



Macroprudential Policies in Managing Systemic Risk: A review

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ABSTRACT

The great financial crisis has emphasized the importance of establishing macroprudential architectures to address problems of financial stability. Macroprudential authorities monitor the entire financial system and identify risks and vulnerabilities unlike micro prudential policies that do not incorporate endogenous risk. The adoption of macroprudential tools to mitigate systemic risk has become the norm in many financial markets. This paper covers a wide range of literature review of macroprudential policies from all around the world.

Ultimately, it is evident that macroprudential regulation enables long term financial stability of an entire financial system not just an individual entity. In addition macroprudential policy instruments should be paired with financial stability objectives to be able to address the likelihood of systemic risk which is not factored in many institutions.

Keywords: Macroprudential Policy, Macroprudential Capital Requirements, Financial Stability, Regulation, Systemic Risk.

1. Introduction

The recent financial crisis has shown the negative effects of a huge collapse in financial intermediation for banks. Through contagion, systemic risk is derived within the banking system.

Systemic risks raise in the presence of financial vulnerabilities, such as credit booms, a strong reliance on wholesale funding and unhedged borrowing in foreign currency. Simultaneously, international capital flows, and particularly international bank flows, provide a key link in the transmission of systemic risks across countries. (Beirne & Freidrich, 2017)

The 2007 global financial crisis highlighted some weaknesses of the current supervisory structure, specifically its inability to address the solidity of the financial system as a whole. Macroprudential policy, as an attempt to safeguard the market infrastructure has become a pivotal point of interest for policy makers and central banks around the world.

The financial system needs to be properly functioning for real economy and a healthy economic growth that ensures funding for the best investment opportunities, stimulating capital accumulation and improving the spreading of risks. If one wants to draw a

parallel between the overall economy and the human body, the financial system would be the cardiovascular system, the banks would be the veins and the vessels and the capital would be the blood. Banks, as “institutions whose current operations consist in granting loans and receiving deposits from the public” play a crucial role in allocation of capital and financial intermediation in the economy (Kahou & Lehar, 2015). A consensus has emerged on the need to establish macroprudential policy as critical addition to microprudential capital and liquidity regulations. At present, the monetary and macro-prudential functions represent independent parts of central bank policies, with their own aims and toolkits.

The current financial system comprises many different types of assets and markets, and the rules designed to protect it are just as varied. Before the financial crisis of 2007-08, banking regulation was largely a static affair, with capital requirements (which guarantee that banks hold enough money on their balance-sheets) and leverage caps (which limit the amount they can borrow) fixed over the business cycle. However, as the crisis proved, these guidelines were insufficient. The 2010 Basel III accord strengthened these restrictions and introduced the concept of counter-cyclical buffers. The buffers allow regulators to



increase capital requirements when credit growth is high relative to GDP, a suggestion that there is a heightened risk of financial instability. These counter-cyclical regulations aim to avert financial crises from happening by reining in lenders before an asset bubble forms.

The assimilation of macroprudential policy into the structure for the running of central banks has given rise to new questions regarding the form of coordination between macroprudential and monetary policy. The need for such coordination stems from the observation that monetary and macroprudential policy tools are not independent (Malovana & Freit, 2017).

Even though macroprudential policies have been used widely in recent years, the understanding of these policies and their usefulness is limited. The modern financial system involves many different types of assets and markets, and the rules intended to safeguard it are just as varied. Before the financial crisis of 2007-08, banking regulation was primarily a static issue, with capital requirements (which ensure that banks hold adequate money on their balance-sheets) and leverage caps (which limit the amount they can borrow) fixed over the business cycle. However, as the crisis confirmed, these guidelines were not enough.

Financial institutions are able to provide valuable credit, risk-management, and liquidity services to businesses and households because they are designed to take risks and are highly lever-aged compared with nonfinancial businesses. But this risk-taking and leveraging increase the likelihood of systemic problems that could threaten the operation of the financial system, hurt real economic activity, and impose substantial economic costs. The pain caused by the 2008 financial crisis and deep recession that followed is still being felt by many in our economy. Financial sector super-visors and policymakers can learn many lessons from the crisis and its outcome, and many institutions have taken mitigation measures to ensure a similar incident does not occur (Mester,2017.)

Macro-prudential policies can be vital elements of the policy toolkit directed at overall systemic risk mitigation,

particularly for countries exposed to international shocks. As they affect resource allocations, however, macro-prudential policies suggest also some costs, including possibly limiting financial sector development. (Claessens et al,2013)

This paper provides a brief review of macroprudential policy and challenges facing policymakers and scholars wishing to create a dependable regulatory framework. This paper is organized as follows. Section 2 discusses the deficiencies of a pure micro prudential approach to regulation. These deficiencies emanate from overlooking the interconnectedness of the financial institutions and the effect of the collective behaviour of these institutions on financial stability. Section 3 expounds on the significance macroprudential policy and the related issues that need to be addressed in a complete macroprudential structure such as financial stability, and the procyclicality of the financial sector. Section 4 reviews potential tools for effecting macroprudential policy. Section 5 summarizes the general issues on macroprudential policies, where we are and the where we are going, and concludes.

2. Microprudential Policy Shortcomings

Micro-prudential regulation scrutinises the responses of an individual bank to exogenous risks, but does not incorporate endogenous risk. It also largely disregards the systemic importance of individual institutions in terms of its size, complexity, extent of leverage and interconnectedness with the rest of the financial system (Brunnermeier *et al*, 2009). That objective of the micro prudential approach is to reduce the likelihood of failure of individual institutions, regardless of their impact on the economy. Drilled down further we find that the main objective of micro-prudential regulation can be rationalised in terms of protecting investors and depositors whereas in macro-prudential regulation the main objective is to circumvent output losses or decrease the negative externalities from financial system failure.

Table 2.1 Differences between micro and macro-prudential orientations.

	<i>Macroprudential</i>	<i>Macroprudential</i>
<i>Proximate Objective</i>	Limit financial system wide distress	Limit distress of individual institutions
<i>Ultimate Objective</i>	Avoid output (GDP) Costs	Consumer Protection
<i>Characterisation of risk</i>	Endogenous	Exogenous
<i>Correlations and common exposures across institutions</i>	Important	Irrelevant
<i>Calibration of prudential controls</i>	In terms of system wide risk: top down.	In terms of risk of individual institutions: bottom up(Borio, 2003)

As noted in Table 2.1, micro prudential rational assumes that the risk emanates from the market and does not depend on the decisions made by the individual financial institutions and the movement of asset prices is exogenous. In contrast, a macroprudential rational treats the aggregate risk as an endogenous variable that depends on the collective behaviour of financial institutions.

One of the arguments of the underlying rationalities of the micro prudential orientation is that “financial stability is guaranteed as long as each organization is solid”. Due to the interconnection of financial institutions, what may look steady at the individual level can be fragile and unstable at the macro level (Hellwig, 1995). Moreover, as noted by Crockett (2000), guaranteeing the solidity of each individual institution may provide excessive protection which harms market efficiency and discipline.

It is quite evident especially in emerging and developing economies that a micro prudential approach is prevalent in policy making for supervisory and regulatory purposes. Most regulatory bodies rely on this line of

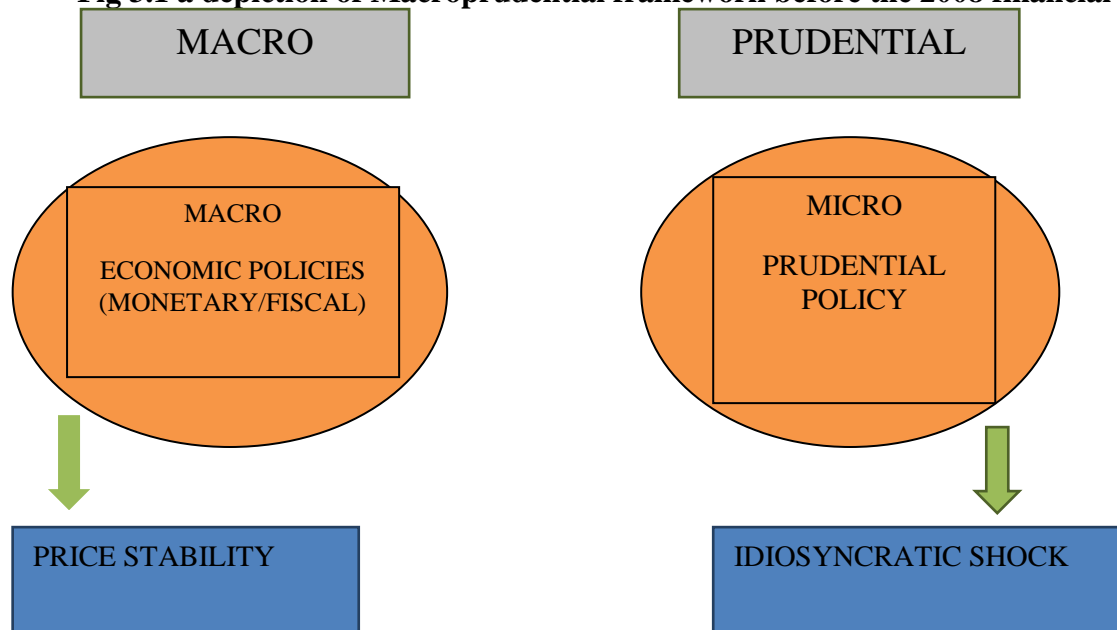
thinking and to a lesser extent do they implement a macroprudential approach.

3. The significance of adopting a Macroprudential policy approach

3.1 Enabling Financial Stability

Macroprudential authorities monitor the entire financial system and identify risks and vulnerabilities. Policies addressing such risks and vulnerabilities can be put in place and limit them from building up further and spreading across the financial system. Macro-prudential policy aims to reduce the systemic risk of the financial system by to enabling the stability of the financial system as a whole. The consequences of the financial crisis elicited a deep debate regarding macro-prudential policy. The financial crisis reminded policy makers around the globe about the costs of a systemic disruption in financial markets. Below is a depiction of the traditional macroprudential approach before the 2008 financial crisis. This approach was deemed ineffective thus the new approach that deals with the entire financial system, focusing on systemic risk.

Fig 3.1 a depiction of Macroprudential framework before the 2008 financial crisis



Source: *The interaction of monetary and macroprudential policies, IMF, 2013*

Although the global financial crisis led to a broad conversation on macro-prudential policy, it is imperative to note that many EMEs (Emerging Market Economies) applied prudential regulation at the end of the nineties in response to several EMEs crisis. EMEs have fortified their

regulatory framework with respect to maturity disparities on the balance sheets of financial institutions, restricted short-term foreign borrowing, and enhanced the supervision of foreign currency exposures. (Cuadra & Nuguer, 2018)



In 2010, the US Congress passed the Dodd–Frank Act. This law created the Financial Stability Oversight Council (FSOC), which includes the Fed as the authority responsible for identifying risks and responding to events that threaten financial stability. In the EU, the European Systemic Risk Board (ESRB) is a new agency, created in the autumn of 2009 with the responsibility for macro prudential policies, where the coordinating actor is the European Central Bank (ECB). The building up of macro prudential architectures has also characterized single countries within the European Union. In Germany, policymakers passed the Act on Monitoring Financial Stability in 2013 and set up a new macro prudential authority, known as the Financial Stability Committee (FSC), which works in close relation with the Bundesbank. In the UK, a key factor of the latest regulatory reform was the creation of a macro prudential agency within the Bank of England, namely, the Financial Policy Committee (FPC). (Masciandaro & Volpicella, 2016) The Great Crisis which started in 2008, or rather in 2007 depending on the interpretations reawakened political and academic interest in macro prudential policies (Angelini et al., 2012; Beau et al., 2012; Kannan et al., 2009; Lambertini et al., 2011; N’Diaye, 2009). Recent literature delivers two key and divergent results. The key question is: given two policies monetary policy and macro supervision policy having two different macro goals, which is the ideal degree of involvement of the monetary agent i.e. the central bank in the supervisory responsibilities?

On the one side, the more the central bank gains information advantages, the more its leading role in the definition and application of macro supervision can be supported. This position is founded on the fact that in each country the central banker is the liquidity manager, the unique monetary agent, that is, the agent designated by society to manage liquidity in order to pursue monetary policy goals. Being sources of liquidity, central banks are naturally involved as leaders in avoiding and managing systemic banking crisis in advanced, emerging and developing countries.

On the other side also the opposite could be true, i.e. if the central bank is the leading macro supervisor the risk that the instruments of one policy can be allocated to the wrong objectives arises. At the same time when the central bank is the main institution responsible in maintaining financial stability, the risk of financial dominance can rise. (Masciandaro & Volpicella, 2016)

A study (Akinci, Olmstead Rumsey, 2018) investigates how a country’s general macroprudential policy stance, as well as its stance with regard to one particular sector, housing, affects credit growth and house prices. This study finds that bank credit growth is controlled by both housing and non-housing measures. Analysis on the individual level suggests provision requirements are effective, along with risk weights on mortgages, and other housing measures. Our results predict that only housing-related macroprudential policies, constrain housing credit growth and house price appreciation.

Basel III is an internationally agreed set of measures established by the Basel Committee on Banking Supervision in reply to the financial crisis of 2007-09. The main goal is to toughen the regulation, supervision and risk management of banks.

They are minimum requirements which apply to internationally active banks. Members are committed to applying standards in their jurisdictions within the time frame established by the Committee.

In a research (Hessou & Lai, 2017) examining how the capital buffers (Basel risk-based and leverage ratio) of Canadian credit unions fluctuate over the business cycle. It is evident that capital buffers (risk-based and assets-based) behave counter cyclically. However, credit unions with low capital buffers react differently to the business cycle than credit unions with relatively higher capital buffers. Low-capitalized credit unions decrease capital buffers during busts. This decrease is jointly driven by capital and risk-weighted assets. Low-capitalized banks reduce capital and raise risk-weighted assets over the business cycle. One plausible reason, suggested by Stolz and Wedow (2011), may be credit unions’ differing risk attitudes. A low capital buffer would then simply reflect lower credit union risk aversion. Furthermore, Blum (1999) shows that constrained banks may take higher risk to target higher profits in order to meet capital requirements. The behavior of low-capitalized credit unions may also reflect poor risk management. The recommendation for this study was for regulators implement the conservation buffer requirement to force low-capitalized credit unions to hold additional buffers.

Allen and Wood (2006) note that the term “financial stability” (as an independent objective from price stability) was first used in 1994 by the Bank of England. Although the term is fairly new, the concept is an old one. Volcker (1984) notes that “the principal reason



for the founding of the Federal Reserve is to assure stable and smoothly functioning financial and payments systems”.

3.2 Managing Systemic Risk

Ultimately the purpose of macroprudential policies is to mitigate risk and especially systemic risk in the financial sector.

Systemic risk as one of the main factors in assessing financial stability is a fairly new concept in the central banks and policy-makers' circles. However, the attempt to define and evaluate systemic is not so simple. Some of the early definitions of systemic risk focus on a considerable disruption of confidence and information in the banking sector and subsequently in the financial sector. For instance, Mishkin (1995) argues that “systemic risk is the likelihood of a sudden, usually unexpected, event that disrupts information in financial markets, making them incapable of effectively channeling funds to those parties with the most prolific investment opportunities.” Bartholomew and Whalen (1995) define systemic risk as “the probability of a sudden, typically unanticipated, collapse of confidence in a substantial portion of the banking or financial system with a potentially large real economic effect.”³⁰ Some of the definitions focus on the propagation of distress and loss from one institution to another (also known as contagion). For instance, Rochet and Tirole (1996) argue that systemic risk “refers to the propagation of an agent's economic distress to other agents linked to that agent through financial transaction”.

Lehar (2005) describes systemic crisis as “an event in which a significant number of financial institutions default simultaneously.” A financial crisis is systemic in nature if many banks fail together, or if one bank's failure propagates as a contagion causing the failure of many banks Acharya (2009). There are two key means of measuring systemic risk: a micro based approach based on modelling the interbank network and a macro approach based on stock price data, which will be discussed in more detail in the following two subsections.

Financial networks are stable but at the same time delicate (Haldane, 2013; Glasserman and Young, 2015 and Acemoglu et al., 2015) meaning that they can absorb smaller shocks to the system but might show contagion and manifest defaults once exposed to a large enough shock. In the network scenario where shocks within a bank can propagate within the network to cause a collapse of other bank/s is a possible occurrence and risk and a

dimension of systemic risk. To study the consequences of macroeconomic shocks on banking networks we have to consider that banks have correlated asset portfolios. Therefore, upon a bank default, when the danger of contagion emerges, other banks might be in a weak position as well making them more prone to contagion.

To avoid having to depend on detailed interbank link data, several risk measures have been proposed lately that can be derived from stock returns. The idea is that financial markets incorporate all information on connections between banks as well as interrelated exposures across banks in the stock price. One of the early methods employed to measure systemic risk using stock market information (Lehar, 2005). He studies equity as a call option on a bank's assets and recommends a measure for systemic risk through contingent claims analysis. Over a hundred banks over a twelve-year period are studied. The outcome indicates an inverse relation between capitalization of banks and systemic risk. The two main methods of measuring risk of an individual institution are Value at Risk (VaR) and Expected Shortfall (ES).

Banks tend to engage in riskier investments and offer excessive loans in good times due to underestimation of risk in the market. By contrast, in bad times they tend to shrink lending due to overestimation of risk. It follows that the financial sector can intensify fluctuations in business cycles, crippling the efficient apportionment of capital in the economy and causing financial volatility. The literature has provided robust empirical proof for the procyclical behaviour of the banking sector. For example, banks' lending standards change from limitation to excessive slackening through the business cycle. Their findings suggest that extreme slackening during the growths has a substantial unwanted impact on cumulative variations. (Kahou & Lehar, 2017)

4. Macroprudential Policy

4.1 Illustrations of Macroprudential policies implemented

The consequences of the financial crisis and the Advanced Economies (AE) response prompted a deep discussion regarding macro-prudential policy. The financial crisis reminded policy makers around the globe about the costs of a systemic disruption in financial markets. Macro-prudential policy aims to reduce the systemic risk of the financial system.

Although the global financial crisis led to a broad discussion on macro-prudential policy, it is vital to note



that many EMEs employed prudential regulation at the end of the nineties in response to several EMEs crisis. EMEs have reinforced their regulatory framework with respect to maturity disparities on the balance sheets of financial institutions, limited short-term foreign borrowing, and improved the supervision of foreign currency exposures. These measures have ensured a robust financial system (BIS, 2010b).

In a study to alleviate the effects that AE (Advanced Economies) shocks prompt in the EME (Emerging Market Economies), a macro-prudential policy is proposed. The main objective of the policy is to even out the effect of cross-border bank flows' volatility on the EME financial system through a charge on non-core bank liabilities. In particular, when bank credit is increasing quicker than bank deposits, EME banks pay a tax on non-core liabilities, and the size of this tax depends on the ratio of bank credit growth to growth in bank deposits. This restricts the risk of extensive disruptions from the AE to the EME, limiting the negative consequences for the small economy. With the policy in place and after a shock, cross-border bank flows react 25% less on impact and the transmission of the shock is alleviated. EME banks experience a smoother reaction of their net worth, which translates into a 20% reduction in the decrease in credit and a 19% reduction in the fall of asset prices on impact (Cuadra & Nuguer, 2018).

Another example of macroprudential regulation was in Mexico. After the so called Tequila Crisis in 1995, the Bank of Mexico had begun implementation of prudential regulation. One of the main changes in the regulation was to require financial intermediaries offering banking services in Mexico to do it through subsidiaries, instead of branches. Other prudential regulation methods included: regulation of banks' foreign currency operations (maturity and currency); a cap on exposure to related counter-parties; caps on interbank exposures and higher limits on value at risk for pension fund portfolios at times of high volatility (Guzman Calafell, 2013). The prudential measures affected in the nineties assisted Mexican banks to be more robust than other financial intermediaries during the 2008 financial crisis. With the financial crisis and the Basel III Agreement, some new measures were implemented; nevertheless there is still room for working on targeting the sources of volatility in the financial system.

4.2 Ideal use of macro-prudential policies

The favoured use of macro-prudential policies will differ subject to the specific country's exposure to shocks and risks, and its organizational, institutional and financial market characteristics that affect the amplification of financial and real sector cycles and the effectiveness of (specific) policies. For one, the country's financial structure, that is, the significance of banks versus capital markets in external financing is likely an important factor in the choice of policy. For example, financial institution-based measures are likely of greater importance when much of the external financing comes from the regulated financial system. (Claessens et al, 2013)

The degree of international financial integration will matter as well, not only for the type of policy (and capital flow management) tools that can best be used, but also the effectiveness of policies. For example, in a country with a very open capital account and a large foreign bank presence, it will be harder to prevent the avoidance of (some) macro-prudential policies.

The use and efficacy of policies could also vary contingent on the availability and effectiveness of fiscal, monetary, and micro-prudential policies. For example, some countries can use monetary policy to affect the financial cycle, but for others, such as those in a currency union and having a pegged exchange rate, this is possible. Other may have high debt and less room to conduct countercyclical fiscal policy. And, the degree of financial openness will matter for the choice of policies, because of it affects the degree to which some policies can be implemented. There are strong links between behaviour of capital flows and bank vulnerabilities; see further Hahm et al., 2011; Claessens and Ghosh, 2013).

4.2.1 Stress tests

Since the financial crisis of 2007–2009, macroprudential stress tests have become a standard tool that regulators use to evaluate the stability of financial systems. Macro stress tests have been designed to assist and enable macroprudential regulation, which basically targets averting the costs of the financial sector's distress spreading to the real economy. (Borio and Drehmann, 2009; Hirtle et al., 2009; Acharya et al., 2010; Hanson et al., 2011)

The capital ratio of a bank is usually defined as the ratio of a portion of its capital to a measure of its assets. The measures of capital employed in regulatory ratios match to different qualities of capital based on their ability to absorb asset losses.



The Board of Governors of the Federal Reserve (United States) is responsible for guiding macroprudential stress tests in the U.S. A first stress test exercise called the Supervisory Capital Assessment Program (SCAP) was launched in 2009 as a response to the recent financial crisis. This program led to a substantial recapitalization of the U.S. financial system by compelling 10 bank holding companies to raise a \$75 billion capital buffer. Its objective of recapitalizing the U.S. financial sector, as well as that the government would make available an extra capital buffer was clear from its announcement in February 2009 (Acharya et al., 2014)

As part of the regulatory toolkit, stress testing should ensure that the financial sector is adequately capitalized to protect taxpayers against (i) and limit the likelihood and the cost of (ii) under a wide range of possible scenarios. Macroprudential stress tests can help address this market failure by bringing the capitalization of the financial sector in line with market perceptions of risk. This should ensure the financial sector's access to short-term funding.

4.2.2 Macroprudential Capital requirements

Macroprudential capital requirements can be defined as the fixed point at which each bank's capital requirement equals its contribution to the risk of the system under the proposed capital requirements. When regulating banks based on their input to the overall risk of the banking system we have to consider that the risk of the banking system as well as each bank's risk contribution changes once bank equity capital gets reallocated.

Macroprudential capital requirements are positively correlated to future capital raised by banks as well as future losses in equity value. Across both models and all risk allocation mechanisms that macroprudential capital requirements reduce the default probabilities of individual banks as well as the probability of a systemic crisis by about 25%. (Gauthier et al., 2010)

The previous macroprudential capital requirements before the 2008 financial crisis ensured the banks held enough money on their balance sheets and also limited the amounts that could be borrowed which were fixed over a business cycle. The 2010 Basel III accord tightened these restrictions and introduced the concept of counter-cyclical buffers. The buffers allow regulators to increase capital requirements when credit growth is high relative to GDP, an indication that there is a heightened risk of financial instability. These counter-cyclical regulations aim to prevent financial crises from occurring by reining in lenders before an asset bubble forms.

The key deterrent for a true implementation of macroprudential capital requirements is that each bank's capital requirement would in part be driven by the actions of other banks. A bank could therefore not exercise full control over its own capital requirements. Hence, we are not aware of any jurisdiction in which full macroprudential capital requirements have been applied. (Kahou & Lehar, 2017)

4.3 Actual use of Macroprudential Policies

The following is an instance of the actual use of macroprudential policies in a number of countries.

Data on the actual use of macro-prudential policies in recent years have been collected through a survey of country authorities as well as from an internal IMF survey of country desk economists for a sample of some 48 countries, both advanced countries and emerging markets (see further Lim et al., 2011)

In the sample used a total of 35 countries of which 25 are emerging markets and 10 are advanced countries have applied at least one of these instruments once during the period 2000-2010 and 13 countries have never used any of these instruments during this period (Table 4.1 provides the details, including when the tool was in use, although not necessarily continuously).



Table 4.1

Measures	Characteristics	Country	Classification	Period
Targeted at borrowers				
Loan-to-value caps	Less vulnerable, due to highly geared borrowings	Brazil	Closed Emerging	2000-2010
		Bulgaria	Closed Emerging	2010
		Canada	Open Advanced	2000-2010
		Chile	Open Emerging	2000-2010
		China	Closed Emerging	2000-2010
		Colombia	Closed Emerging	2000-2010
		Croatia	Open Emerging	2000-2010
		France	Open Advanced	2000-2010
		Hong Kong	Open Advanced	2000-2010
		Hungary	Open Emerging	2010
		India	Closed Emerging	2000-2010
		Italy	Open Advanced	2000-2010
		South Korea	Closed Advanced	2002-2010
		Malaysia	Closed Emerging	2000-2010
		Mexico	Open Emerging	2000-2010
		Norway	Open Advanced	2010
		Philippines	Closed Emerging	2000-2010
		Poland	Closed Emerging	2000-2010
		Romania	Open Emerging	2004-2007
		Singapore	Open Advanced	2000-2010
		Spain	Open Advanced	2000-2010
		Sweden	Open Advanced	2010
		Thailand	Closed Emerging	2003-2010
		Turkey	Closed Emerging	2010
Debt-to-income caps	Reduces vulnerability arising from highly geared borrowings	China	Closed Emerging	2000-2010
		Colombia	Closed Emerging	2000-2010
		Hong Kong	Open Advanced	2005-2010
		Poland	Closed Emerging	2010
		Romania	Open Emerging	2004-2008
		Serbia	Open Emerging	2010
		South Korea	Closed Advanced	2006-2010
Targeted at financial institutions (Asset side)				
Credit growth caps	Reduces credit growth directly	China	Closed Emerging	2000-2010
		Colombia	Closed Emerging	2000-2010



Table 4.1 (Continued)

Measures	Characteristics	Country	Classification	Period
		Malaysia	Closed Emerging	2000–2010
		Nigeria	Closed Emerging	2010
		Serbia	Open Emerging	2008–2010
		Singapore	Open Advanced	2010
		Argentina	Closed Emerging	2003–2010
		Austria	Open Advanced	2008–2010
Foreign currency lending limits	Reduces vulnerability to fit risks; Reduces credit growth (Directly)	Brazil	Closed Emerging	2000–2010
		Hungary	Open Emerging	2010
		Poland	Closed Emerging	2006–2010
		Romania	Open Emerging	2005–2010
		Serbia	Open Emerging	2008–2010
		Turkey	Closed Emerging	2009–2010
Targeted at financial institutions (addressing liabilities side)				
Reserve Req.	Reduces vulnerability to funding risks; Reduces credit growth (Indirectly)	Brazil	Closed Emerging	2008–2010
		Bulgaria	Closed Emerging	2007–2010
		China	Closed Emerging	2004–2010
		Colombia	Closed Emerging	2007–2010
		Russia	Closed Emerging	2004–2009
Targeted at financial institutions (addressing bank buffers)				
Dynamic loan-loss provisioning	Increases resilience and reduces credit growth (Indirectly)	Brazil	Closed Emerging	2005–2010
		Bulgaria	Closed Emerging	2005–2010
		Colombia	Closed Emerging	2007–2010
		India	Closed Emerging	2010
		Mongolia	Open Emerging	2010
		Peru	Open Emerging	2008–2010
		Russia	Closed Emerging	2010
		Spain	Open Advanced	2000–2010
		Uruguay	Open Emerging	2001–2010
Countercyclical capital requirements	Increases resilience and reduces credit growth indirectly;	Brazil	Closed Emerging	2007–2010
		India	Closed Emerging	2003–2010
		Argentina	Closed Emerging	2010
Profit distribution restrictions	Limit dividend payments in good times to help build up capital buffers in bad times	Colombia	Closed Emerging	2008–2010
		Poland	Closed Emerging	2009–2010
		Romania	Open Emerging	2009–2010



Table 4.1 (Continued)

Measures	Characteristics	Country	Classification	Period
		Slovakia	Open Emerging	2008–2010
		Turkey	Closed Emerging	2008–2010
Institutional infrastructure				
Moving of derivatives to organized	Increases transparency			
Volcker/Vickers types-rules	Reduces (counterpart) risks in capital			
Increase disclosure at-System level	Reduces risks of intra-sector spill overs			
Market structure - measures	Enhance market discipline			
Other				
Other macro-prudential-Lessen lev. growth measures (countercyclical provisioning, countercyclical capital, restrictions on profit distribution, restrictions on treatment of profits in regulatory capital)		Brazil	Closed Emerging	2007–2010
		Colombia	Closed Emerging	2000–2010
		Croatia	Open Emerging	2007–2010
		Hungary	Open Emerging	2010
		Indonesia	Open Emerging	2005–2010
		Malaysia	Closed Emerging	2000–2010
		Norway	Open Advanced	2010
		Serbia	Open Emerging	2008–2010
		Slovakia	Open Emerging	2008–2010
		South Africa	Closed Emerging	2008–2010
		South Korea	Closed Advanced	2008–2010
		Thailand	Closed Emerging	2008–2010
		Uruguay	Open Emerging	2008–2010

The classification variable divides the sample into emerging versus advanced economy countries (source: IMF)

In the study as depicted in table 4.1, the greatest usage of macroprudential policies can be seen in the emerging countries. This pattern is consistent with the bigger needs in emerging markets, both for being more exposed to external shocks and for having more “imperfect” financial markets, and therefore the urgent need to confront market failures. There is also a differentiation between open and closed capital account countries on the basis of the country having a Chinn et al. (2008) index of financial openness in 2005 above (33 countries) or below (15 countries) the median global index. The capital account dimension is an analytically useful distinction as it indicates what risks are (more) important and affects the consequences that may need to be managed. On this measure, as expected, all advanced countries have open capital accounts, while in

the case of emerging markets, some have relatively open capital accounts, but others like China and India, are relatively closed. It turns out that macro-prudential policies have been used more in closed capital account countries, reflecting perhaps these countries’ generally less liberalized financial systems. (Claessens et al., 2013)

There are also many possible interactions between macro-prudential policies and capital flow management tools. The reason being, some macro-prudential policies operate similarly to a capital flows management tool (e.g., limitations on foreign currency exposures for banks that end up affecting mostly non-residents (Ostry et al., 2011; IMF, 2012)). In addition, macro-prudential policies can also affect the need for capital flows management tools.



In addition to these more aggregate, cross-country studies, there are also some case studies, dealing with specific risks or market segments that use micro data. The case of Spain, for example, countercyclical macroprudential policies, such as dynamic provisioning, are useful in taming credit supply cycles (Jiménez et al., 2012). Significantly, they find that during bad times, dynamic provisioning helps smooth the downturn, maintaining firm credit availability and performance during recessions. Igan and Kang (2011) find evidence of effects of LTV (Loan-to-Value) and DTI (Debt-to-Income) limits on mortgage credit growth in Korea. And for the case of the UK over the period 1998–2007 (Aiyar et al., 2012, 2013) show that bank-specific higher capital adequacy requirements diminish lending by individual banks (whereas tighter monetary policy does not affect the supply of lending).

4.4 Macroprudential Policy Regulations.

The main aim of macroprudential regulation is to lessen the risk and the macroeconomic costs of financial volatility. It fills the gap between macroeconomic policy and the traditional microprudential regulation of financial organizations. A macro prudential framework has to address the cross-sectional dimensions which characterize any systemic risk distribution, and consequently different authorities have to be involved in macro governance, including the central bank. In fact, in each country the already existing overall micro supervisory architecture can suggest the existence of different authorities (at least 2) excluding the cases where the central bank is at the same time also the single supervisor. (Masciandaro & Volpicella, 2016)

At the same time when the central bank solely responsible in maintaining financial stability, the risk of financial dominance can rise. An instance of this can be when financial stability concerns weaken the central bank credibility and efficiency as monetary authority.

Moreover, potential inadequacies can occur if the involved central bank is not the micro supervisor, given that in this case it is more probable that its policy as macro supervisor can produce negative, though inadvertent repercussions. Subsequently, the less the central bank is

involved as micro supervisor the less it is likely to be its information on the state of health of the single banking firms and consequently the higher will be the possibility to err as macro supervisor. At the same time, for the central banker to be a micro supervisor is not simple. In fact, if the central bank is also a micro supervisor, the risk of capture by banks can be a worry. Hence, the general effect of the role of central bank as micro supervisor is theoretically uncertain and needs further analysis. (Masciandaro & Volpicella, 2016)

We can take a case in point in Russia, where there has been an effort to implement a macroprudential policy. In the past few decades, the Central Bank of the Russian Federation (CBR) has also gained experience in using macroprudential instruments to counter systemic risks. Drawing lessons from the Global Financial Crisis, the Russian authorities have integrated financial stability as an objective of the CBR and defined the institutional system for macroprudential policy. In July 2013, the Russian government set up the National Council on Ensuring Financial Stability (FSC). Chaired by the Minister of Finance, the FSC was created primarily as a high-level inter-agency advisory body on financial stability issues and served as an effective platform for inter-agency coordination. Given its role as the single financial regulator and supervisor, and in the light of its financial stability mandate, the CBR plays the crucial role in the country's macroprudential policy framework. (Danilova & Mozorov, 2017)

Banks in Russia had little opportunity to focus on mortgage and corporate lending to increase yields on deposits owing to the relatively low level of interest rates on these products as compared with unsecured consumer loans. Confronted with these challenges, the CBR took a number of measures to curb risks in the segment of unsecured consumer lending. Loan-loss provisions for unsecured consumer loans without overdue payments and with overdue payments of one to 30 days were doubled in 2013. Also, risk weights for consumer loans were raised depending on the currency of the loan and the level of the loan total cost.



Table 4.2 from the beginning of 2014, the CBR additionally raised loan-loss provisions for unsecured consumer loans by 50%, and also increased risk weights.

Change in risk weights for unsecured consumer loans in 2013–14

Date of changes	Loan Currency	Loan total cost	Risk weight, %
1 July 2013	Roubles	from 25% to 35%	110
		from 35% to 45%	140
		from 45% to 60%	170
		over 60%	200
	Foreign currency	from 20% to 25%	170
		over 25%	200
1 January 2014	Roubles from	45% to 60%	300
		over 60%	600
	Foreign currency	from 20% to 25%	300
		over 25%	600

* Prior to 1 July 2013, the risk weight for unsecured consumer loans was 100%.

The CBR has set up macroprudential policy measures severally. One of the instances was in 2007-08, a period characterised by considerable inflows of foreign capital and a growing share of foreign debt in the banking sector’s liabilities. Additionally, the CBR’s experience of using macroprudential measures in the segment of unsecured consumer lending is largely positive. Generally, most of the Macroprudential measures by the CBR have been positive and beneficial in being able to mitigate systemic risk.

Recent theoretical advances support a role for macro-prudential policies in ensuring financial stability. Such policies can lessen the accumulation of vulnerabilities and can help mitigate the impact of adverse cycles by boosting a greater build-up of buffers.

Countries stand to benefit from greater use of macro-prudential policies to reduce the risk arising in their banking systems. It is evident that many macro-prudential policies reduce the growth in key variables: leverage, assets, and the noncore to core liabilities ratio. (Claessens et al., 2013)

5. Conclusion

One of the aims of macroprudential regulation is to internalize the externalities within the financial system. In this paper, after an analysis of substantial academic research we deduce that financial stability can be improved markedly by affecting a systemic outlook on bank regulation.

Ultimately the purposes of macroprudential policies are to mitigate risk and especially systemic risk in the financial sector.

The financial sector can intensify fluctuations in business cycles, crippling the efficient apportionment of capital in the economy and causing financial volatility. The literature has provided robust empirical proof for the procyclical behaviour of the banking sector. For instance, in countercyclical regulation banks are forced to set aside funds or hold more capital in good times as a cushion against losses in downturns.

As part of the regulatory toolkit, stress testing ensures that the financial sector is adequately capitalized to protect banks and similar institutions against shocks from the system. Similarly, Macroprudential capital requirements reduce the default probabilities of individual banks as well as the probability of a systemic crisis. Ultimately, the main aim of macroprudential regulation is to lessen the risk and the macroeconomic costs of financial volatility. It fills the gap between macroeconomic policy and the traditional micro prudential regulation of financial organizations.

The macroprudential policy instruments should be paired with financial stability objectives to be able to address the likelihood of systemic risk which is not factored in many institutions. Macro-prudential policies in ensuring financial stability lessen the accumulation of vulnerabilities and can help mitigate the impact of adverse cycles by boosting a greater build-up of buffers. Macroprudential regulation enables long term financial stability of the entire system not just an individual entity.



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