macroprudential policies can be created through the close institutional integration of the macroprudential policy maker and the main prudential agency. The macroprudential authority then functions as the governance body for all prudential actions, ensuring that microprudential policy serves the overarching objective of mitigating systemic risk.

Particular emphasis should be placed on developing the role of the central bank.³⁴ Because of their roles in monetary policy and payments system oversight, as well as their function as lender of last resort, central banks bring extensive expertise to macroprudential policy making. A central bank also has strong incentives to support effective macroprudential regulation and policy because when systemic risks are contained, it can concentrate on its price stability mandate and reduce the probability that if systemic risks increase, the monetary policy maker will be asked to use its monetary policy instruments to ‘lean against the financial cycle’ or engage in ‘cleaning’ – should there be a financial crisis. However, monetary and macroprudential policy should have different governance frameworks since their mandates and objectives differ.

3.4 Coordination of national and international policies and cooperation of policy institutions

There is great debate about how much macroprudential regulation should be coordinated at the regional and international levels, and the role of international policy institutions in supporting and enforcing macroprudential policy cooperation has not yet been clarified. On one hand, international coordination can limit spillovers and regulatory arbitrage across borders, which is beneficial for the financial stability environment. On the other hand, national policy makers must have sufficient flexibility when framing macroprudential policy making to be able to accommodate a country’s conditions and circumstances. Knowledge remains limited about how to design and implement macroprudential tools. At the international level, this is especially complex because the channels that transmit risk and financial instability are not fully understood and the interplay of domestic and global stability has not yet been investigated.³⁵

Nier (2011) emphasises that besides reducing the scope for international arbitrage and containing the spillover risks by systemically important institutions with cross-border activities, international and regional coordination can also help stimulate national policy makers to act. International policy institutions can offer useful instruments for coordination, such as minimum standards, as well as guidance and surveillance of national action.

CGFS (2010) states that there is a “fairness” problem in applying macroprudential regulation across borders, where it is difficult to establish a level-playing field since financial cycles are not synchronised and macroprudential measures cannot be applied equally at the same time.³⁶ CGFS (2010) advocates close international cooperation to enhance domestic resilience to financial shocks, viewing a coordinated approach to leaning against the cycle as more difficult.

The Group of 30 (2010) is also rather skeptical regarding the benefits of international coordination, arguing that the lack of strong national supervision clearly contributed more to

34 For the role of the treasury, see IMF (2011b) or Nier (2011).

35 Bruno and Shin (2013) present early empirical evidence on how global financial conditions impact capital flows to Korea and a comparative sample of 48 advanced and emerging economies.

36 Ensuring fairness in the home market will be easier to reach. One way for the macroprudential policy maker to ensure fairness would be to broadly apply the principles across differing types of institutions. Foreign financial institutions could then be brought into scope by local incorporation or ‘subsidiarisation’.

the global crisis than any lack of international coordination and cooperation. They put forward that a primary goal of macroprudential policy should be to enhance the resilience of local regimes. Only national governments can apply fiscal resources to resolve a financial crisis, and policy makers do not yet fully understand how macroprudential policies function across borders. In an effort to prevent a “race to the bottom”, the G30 suggest that sharing cross-border information and coordinating supervision in order to limit arbitrage between strong and lax instances of national financial supervision. Early warning systems, international surveillance frameworks, and continuous peer review conducted by international organisations could be useful.

FSB / IMF / BIS (2011b) suggest that national structural policies promote robust market operations and resilient market infrastructures. International harmonising principles and market practices by standard setters like the Committee on Payment and Settlements Systems (CPSS) and the International Organization of Securities Commissions (IOSCO) also help push national policy makers to act. In their view, cooperation only succeeds if strong institutional mechanisms lead to a common understanding of threats to global financial stability and appropriate policies. Multiple efforts, such as identifying common exposures, risk concentrations, inter-linkages within and across financial systems, and the build-up of macroeconomic and financial imbalances, already exist.³⁷

Moreover, international cooperation should ensure that the macroprudential frameworks in individual countries are mutually consistent. Few steps have yet been taken in this direction. Examples include the reciprocity principle in the Basel Committee on Banking Supervision’s (BCBS) countercyclical capital buffers and the Financial Stability Board’s (FSB) arrangements for global systemically important financial institutions (SIFIs).

4 Implications for developing and emerging market economies

Since the global financial crisis originated in the advanced economies where its consequences were most strongly felt, it is normal that the debate on macroprudential regulation has focused mainly on the needs of the North American and European economies, and that regulatory proposals have been examined primarily against the background of advanced economies.

However, although developing and emerging economies were not hit as hard by the crisis as the advanced economies and already have experienced a strong rebound in economic activity, there are two main reasons to consider the implications of the crisis for financial market regulation in developing and emerging economies.

First, despite fast and strong recovery from the global financial crisis, its spillover effects caused a severe slump in many developing and emerging economies. With a long history of debilitating financial crises and costs – often exceeding 10% of GDP in Latin America, and in some case even as much as 30% of GDP (Jacome / Nier / Imam 2012) – policy makers in developing and emerging economies need to carefully analyse the causes and patterns of the

37 Including the FSB standing committee on the assessment of vulnerabilities, IMF’s regular bilateral and multilateral surveillance, the IMF–FSB early warning exercise, the G20 mutual assessment process, diverse BIS workstreams, and CGFS monitoring.

ongoing crisis and start framing macroprudential financial market regulation to help their financial markets and real sectors better withstand such shocks. While the post-crisis reforms aim to ensure a more stable and resilient financial system, the trade-off in terms of growth is unknown. If there is a slowdown in financial intermediation and investment, growth could be negatively impacted and the reforms turn out to be a disproportionately heavy price for emerging economies undergoing structural transformation. Policy makers must carefully assess the impact of macroprudential financial market regulation on crucial drivers of economic growth such as short-term trade finance, long-term financing for infrastructure investments, and the availability of credit for small and medium-sized enterprises (SMEs).³⁸

Second, there is a risk of being satisfied with the status quo and overlooking risks to financial stability. According to De Gregorio (2010): *“It is tempting to think that emerging economies did not suffer the financial crisis for having better regulatory framework than industrial ones. In some way, emerging markets enjoyed also less complexities and smaller sized financial systems.”* While financial market regulation might appear appropriate for the current level of development, financial sectors – in particular in emerging economies – have robust growth records in both scale and scope. Should their financial markets further develop, higher levels of systemic risk could be created, like in advanced economies. The challenge is to allow financial development to continue within a solid financial system. De Gregorio (2010) stresses the importance of learning from policy and regulatory mistakes in more mature markets, and analysing and participating in changes in the global financial landscape.

4.1 Sources of systemic risks: relevant markets and financial institutions

In developing economies, systemic risk results, first, from a lower level of financial development in scale and scope, second, from specific characteristics of the banking sector which often show up in developing economies, and, third, from typical features of the country’s economic structure.

The financial systems of developing and emerging economies are often characterised by a relatively low level of development and strong dominance of the banking sector. Debt markets, except for the sovereign debt market, play minor roles. The corporate sector normally does not rely on corporate debt or commercial paper for refinancing and uses internal funds or bank credit instead. Stock markets are of less importance, since many firms in developing countries are state- or family-owned and do not issue equity. Only in East Asia, and to a lesser extent in Latin America, are real property asset markets relevant because housing is seen as an attractive asset for investment (Agenor / Pereira 2010; De Gregorio 2010; Moreno 2011; Park 2011; Jacome / Nier / Imam 2012; Pereira / Harris 2012; Shin 2012). Market segments in which derivatives and securitised instruments are traded are at best underdeveloped. As a consequence, fewer types of financial services are offered, but there are also fewer opaque and complex off-balance-sheet instruments avail-

38 See Sinha (2012) for a detailed discussion.

able³⁹ than in advanced economies, so that systemic risk stemming from this source is not a big issue.

The financial development of some regions has been hampered by low saving rates.⁴⁰ Generally, thin financial markets pose more systemic risks because market volatility is typically higher and financial assets are less reliable as collateral. There are also greater risks of market manipulation.⁴¹ When fewer asset classes are available for diversification, the local banking sector and other economic agents are more dependent on the sovereign debt market for liquid securities. A negative side effect of large sovereign-debt holdings with regard to systemic risk is the build-up of strong, widespread common exposure to public finances and political risk. Many sovereign paper holdings in the financial sector, combined with an erosion of confidence, could threaten financial stability.⁴² Given the potential systemic risks that stem from this common exposure, macroprudential policy should aim at establishing a diversified bond market.

Banking markets in developing economies are driven by commercial, public, and foreign banks, which are the main source of credit and still follow the ‘originate-to-hold’ principle. Other types of financial intermediaries, considered to be the ‘shadow-banking’ sector, play no decisive role. Although few non-bank financial intermediaries exist, Correia / Jimenez / Manuelito (2009) emphasise that in Latin America unregulated lending institutions have grown large enough to become sources of systemic risk. For example, credit cards issued by department stores and supermarkets, which are not defined as financial institutions, have become a major source of credit, particularly for lower-income segments. Risk comes from possible interruptions in the payments chain, and heightens the more credit cards are used as payment instruments. ‘Mobile banking’, in which payments are made with mobile phones supported by local telecom agencies, might also give cause for concern. Macroprudential policy makers should consider bringing these companies into the scope of regulation.

Many banking systems in developing economies are dominated by just a few banks. When a market is dominated by a few similar institutions, the risk that market participants will simultaneously move in the same direction can be greater. Systemic risks can also develop because of systemically important financial institutions.⁴³ In such circumstances, SIFI-related macroprudential regulation should have high priority.

Foreign banks are major players in many developing and emerging economies. In Eastern Europe their average market share is 60%, in Latin America 20%,⁴⁴ in East Asia 10%, and in the Middle East and Africa less than 10%. In Latin America, most lending is handled by local subsidiaries of foreign banks, most of them Spanish. When crises have originated in

39 Gopinath (2011) emphasises that the Indian financial system is less complex than most developed markets because many complex, high-risk products either are not permitted or are regulated.

40 See also Correia / Jimenez / Manuelito (2009).

41 For Africa, see Jeanneau (2012).

42 See also Correia / Jimenez / Manuelito (2009).

43 The presence of large public banks in several Latin American countries is an additional vulnerability. Public banks have more than 40% market share in several countries, e.g., Brazil and Costa Rica; see Jacome / Nier / Imam (2012).

44 The market share of foreign banks varies greatly throughout Latin America, but can be as high as 70% (Mexico); see Jacome / Nier / Imam (2012) for more details.

emerging markets, foreign banks had mainly a stabilising role in these economies. However, in the ongoing global crisis, instead of absorbing local shocks, foreign banks may have transmitted foreign shocks to the domestic economy. Macroprudential policy must acknowledge that shocks to parent-bank economies can cause aggregate credit shock in the domestic banking sector of developing and emerging economies.

For a regulator, it also matters whether the foreign banks operate as foreign branches or foreign subsidiaries. Foreign branches are subject to home-country supervision, meaning that if the parent bank fails, inadequate resolution mechanisms for cross-border financial institutions could create systemic risks. Developing international standards for cross-border resolution mechanisms should have high priority in macroprudential policy making for countries with many branches of foreign banks.

If foreign subsidiaries and local banks finance themselves almost exclusively out of local deposits, the banking system will remain relatively robust when faced with temporary liquidity dry-ups. Latin American banking markets are good examples since they are characterised by high deposit-to-loan ratios and limited cross-border lending (Jacome / Nier / Imam 2012). If the local deposit base is small, domestic short-term wholesale funding can lead to a larger maturity mismatch on bank balance sheets. With foreign sources of wholesale financing,⁴⁵ cross-border exposures and shocks can lead to common exposures and negative spillover effects in the domestic market that also increase systemic risk. These risks are much more pronounced in East Asian than in other developing economies. Macroprudential regulation in East Asia should rely on instruments to limit or reduce maturity mismatch.

Park (2011) notes that in emerging economies, banks that are active in international financial intermediation are vulnerable to another serious risk: currency mismatch. Currency mismatch occurs when local currency lending is financed by borrowing in foreign currencies. Banks commit this mismatch because long-term relationship lending assumes that loans will be rolled over. Macroprudential regulation could mitigate these risks by restricting the scope of banks' asset-liability management. Such regulation would most likely undermine banks' competitiveness in international financial intermediation with regard to their counterparts from advanced or reserve currency countries. Such macroprudential measures can be expected to stimulate heavy lobbying.

High financial dollarization, not only in the financial sector but also at firms and in households, heightens countries' exposure to the effects of currency depreciations and can amplify financial stress.

Another source of systemic risks in developing and emerging economies results from more severe asymmetric information problems. Less reliable accounting frameworks and standards and opaque SMEs make it harder for banks to monitor their borrowers. This leads to more collateralised lending at relatively short maturities, which strongly increases the pro-cyclicality of lending. An appropriate macroprudential policy might foster stronger accounting rules and frameworks. Individual financial agents lack information to assess market risks that are caused by credit concentration at an aggregate lev-

45 Besides wholesale funding from foreign sources, foreign lending can be effected through direct cross-border lending.

el, so credit extension is often concentrated in certain market segments, especially property (residential and commercial), which leads to overinvestment in these sectors and potential asset price bubbles.⁴⁶ Enhancing market transparency can help to reduce information frictions.

In addition, many developing and emerging economies still rely on exporting commodities, so they are vulnerable to terms of trade shocks and the adverse effects of highly volatile commodity prices. Such shocks can weaken the real economy and lead to lower loan-repayment rates that weaken the financial sector. Macroprudential policy makers must pay attention to this source of common exposures.

4.2 Macroprudential policy framework

Relation to other macroeconomic policies

Just as in advanced economies, there are strong links between macroeconomic and financial stability in developing and emerging economies. In particular, monetary and fiscal policies impact the macroprudential policy field. The ongoing crisis has shown that sustainable fiscal policies are important for safeguarding sovereign debt and avoiding adverse feedback loops between sovereign risk and the financial system. This is particularly true for the thin financial markets found in many developing countries where government debt securities are among the few liquid debt instruments. When a systemic risk build-up is driven by a consumption boom accompanied by strong capital inflows and persistent current account deficits, macroprudential policy will be insufficient to sustain systemic stability: the underlying macroeconomic problems must be solved first.

The strongest complementarities are between monetary and macroprudential policies. Park (2011) indicates that most macroprudential instruments that lean against the financial cycle function through changes in the availability of sectoral and aggregate credit. Macroprudential tools affect bank lending, but changes in bank loans also cause changes in investment and consumer spending. In emerging economies where the banking system dominates financial intermediation, with regard to the channel of policy transmission, macroprudential policy aimed at controlling pro-cyclicality in bank lending and monetary policy that targets price stability are one and the same, but they have different objectives. In small open economies that are suffering inflationary shocks, interest rate changes may be necessary, but may also dramatically affect capital flows so that they contribute to excessive financial risk. Macroprudential policy makers must ensure that monetary and macroprudential policies successfully complement each other – through close coordination.⁴⁷

Many developing and emerging economies operate under more or less fixed-exchange-rate regimes. In this case, monetary policy instruments are not available: for example, monetary policy makers have no interest rate tool to lean against the financial cycle. As

46 See also Correira / Jimenez / Manuelito (2009) for other problems. For example, banks can be highly exposed to the risk of major customers going bankrupt or lending to related parties.

47 In this context, see also De Gregorio (2011).

a consequence, policy-makers must exclusively rely on adapted microprudential or ‘modern’ macroprudential tools to mitigate systemic risks and foster financial stability.⁴⁸ Hence, macroprudential policy has a more prominent role to play and the policy framework should be developed accordingly.

Institutional arrangements

There are many challenges to creating macroprudential policy frameworks in emerging and developing economies, four of which are described below. The first two are related to regional characteristics and the last two touch on problems also shared by policy makers in advanced economies but that are more urgent in emerging and developing economies.

First, a country’s effective macroprudential framework is established against the historical and institutional background of monetary policy and financial supervision. The Latin American case illustrates this problem, as explained by Jacome / Nier / Imam (2012). In the region, institutional foundations for financial stability have deep roots. The integration – or separation – of responsibilities between central banks, financial regulators, and supervisors has remained unchanged since the respective agencies were created in the 1920s and 1930s. Financial stability often is not an explicit objective in Latin America, either for central banks or financial supervision agencies. Central banks focus on price stability; supervision authorities are responsible for consumer protection. Only recently have some countries introduced new legislation to strengthen institutional underpinnings for macroprudential policies. This contrasts with the experience in Asia and Europe where several countries had reformed their institutional frameworks for financial stability in the last 20 years, often following financial crises. Latin American constitutions usually set the mandates and powers of central banks and supervisory agencies, so it is more difficult to change existing institutional arrangements regarding financial stability. In addition, in some countries, the central bank law has precedence over other legislation, meaning that a qualified legislative majority may be required to approve amendments. To sum up, the Latin American institutional and legal background makes the successful and timely implementation of a macroprudential policy framework much more difficult than in other regions. The macroprudential governance structure must be adapted to these circumstances.

Second, financial systems in developing countries and emerging economies depend much more on credit intermediation by foreign banks, cross-border lending, foreign currency funding in wholesale markets, and relatively volatile capital flows than those in developed economies. As a consequence, systemic risk to the financial sector always has an international component, and regulatory arbitrage and consistency of macroprudential policy across borders is an important part of the discussion. Also, given the strong presence of international banking groups and the expanding web of intra-regional banking relationships in developing countries, careful thought must be given to coordinating with outside regulators, in such areas as cross-border consolidated supervision.⁴⁹ This is particularly important for policy makers in Emerging Europe and Latin America, and to a

48 For a more detailed discussion, see Moreno (2011).

49 See also Delgado and Meza (2011).

lesser degree in Africa. An effective framework for macroprudential policy must include bi- and multilateral coordination and cooperation mechanisms to enhance financial stability at home and at the regional level.

Third, in developing countries microprudential oversight and regulation are often less mature than in advanced countries: setting up a macroprudential policy framework could overburden regulatory agencies and governance frameworks. According to the assessments of Beck et al. (2011), although banking sector reform and regulation has made most banking systems in Africa stable and well capitalized, banking sector oversight is poor. Supervisory processes focus on compliance with regulatory standards but do not identify or manage changing risks in the financial system, and monitoring is hampered by insufficient data and reporting processes. Beck et al. conclude that more complex supervisory arrangements will not provide an adequate framework to enhance financial stability unless the supervisory capacity is first strengthened: the macroprudential framework follows.

Fourth, there are many arguments in favour of the central bank playing an important role in maintaining financial stability. However, wherever central bank autonomy is not well established, new financial stability mandates can create pretexts for political interference, rendering the monetary policy institution less independent. Furthermore, instead of correcting inappropriate fiscal and other macroeconomic policies, governments may pressure the authorities to use macro- and microprudential tools. Therefore it might be preferable to enhance the central bank's governance before adding more complex policy making to its mandate.⁵⁰ Since a developing economy's financial system plays a substantive role in financing sustainable growth and macroprudential financial market regulation is viewed as potentially leading to a reduction of financial services for the economy, it could be important to specify a secondary objective of macroprudential policy such as "maintaining a level of financial services conducive to the balanced growth of the economy" as a way of clearly identifying trade-offs between the costs and benefits of macroprudential financial market regulation. This might help increase the acceptance and accountability of macroprudential policy.

Indicators

The literature on the measurement of systemic risk views the deviation of the credit-to-GDP ratio from its trend as reliable leading indicator for financial sector systemic risks; several international policy organisations agree. However, Sinha (2012) and Pereira and Harris (2012) cast doubt that this indicator is useful for emerging economies that are undergoing rapid structural changes. For them, the upward deviation of the credit-to-GDP metric from the trend does not necessarily result from a build-up of systemic risk. The trend also includes structural components, so it is more difficult to identify periods of excessive credit growth. In addition, Dell' Ariccia et al. (2012) show that not all credit booms end in a bust, they may result from better fundamentals, and loan growth can contribute to healthy financial deepening. Hahn et al. (2012) and Shin (2012) argue that in developing and emerging economies, the banking sector finances excessive asset or credit growth, concluding that policy makers should observe how banks fund their assets and

50 See Jeanneau (2011) for a detailed proposal of how African central banks could make macroprudential policy.

pay special attention to the liability side of the balance sheets. In emerging economies, funding vulnerabilities often stem from reliance on unstable short-term funding and short-term foreign currency funding. Measuring such liabilities could be a useful indicator of systemic risk. Big increases in credit should not be used as the unique indicator for systemic risk in developing and emerging economies. Instead, systemic risk analysis should also include indicators to explain the macroeconomic and financial stability environments, such as external imbalances, exposures to currency risks, asset prices, and funding structures.

Instruments

Many emerging and developing economies have had recurrent financial crises in the context of pronounced boom-and-bust cycles. Jacome / Nier / Imam (2012) note that several countries in Latin America began to recognise that traditional financial regulation ignored a key dimension of financial stability, namely the interplay of macroeconomic performance and the stability of financial institutions. They introduced instruments that are now considered to be macroprudential, although some of them have also been used in monetary policy. Most tools in Latin America tackle the time dimension of systemic risk⁵¹ to avoid the potential adverse effects of rapid credit growth.

In Latin America and in East Asia, reserve requirements are very popular. These regulatory tools require banking institutions to hold a fraction of their deposits/liabilities as liquid reserves, usually in cash or highly liquid sovereign paper at the central bank. Size, currency denomination, duration of the holding period, and remuneration are all regulated. Tovar / Garcia-Escribano / Martin (2012) point out that reserve requirements can play a counter-cyclical role, contain systemic risks by improving the banking system's funding structure, and serve as a tool for allocating credit to ease liquidity pressures. They can also be used as a complementary tool for capital requirements or bank recapitalisation when remunerating reserves helps to increase earnings. On the downside, reserve requirements constrain banks' funding and, if remunerated below market rates, act as a tax on banks. Banks may respond by passing along their costs to other agents by raising the spread between lending and deposit rates, which in turn may stimulate disintermediation,⁵² increase non-bank financing, and lead to excessive risk-taking in less regulated sectors. Many policy makers in emerging economies⁵³ are still convinced of the usefulness of reserve requirements, although the empirical evidence regarding their effectiveness is rare and generally weak.⁵⁴ Reserve requirements should be regarded as a blunt instrument. There are newer macroprudential instruments that effectively support financial stability with generally fewer costs for financial intermediation.

51 For example loan-to-value and debt-to-income caps on credit have been used in housing, consumer credit, credit card, and auto loans. Counter-cyclical dynamic provisioning is more common in Latin America than elsewhere. See Terrier et al. (2011) for an in-depth survey of policy instruments used in Latin America.

52 Since reserve requirements only affect banks, other intermediaries are not covered by regulation; see De Gregorio (2010) and Hahm et al. (2012).

53 See, e.g., Pereira and Harris (2012) for Brazil, or Sinha (2012) for India.

54 See Tovar / Garcia-Escribano / Martin (2012) for an empirical study on the effectiveness of constraining credit to the private sector.

For developing and emerging economies with open capital markets, international capital flows play a particularly important role for financial stability, and thus have implications for the design of macroprudential policies.⁵⁵ Foreign capital that flows into these economies in the form of short-term loans to local banks constitutes a volatile source of funding. Liquidity requirements for foreign short-term funding and provision policies to address the credit risk associated with large capital inflows could serve as macroprudential instruments. Most countries discourage currency mismatches by limiting net open positions.⁵⁶ In their empirical cross-country study of emerging market economies about whether macroprudential policies can enhance financial stability in the case of large capital inflows, Ostry et al. (2012) find that foreign exchange related prudential measures can reduce the share of foreign exchange lending in total domestic credit, helping to reduce the proportion of portfolio debt in total external liabilities. Hahm et al. (2012) suggest using loan-to-deposit caps, which are suited for restraining excessive asset growth and the growth of non-core liabilities, thereby reducing vulnerabilities on the liability side of bank balance sheets. One possible drawback is that loan-to-deposit caps do not apply to branches of foreign banks. Their other proposal, a levy on foreign-non-core liabilities, has several advantages in such cases.⁵⁷ First, the base of the levy varies over the financial cycle, so even if the rate remains constant over time, it functions as an automatic stabiliser. Second, the levy on non-core liabilities addresses financial vulnerability but leaves intact the financial system's function of channeling core funding from savers to borrowers. Third, targeting non-core liabilities tends to address emerging economies' vulnerabilities to sudden reversals in capital flows as a result of deleveraging by banks. Developing and emerging 'small, open economies' should carefully consider which macroprudential instruments are best for the risks that stem from international capital flows.

One lesson from the crisis is that banks must reveal their exposure to risks that result from operations. Correia et al. (2009) stress that prompt, regular and reliable reporting is needed. Transparency helps to discipline banks by encouraging more cautious lending behaviour: if banks take very risky positions, depositors and investors will lose confidence. Macroprudential policy frameworks should advocate the creation of greater transparency and better disclosure rules as a way of enforcing market discipline.

Despite the interest of policy makers in emerging economies in establishing macroprudential frameworks, concerns exist that some instruments could negatively impact their economies. Sinha (2012) reports fears that liquidity and much higher capital requirements would adversely affect growth, that the additional risk sensitivity of capital requirements would slow credit flows to SMEs, that the proposed net stable funding ratio would raise the cost of infrastructure financing, and that being forced to adhere to single/group exposure norms would cripple infrastructure financing. He suggests that supportive policies might be necessary. For instance, a slowdown in growth resulting from higher capital re-

55 See Forbes and Warnock (2012) for a detailed empirical analysis regarding the determinants of different capital flow waves. They distinguish between surges, stops, flight, and retrenchment episodes, concluding that global factors (risk, growth, high interest rates) and contagion (driven by financial or trade linkages or regional proximity) are the main drivers of capital flow waves, while domestic variables play almost no role.

56 See also Delgado and Meza (2011) for Central American countries.

57 See also Bruno and Shin (2013b) for an empirical assessment of the impact of Korea's macroprudential instruments, which include a levy on non-core liabilities.

quirements could be cushioned by monetary policy, while SME and infrastructure financing could be facilitated by guarantee schemes and other measures. Macroprudential policy should carefully evaluate trade-offs and use instruments that are specifically adapted for each country's circumstances.

5 Conclusion

Since the global financial crisis began, it has become obvious that financial market regulation focusing on the liquidity and solvency position of individual financial intermediaries is not sufficient to mitigate the overall risks to financial stability. The real economic costs of financial instability are much higher than expected. A core element of the international policy response to the crisis has been to strengthen the macroprudential orientation of financial market regulation. Macroprudential policy and regulation represent an enhanced regulatory focus on systemic risks in the financial system and their repercussions on the macroeconomy.

This paper provides a concise overview of the most important aspects of macroprudential policy making from an emerging and developing economy perspective. The first part sets out the concepts of macroprudential regulation and gives an overview of the state of the art with regard to macroprudential policy implementation. Then, it takes the perspective of developing and emerging economies, identifies the most important sources of systemic risks, discusses the specific challenges for the development of macroprudential policy frameworks under given circumstances, and establishes recommendations regarding macroprudential policy choices for developing and emerging economies.

Three findings underscore why macroprudential policy makers should carefully assess if a macroprudential policy framework has been properly adapted to the needs and specific circumstances of a particular developing economy.

First, in developing economies many financial systems are dominated by the banking sector and have relatively thin financial markets with few asset classes. The fewer asset classes there are for diversification, the more dependent the local banking sector and other economic agents are on the sovereign debt market for liquid securities. With regard to systemic risk, a negative side effect of large sovereign debt holdings is the build-up of a broadly shared common exposure to public finances and political risks. Macroprudential policy makers should consider potential systemic risks that stem from common exposures and seek to establish a more diversified bond market, and deeper financial markets in general.

Second, financial systems in developing countries are much more dependent on credit intermediation by foreign banks, cross-border lending, foreign-currency funding in wholesale markets, and relatively volatile capital flows than those in developed economies. Systemic risk in the financial sector always has an international component. The strong presence of international banking groups in many developing and emerging countries and the expanding web of intra-regional banking relationships make coordination with outside regulators crucial, for example, regarding cross-border consolidated supervision. To enhance financial stability, a macroprudential framework must include coordination and cooperation mechanisms for bilateral and multilateral policy making.

Third, because developing countries' financial systems play substantive roles in financing sustainable economic growth, it is feared that macroprudential financial market regulation could lead to lower levels of financial intermediation. Therefore, to enhance the acceptance and accountability of macroprudential policy, it might be necessary to adapt the governance structure. In addition to the primary objective of enhancing financial stability, it might be useful to specify a secondary policy objective such as "maintaining a level of financial services conducive to the balanced growth of the economy". This would clearly indicate the trade-offs between the costs and benefits of macroprudential financial market regulation, and macroprudential policy could be held accountable for supporting balanced growth.

To sum up, the development of macroprudential policy frameworks that foster financial and macroeconomic stability is a high priority for policy makers in developing countries. But that requires choosing institutional models, indicators and instruments to suit the particular financial and its governance structures.

How can development cooperation support developing countries' participation in the changing global financial landscape? Recurrent financial crises in many developing and emerging economies have led to the introduction of various instruments of a macroprudential nature, so that these countries already have had some experience with the implementation of macroprudential tools. Ongoing reforms of financial market regulation offer opportunities for fruitful dialogue between advanced, emerging and developing countries regarding the use of macroprudential policy instruments. Development cooperation could make an important contribution by initiating and fostering this dialogue.

Developing countries' participation in decision-making processes must be enhanced in order to support their ownership of the reform process. Discussions about global macroprudential policies are currently taking place in three international organisations – the IMF, the BIS, and the FSB – each of which has distinct experience and expertise in macroeconomic and macroprudential analysis. A few emerging countries are active at the BCBS and the FSB. However, the IMF is the only organisation in which all developing countries are represented and entitled to discuss and shape macroprudential policy making. Development cooperation could either advocate a strong role for the IMF in analytical and advisory work regarding macroprudential policy, or support developing countries' stronger representation in the relevant decision-making bodies.

Bibliography

- Agenor, P.-R. / L. Pereira da Silva* (2010): Reforming international standards for bank capital requirements : a perspective from the developing world, in: *International Finance Review* 11, 191–254
- Aizenman, J.* (2010): Macro prudential supervision in the open economy and the role of central banks in emerging markets, in: *Open Economies Review* 21 (3), 465–482
- Bank of England* (2009): The role of macroprudential policy : a discussion paper, London
- (2011): Instruments of macroprudential policy : a discussion paper, London
- Barrell, R. et al.* (2010): Calibrating macroprudential policy, London: National Institute of Economic and Social Research (NIESR Discussion Papers 354)
- BCBS (Basel Committee on Banking Supervision)* (2011): Global systemically important bank : assessment methodology and the additional loss absorbency requirement, Basel: Bank for International Settlements
- Beck, T. et al.* (2011): Financing Africa : through the crisis and beyond, Washington, DC: The World Bank
- BIS (Bank for International Settlements)* (2011): Macroprudential regulation and policy, Basel (BIS Papers 60)
- (2012): Financial sector regulation for growth, equity and stability, Basel (BIS Papers 62)
- Borio, C. / W. White* (2004): Whither monetary and financial stability? : the implications of evolving policy regimes, Basel: Bank for International Settlements (BIS Working Papers 147)
- / *I. Shim* (2007): What can (macro-)prudential policy do to support monetary policy?, Basel: Bank for International Settlements (BIS Working Paper 242)
- / *H. Zhu* (2008): Capital regulation, risk-taking and monetary policy : a missing link in the transmission mechanism?, Basel: Bank for International Settlements (BIS Working Papers 268)
- / *M. Drehmann* (2009a): Assessing the risk of banking crises – revisited, in: *BIS Quarterly Review* March, 29–46
- / *M. Drehmann* (2009b): Towards an operational framework for financial stability : “fuzzy” measurement and its consequences, Basel: Bank for International Settlements (BIS Working Paper 284)
- Bruno V. / H. S. Shin* (2013a): Capital flows, cross-border banking and global liquidity, Cambridge: National Bureau of Economic Research (NBER Working Paper 19038)
- / – (2013b): Assessing macroprudential policies : case of Korea, Cambridge: National Bureau of Economic Research (NBER Working Paper 19084)
- Canuto O. / M. Cavallari* (2013): Monetary policy and macroprudential regulation, Washington, DC: The World Bank (Policy Research Working Paper 6310)
- Cerutti, E. / S. Claessens / P. McGuire* (2012): Systemic risks in global banking : what can available data tell us and what more data are needed?, Basel: Bank of International Settlements (BIS Working Papers 376)
- CGFS (Committee on the Global Financial System)* (2009): Capital flows and emerging market economies, Basel: Bank for International Settlements (CGFS Papers 33)
- (2010): Macroprudential instruments and frameworks : a stocktaking of issues and experiences, Basel: Bank for International Settlements (CGFS Papers 38)
- (2012): Operationalising the selection and application of macroprudential instruments, Basel: Bank for International Settlements (CGFS Papers 48)
- Claessens, S. / M. A. Kose / M.E. Terrones* (2011): How do business and financial cycles interact?, in: *Journal of International Economics* 87, 178–190
- Clement, P.* (2010): The term “macroprudential” : origins and evolution, in: *BIS Quarterly Review* March, 59–67
- Correia, F. / L F. Jiménez / S. Manuelito* (2009): Financial regulation and oversight : lessons from the crisis for Latin America and the Caribbean, in: *Cepal Review* 99, 7–23

- Crowe C. et al.* (2011): Policies for macrofinancial stability : options to deal with real estate booms, Washington, DC: International Monetary Fund (IMF Staff Discussion Note SDN/11/02)
- De Gregorio, J.* (2010): Macroprudential regulation, financial stability and capital flows, Santiago: Central Bank of Chile (Economic Policy Paper 37)
- (2011): Capital flows and the interaction between macroprudential policy and monetary policy, speech at the Central Bank of Chile annual conference on “Capital Mobility and Monetary Policy”, Santiago, 17 Nov. 2011
- Delgado, F. L. / M. Meza* (2011): Development in financial supervision and the use of macroprudential measures in Central America, Washington, DC: International Monetary Fund (IMF Working Paper 299)
- Dell’Ariccia, G. et al.* (2012): Policies for macrofinancial stability : how to deal with credit booms, Washington, DC: International Monetary Fund (IMF Staff Discussion Note SDN/12/06)
- De Nicolò, G. / M. Lucchetta* (2010): Systemic risks and the macroeconomy, in: J. Haubrich / A. W. Lo (eds.), *Quantifying systemic risk*, Cambridge: National Bureau of Economic Research, 113–148
- / *G. Favara / L. Ratnovski* (2012): Externalities and macroprudential policy, Washington, DC: International Monetary Fund (IMF Staff Discussion Note SDN/12/05)
- Drehmann, M. et al.* (2010): Countercyclical capital buffers : exploring options, Basel: Bank for International Settlements (BIS Working Papers 317)
- ECB (European Central Bank)* (2009): The concept of systemic risk, in: *Financial Stability Review* December, 134–142
- Fiechter, J. et al.* (2011): Subsidiaries or branches : does one size fit all? Washington, DC: International Monetary Fund (IMF Staff Discussion Note SDN/11/04)
- Fonseca, A. R. / F. González / L. Pereira da Silva* (2010): Cyclical effects of bank capital buffers with imperfect credit markets : international evidence, Brasília: Banco Central do Brasil (Working Paper 216)
- Forbes, K. J. / F. E. Warnock* (2012): Capital flow waves : surges, stops, flight, and retrenchment, in: *Journal of International Economics* 88, 235–251
- Frieden, J. et al.* (2012): After the fall : the future of global cooperation, London: Centre for Economic Policy Research (Geneva Reports on the World Economy 14)
- FSB (Financial Stability Board)* (2010): Reducing the moral hazard posed by systemically important financial institutions, Basel
- (2012a): Consultative document : strengthening oversight and regulation of shadow banking : an integrated overview of policy recommendations, Basel
- (2012b): Global adherence to regulatory and supervisory standards on international cooperation and information exchange : status update, Basel
- / *IMF (International Monetary Fund) / BIS (Bank for International Settlements)* (2011a): Macroprudential policy tools and frameworks : update to G20 finance ministers and central bank governors, 14 Feb. 2011
- / – / – (2011b): Macroprudential policy tools and frameworks : 2011 progress report to G20 *Galati, G. / R. Moessner* (2011): Macroprudential policy – a literature review, Basel: Bank for International Settlements (BIS Working Papers 337)
- Ghosh, A. et al.* (2008): Capital inflows and balance of payments pressures – tailoring policy responses in EMEs, Washington, DC: International Monetary Fund (IMF Policy Discussion Paper 08/2)
- Gopinath, S.* (2011): Macroprudential approach to regulation – scope and issues, Tokyo: Asian Development Bank Institute (ADB Working Paper 286)
- Group of Thirty* (2010): Enhancing financial stability and resilience – macroprudential policy, tools, and systems for the future, Washington, DC

- Habermeier, K. / A. Kokenyne / C. Baba* (2011): The effectiveness of capital controls and prudential policies in managing large inflows, Washington, DC: International Monetary Fund (IMF Staff Discussion Note 11/14)
- Hahn, J. et al.* (2012): Macroprudential policies in open emerging economies, Cambridge: National Bureau of Economic Research (NBER Working Paper 17780)
- Hanson, S. G. / A. K. Kashyap / J. C. Stein* (2011): A macroprudential approach to financial regulation, in: *Journal of Economic Perspectives* 25 (1), 3–28
- Hawkins, P.* (2011): Financial access : what has the crisis changed?, in: D. Mihajek (ed.), *Central banking in Africa : prospects in a changing world*, Basel: Bank for International Settlements (BIS Working Paper 56), 11–20
- IMF (International Monetary Fund)* (2010): *The IMF–FSB early warning exercise : design and methodological toolkit*, Washington, DC
- (2011a): *Toward operationalizing macroprudential policies : when to act?*, Washington, DC (Global financial stability report September 2011 : grappling with crisis legacies)
- (2011b): *Macroprudential policy : an organizing framework*, Washington, DC
- (2011c): *Macroprudential policy : an organizing framework : background paper*, Washington, DC
- Iossifov, P. / M. Khamis* (2009): *Credit growth in Sub-Saharan Africa – sources, risks, and policy responses*, Washington, DC: International Monetary Fund (IMF Working Paper 180)
- Jácome, L. I. / E. W. Nier / P. Imam* (2012): *Building blocks for effective macroprudential policies in Latin America : institutional considerations*, Washington, DC: International Monetary Fund (IMF Working Paper 183)
- Jeanneau, S.* (2011): *Central bank governance and financial stability : issues of potential relevance to Africa*, in: D. Mihajek (ed.), *Central banking in Africa : prospects in a changing world*, Basel: Bank for International Settlements (BIS Paper 56, 21–36)
- Kashyap, A. K. / R. Berner / C. A. E. Goodhart* (2011): *The macroprudential toolkit*, in: *IMF Economic Review* 59 (2), 145–161
- Korinek, A.* (2010): *Regulating capital flows to emerging markets : an externality view*, mimeo
- (2011): *The new economics of prudential capital controls, a research agenda*, in: *IMF Economic Review* 59, 523–561
- Laeven, L. / F. Valencia* (2012): *Systemic banking crises database : an update*, Washington, DC: International Monetary Fund (IMF Working Paper 12/163)
- Lim, C. et al.* (2011): *Macroprudential policy : what instruments and how to use them? : lessons from country experiences*, Washington, DC: International Monetary Fund (IMF Working Paper 11/238)
- Macroeconomic Assessment Group* (2010): *Assessing the macroeconomic impact of the transition to stronger capital and liquidity requirements*, Basel: Bank of International Settlements
- Majnoni, G. / A. Powell* (2011): *On endogenous risk, the amplification effects of financial systems and macro prudential policies*, Washington, DC: Inter-American Development Bank (IDB Working Paper 276)
- Melecky, M. / A. M. Podpiera* (2010): *Macroprudential stress-testing practices of central banks in central and south eastern Europe : an overview and challenges ahead*, Washington, DC: The World Bank (Policy Research Working Paper 5434)
- Metzger, M. / G. Taube* (2010): *The rise of emerging markets’ financial market architecture : constituting new roles in the global financial governance*, Munich: Munich Personal RePEc Archive (MPRA Paper No. 31433)
- Moreno, R.* (2011): *Policymaking from a “macroprudential” perspective in emerging market economies*, Basel: Bank for International Settlements (BIS Working Papers 336)

- Nier, E. W.* (2011): Macroprudential policy – taxonomy and challenges, in: *National Institute Economic Review* 216 (1), 1–15
- et al. (2011): Towards effective macroprudential policy frameworks : an assessment of stylized institutional models, Washington, DC: International Monetary Fund (IMF Working Paper 11/250)
- Ocampo, J. A.* (2011): Macroeconomy for development : countercyclical policies and production sector transformation, in: *CEPAL Review* 104, 7–35
- Ostry, J. D.* et al. (2012): Tools for managing financial-stability risks from capital inflows, in: *Journal of International Economics* 88 (2), 407–421
- Park, Y. C.* (2011): The role of macroprudential policy for financial stability in East Asia’s emerging economies, Tokyo: Asian Development Bank Institute (ADB Working Paper 284)
- Pereira da Silva L. A. / R. E. Harris* (2012): Sailing through the global financial storm : Brazil’s recent experience with monetary and macroprudential policies to lean against the financial cycle and deal with systemic risks, Brasília: Banco Central do Brasil (Working Paper 290)
- Rodríguez-Moreno, M. / J. I. Pena* (2011): Systemic risk measures : the simpler the better, in: Bank of International Settlement (ed.), *Macroprudential regulation and policy : proceedings of a joint conference organised by the BIS and the Bank of Korea in Seoul on 17–18 Jan. 2011*, Basel (BIS Paper 60, 29–35)
- Sanya, S. / W. Mitchell / A. Kantengwa* (2012): Prudential regulations on liquidity risk in developing countries : a case study of Rwanda, Washington, DC: International Monetary Fund (IMF Working Paper 20)
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- Shin, H. S.* (2011): Macroprudential policies beyond Basel III, in: Bank of International Settlement (ed.), *Macroprudential regulation and policy : proceedings of a joint conference organised by the BIS and the Bank of Korea in Seoul on 17–18 Jan. 2011*, Basel (BIS Paper 60, 5–15)
- (2012): Adapting macroprudential policies to global liquidity conditions, Santiago: Central Bank of Chile (Working Paper 671)
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