

The macroprudential policy debate, some concepts and the Brazilian context

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Abstract

The economic literature related to the financial system seeks to define concepts of financial stability, systemic risk and macroprudential instruments for the purpose of drafting a policy essentially "lean against the wind", that is, an policy that monitors macroeconomic vulnerabilities and combat system instability. It should cover all financial institutions involved in credit intermediation (not just banks) and consider the pro-cyclicality and the endogenous nature of risk in the financial system, and also, spillovers effects of policies in other countries, namely, the global context. This article summarizes the main concepts related to macroprudential policy discussed in the economic literature post-crisis 2008. In addition, we detail the macroprudential policy in the context of the Brazilian financial system, more specifically, describes the main policies implemented and banking regulatory environment related to Basel III and non-bank regulatory related to shadow banks. After the 2008 crisis, Brazil was one of the precursors countries in operating macroprudential instruments to curb excessive credit growth and strong capital inflows. The Brazilian financial system has a broad regulatory perimeter, adhering to international standards and covering, also, the Shadow banking system. This system has low connectivity with the banking system and small size compared to assets of the national and global financial system.

Key-words: Macroprudential. Systemic risk. Instruments.

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Área de interesse: Macroeconomia, política econômica e financiamento do desenvolvimento.

Resumo

A literatura econômica relacionada com sistema financeiro procura definir conceitos de estabilidade financeira, risco sistêmico e instrumentos macroprudenciais com o propósito de desenhar uma política essencialmente "lean against the wind", ou seja, uma política que monitora as vulnerabilidades econômicas e combate instabilidade do sistema. Esta deve cobrir todas as instituições financeiras envolvidas na intermediação do crédito (não só bancos), considerar a pró-ciclicidade e a natureza intrínseca do risco no sistema financeiro, e ainda, efeitos transbordamentos de políticas em outros países, sobretudo, contexto global. Este artigo resume os principais conceitos

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relacionados a política macroprudencial discutidas na literatura econômica pós-crise de 2008. Além disso, a política macroprudencial é detalhada no contexto do sistema financeiro brasileiro, mais especificamente, aponta as principais políticas implementadas e ambiente regulatório bancário relacionado com Basileia III e regulatório não-bancário relacionado com os shadow banks. Após a crise de 2008, Brasil foi um dos países precursores em operar políticas macroprudenciais afim de limitar o excessivo crescimento do crédito e a forte entrada de capitais. O sistema financeiro brasileiro tem um amplo perímetro regulatório, aderindo ao padrão internacional e cobrindo o sistema shadow bank. Este sistema tem baixa conectividade com o sistema bancário e pequeno tamanho comparado com os ativos do sistema nacional e global do sistema financeiro.

Introduction

The economic literature and practice of central banks are in discussion process in order to rethink macroeconomic policy regarding the prudential approach. Given the causes and effects of the international financial crisis of 2008, it was noticed that only one instrument of monetary policy, originated from inflation targets adopted by most central banks, is not able to ensure the stability of the entire financial system.

The current economic theory debate want to include a prudential policy in the macroeconomic framework. The literature has not reached into a strictly consensus about definitions and macroprudential objectives, and not even an exact list of what types of instruments are more effective, at least for the general purpose of systemic risk. Few studies have documented the effectiveness of macroprudential instruments, and the relationship with the reduction of systemic risk is still unclear. There is also a problem of lack of data, because the implementation is very recent, and only a few countries, including Brazil, used some instruments in addition to monetary policy.

The present chapter summarizes the context and the debate of the economic literature regarding macroprudential policy. The aim is to show the main existing definitions of prudential policy within the context of macroeconomic management, including attempting to strict definitions of systemic risk, financial stability, macroprudential instruments. Also, it point out some issues that should be considered in the implementation of macroprudential policy, such as the pro-cyclicality and the systemic nature of risk, the global risks channels and the coverage of such policies to the shadow banking system. From those concepts, how Brazil is included in this debate? the chapter aims to analyze the macroprudential policy in the Brazilian context, in which outlines the main policies implemented, the banking regulatory environment associated with Basel III and non-bank regulatory related to the shadow banks.

The chapter is organized as follows. The first part summarizes the economic consensus on financial stability policy before the international crisis of 2008. The second section summarizes the main concepts, objectives and instruments of macroprudential policy and, also, exposes some important considerations. The section three describes some characteristics of the Brazilian financial system. The first subsection reveals the macroprudential policies carried out between 2007-2015, then the implementation of Basel III in the Brazilian scene and criticisms, and lastly, describes the shadow banking system. Finally, the final considerations.

1 Macroeconomic framework - traditional theory

In 1999, the academic world and the practice of central banks reached a consensus about the core of macroeconomics theory and, in particular, monetary policy. This is not a general consensus, but the existence of elements that are well accepted by many academic economists and central

banks, which allowed a convergence and greater interaction between academic theory and practical application of economic theory. (GOODFRIEND, 2007)

The money neutrality in the long run, that is, the inexistent trade-off between permanent inflation and unemployment, is among the elements that guide the core of this macroeconomic theory. But in the short term, the trade-off exists, caused mainly by a temporary rigidity of prices and nominal wages. In the case of monetary policy, the priority was price stability (low and credible inflation) using a core inflation target supported by a transparent policy on the objectives and procedures through its main (and unique) tool: interest rate. (GOODFRIEND, 2007)

Blanchard, Dell’Ariccia e Mauro (2010) point out that within this theoretical framework, financial regulation was framed in the microeconomic context of the financial system. These authors cite also the implications of the Great Moderation¹ period, noting that the decline in the volatility of output and inflation may result from the monetary policy influence, but there is ambiguity of how this result refers to luck, small shocks, structural changes or even enhancements policies.

Thus, price stability was a separate policy from financial stability, (Tinbergen Proposition)², and the latter was achieved with microprudential regulation and supervision (EICHENGREEN et al., 2011). In macro perspective, the price stability policy would be enough to influence short-term expected interest rates, given the arbitrage mechanism in which the interest rates would fit in accordance with the expectation of long-term interest rate plus a risk premium. Therefore the asset prices will follow in accordance with its fundamentals (BASTO, 2013).

Bean et al. (2010) add that monetary policy has a primary role in controlling aggregate demand, by manipulating the interest rate with an independent central bank in order to modify the long-term interest rates, asset prices and inflation expectations. Intermediate monetary targets were no longer used, it was believed in the efficiency of markets in innovation, distribution and pricing of risks, besides the understanding of systemic financial crises "were seen only in history books and emerging markets" (BEAN et al., 2010, p.2) . Thus, the understanding of financial crises was generated by the combination of academic theory and supported by empirical facts (great moderation). This contributed to the inadequate regulation of financial markets, no measure of prevention and management of crisis, especially on the international sphere, and also, few economists were able to foresee the 2008 financial crisis (G30, 2015).

2 Financial stability: is it necessary to introduce a macroprudential policy?

The 2008 financial crisis has shown that the instability of the financial system can cause extreme consequences, especially in the real economy. The deviation of asset prices, even in a scenario of price stability and further dissemination of instability to the entire economy, stated an inherent problem of the financial system: systemic risk. This episode highlighted macroeconomic aspects that must be taken into consideration by the financial authorities to contain financial crises. The crisis provoked an internal critique within the mainstream economic theory, since the majority of macroeconomic models did not include the financial system and the credit creation of money, as well as their relationship with the real economy. Moreover, the belief in the scope of prudential regulation solely on individual banks and in this regulation was able to generate the robustness of the financial system as a whole, it has been questioned by macroprudential discussion that incorporates the argument of the fallacy of composition (of the microprudential measures) about the stability of

¹ Great Moderation refers to the period between mid-1980s and mid-2000s, in which there was a reduction in the volatility of business cycle fluctuations. First term’s use was in Stock, James; Mark Watson (2002). "Has the business cycle changed and why?". NBER Macroeconomics Annual.

² Tinbergen proposition: If there are n goals in the economic policy problem, then n linearly independent tools are necessary to solve the problem.

financial system and highlights the growth of systemic risk between financial institutions themselves, and also, with real economy (GOODHART, 2010).

Due to this episode, central banks and economic theory concentrate their efforts to develop an approach that effectively includes the issue of financial stability. The main idea is to monitor the possible threats and its relationships with other macroeconomic policies. The debate is initial and does not reach any consensus on how may be the inclusion of financial stability policy in the current model, neither an agreement of the most appropriate way to ensure system stability. ENGLAND (2009) suggests that the main goal should be stability in the provision of financial intermediation services for the entire system and the real economy. In other words, providing an efficient payment system, ensuring the credit intermediation and insurance against the market agents risk, and also ensuring the resilience of the financial system over time (the upswings and downswings of the economic cycle). Borio e Drehmann (2009) emphasize the financial system as a whole (not individual institutions) as the focus macroprudential policy. The authors define financial stability as the antonym of financial instability. They explain that shocks associated with a set of system conditions could cause financial crisis ³.

Therefore, the economic literature emerges with an urgency of a prudential policy in the macroeconomic sense, with own targets, objectives and instruments to support financial stability in the economy as a whole, in order to avoid financial crises, instead of an exclusive adoption of microprudential policy of individual financial institutions. (BLANCHARD; DELL'ARICCIA; MAURO, 2010; EICHENGREEN et al., 2011; BEAN et al., 2010; BORIO; DREHMANN, 2009). The macroprudential policy has multiple dimensions according to its objectives and its operation, since the scope of activities is extremely broad on the financial system and takes into account various aspects, including the determination of their tools.

This new optical face some challenges. What are your main objectives? And how to measure and to evaluate system stability? What tools to use? The regulator would be the central bank or a set of institutions? Would only one tool can accomplish the prudential goals as the monetary policy of the New Consensus adopted? The following subsections gathers the ideas of economists, international groups and central bank that focused its efforts to define and to draw macroprudential framework.

2.1 Objectives of macroprudential policy

The macroprudential term, as stated by Clement (2010), appeared in unpublished documents in the mid 1970s before the Cooke Committee ⁴ relating the systemic supervision with macroeconomics. The use of this term became more common after the financial crisis of 2008 in the economic literature related to monetary policy and financial stability. The general view of academic literature highlights the pursuit of financial stability as the overall objective of macroprudential policy. However, a consensus on the definition of financial stability has not been formed in the literature yet.

Galati e Moessner (2013) separate two types of literature approach: the first specifies a robust financial system to external shocks; and the second, a resilient financial system to shocks that originate within the system itself (endogenous). The latter mechanism stresses the endogenous nature of financial crises. Macroprudential policy seeks to strengthen the financial system against shocks, reducing pro-cyclicality or magnitude of financial failures (CGFS, 2010; FSB, 2011) and ensuring the financial system's contribution to economic growth (COLLIN et al., 2014). Financial stability is often synonymous with the mitigation of asset price/credit/leverage boom and burst (CANUTO; CAVALLARI, 2013; GOODHART, 2010) and reducing the fragility of bank liabilities (SHIN, 2013), in a way that macroprudential policy seeks to reduce the probability of financial crises and their

³ Financial crises, according to the authors, are any material failure or fundamental losses of any financial institution that transmits its effects on the real economy (BORIO; DREHMANN, 2009).

⁴ In order to deal with banking supervision and prior to the Basel committee.

impacts (VINALS et al., 2011; G30, 2015) placing the credit supply in a sustainable path (WEF, 2015) and limiting the macroeconomic costs (GALATI; MOESSNER, 2014).

Some authors (SILVA; SALES; GAGLIANONE, 2013; BORIO; DREHMANN, 2009; VINALS et al., 2011) point out that "stability" means a financial system resilient to a normal sized shocks, and that within the time interval, the system can return and perform its standard functions (intermediation, saving allocation, maturity transformation etc.). Borio (2011) emphasize the endogenous character of shocks and the macroeconomic cause of the financial instability, that is closely connected with the business cycle fluctuations. The author claims that "the boom does not just *precede*, but *causes* the bust. Financial instability is a symptom of deep-seated forces that drive the economy *at all times*, although financial distress emerges only infrequently." (p. 22, author emphasis).

The source of endogeneity arises from credit mechanism and its generation of purchasing power, and also from the cross-sectional and inter-temporal coordination failures⁵. According to Borio (2011), the macroeconomic models should be away from the focus on the equilibrium point and representative agent, and should emphasize in a more detailed way the analyses of credit risk and disequilibrium models prepared by the Classics, incorporating the expansion and contraction of credit and monetary factors.⁶ Claessens, Ghosh e Mihet (2013) mention a growing recognition in the literature of endogenous character of the financial cycle. The authors indicate the collective cognition of market participants, in which it is amplified by the experience-based expectations (waves of optimism and exuberance) and at some point, the divergence of expectations creates a large risk aversion and mood swings starting the downturn in the financial cycle.

Furthermore, Carvalho (2009), Goudard e Terra (2015), Prates e Cunha (2012) rely on Financial Instability Hypothesis of Minsky and the psychological effect of Kenyes agents to explain the endogenous nature of financial instability. The state of confidence and optimism in expectations about the future, lead the agents to take riskier and leveraged positions with the reduction of precautionary margins, so that the financial system evolves from robust to fragile in a period "because even a small disappointment, like a small rise in interest rates or the deceleration of the growth in the supply of credit, or a disappointment in profit expectations can lead to a massive de-leveraging process." Carvalho (2009, p. 15)

The general view is the prevention and mitigation of systemic risk (sometimes referred to as financial vulnerability)⁷ as a specific objective of macroprudential policy (GALATI; MOESSNER, 2013; BASTO, 2013; PRATES; CUNHA, 2012; CGFS, 2010; LIM et al., 2011; FSB, 2011; ENGLAND, 2009; COLLIN et al., 2014; SHIN, 2013; BORIO, 2011). It should be emphasized that the scope of the policy operationalization is the reduction of risks in the financial system as a whole and also its integration with the real economy, with focus on the economic cycle (evolution over time) and cross-section dimension (problem between the institutions). For instance, the policy framework must monitor the excessive credit growth in a country, but also identify the joint exposures and risk concentrations among certain financial institutions in a point in time that can lead to contagion to other institutions and the real economy.

Borio (2011) stresses the problem of defining the concept of macroprudential policy as one that seeks to reduce the systemic risks or to achieve the financial system stability: this interpretation may

⁵ He suggest for those who want work with micro-foundations models, they should break the omniscient representative agent assumption and include financial distress with credit risk and default in many forms, for instance, with different opinions, imperfect knowledge, heuristic expectation formation, financial imbalances deviations from historical standards, among others.

⁶ The author mentions Wicksell, K (1898): *Geldzins und Guterpreise. Eine Untersuchung uber die den Tauschwert des Geldes bestimmenden Ursachen.* Jena. Gustav Fischer (tr., 1936. *Interest and prices: A study of the causes regulating the value of money*, London: Macmillan); Fisher, I (1932): *Booms and depressions*, New York: Adelphi Co.; Mises, L von (1912): *The theory of money and credit*, Foundation for Economic Education 1971, reprint, New York; and Hayek, F (1933): *Monetary theory and the trade cycle*, Clifton, New Jersey: Augusts M Kelly reprint 1966

⁷ Next subsection defines systemic risk according to perspective of recent literature debate.

be a very broad. Any policy, as fiscal and monetary policy, can substantially influence the financial system. For a more clear definition, it can be considered aspects such as: establishing a successful criterion for policy, choice of instruments aims to systemic risk, balance the issue of aggregate and sectoral approach and also between rules and discretion.

Therefore, the macroprudential policy should limit the build up of financial fragilities and strengthen the resilience of the financial system, generating a system robust against adverse shocks and reducing the amplitude of the financial system cycle. Macroprudential policy tends to be forward-looking, in a horizon possibly greater than monetary policy because the risk tends to take a while to build up (CGFS, 2010). This treatment against the risk underscores an essentially "leaning against the wind" policy that tries to perceive the imperfections and conditions of the financial system, leading to financial authority to evaluate the present in order to monitor its consequences in the future. Also, prevent these vulnerabilities from being forwarded and amplified for the economy as a whole. This macroeconomic framework purpose a financial authority and policy makers more active supervisors of the financial system in a manner that macroprudential policy acts beyond the previous idea of cleaning up after financial bubbles.⁸

2.2 Systemic Risk

Almost all authors reoriented the focus of macroprudential policy to reduce systemic risk. But how to define it? Recent literature stands as "a risk of disruption to financial services that is caused by an impairment of all or parts of the financial system and has the potential to have serious negative consequences for the real economy." (CGFS, 2010, p.2).⁹

The specific form of measurement of systemic risk is based on the use of indicators set that can point out problems and disturbances in financial services that compromise the aggregate financial system. Therefore, these measures need to denote the broad aspect of the financial system, such as leverage of financial institutions, currency and maturity mismatches, interconnectivity measures, excessive credit growth and aggregate evolution of asset prices, among others. The policy focus is to reduce the amplitude of the financial cycle associated with systemic risk (CANUTO; CAVALLARI, 2013).

There are two dimensions of systemic risk in macroprudential approach: the evolution of risk over time (time-dimension) and at a given point of time, which is structural and transverse (cross-sectional dimension). The first reflects the pro-cyclicality of the financial system as a source of stress (often associated with the credit/asset price/leverage boom and bust cycle), while in the second, the risk factors associated with interconnections and joint exposure of the individual financial institutions and markets (with respect to the cross-section treatment of risk) (GALATI; MOESSNER, 2014; GALATI; MOESSNER, 2013; FSB, 2011; BORIO, 2011; CANUTO; CAVALLARI, 2013). Silva, Sales e Gaglianone (2013) reinforce that systemic risk must be captured by the probability of disruption in financial services given the dimensions of risk (changes over time and between institutions).

The literature economic does not have a strict consensus on which indicators should be used, but they are converging on a set of measures that serve to an information base for policy actions (quantitative and qualitative analysis). Vinals et al. (2011) systematize an indicator list separated by two dimensions of systemic risk. The time dimension measures are: (a) credit for GDP

⁸ Before the 2008 financial crisis, there was a literature debate in monetary policy between leaning against asset-price bubbles ("lean") versus cleaning up after the bubble bursts ("clean"). The latter, also referred as "Greenspan doctrine", was well accepted among mainstream economists with the arguments such as: it is hard to identify financial bubbles, raising interest rate may be ineffective and only affect a fraction of assets, and also, may cause the bubble to burst more severely.

⁹ Referenced in this manner also: G30 (2015), FSB (2011).

¹⁰; (b) macroeconomic aggregates and their predictions; (c) Fundamental analysis ¹¹; (d) asset prices (especially house, properties and equity); (e) value-at-risk models (VaR); (f) macroeconomic stress test.

In the cross-sectional dimension, there are measures of size and concentration of financial institutions in percentage of the market or GDP (includes analysis of assets, equity, credit, deposits, etc.); or verification of joint exposure in the balance sheet of financial institutions, such as capital and liquidity positions; default probability measures of a group of financial institutions using dependency indicators such as stock prices and credit default swaps (CDS); and also the contingency claims analysis (CCA), which is a measure of risk adjusted balance sheets by financial institutions in order to quantify the contribution of a specific institution in systemic risk. As cross-section systemic risk has a multiplicity of factors and an indicator base or a standard methodology does not exist yet.¹²

2.3 Instruments

Authors categorize the types of instruments in various ways. [Lim et al. \(2011\)](#) split in: credit, liquidity and capital, while [Collin et al. \(2014\)](#) similarly divides into equity-based, liquidity-based and lending limits. [CGFS \(2010\)](#) divides the instruments by vulnerabilities: leverage, liquidity and interconnectivity. All author recognize the difficulty of finding only an instrument that deal with the prudential objectives for the entire financial system, so they realize the multiplicity of aspects to be considered in the prudential policy, each with its proper tool.

The table 1 separates macroprudential tools in accordance with the classification of [Galati e Moessner \(2014\)](#) ¹³. The authors separate into three intermediate goals: credit booms/leverage/asset prices; risk and market liquidity; and interconnectivity/market structure/financial infrastructure. The first two manage essentially the time dimension risk and the latter, the systemic risk cross-sectional dimension.

[Shin \(2013\)](#) distinguishes the banks liabilities in their balance sheets in two types: core and non-core. [Galati e Moessner \(2014\)](#) adopts this terminology in one instrument related with liquidity risk/market. The core liability refers to bank funding provided by domestic nonbank creditors, i.e. through retail deposits from households (typically more stable), and the non-core liabilities is related to obligations with other banks and with foreign creditors. This terminology will depend on the degree of openness and the context of financial development of the country. Countries with financial systems not in advanced stages of development and more closed to the global system, the non-core liabilities are concentrated in domestic deposits (term) of non-financial firms (which are financed in the capital market by issuing bonds and depositing their funds on the banks). In an open financial system, [Shin \(2013\)](#) highlights the international capital flows directed to the financial system composing a source of funding to firms and financial institutions that may increase the balance sheet liabilities in international currency, that is, in certain extent increase the vulnerabilities in the financial system. The next section takes up this discussion on topics such as financial cycles, the shadows Banks and risk channel of capital flows.

The matter of international capital flows in macroprudential policy has a close relationship with the capital controls recently referred (more impartial form) by [Vinals et al. \(2011\)](#) as "capital

¹⁰ Used as the main indicator of stage of the financial cycle ([SHIN, 2013](#); [CGFS, 2010](#); [VINALS et al., 2011](#)). Some studies already signaled its effectiveness ([DREHMANN et al., 2010](#); [GONZALEZ et al., 2015](#))

¹¹ Indicators of the bank's balance sheet liabilities (funding) related with the financial cycle. Discussions in [Shin \(2013\)](#).

¹² The effectiveness of each indicator has been builded, measured, and analyzed by central banks and international agencies. An example is the banks stability index ([VINALS et al., 2011](#)) or financial stress index that adds five indicators ([CANUTO; CAVALLARI, 2013](#)). An even bigger challenge is to build an indicator that captures the liquidity risk.

¹³ The authors also indicate an alternative taxonomy for macroprudential instruments with the focus in market failures. They divides into three types of risk externality: strategic complementarities, fire sales and interconnectivity.

Table 1 – Macroprudential instruments for intermediate objectives

Credit booms/leverage /asset prices	Liquidity risk/market ^a	Interconnectivity/market structure/financial infrastructure
Countercyclical capital buffers	Time-varying systemic liquidity surcharges	Higher capital charges for trades not cleared through CCPs
Through-the-cycle valuation of margins or haircuts for collateral used in securitized funding markets (repo)	Levy on non-core liabilities	Systemic capital surcharges
Countercyclical change in risk weights for exposure to certain sectors	Time-varying limits in currency mismatch or exposure (e.g. real estate)	Systemic liquidity surcharges
Time-varying LTV, Debt-To-Income (DTI) and Loan-To-Income (LTI) caps	Time-varying limits on loan-to-deposit ratio	Powers to break up financial firms on systemic risk concerns
Dynamic provisioning and Time-varying caps and limits on credit or credit growth	Stressed VaR to build additional capital buffer against market risk during a boom	Deposit insurance risk premia sensitive to systemic risk
Rescaling risk-weights by incorporating recessionary conditions in the probability of default assumptions (PDs)		Restrictions on permissible activities (e.g. ban on proprietary trading for systemically important banks)

Source: Galati e Moessner (2014)

^a Only two instruments were related to cross-sectional dimension in this objective: Capital charge on derivative payables and levy on non core liabilities

flows managements". Shin (2013) divides three types of instruments: the prudential use with domestic focus as LTV, DTI and others; the currency-based use - born of concern for global liquidity such as the limits of mismatching currency (the constraints of macroprudential tools are based on the distinction between currency); finally, the traditional capital controls that impose restrictions based on the investor's residence. According to the author, capital controls have two objectives: to avoid the appreciation of the exchange rate and as financial stability tool.

Especially in the context in the no-banking financial sector, ESRB (2017) suggest the macroprudential use of margins and haircuts in securities financing transactions, given the collateral requirements in those transactions. The report focus on procyclicality of collateral requirement seeing as market failure, in which margin and haircut practices may exacerbate systemic risk and contribute to the accumulation of excessive leverage (deleveraging) during upswings (downswings) in the financial system¹⁴. Some potential tools are considered to address this problem: fixed numerical

¹⁴ For instance, during upswings, an increase in asset prices provides a valuations of securities that have been provided as collateral, leading a fewer requirements of securities as collateral in a given exposure and then, the build-up of leverage.

"automatic valuation effects may be compounded by the characteristics of the risk-based models used by central counterparties and by participants in bilateral markets. These models generally link the calculation of margins and haircuts to price volatility, which means that margin and haircut requirements will tend to decrease when conditions in financial markets are benign, and increase when volatility rises. The procyclical aspect

floors and/or time-varying floors on initial margins and haircuts; margin add-ons (extra margins used in a time-varying manner); collateral pool buffers (authorities may require to deposit a amount of collateral); margin and haircut ceilings; and others. Regulatory arbitrage, modification of relative costs of central cleared transactions (CCT) compared to over-the-counter (OTC), and overlaps with others regulatory tools may be some practical challenges for the tools implementation. Numerical haircut floor framework of Financial Stability Board (FSB) are due to be implemented in 2018.

2.4 Some aspects about macroprudential policy

The matter of financial stability and contention of crises has always been in history and discussion of the economic literature, and often the central bank was appointed and established to fulfill this function (GOODHART, 2010). The 2008 financial crisis influenced the debate direction on a more active macroeconomic policy over the financial system as a whole, forwarded in the prudential sense and as a complement to the monetary policy. Therefore, some important perspectives on this issue should be taken into account in policy and this section examine that.

The macroprudential policy involves two different aspects: financial instability prevention policy on normals times; management and resolution of crisis. In the latter, other types of macroprudential actions are used compared with the instruments on the table 1 (the main focus is the *prevention* of vulnerabilities). In the case of occurrence of the bubbles and its burst (deleveraging situation of agents and institutions, asset deflation, debt accumulation, among others), the central bank coordinated with the government plays a crucial role in resolving crises by taking measures including liquidity support to banks, balance sheets restructuring, recapitalization of the financial sector, conventional and unconventional monetary policies (quantitative easing and forward guidance).(GOODHART, 2010; G30, 2015)

In this latter aspect, it is important to stress the central role of the monetary authority's leadership in pursuing macroprudential stability given its ability to liquidity generation, control of the main instruments, the operation of the open market and loans to banks (Lender of last resort), especially in financial crises. However, the central bank should not be the only active agent of macroprudential policy. In the event of crises and when the liquidity provided is not sufficient to eliminate the problem, capital support to financial institutions may be required. Hence, the government treasure who fulfills this function. (GOODHART, 2010)

There are several elements for institutional arrangements and policies being adopted across economies dedicated to macroprudential policy framework. IMF-FSB-BIS (2016) reforce that is no "one-size-fits-all" approach. Usually, central banks plays an important role¹⁵, or involving a macroprudential regulatory and supervisory authority in coordination with other relevant authority. In addition, the participation of minister of finance in the decision making arrangement as in UK, Poland, France, Germany and US, or involving independent external experts in these structure. The decision maker body must have well defined objectives, transparency and accountability mechanism and frequency of formal meetings, requiring powers that ensure the ability to act within the countries.¹⁶

of margin and haircut requirements can exacerbate leverage cycles in which market participants use the collateral freed up by higher asset prices and lower margin and haircut requirements to increase their borrowing and contingent commitments from derivatives, thereby accumulating financial and synthetic leverage."(ESRB, 2017, p.4,5)

¹⁵ The decision-making body is the central bank board (or governor) in Ireland and New Zealand. In Malaysia, South Africa and United Kingdom, the governor chair is the policymaking committee. The analysis of systemic risk and proposals for policy action is made by the central bank in France and Germany and in US, the central bank has the priority role to regulate and supervise the systemically important financial institutions (SIFIs).(IMF-FSB-BIS, 2016)

¹⁶ Powers can be "Hard direct" - policy makers have a direct control over macroprudential tools; "sem-hard"- they

Regarding macroprudential policy in normal times, there are two views ¹⁷ in literature debate, extremely related with monetary policy conduction. The first view purpose macroprudential policy conduction must be separate from monetary policy. The use of macroprudential policy is strict and only apply in a few sectors, playing a role in crisis prevention, particularly in credit-supported booms by the housing sector (G30, 2015). The authors (G30, 2015; BEAN et al., 2015) mention that there is no consensus about the effectiveness of macroprudential measures in other sectors and in spillover effects from other countries. This interpretation derives from "saving glut" ¹⁸ argument in which the natural real interest rates were very low for a long period before 2008 crisis and generated financial stabilities. For those authors, the role of central bank in dealing with systemic risk allow more political influence, and in this case, can jeopardize the price stability target and central bank independence. All the argumentation is based in the separation principle of inflation and financial stability. The former should be the focus of Monetary policy and the latter of macroprudential policy. The disequilibrium notion of business cycle is based in inflation signal and the financial instability arises from a pure financial aspect (not real). The combination of central banks' and market participants' actions determine the equilibrium or natural real interest rate in which, before the crisis, was persistently low:

a world of persistently low interest rates may be more prone to generating a leveraged "reach for yield" by investors and speculative asset-price boom-busts. While prudential policies should be the first line of defence against such financial stability risks, their efficacy is by no means assured. In that case, monetary policy may need to come into play as a last line of defense.(BEAN et al., 2015, p.2)

The second view has a different prospect. The equilibrium notion (and monetary policy) has to be analyzed in a broader aspect and include financial stability perspective. Borio (2016) says that equilibrium rate of the latter approach has a narrow notion and suggests output deviation from potential must be at financial cycle frequencies (not business cycle). Based in the empirical studies, he recognize that money (monetary policy) is not neutral in time horizons relevant for policy (over medium term and, even, long term) and it is important to distinguish the supply-driven deflation (depress prices and boost output) from the demand-driven deflation (decline of prices and output). Thus, the low real interest rate before the crisis is perceived as disequilibrium phenomenon ¹⁹ by a combination of asymmetrical monetary policy (especially in financial bust), global disinflationary forces (globalization of the real economy and technological innovation) and unsustainable financial booms. This combination caused by a downward bias of interest rates and an upward one to debt induced a self-validating of the low interest rates over long horizons,: "In other words, policy rates are not simply passively reflecting some deep exogenous forces; they are also helping to shape the economic environment policymakers take as given ("exogenous") when tomorrow becomes today." (BORIO, 2016, p.228)

Therefore, this approach changes monetary policy perspective and their conduction, in which central bank should use tools available and monetary policy to mitigate financial boom and bust. Since macroprudential and monetary policy have influence on credit expansion, assets prices and risk-taking, it does not make sense to separate their effects. Borio point out the needs of flexibility and the adjustment of the analytical current framework to include the financial cycle.

can make a formal recommendations to regulatory authorities; or "soft"- policy makers can warn about an financial instability or express an opinion about that.(IMF-FSB-BIS, 2016)

¹⁷ The theoretical debate of the relation of macroprudential policy and monetary policy is still in its infancy and is not closed among those economists. This section provide only limited guidance on the main difference assumptions.

¹⁸ Term created by Ben Bernanke explaining the desired saving exceeding desired investment as the cause of low interest rates. Bernanke, B. (2005) "The Global Saving Glut and the U.S. Current Account Deficit." Sandridge Lecture, Richmond, Va., March 10.

¹⁹ "Then it follows that if we think of an equilibrium rate more broadly as one consistent with sustainable good economic performance, rates cannot be at their equilibrium level if they are inconsistent with financial stability."(BORIO, 2016, p.217)

there is a need to adjust monetary policy frameworks to take financial booms and busts systematically into account. This, in turn, would avoid that easing bias and the risk of a debt trap. Here I highlighted that it is imprudent to rely exclusively on macroprudential measures to constrain the build-up of financial imbalances. Macroprudential policy must be part of the answer, but it cannot be the whole answer. (BORIO, 2016, p.233)

Another important perspective necessarily refers to the inclusion of the issue of the shadow banking system in macroprudential policy debate. The shadow banks are entities or activities that are outside of the traditional banking system, but participate of the credit intermediation (FSB, 2015; POZSAR et al., 2010). This means that shadow banks do not have the banks's network protection as deposit insurance and liquidity lines offered by central bank against the risks of solvency²⁰ and liquidity risk²¹, respectively. Besides those entities are not regulated as traditional banking in most countries. The shadow banks contribute substantially to systemic risk according to its interconnection with traditional banks and for being "structured to perform bank-like functions (e.g. maturity and liquidity transformation, and leverage)" (FSB, 2015, p.1), i.e. involves activities, and consequently risks typically of bank as providing long-term credit to the financial system through funding and leverage of short-term. Given the complexity of the system, the Financial Stability Committee (FSB, 2015) classifies the shadow banking system (strict) by economic activity or function for a more comprehensive monitoring of credit intermediation risks in the nonbank segment. The activities are related to securitization, collateral services, providing funding to banks (repo), performing loans and nonbank deposits by households and entities ²².

The perception and importance of this parallel system to the banking system in this literature was born in the 2008 financial crisis, when these institutions played a key role in the complex transformation network of credit, maturity and liquidity along with the banking system in the United States, and also European, contributing substantially to the outbreak of the crisis. Mehrling (2010) define shadow banking as institution that operate money market funding of capital market lending, in which they face a similar liquidity risk of banking institution because of maturity transformation of their activities: short term funding with long term lending. The table 2 provides an analogy of financial instruments in the balance sheet of shadow banks compared to traditional banks ²³. Banks deal with solvency risk managing the capital buffers and treat the liquidity risk with bank reserves and/or with the support of deposit insurance and the discount window of the central bank. Shadow banks deals with the solvency risk with credit default swaps (CDS) and the liquidity risk through the issuance of asset-backed commercial paper (ABCP) and the Repurchase Agreement (RP) for the wholesale money market (securitized loans are collateral in the operation). (MEHRLING, 2010)

Table 2 – Simplified balance sheet

Tradicional bank		Shadow bank	
Assets	Liabilities	Assets	Liabilities
Bank reserves	Deposits	Securitized loans	Money markert funding
Loans	Capital buffers	CDS	-ABCP
			-RP

Source: Mehrling (2010)

The Financial Stability board (FSB) features shadow banking system in a broader definition which involves all entities outside of traditional baking performing credit intermediation and

²⁰ When the market value of the institution's assets falls below its obligations.

²¹ When the institution can not convert assets in currency to pay its obligations because its market assets are illiquid.

²² Section 6 detail the activities in describing the Brazilian shadow banking system.

²³ This representation is inspired in operations carried out by US financial institutions before the 2008 crisis.

maturity/liquidity transformation without central bank backstop.²⁴ ²⁵ Despite the regulation and supervision in the sector is still in the process of formulation and debate especially in microeconomic sphere, the monitoring of the shadow banking system is a fundamental prerogative of macroprudential policy, since the system is susceptible to runs, essentially connected to banking system and also present activities with pro-cyclical and systemic character. Furthermore, there is a great challenge of the alignment norms between countries given the system is global. Supervisors can also act indirectly, for example by controlling the supply of instruments of regulated banks to the shadow bank system (collateral to operations) or limiting the transactions of other large entities to-big-to-fail.

The macroprudential policy seeks to monitor systemic risk within the context of the economic cycle. Empirical studies (CLAESSENS; KOSE; TERRONES, 2011b; CLAESSENS; KOSE; TERRONES, 2011a) demonstrate a strong interaction between business cycle and financial cycle, so that the latter usually is more persistent, deeper and shaper in comparison with the first. The business cycle has a high level of synchronization with the credit cycle and house prices, and yet, recessions accompanied by financial disruptions ²⁶ tend to be more pronounced and longer. The business cycle upturn also shows faster GDP growth when combined with credit booms and house prices. The financial cycle is characterized by financial disruptions longer than boom phases; equity and house prices cycles are typically longer and more intense than the credit cycle; and finally, some features changes over time as the shortening of the equity prices cycles. When the analysis has focused on the interaction between countries, high synchronization of credit cycles and house prices is also perceived and intensified over time between countries. Moreover, emerging countries when compared with advanced countries demonstrate business and financial cycle more pronounced.

Shin (2013), Claessens, Ghosh e Mihet (2013) point out the procyclicality of the financial system arising from changes in the values of assets and leverage in the structure of balance sheet of financial institutions, amplifying the business cycle. If banks manage their balance sheets with desirable target of leverage, an increase of asset prices (for any productivity shock²⁷, raises the value of total bank assets represented by loans and securities), causes increased its capital position²⁸ and consecutive purchases of those assets in the balance sheet of banks (expanding its size). If all institutions face the same situation, the increase in demand for assets lead to further rises in asset prices, generating a feedback effect on asset prices and expansion of bank balance sheets (the opposite is also true). This mechanism (the case of an increase in asset prices), causes a credit boom in a country and leaves the financial system as a whole more leveraged and vulnerable.

Due to the expansion (reduction) of bank balance sheets in the upturn (downturn) of the economic cycle, Shin (2013) states non-core liabilities (proportion of these in relation to the balance sheet) as an important indicator of financial cycle stage. During upturn in financial cycle, banks will expand its balance sheet through debt issuance, i.e., raising its funding with financial instruments between banks, the shadow banks and also foreign currency obligations. According to this author, there is an intrinsic relationship between three elements in boom phases: elevation of asset prices (increase in banks total assets) and consequently increase in bank lending; high the proportion of non-core liabilities ratio to total liabilities; and systemic risk arising from the elevation of the

²⁴ (FSB, 2015) includes money market funds also in the activities and entities of the shadow banking system for providing to the banks short-term funds and for manage a separate credit intermediation funding for non-bank deposits. Furthermore, the funds are susceptible to runs.

²⁵ Liquidity transformation is a similar concept to maturity transformation (fund in a short term to lend in a long term): obtain cash-like liabilities to purchase harder-to-sell assets (such as loans).

²⁶ Intense downturn of the financial cycle when compared to all the valleys of credit cycles, equity and houses prices that is, the authors define a strict concepts for financial crisis within the financial cycle.

²⁷ By increased market value of the security or stock that reflects in bank equity, also the asset risk measure decreases or bank issuing new capital in order to buy more assets, among other factors.

²⁸ If the bank has a target leverage x (assets to equity) and the asset price rises, the value of equity rises by the same amount, reducing leverage. To maintain the value of x , the bank will issue more debt to buy more assets. (SHIN, 2013)

intermediaries joint exposure (some institution issues and other purchase the financial instruments that are characterized as non-core liabilities).

Another important intrinsic analysis is the relationship between the exchange rate and financial stability. [Avdjiev, McCauley e Shin \(2015\)](#) point out the international currency risk-taking channel in global context and large capital flows between countries, i.e., dollar movements disturb domestic conditions, particularly in emerging countries. The depreciation of the international currency produces a strengthening of the balance of domestic borrowers whose assets is in domestic currency and liabilities in dollars (not only financial institutions but also corporate agents), increasing their ability to pay and, in the case of banks, the ability to borrow, reinforcing the riskiest behavior and raising the currency mismatch on its balance sheet. In contrast, the appreciation of the international currency weakens the balance sheet of the borrower deteriorating the quality of the liabilities denominated in US dollars.

The monitoring logic of global financial instability, according to the authors, has two other aspects beyond the issue of the international currency movements. Macroeconomic analysis should consider the gross capital flows and a more sectoral approach (the expense of net flows and balance of payments consolidation of a country). The first argument is based on the financial intermediation chain of the 2008 international crisis among European banks, shadow banks and residents of the United States (US). European banks provided financial instruments for the money market funds market ²⁹ of the US (represented as a dollar funding) and buying products of shadow banks (financial institutions that issued ABCP derived from US loans - residents). The analysis of net flows in the balance of payments would lose the extent of the deterioration of the country financial condition as the growth of shadow banks, increased leverage in the European and the US financial institutions, and even preference for riskier financial instruments. The second argument assert the problem of consolidated macroeconomic analysis that does not display the differences between the sectors positions, since a country may have a surplus position of foreign assets, but the corporate sector to be net debtor (relative to the rest of the world), as in the case of Korea during the 2008 crisis. The appreciation of the dollar deteriorated Korean firms positions and output growth, even with a positive investment position in balance of payments. ([AVDJIEV; MCCAULEY; SHIN, 2015](#))

3 Brazilian Framework

3.1 Macroprudential policy in Brazil

Particularly between 2010 and 2011, the Brazilian government and Brazil's central bank conducted macroprudential measures in the foreign exchange and credit markets. The diagnosis for these measures was the credit growth in the Brazilian market and increased capital flows due to US monetary stimulus policies. Brazilian authorities also implemented contractionary fiscal and monetary policy during this period. In 2011, the government proposed a cut in public spending (R\$ 50 billion) and the end of the year delivered a primary surplus of 3.1% of GDP. Also, it raised the benchmark interest rate 375 basis points between 2010 and 2011. ([SILVA; HARRIS et al., 2012](#))

Furthermore, in September of 2011, the Brazilian normative agency, National Monetary Council (Conselho monet ario nacional - CMN), issued resolution No 4.019 establishing standards for preventive prudential measures regarding the financial institutions. The resolution divides in three main parts the implementation of macroprudential policy by the Brazilian Central Bank: list conditions that may lead to the adoption of prudential measures; the indicators of such conditions and the possible measures that can be adopted. For instance, conditions such as exposure to risks not included or inadequately considered in calculating the Required Reference Equity, non-compliance with operational limits and deficiency in internal controls, among others are listed in the norm.

²⁹ An activity that is also considered as the shadow banking by [FSB \(2015\)](#).

Moreover, the resolution set leverage, liquidity, stress tests, risk management structures (among others) as indicators of vulnerabilities and, some macroprudential measures: reducing the degree of risk exposures; compliance with more restrictive operational limits; recomposition of liquidity levels; limitation or suspension, etc. This resolution came to design and formalize the rules that were already being taken in some previous years.

The table 3 summarizes the main measures taken in the credit market between 2008 and 2014. The reserve requirements rate (RR) in 2010 increased 15 % to 20 % in time deposits, and 8 % to 12 % in additional eligibility of demand deposits and time deposits. In that same year, the government exempted Financial Letter of Credit of RR. In 2008, the RR was also used for inject liquidity into the banking system, so that the reserve requirements rate of demand deposits was reduced from 45 % to 42 %, and the additional requirement from 8 % to 5 %. In addition, selective release of resources (from reserve Requirements time deposits and additional liabilities) was another measure to large banks, which should apply those resources in the acquisition of assets or deposits in/of small and medium-sized banks (institutions with reference equity up to seven billion reais)³⁰. However, it was observed that the funds were not used by major banks. (BCB, 2012)

Table 3 – Macroprudential measures on the credit market in Brazil

Reserve requirements				
	Oct. 2008	Sep.2009	Feb. 2010	Jun. 2010
Demand deposits	42%	-	-	42%
Time deposits	15%	13,5%	15%	20%
Additional eligibility	5%	-	8%	12%
IOF - Financial operations tax - Maximum tax				
	Apr. 2011	Dec. 2011	May. 2012	Jan. 2015
Credit operations for individuals	3%	2,5%	1,5%	3%
Capital requirements - Risk Weight Factor				
	Dec. 2010	Nov. 2011	Mar. 2013	Aug. 2014
Personal loan (Between 24 and 60 months)	150%	^b 75% ã 150%	75 % ã 150%	75%
Personal loan (> 60 months)	150%	300%	^c 150%	75%
Payroll-deducted loan (Between 36 and 60 months)	150%	75% ou 100%	75%	75%
Payroll-deducted loan (> 60 month)	150%	300%	150%	75%
Vehicles (Between 24 and 60 months)	150%	75% ou 100%	75%	75%
Vehicles (> 60 months)	150%	150%	150%	75%
Others consumer loans	100%	75%	75%	75%
In Dec. 2010, exemption of bank-issue debenture (letras financeiras) of reserve requirements				
In Nov. 2010, higher minimum payment of credit card of 15%				

Source: Brazilian Central Bank; (SILVA; HARRIS et al., 2012)

^a Maturity between 24 and 36 months and LTV of 80%; Maturity between 36 and 48 months and LTV of 70%; maturity between 48 and 60 months and LTV of 60%.

^b Maturity less than 36 months, the RWF is 75 % or 100 %; Maturity between 36 and 60 months, the RWF is 150 %.

^c Application of RWF of 300 % to personal loans over sixty months with no specific destination on the contractual period.

The financial operations tax (IOF) on credit operations for individuals was increased in April 2011. In practice, the maximum rate of IOF increased from 1.5% to 3%. In December 2011, the rate was reduced to 0.0068% per day, and in May 2012, to 0.0041%. For a non-prudential reason, in January 2015, the Brazilian authorities increased the IOF tax rate on loans. The goal was to increase budget resources in a context of fiscal deficit.

Another instrument used in the measures package on credit in December 2010, was the adjustment of the minimum capital requirement (CR). In practice, the minimum capital requirement increased from 8% to 16.5% for household loans: personal loans (over 24 months), payroll-deducted loan (over 36 months), vehicles (financing and leasing).³¹ Most of these measures have been reversed at the end of 2011. However, with the diagnosis that the measures generated a modest effect on long term credit operations, the central bank raised risk weighting factor (RWF) of personal credit loans and payroll over sixty months to 300%, and maintained at 150%, those related to vehicle (SILVA;

³⁰ In September 2009 this measure was reversed.

³¹ It was applied to rural credit, mortgages, credit for the purchase of trucks and similar.

HARRIS et al., 2012). In August 2014, the central bank, in order to continue the convergence to international standards of Basel and the reversal of macroprudential measures implemented since 2010, reduced the RWF of loans to 75%.

The Brazilian government jointly with the central bank also introduced macroprudential measures on the foreign exchange market to mitigate the intensity and volatility of capital flows (Table 4). In October 2010, the IOF tax on portfolio investment to non-residents in fixed income increased from 2% to 6%. Also, in order to limit the large short-term and speculative capital inflows, particularly directed to the carry trade operations³², the IOF tax on margins deposits in derivative contracts, such as stocks, commodities and future trade increased from 0.38% to 6%. The revision of the macroprudential measures began in December 2011 and was completed in June 2013.

Table 4 – Macroprudential measures on the foreign exchange market in Brazil

IOF - Financial operations tax								
Portfolio	Dec.2007	Mar.2008	Oct.2008	Oct.2009	Oct.2010	Dec.2010	Dec.2011	Jun.2013
Fixed income	zero	1,5%	zero	2%	6%	6%	6%	zero
Equity	zero	zero	zero	2%	2%	2%	zero	zero
Derivative margin	zero	0,38%	0,38%	0,38%	6%	6%	6%	zero
IPO	zero	zero	zero	2%	2%	2%	zero	zero
Funds ^a	zero	1.5%	zero	2%	6%	2%	zero	zero
External credit	Dec. 2007	Jan.2008	Mar.2011	Apr.2011	Mar.2012	Jun.2012	Dec. 2012	Jun.2014
90 days	5%	5,38%	6%	6%	6%	6%	6%	^b 6%
360 days	zero	zero	6%	6%	6%	6%	6%	zero
720 days	zero	zero	zero	6%	6%	6%	zero	zero
1080 days	zero	zero	zero	zero	6%	zero	zero	zero
1800 days	zero	zero	zero	zero	6%	zero	zero	zero
Tax rate for external purchases on the credit card rose in Dez.2010 to 2.38% and Mar.2012 to 6.38%								
Tax rate of 1% on excessive short positions in contracts of foreign exchange derivatives (Jul.2011 to Jun.2013)								
In Mar.2012, Advance payment for Brazilian exporters only by the current importer (period of 360 days) ^c								
In January 2011, RR of the 60% in dollar short position								

Source: Brazilian Central Bank; (SILVA; HARRIS et al., 2012)

^a Emerging Companies Investment fund (FIEE) and Private Equity Funds (FIP).

^b The Decree 8,263 / 2014 reduced the IOF tax rate for foreign loans with minimum average term of 180 days.

^c This operation has 0% of IOF.

Proceeding macroprudential policy to limit capital flows into speculative capital, the central bank in January 2011, instituted a RR of 60% (not remunerated) in dollars short position in the spot forward exchange market that exceeded US\$ 3 billion or Tier 1 capital. In July, decreased to US\$ 1 billion. The Brazilian government also stipulated a tax rate of 1 % on the net change in short position in foreign exchange derivatives traded on the stock exchange (changes in forward exchange market below US\$ 10 million with a ceiling of 25 % stipulated by law) and some changes in legislation. Only with these measures, the central bank could effectively affect the carry trade operations in the derivatives market, because the IOF was applied to the notional value of the derivative, unlike earlier measure that only affected the value of the margin (with IOF 6 %). In March 2011, increased to 6% the IOF foreign direct loan or debt securities issued by residents with maturity of 360 days (in the same month changed to 720 days). This IOF adjustment stretched the loans term.

The logic of the measures implemented in the first half of 2011 was a disincentive for banks to take risky positions in derivatives and credit market due to abundant liquidity in the foreign market. The measures have been introduced in order to limit the funding of assets in dollars. For instance, in 2010, banks began the year with a net long position in the open market exchange three billion and at the end of the year, achieved a net short position almost seventeen billion. The Brazilian authorities were intended to discourage currency mismatch in operations where the

banks open a short cash position when they sell foreign currency borrowed abroad resulting from drawings on external credit lines. Under those same regulations, although

³² Speculative operation pressing the exchange rate appreciation. "A synthetic carry trade can be performed in the derivatives market by acquiring long positions on a high yield currency (i.e. Brazilian real) and short position on a funding currency (i.e., dollars, yens, etc)" Silva, Harris et al. (2012, 28).

the operation is similar in accounting terms, when a bank contracts a direct loan or issues securities abroad (e.g. commercial paper), it opens a long position. (SILVA; HARRIS et al., 2012, p. 30)

All measures on the foreign exchange market are complementary: while the IOF on foreign loans purchased operates in the exchange rate long position, the RR operates on short positions in the spot market. The future foreign exchange market was affected by the introduction of the IOF 1% of the increase in short operations in currency derivatives and the IOF on portfolio investments. In March 2012, to prevent arbitrage between the foreign currency loans, the financial transactions of advanced payments (PA) of Brazilian exporters that could be made by any entity and without time limit, were changed so that only the current importer can perform PA for a limited period of maturity of 360 days (this operation has 0 % IOF).

The measures on capital flows may also be defined as capital controls (by investor's residence distinction) and were based primarily on the market. According to Garcia e Chamon (2013), they were effective in transforming the financial assets more costly, reducing the incentives of carry trade strategies. However, if the motivation of capital controls was to avoid currency appreciation, the measure was not efficient (with an influence of less than 5%, (GARCIA; CHAMON, 2013)). In contrast, Araujo e Leão (2015) stress that capital controls had an impact on the non-financial sector, suggesting that banks passed the costs of new macroprudencial measures to Non-Deliverable Forward contracts. These operations are usually carried out by companies (importers, for example) seeking hedging instruments. Acharya et al. (2015) show that cross-country interest rate differential create incentives of external bond insurance for non financial corporations in Latin America. Those movements was more pronounced in a presence of capital controls in way that firms maintain cash holding to engage in carry trade activities. "The ability of capital controls to create room for autonomous monetary policy, allowing for greater independence from global financial conditions, is limited by the ability of nonfinancial corporates to issue international bonds." Acharya et al. (2015, p.41)

3.2 Basel III and the implementation in Brazil

Given the process generated the 2008 crisis and its repercussions on the global financial system, the Basel committee has corrected some shortcomings in the regulation and recognized that financial institutions face liquidity risk, apart from the risk of solvency, which was exclusive focus of Basel I and II. The recognition of two types of risk lead failure of the institution and also cause financial instability was a breakthrough. In 2010, Basel III has set new adjustments of the minimum capital requirement³³ of institutions such as the rise in percentage of risk-weighted assets of the core capital (4.5%), tier 1 (6%) and total capital (10.5%); added two types of "capital buffer": the conservation (2.5%) and the countercyclical (between 0 and 2.5%). The committee also established minimum leverage rates and created liquidity ratios for the observance of banks.

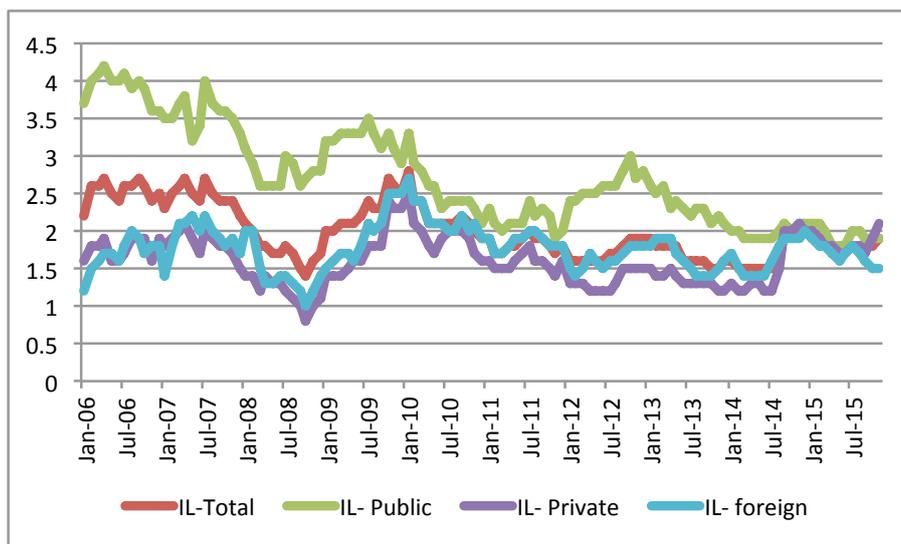
Before this agreement Basel III, the Brazilian regulatory system already practiced capital requirements rate of 11 %. In 2013, the BCB adjusted the Brazilian rules in accordance with international recommendations with gradual implementation between 2013 and 2019. The capital requirements are aligned with international standards according to the types of risk weighting factor of assets, and levels and type of capital. Banks in Brazilian financial system had high capitalization between 2006 and 2015: the Basel index³⁴ reached values greater than 15% in majority of months. And yet, the indices of capital requirements of the core capital and Tier 1 are more than 10% between 2013 and 2015 (BCB, 2015a).

³³ Gradual implementation between 2013 and 2019.

³⁴ The Basel ratio applies to the consolidated bank I and II composed of multiple banks and commercial banks with and without commercial portfolio; banking conglomerates with and without commercial portfolio and investment banks; savings bank.

The BCB also implemented liquidity ratio³⁵ which is similar to the Liquidity Coverage Ratio (LCR) recommended by Basel III. The index for all types of banks - public, private and foreign - keeps over one unit throughout the decade, except in a few months during the 2008 crisis as shown in Figure 1. The BCB initiated the calculation of structural liquidity ratio³⁶ (ILE) which incorporates the notion of funding liquidity risk, which check if banks hold available stable resources to finance its long-term activities (considered here as over 1 year). According to BCB (2015a), the ILE went from 1.12 % in 2011 to 1.07 % in the first half of 2015.

Figure 1 – Brazilian liquidity index.



Source: Brazilian Central Bank.

Subtitle: IL-Total: Liquidity index for all financial institutions; IL-Public: Liquidity index for Government financial institutions; IL-Private: Liquidity index for Private financial institutions; IL-Private: Liquidity index for Foreign financial institutions.

There are some criticisms related to systemic risks discipline of macroprudential policy and Basel III. Despite the concern of the liquidity and solvency risk of financial institutions, the main focus of Basel III still rely on the individual institution. There is no effort to identify *when* those risks faced by an institution generate systemic risks to the financial system. The capital requirements, in turn, focuses only on microprudential risks of financial institutions. Furthermore, the use of risk-weighted assets factors may exacerbate systemic risk since encourage banks to keep the same risks in their portfolios. The dynamics of endogenous underlying risks to assets are ignored insofar as materialization of the risk in this class of assets occur, all financial firms will face a liquidity risk because they are exposed in a corresponding way in the same asset class.(ACHARYA, 2013)

Shin (2010) claims the problem of seeking a greater loss absorbency of bank capital through higher capital requirements in Basel III, does not necessarily contain the excessive growth of assets during phases of euphoria. Also diverts attention from dysfunctions in banks liabilities which are subject to unstable short-term funding and short-term foreign currency debt. Hence it can not be considered a macroprudential policy. Acharya (2013) suggests more robust and counter-cyclical macroprudential tools: concentration limits on asset class exposure for economy as whole, leverage restrictions and restrictions on risk assets (LTV); The author points out "the Basel risk-weight

³⁵ Ratio of highly liquid assets and the stressed cash flow (expected disbursements for the subsequents 30 days in a stress scenario). Banks with total assets greater than R\$ 100 billion should accomplish a IL greater than 1 (100%).

³⁶ Ratio of available stable resources on the horizon of a year and required stable resources (total assets). Implementation is expected in 2018.

approach is an attempt to target relative prices for lending and investments by banks, rather than restrict quantities or assets risks directly." [p.68].

3.3 Macroprudential policy and Shadow Banks in Brazil

The Central Bank of Brazil divide shadow banks in two types, a broad and strict measures, following the Financial Stability Board (FSB) characterization. The first concept seeks to measure financial assets focusing on non-bank entities that perform the credit intermediation ³⁷. The strict concept focuses on the typical activities of the shadow bank held by any entities outside the traditional banking system.

Table 5 summarizes the five main economic functions. The first are the funds involved in the maturity and/or leverage transformation in credit intermediation whose activity is subject to runs. Financial companies (leasing companies, credit to microenterprise, real estate credit companies and real estate credit redistributors) with rate of credit to financial assets more than 10% compose the second function economy Shadow banks, because they do not have access to Credit Guarantor Fund (FGC - deposits insurance) and the central bank's liquidity provision. Moreover, organizations representing the third function (brokers and distributors of stocks and securities not linked to banking conglomerates) are monitored because of engagement in short-term funding for financing its customers. The fourth function are insurance companies and the financial assets of entities that perform insurance in parallel to a financing agreement or loan. Finally, the fifth function comprises the direct credit investment funds (FIDC).

Table 5 shows the financial assets of investment funds composing the majority of the shadow banking strict estimate in Brazil, totaling the value of R\$ 308 billion (79.3% of the total). According to [BCB \(2015b\)](#), the majority of the investment funds assets (almost 60% in December 2013) are composed of government securities and repurchase agreements (guaranteed by those government securities), reducing liquidity and credit risk. The total amount of shadow banking assets grew from R\$ 338 billion in 2013 to R\$ 382 billion in 2014. This value is scarcely representative when compared to the total assets of the traditional banking system, since it represents only 6.6% of the total in 2014. Regarding the interconnectivity between banks and banking conglomerates and shadow banks, banks have 0,3% of its assets invested in the shadow banks, while the latter invest 25.5% of their assets in the banking system. 2% of the banks' funding comes from shadow banks, whose composition is mainly represented by bank-issued debenture (letras financeiras) and does not include (on this measure) repurchase agreements with federal securities. ([BCB, 2015a](#))

In accordance to estimates of [FSB \(2015\)](#), the growth rate of the shadow banking system during 2011-2014 in Brazil was 15%. In comparison to emerging countries, this percentage becomes higher than countries such Mexico (7.2%), Turkey (8.6%) and Chile (12.4%), but well below the growth rate in countries such China (48.7%), Argentina (47.7%) and Russia (32%). A adopted form by the FSB to measure the size of this system is comparing the size of banks and other financial intermediaries (OFI)³⁸ as a percentage of gross domestic product (GDP) (Figure 2). It is noticed that the shadow banking system in countries such as Argentina, Russia, Saudi Arabia, Turkey exhibit percentages lower than 10% in terms of GDP. In Brazil, the number is 33% of GDP. Regarding the total assets in the global system, [FSB \(2015\)](#) points out that the United States and the United Kingdom have the first (40%) and second (29%) greater participation in total assets of the shadow banking system, respectively, in 2014. The Brazilian system has 1.9% of the total.

³⁷ Investment funds, investment funds in credit rights, real estate investment funds, brokers and distributors of stocks and securities, financial companies - leasing companies, real estate credit companies and micro-enterprise credit companies - capitalization companies and nonbank credit card companies.

³⁸ Financial Intermediaries not classified as banks, insurance companies, pension funds, public financial institutions, central banks and financial auxiliaries. ([FSB, 2015](#))

Table 5 – Economic function of the shadow banking and Brazilian estimates

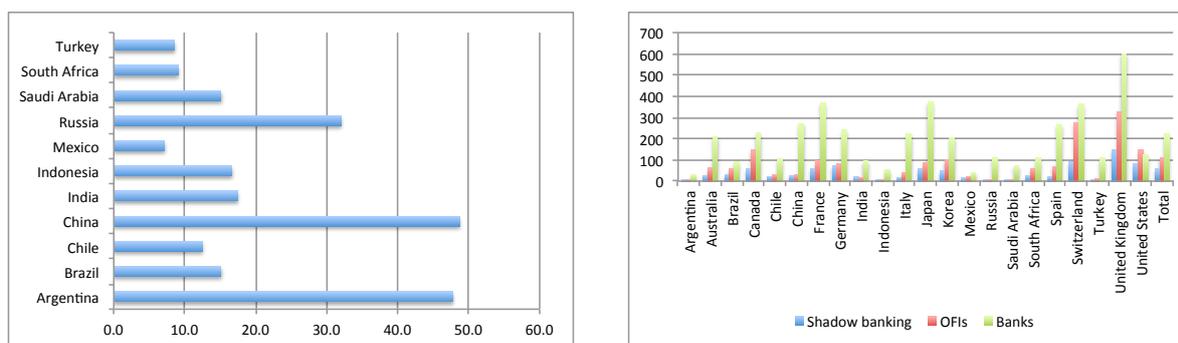
Economic function	Typical activities	Assets (R\$ milions)
1	Collective investment vehicles: Investment Funds ^a	308.772
2	Loan provision dependent on short-term funding	2.917
3	Intermediation of market activities dependent on short-term funding or on secured funding of client assets	5.697
4	Facilitation of credit creation	16.393
5	Securitisation-based credit intermediation and funding of financial entities	55.350
		389.129

Source: [BCB \(2015a\)](#), [BCB \(2015b\)](#)

^a Investment funds with leverage higher than to 25% or ratio between net assets and total financial assets less than 37% to referenced funds; 28% for fixed income funds; 26% for hedge funds.

Figure 2 – Shadow Banks - Comparison between countries

- (a) Growth rate of the Shadow Banks between 2011-2014 (b) Shadow banking, other financial intermediaries (OFI) and banks as % of GDP



Source: [FSB \(2015\)](#)

Regulatory and supervisory agencies in Brazil operates a large perimeter in the financial system, involving shadow banking entities. Brazilian authorities are composed of normative agencies ³⁹ and supervisory agencies ⁴⁰, they are arranged according to scope of activity in the market. The coordination between the supervisory bodies is performed by Coremec (Committee for Regulation and Supervision of Financial, Capital, Insurance, Pension and Capitalization) receiving information about the stability of the Brazilian financial system by Sumef (Subcommittee Monitoring the national financial system stability). The BCB also established a Financial Stability Committee (COMEF) to act inside the entity itself and for guidance of Coremec. ([BCB, 2015b](#))

Financial companies and brokers and distributors companies are regulated and supervised similarly to the traditional banking system. Those entities must have management of liquidity risk, structures, market, credit and operational risks, and must submit quarterly financial information to supervisors. Also send prudential information monthly⁴¹, and also, depending on the relevance of their activities the market, institutions are subject to the same rules on minimum capital requirements and

³⁹ National Monetary Council (Conselho monetário nacional - CMN), National Council of Private Insurance (Conselho Nacional de Seguros Privados - CNSP) and National Council of Supplementary Pension (Conselho Nacional de Previdência Complementar - CNPC).

⁴⁰ Brazil's Central Bank, Brazilian Securities Commission (Comissão de Valores Mobiliários - CVM), Superintendency of Private Insurance (Superintendência de Seguros Privados - SUSEP), National Superintendency of Supplementary Pension (Superintendência Nacional de Previdência Complementar - PREVIC).

⁴¹ The credit company to micro-enterprise sends data in order to calculate realized capital limits, equity, debt and

on market, credit and operational risks. The regulation and supervision of investment funds is vast with diligence on redemption policies (e.g. suspension of redemptions in a case of extreme liquidity situation), portfolio composition (e.g. concentration limits of assets/issuers, derivatives and repos), leverage (e.g. fund can not borrow/lend and all derivatives shall be registered in clearing house) and risk management. As well as investment funds, the FDIC is regulated and supervised by the CMN and CVM, and should perform liquidity risk control measures (redemptions policy), stress testing, report monthly, etc (BCB, 2015b).

Conclusion

The economic literature has been converging to implement a macroprudential policy, seeking the stability of the financial system and especially the mitigation of systemic risks. The endogenous nature of risks in the financial system has been increasing acceptance within the post-crisis mainstream literature, because of the recognition of some mechanisms within the financial system (credit creation) and financial cycle (interaction between agents) that may cause instabilities of the financial system. Therefore, macroprudential policy seeks monitoring the instabilities in aggregate system through indicators that represent the evolution of systemic risk between institutions and throughout the financial cycle. Also, the specific and targeted use of macroprudential tools for each type of risk indicator in the event of growth vulnerabilities. These measures are associated with credit growth, leverage, asset prices; taking into account the liquidity risk and market, as well as interconnectivity between firms, market structure and financial infrastructure.

The supervision of macroprudential policy should also include other financial institutions and banks, as shadow banks, due to its connections with the banking system and participation in the credit intermediation process, evolving credit, leverage, maturity and liquidity transformation and, also, because they are source of weaknesses propagation into the system. The interconnectedness between financial institutions is closely related to the expansion in their balance sheets by financial instruments between themselves, to the procyclicality of the financial cycle and their feedback effect on the price of assets, credit growth and leverage. That said, macroprudential policy should follow the deterioration of risk channels indicated by risk systemic measures such as the increase in non-core funding between banks, shadow banks and also foreign currency obligations.

In the case of the Brazilian financial system, regulation and supervision plays a wide perimeter, including the shadow banking system. According to BCB data, this system has low connectivity with the Brazilian banking system and small size compared to the financial assets of national and global financial system. On the other hand, regardless of the Basel agreement having a main focus on individual financial institution, the Brazilian authorities have adopted the recommendations highlighted by Basel III, as the new types and rates for capital requirements and liquidity ratios. In that matter, banks in Brazil have a high capitalization and low liquidity risk (even before the recommendations). About the policies conducted in Brazil, the Brazilian government and the BCB have a comprehensive set of macroprudential tools, used mainly during and after the crisis of 2008. In 2010 and 2011, the Brazilian authorities have adopted discipline measures of credit growth and flows capital in the country. An important observation is that few studies have verified the effectiveness of these measures specifically as macroprudential instrument to reduce systemic risk. This is the subject of next chapter.

credit risk for the customer.

Bibliography

- ACHARYA, V. et al. Corporate debt in emerging economies: A threat to financial stability? Committee for International Policy Reform, Brookings Institution, 2015.
- ACHARYA, V. V. Adapting micro prudential regulation for emerging markets. *Dealing with the Challenges of Macro Financial Linkages in Emerging Markets*, World Bank Publications, p. 57, 2013.
- ARAÚJO, G.; LEÃO, S. Otc derivatives: Impacts of regulatory changes in the non-financial sector. 2015.
- AVDJIEV, S.; MCCAULEY, R. N.; SHIN, H. S. Breaking free of the triple coincidence in international finance. BIS Working Paper, 2015.
- BANCO CENTRAL DO BRASIL. DepÃ§sitos compulsÃ§rios, sÃ§rie de perguntas mais frequentes. Departamento de Relacionamento com Investidores e Estudos Especiais, 2012.
- BANCO CENTRAL DO BRASIL. Relatório de estabilidade financeira. october 2015.
- BANCO CENTRAL DO BRASIL. Shadow banking no brasil - box do relatório de estabilidade financeira. march 2015.
- BASTO, R. B. Uma política macroprudencial para a estabilidade financeira. *Relatório de Estabilidade Financeira*, 2013.
- BEAN, C. et al. Low for long? causes and consequences of persistently low interest rates. *Geneva Reports on the World Economy*, n. 17, 2015.
- BEAN, C. et al. Monetary policy after the fall. *Macroeconomic Challenges: The Decade Ahead*, p. 26–28, 2010.
- BLANCHARD, O.; DELL'ARICCIA, G.; MAURO, P. Rethinking macroeconomic policy. *Journal of Money, Credit and Banking*, Wiley Online Library, v. 42, n. s1, p. 199–215, 2010.
- BORIO, C. Implementing a macroprudential framework: Blending boldness and realism. *Capitalism and Society*, v. 6, n. 1, 2011.
- BORIO, C. Revisiting three intellectual pillars of monetary policy. *Cato Journal*, v. 36, n. 2, 2016.
- BORIO, C.; DREHMANN, M. Towards an operational framework for financial stability: "fuzzy" measurement and its consequences. BIS Working Paper, 2009.
- BORIO, C. E. Rediscovering the macroeconomic roots of financial stability policy: journey, challenges and a way forward. BIS Working Paper, 2011.
- CANUTO, O.; CAVALLARI, M. Monetary policy and macro prudential regulation: Whither emerging markets. *Dealing with the Challenges of Macro Financial Linkages in Emerging Markets*, World Bank Publications, p. 118, 2013.
- CARVALHO, F. J. C. de. Systemic crisis, systemic risk and the financial instability hypothesis. *Macroeconomic Policies on Shaky Foundations*. Berlin: Metropolis-Verlag, p. 261–82, 2009.
- CLAESSENS, S.; GHOSH, S. R.; MIHET, R. Macro prudential policies to mitigate financial vulnerabilities in emerging markets. *Dealing with the Challenges of Macro Financial Linkages in Emerging Markets*, World Bank Publications, p. 155, 2013.

- CLAESSENS, S.; KOSE, M. A.; TERRONES, M. E. Financial cycles: What? how? when? *IMF Working Papers*, 2011.
- CLAESSENS, S.; KOSE, M. A.; TERRONES, M. E. How do business and financial cycles interact? *IMF Working Papers*, p. 1–54, 2011.
- CLEMENT, P. The term 'macroprudential': origins and evolution. *BIS Quarterly Review*, March, 2010.
- COLLIN, M. et al. Macroprudential policy in the banking sector: framework and instruments. *Financial Stability Review*, National Bank of Belgium, v. 12, n. 1, p. 85–97, 2014.
- COMMITTEE ON THE GLOBAL FINANCIAL SYSTEM (CGFS). Macroprudential instruments and frameworks: a stocktaking of issues and experiences. n. 38, 2010.
- DREHMANN, M. et al. Countercyclical capital buffers: exploring options. BIS working paper, 2010.
- EICHENGREEN, B. et al. Rethinking central banking. committee on international economic policy and reform. *Brookings Institution*, 2011.
- ENGLAND, B. O. The role of macroprudential policy. *Bank of England Discussion Paper*, 2009.
- EUROPEAN SYSTEMIC RISK BOARD. The macroprudential use of margins and haircuts. February 2017.
- FINANCIAL STABILITY BOARD. Macroprudential policy tools and frameworks. *progress report to the G-20 (Basel: October)*, 2011.
- FINANCIAL STABILITY BOARD. Global shadow banking monitoring report 2015. 2015.
- GALATI, G.; MOESSNER, R. Macroprudential policy—a literature review. *Journal of Economic Surveys*, Wiley Online Library, v. 27, n. 5, p. 846–878, 2013.
- GALATI, G.; MOESSNER, R. What do we know about the effects of macroprudential policy? De Nederlandsche Bank Working Paper, 2014.
- GARCIA, M.; CHAMON, M. Capital controls in brazil: effective. *Economia*, 2013.
- GONZALEZ, R. B. et al. Countercyclical capital buffers: bayesian estimates and alternatives focusing on credit growth. Central Bank of Brazil, Research Department, 2015.
- GOODFRIEND, M. How the world achieved consensus on monetary policy. National Bureau of Economic Research, 2007.
- GOODHART, C. The role of macro-prudential supervision. Citeseer, 2010.
- GOUDARD, G. C.; TERRA, F. H. B. Política macroprudencial: Uma leitura keynesiana. *Análise Econômica*, v. 33, n. 63, 2015.
- GROUP OF THIRTY G30. Fundamentals of central banking: Lessons from the crisis. Washington:G30, 2015.
- IMF-FSB-BIS. Imf-fsb-bis - elements of effective macroprudential policies, lessons from international experience. 2016.
- LIM, C. H. et al. Macroprudential policy: what instruments and how to use them? lessons from country experiences. *IMF working papers*, p. 1–85, 2011.

MEHRLING, P. The new lombard street: How the fed became the dealer of last resort. Princeton University Press, 2010.

POZSAR, Z. et al. Shadow banking. *FRB of New York Staff Report*, n. 458, 2010.

PRATES, D. M.; CUNHA, A. M. Medidas macroprudenciais e a evolução do crédito em 2011. *Indicadores Econômicos FEE*, v. 39, n. 4, 2012.

SHIN, H. S. Macroprudential policies beyond basel III. Princeton University, 2010.

SHIN, H. S. Adapting macroprudential approaches to emerging and developing economies. *Dealing with the Challenges of Macro Financial Linkages in Emerging Markets*, World Bank Publications, p. 17, 2013.

SILVA, L. A. P. D.; HARRIS, R. E. et al. 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. Central Bank of Brazil, Research Department Working Papers Series, n. 290, 2012.

SILVA, L. A. P. d.; SALES, A. S.; GAGLIANONE, W. P. Financial stability in brazil. BCB Working Paper, n. 289, 2013.

VINALS, J. et al. Macroprudential policy: an organizing framework. *IMF Paper*, 2011.

WORLD ECONOMIC FORUM. The role of financial services in society statement in support of macroprudential policies. 2015.