Macroprudential policy debate, concepts and the Brazilian context

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Abstract

The economics literature related to the financial system seeks to define the concepts of financial stability, systemic risk and macroprudential instruments for the purpose of drafting a policy that essentially "leans against the wind", that is, a policy that monitors macroeconomic vulnerabilities and combats system instability. Such a policy should cover all financial institutions involved in credit intermediation (not just banks) and consider the pro-cyclical and intrinsic nature of risk in the financial system, and account for the spillovers effects of policies in other countries, that is, the global context. This article summarizes the main concepts related to macroprudential policy discussed in the economics literature after the crisis the 2008 financial crisis and point out their relation with Minsky's Financial Stability Hypothesis. In addition, we describe macroprudential policy in the context of the Brazilian financial system, specifically major policies implemented in the banking regulatory environment related to Basel III and non-bank regulations 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 the Shadow banking system. This system has a weak connection with the banking system and is small relative to the financial assets of the national and global systems. The analytical part concludes, through descriptive and econometric analyses, the principal tools implemented in Brazil during 2007-2015 were not active in changing the systemic risk proxy variables.

Keywords: Macroprudential, Systemic risk, Instruments.

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1. Introduction

The economics literature and the practices of central banks have been under discussion in order to rethink macroeconomic policy in light of a prudential approach. Given the causes and effects of the international financial crisis of 2008, it was noticed that a single monetary policy instrument, originating from the inflation targets adopted by most central banks, is unable to ensure the stability of the entire financial system.

The current debate in economic theory is over the inclusion of prudential policies in the macroeconomic framework. The literature has not produced consensus regarding definitions and macroprudential objectives or even regarding an exact list of which types of instruments are more effective for systemic risk management. Few studies have documented the effectiveness of macroprudential instruments, and their relationship with systemic risk reduction is still unclear. Lack of data is also a problem because the implementation of these policies is very recent, and only a few countries, including Brazil, have used instruments in addition to monetary policy.

The present article summarizes the context of and debate in the economic literature regarding macroprudential policy. The aim is to show the main mainstream definitions of prudential policy in the context of macroeconomic management, including attempting to provide strict definitions of systemic risk, financial stability, and macroprudential instruments. It also highlights some issues that should be considered in the implementation of macroprudential policy, such as the pro-cyclical and systemic nature of risk, global risks channels and coverage of policies that regulate the shadow banking system. Moreover, the article adds that this current mainstream discussion have been discussed by Post-Keynesian authors, especially Minsky.

How is Brazil included in debates over those concepts? This article also aims to analyze macroprudential policy in the Brazilian context and outlines the main policies implemented, the banking regulations associated with Basel III and non-bank regulations related to shadow banks.

This article is organized as follows. The first part summarizes the economic consensus that existed around financial stability policy before the 2008 global financial crisis. The second section summarizes the main concepts, objectives and instruments of macroprudential policy and provides some important considerations related with mainstream discussion and also, appoints their relation with Minsky's theory. Section four describes and analyses some characteristics of the Brazilian financial system. The first subsection describes the macroprudential policies implemented in 2007-2015 and examines them by descriptive and econometric analyses. The second subsection describes the implementation of Basel III in the Brazilian scene, and finally, the shadow banking system. Final considerations are also presented.

2. Macroeconomic framework - traditional theory

In 1999, academics and practitioners in central banks had reached consensus about the core of macroeconomic theory and, in particular, monetary policy. This was not a general consensus but various elements were well accepted by many academic economists and central

bankers, which allowed convergence and greater interaction between economic theory and practical application (Goodfriend, 2007).

Money neutrality holds that, in the long run, the trade-off between permanent inflation and unemployment is non-existent among the elements that guide the core of macroeconomic theory. However, in the short term, a trade-off exists, which is caused mainly by the temporary rigidity of prices and nominal wages. In the case of monetary policy, the priority was the pursuit of price stability (low and credible inflation) using a core inflation target supported by transparency about the policy objectives and procedures of its main (and unique) tool: the interest rate (Goodfriend, 2007).

Blanchard et al. (2010) note that within this theoretical framework, financial regulation was framed in the microeconomic context of the financial system. These authors also cite implications of the Great Moderation[1] period, noting that declines in the volatility of output and inflation may have been influenced by monetary policy, but it is unclear whether this result stems from luck, small shocks, structural changes or even improved policies.

Thus, price stability is a separate policy goal from financial stability (Tinbergen Proposition)[2], and the latter was achieved by microprudential regulation and supervision (CIEPR, 2011). From the macro perspective, price stability policy is sufficient to influence short-term expected interest rates given the arbitrage mechanism in which interest rates would correspond to the expectation of the long-term interest rate plus a risk premium. Therefore, asset prices are in accordance with the fundamentals (Basto, 2013).

Bean et al. (2010) add that monetary policy plays a primary role in controlling aggregate demand, altering the interest rate of an independent central bank in order to modify long-term interest rates, asset prices and inflation expectations. Intermediate monetary targets were no longer used, as authors believed in the efficiency of markets in the innovation, distribution and pricing of risks; moreover, systemic financial crises "were seen only in history books and emerging markets" (Bean et al., 2010, p.2). Thus, an understanding of financial crises was generated by a combination of academic theory and supported by empirical facts (the Great Moderation). This combination contributed to the inadequate regulation of financial markets, lack of prevention measures and methods of crisis management, especially in the international sphere; thus, few economists were able to foresee the 2008 global financial crisis (G30, 2015).

3. Financial stability: is the introduction of macroprudential policy necessary?

The 2008 financial crisis showed that financial system instability can have extreme consequences, especially for the real economy. The deviation of asset prices, even in a scenario with price stability, and dissemination of instability throughout the entire economy revealed a problem inherent in the financial system: systemic risk. This episode highlighted that macroeconomic aspects must be taken into consideration by financial authorities to

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[1] The Great Moderation refers to the period between the mid-1980s and the mid-2000s during which there was a reduction in the volatility of business cycle fluctuations. The term was first used in Stock and Watson (2002).
[2] The Tinbergen proposition is that if there are n goals in an economic policy problem, then n linearly independent tools are needed to solve the problem.

contain financial crises. The crisis provoked internal critiques within mainstream economic theory, since the majority of macroeconomic models did not include the financial system, the credit creation of money, or their relationships with the real economy. The belief that prudential regulation solely focused on individual banks would be able to ensure the robustness of the financial system as a whole has been questioned in discussions of macroprudential policy. Moreover, the fallacy of composition (of microprudential measures) regarding the stability of the financial system allowed the growth of systemic risk among financial institutions and in the real economy (Goodhart, 2010).

Due to this episode, central banks and economists have endeavored to develop an approach that effectively includes the issue of financial stability. The main idea is to monitor possible threats and their relationships with other macroeconomic policies. The debate is recent and has produced neither consensus on the inclusion of financial stability policy in the current model nor agreement on the most appropriate way to ensure system stability.

Therefore, the economic literature approached prudential policy in the macroeconomic sense with a sense of urgency, setting targets, objectives and instruments to support the financial stability of the economy as a whole in order to prevent financial crises instead of adopting exclusively microprudential policies for individual financial institutions (Blanchard et al., 2010; CIEPR, 2011; Bean et al., 2010; Borio and Drehmann, 2009). Macroprudential policy has multiple dimensions based on its objectives and operation in the financial system, since the scope of activities is extremely broad and takes into account various aspects, including the determination of its tools.

This new perspective faces some challenges. What are its main objectives? How should system stability be measure and evaluated? What tools should be used? Would the regulator be the central bank or a set of institutions? Can a single tool accomplish prudential goals, as when the monetary policy of the "New Consensus" was adopted? The following subsections gather the ideas of economists, international groups and central banks and focus on defining and outlining the macroprudential framework.

3.1. Objectives of macroprudential policy

The term "macroprudential", as used by Clement (2010), appeared in the mid-1970s in the unpublished documents of the Cooke Committee[3]. The term was used to relate systemic supervision to macroeconomics, and its use became more common after the 2008 financial crisis, especially in the economic literature related to monetary policy and financial stability. The academic literature generally highlights the pursuit of financial stability as the overall objective of macroprudential policy. However, a consensus definition of financial stability has not yet been formed in the literature.

Galati and Moessner (2013) distinguish between two approaches in the literature: the first specifies a robust financial system to external shocks; the second, a financial system resilient to shocks that originate within the system itself (endogenous shocks). The latter approach stresses the endogenous nature of financial crises. Macroprudential policy seeks to

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[3] Formed to address banking supervision prior to the formation of the Basel Committee.

strengthen the financial system against shocks, to reduce pro-cyclicality and the magnitude of financial failure (CGFS, 2010; FSB, 2011) and to ensure the financial system's contribution to economic growth (Collin et al., 2014). Financial stability is often synonymous with mitigating asset price/credit/leverage boom and bust cycles (Canuto and Cavallari, 2013; Goodhart, 2010) and reducing the fragility of bank liabilities (Shin, 2013) such that macroprudential policy seeks to reduce the probability of financial crises and their impacts (Vinals et al., 2011; G30, 2015) by placing the credit supply on a sustainable path (WEF, 2015) and limiting the macroeconomic costs (Galati and Moessner, 2014).

According to some authors (Silva et al., 2013; Borio and Drehmann, 2009; Vinals et al., 2011), stability means a financial system that is resilient to normal shocks and that can return to and perform its standard functions (e.g., intermediation, saving allocation, maturity transformation) within a particular time interval. Borio (2011) emphasizes the endogenous character of shocks and the macroeconomic causes of financial instability that is closely connected to 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's emphasis).

The endogeneity arises from the credit mechanism and its generation of purchasing power, as well as from cross-sectional and intertemporal coordination failures[4]. According to Borio (2011), the focus of macroeconomic models should shift away from the equilibrium point and representative agent toward more classic and detailed analyses of credit risk and disequilibrium models incorporating the expansion and contraction of credit and monetary factors[5]. Claessens et al. (2013) mention the growing recognition in the literature of the endogenous character of the financial cycle. The authors indicate that the collective cognition of market participants, which is amplified by experience-based expectations (waves of optimism and exuberance), and the divergence of expectations eventually creates greater risk aversion and mood swings, starting a downturn in the financial cycle.

The general view is the prevention and mitigation of systemic risk (sometimes referred to as financial vulnerability) as a specific objective of macroprudential policy (Galati and Moessner, 2013; Basto, 2013; Prates and Cunha, 2012; CGFS, 2010; Lim et al., 2011; FSB, 2011; Bank of England, 2009; Collin et al., 2014; Shin, 2013; Borio, 2011).

Therefore, macroprudential policy should limit the build up of financial fragility and improve the resilience of the financial system, generating a system that is robust to adverse shocks and reducing the amplitude of the financial system cycle. Macroprudential policy tends to be forward-looking with a horizon that is longer than that of monetary policy because risk

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[4] He suggests that those who want work with microfoundations models should relax the omniscient representative agent assumption and include financial distress with credit risk and many forms of default, for instance, based on different opinions, imperfect knowledge, heuristic expectation formation, and financial deviations from historical standards.

[5] Borio mentions Wicksell (1898), Fisher (1932), Von Mises (1912) and Hayek (1933) in order to suggest authors that have a classical approach relating the key role of monetary factors and the disequilibrium phenomena.

tends to take time to build up (CGFS, 2010). This treatment of risk underscores a policy of leaning against the wind that tries to identify the imperfections and conditions of the financial system, leading the financial authority to evaluate the present in order to predict its consequences in the future. Additionally, the financial authority seeks to prevent these vulnerabilities from being forwarded and amplified throughout the economy as a whole. This macroeconomic framework supposes financial authorities and policy makers that are active supervisors of the financial system such that macroprudential policy acts beyond the previous idea of cleaning up after financial bubbles.[6]

3.2. Systemic risk

Almost all authors have reoriented macroprudential policy toward reducing systemic risk, but how do they define it? In the recent literature, the definition 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).

The measurement of systemic risk is based on indicators that can reveal problems and disturbances in the financial services that compromise the aggregate financial system. Therefore, these measures need to identify broad financial system aspects, such as financial institution leverage, currency and maturity mismatches, interconnectivity measures, excessive credit growth and aggregate evolution of asset prices. The policy focus is to reduce the amplitude of the financial cycle associated with systemic risk (Canuto and Cavallari, 2013).

There are two dimensions of systemic risk in the macroprudential approach: the evolution of risk over time (time dimension) and at a given point in 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 credit/asset price/leverage boom and bust cycles); the second, the risk factors associated with interconnections and joint exposure of the individual financial institutions and markets (with respect to the cross-sectional treatment of risk) (Galati and Moessner, 2013, 2014; FSB, 2011; Borio, 2011; Canuto and Cavallari, 2013).

The economics literature has not reached consensus on which indicators should be used, but it is converging on a set of measures that provide an information base for policy actions (quantitative and qualitative analysis). Vinals et al. (2011) systematize a list of indicators separated by the two dimensions of systemic risk. The time dimension measures are (a) credit for GDP[7], (b) macroeconomic aggregates and their predictions, (c) fundamental analyses[8], (d) asset prices (especially for houses, properties and equities), (e) value-at-risk models (VaR), and (f) macroeconomic stress tests.

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[6] Before the 2008 financial crisis, there was a debate in the monetary policy literature between leaning against asset-price bubbles ("lean") and cleaning up after a bubble ("clean"). The latter, also referred to as the Greenspan doctrine, was well accepted among mainstream economists who argued that it is difficult to identify financial bubbles and that raising interest rates may be ineffective, affect only a fraction of assets, and cause bubbles to burst more severely.

[7] Used as the main indicator of the stage of the financial cycle (Shin, 2013; CGFS, 2010; Vinals, 2011). Some studies have already signaled its effectiveness (Drehmann et al., 2010; Gonzalez et al., 2015).

[8] Indicators of bank balance sheet liabilities (funding) related to the financial cycle. See Shin (2013).

In the cross-sectional dimension, the measures include the size and concentration of financial institutions as a percentage of the market or GDP (includes analyses of assets, equity, credit, and deposits); verification of joint exposure in the balance sheets of financial institutions, such as capital and liquidity positions; default probability measures of a group of financial institutions based on dependency indicators such as stock prices and credit default swaps (CDS); and contingency claims analysis (CCA), a measure of the risk-adjusted balance sheets of financial institutions that quantifies the contribution of a specific institution to systemic risk. As cross-sectional systemic risk includes a multiplicity of factors, an indicator base and standard methodology does not yet exist.

3.3. Instruments

Table 1 lists macroprudential tools based on the classification of Galati and Moessner (2014). The first two essentially manage the time dimension risk; the third, cross-sectional dimension.

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)	Levies on non-core liabilities	Systemic capital surcharges
Countercyclical changes 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 loan-to-value (LTV) ratio, debt-to-income (DTI) and loan-to-income (LTI) ratio caps	Time-varying limits on loan-to-deposit ratios	Power to break up financial firms based 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 into the probability of default assumptions		Restrictions on permissible activities (e.g., bans on proprietary trading for systemically important banks)

Source: Galati and Moessner (2014) (a) Only two instruments are related to the cross-sectional dimension in this objective: Capital charges on derivative payables and levies on non-core liabilities.

Shin (2013) distinguishes between two types of banks liabilities on balance sheets: core and non-core. Galati and Moessner (2014) adopts this terminology in an instrument

related to liquidity risk/market. A core liability refers to bank funding provided by domestic non-bank creditors, i.e., through retail deposits from households (which are typically more stable), and non-core liabilities are related to obligations to other banks and foreign creditors. These categories will depend on the degree of openness and the financial development of the country.

The matter of international capital flows in macroprudential policy is closely related to capital controls, which have been recently referred to (in a more impartial form) by Vinals et al. (2011) as capital flow management. Shin (2013) identifies three types of instruments: the prudential use of indicators with a domestic focus, such as the LTV, DTI and other ratios; the currency-based use of indicators born of global liquidity concerns, such as limits on mismatching currency (the constraints of macroprudential tools are based on the distinctions between currencies); and the use of traditional capital controls that impose restrictions based on the investor's country of residence. According to the author, capital controls have two objectives: avoiding the appreciation of the exchange rate and achieving financial stability.

In the context of the non-banking financial sector, ESRB (2017) suggests the macroprudential use of margins and haircuts in securities financing transactions given the collateral requirements of those transactions. The report focuses on the procyclicality of collateral requirements and market failure, as margin and haircut practices may exacerbate systemic risk and contribute to the accumulation of excessive leverage (deleveraging) during upswings (downswings) in the financial system. Some tools are thought to address this problem: fixed numerical 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 an 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 features of macroprudential policy

The matters of financial stability and the prevention of crises have long been discussed in the economics literature, and central banks were established to fulfill this function (Goodhart, 2010). The 2008 financial crisis influenced the direction of the debate over more active macroeconomic policy for the financial system as a whole, which was proposed in the prudential sense and as a complement to monetary policy. Therefore, this section examines some important perspectives on this issue should be taken into account in policy.

Several elements of institutional arrangements and policies dedicated to a macroprudential policy framework are being adopted in various economies. IMF-FSB-BIS (2016) reinforce that this is not a "one-size-fits-all" approach. Usually, central banks play an important role[9], involving a macroprudential regulatory and supervisory authority in

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[9] The decision-making body is the central bank board (or governor) in Ireland and New Zealand. In Malaysia, South Africa and the United Kingdom (UK), the governor chairs the policymaking committee. Systemic risk and proposed policy actions are analyzed by the central bank in France and Germany, and

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coordination with other relevant authorities. In addition, the ministers of finance of the UK, Poland, France, Germany and the US participate in the decision-making arrangements, or independent external experts are involved in these structures. The decision-making body must have well-defined objectives, transparency and accountability mechanisms, frequent formal meetings, and powers that ensure the ability to act within the countries.[10]

Regarding macroprudential policy during normal times, there are two views[11] in the literature, which are extremely closely related to the conduct of monetary policy. The first view proposes that macroprudential policy must be separate from monetary policy. The use of macroprudential policy is strict and only applies in a few sectors, playing a role in crisis prevention, particularly in credit-supported booms in the housing sector (G30, 2015). Various authors (G30, 2015; Bean et al., 2015) mention that there is no consensus about the effectiveness of macroprudential measures in other sectors or in spillover effects from other countries. This interpretation derives from a "saving glut"[12] argument in which the natural real interest rate was very low for a long period before the 2008 crisis and generated financial stability. For those authors, the role of the central bank in addressing systemic risk allows for more political influence, and in this case, can jeopardize the price stability target and central bank independence. This argument is based on the separation principle of inflation and financial stability. The former should be the focus of monetary policy; the latter, of macroprudential policy. The disequilibrium notion of the business cycle is based on an inflation signal, and financial instability arises from purely financial (not real) aspects. The combination of central bank and market participants' actions determines the equilibrium or natural real interest rate, which was persistently low before the crisis:

> 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 differs. The equilibrium notion (and monetary policy) has to be analyzed from a broader viewpoint and includes the financial stability perspective. Borio (2016) says that the equilibrium rate of the latter approach is narrow and suggests that output deviations from potential must be at financial cycle (not business cycle) frequencies. Based on empirical studies, he recognizes that money (monetary policy) is not neutral over policy-relevant time horizons (over the medium term and even over the long term), and it is important to distinguish supply-driven deflation (depressed prices and increased output) from demand-driven deflation (decreased prices and output). Thus, the low real interest rate before

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in the US, the role of the central bank is to regulate and supervise systemically important financial institutions (IMF-FSB-BIS, 2016)

[10] Powers can be "hard direct" – policy makers have direct control over macroprudential tools; "semi-hard" – they can make formal recommendations to regulatory authorities; or "soft" – policy makers can warn or express opinions about financial instability (IMF-FSB-BIS, 2016).

[11] The theoretical debate over the relation between macroprudential policy and monetary policy is still in its infancy among economists. This section provides only limited guidance on the main differing assumptions of mainstream debate.

[12] This term was coined by Bernanke (2005) to explain desired savings that exceed desired investment as the cause of low interest rates.

the crisis is perceived as a disequilibrium phenomenon[13] with a combination of asymmetrical monetary policy (especially in a financial bust), global disinflationary forces (due to globalization of the real economy and technological innovation) and unsustainable financial booms. This combination was caused by downward bias in interest rates and upward bias in debt, which induced a self-validating pattern of 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 the monetary policy perspective and its conduct in which the central bank should use the available tools and monetary policy to mitigate financial booms and busts. Since macroprudential and monetary policy influence credit expansion, assets prices and risk-taking, it does not make sense to separate their effects. Borio notes that the current analytical framework needs to include flexibility and adjustments in order to describe the financial cycle:

> 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 emphasizes the inclusion of the shadow banking system in the macroprudential policy debate. Shadow banks are entities or activities that fall outside of the traditional banking system but that participate in credit intermediation (FSB, 2015; Pozsar et al., 2010). This means that shadow banks do not have protections such as deposit insurance and liquidity lines offered by central banks to banks to protect against risks to solvency[14] and liquidity risk[15], respectively. Moreover, those entities are less regulated than traditional banking in most countries. Shadow banks contribute substantially to systemic risk based on their connections with traditional banks, and they are "structured to perform bank-like functions (e.g. maturity and liquidity transformation, and leverage)" (FSB, 2015, p.1). That is, shadow banks involve the activities and, consequently, the risks typical of banks, such as providing long-term credit to the financial system through funding and short-term leverage. Given the complexity of the system, the Financial Stability Committee (FSB, 2015) classifies the shadow banking system (strictly) by economic activity or function for more comprehensive monitoring of credit intermediation risks in the non-bank segment. These activities are related to securitization, collateral services, providing funding to banks (repo), granting loans and receiving non-bank deposits from households and entities.

The importance of this parallel banking system in this literature grew after the 2008 financial crisis. As these institutions played a key role in the complex transformation of credit,

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[13] "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).

[14] When the market value of an institution's assets falls below that of its obligations.

[15] When the institution cannot convert assets to currency to pay its obligations because its market assets are illiquid.

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maturity and liquidity in the banking systems of the United States (US) and Europe, they contributed substantially to the outbreak of the crisis. Mehrling (2010) define a shadow bank as an institution that operates money market funding of capital market lending in which they face a similar liquidity risk as a banking institution because of the maturity transformation of their activities: short-term funding with long-term lending.

The FSB uses a broader definition of the shadow banking system in which all entities outside of traditional baking performing credit intermediation and maturity/liquidity transformation without a central bank backstop are included.[16][17] Despite regulation and supervision, the sector is still in the process of formulating and debating whether the monitoring of the shadow banking system, especially in the microeconomic sphere, is the prerogative of macroprudential policy, since the system is susceptible to runs, is essentially connected to the banking system and involves activities with pro-cyclical and systemic characteristics. Furthermore, the alignment of norms across countries is a challenge of great importance given that the system is global. Supervisors can also act indirectly, for example, by controlling the supply of instruments from regulated banks to the shadow bank system (providing collateral for operations) or limiting the transactions of other too-big-to-fail entities.

Macroprudential policy seeks to monitor systemic risk within the context of the economic cycle. Empirical studies (Claessens et al., 2011a, 2011b) demonstrate a strong interaction between business cycles and financial cycles, where the latter are usually more persistent, deeper and shaper than the former. The business cycle is highly synchronized with the credit cycle and house prices, and yet, recessions accompanied by financial disruptions[18] tend to be more pronounced and longer. The business cycle upturns also show faster GDP growth when combined with credit booms and higher house prices. The financial cycle is characterized by financial disruptions that are longer than the boom phases; equity and house price cycles are typically longer and more intense than the credit cycle; and finally, some features change over time, such as the shortening of equity price cycles. When analyses have focused on interactions between countries, high synchronization of credit cycles and house prices are also observed and intensify over time. Moreover, compared with advanced countries, emerging countries demonstrate more pronounced business and financial cycles.

Shin (2013) and Claessens et al. (2013) note the procyclicality of the financial system arising from changes in the values of assets and leverage on the balance sheets of financial institutions amplifies the business cycle. If banks manage their balance sheets and maintain a desirable leverage target, an increase in asset prices (any productivity shock[19] increases the value of total bank assets represented by loans and securities) causes an increase in its capital position, and consecutive purchases of those assets increase their share of the bank balance

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[16] FSB (2015) includes money market funds in the activities and entities of the shadow banking system as they provide the banks with short-term funds and credit intermediation funding for non-bank deposits. Furthermore, these funds are susceptible to runs.

[17] The concept of liquidity transformation is similar maturity transformation (short-term funds are used to lend over a longer term): they use cash-like liabilities to purchase harder-to-sell assets (such as loans).

[18] Intense downturns in the financial cycle are compared to all the valleys of credit cycles, equity and houses prices, that is, the authors strictly define financial crisis within a financial cycle.

[19] 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.

sheet. If all institutions face the same situation, the increase in demand for assets leads to further increases in asset prices, generating a feedback effect on asset prices and an expansion of bank balance sheets (the opposite is also true). This mechanism (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 during an economic upturn (downturn), Shin (2013) states that non-core liabilities (the proportion of these in relation to the balance sheet) are an important indicator of the stage of the financial cycle. During an upturn in the financial cycle, banks will expand their balance sheets through debt issuance, i.e., by raising funding with financial instruments from banks, shadow banks and foreign currency obligations. According to this author, there is an intrinsic relationship among three elements of boom phases: the elevation of asset prices (an increase in total bank assets) and, consequently, an increase in bank lending; a high proportion of non-core liabilities to total liabilities; and systemic risk arising from the increased joint exposure of intermediaries (some institutions issue and others purchase financial instruments that are characterized as non-core liabilities).

Another important intrinsic relationship exists between the exchange rate and financial stability. Avdjiev et al. (2015) highlight the international currency risk-taking channel in the global context and the corresponding large capital flows between countries, i.e., dollar movements disturb domestic conditions, particularly in emerging countries. Depreciation of the international currency strengthens the balance of borrowers (not only financial institutions but also corporate agents) whose assets are denominated in the domestic currency and whose liabilities are denominated in dollars, increasing their ability to pay and, in the case of banks, their ability to borrow, reinforcing the riskiest behaviors and worsening the currency mismatch on balance sheets. In contrast, appreciation of the international currency weakens the balance sheet of the borrower, reducing the quality of the liabilities denominated in US dollars.

4. Is this discussion original?

A more active prudential policy (lean against to wind) to avoid financial crises and still, considered of endogenous origin, is not new in the economic literature. Post-Keynesian authors, especially Minsky, argue that economy faces ongoing cumulative forces, that is, endogenous forces that changes the state of economy that may cause several instabilities in the market mechanisms.

Carvalho (2009), Goudard e Terra (2015), and Prates e Cunha (2012) rely on the financial instability hypothesis (FSH) of Minsky and the psychological effect of Keynes' agents to explain the endogenous nature of financial instability. The state of confidence and optimism of expectations about the future lead agents to take riskier leveraged positions with a reduction of precautionary margins, so a once-robust financial system becomes fragile "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).

There are four basic premises for Misky's FSH, namely uncertainty, cyclical perspective, the existence of disequilibrating forces and balance sheet view in which it is based in money

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contracts that requires cash flow commitments. Misnky highlights that the financial system is complex and sophisticated including changes in structure of debts associated with their economic environment. Namely, the network of financial commitments and their cash flows, even in global level, relates income side to the financial side through financial instruments, facing speculative behavior stimulated by innovation in financial markets and profit seeking activities. Off-balance sheet instruments inside shadow banks activities are a pure example. This balance sheet view and cash flow commitments is one of main features addressed for the actors of the macroprudential discussion, especially Borio, Shin, Mehrling, among others (Minsky, 1975).

Another one important feature is endogenous desiquillibrating forces. According to Minsky, the FSH is a particular interpretation of Keynes's General Theory that associates the "systemic result of fundamental factors that operate in a capitalist economy." (p.2, 1975) This is intrinsically related with uncertainty (and the attitudes of agents towards risk) and the economic cyclical behavior. Minsky pointed out that government have the function of keeping the business cycle within bounds, especially the financial side: "Interventions and regulation can contain or abort the thrusts to instability… if left alone, would have produced chaotic behavior" (1986, p.3). The policy "Lean against the wind" is seeking the growth of risks and intervenes in the system before the materialization of financial instability. The mainstream authors are recognizing the endogenous character of the risk growth within the financial system in the post crisis macroprudential literature discussed in last session.

Kregel (2014) address an important point for macroprudential regulation discussed by Minsky: the impact of regulatory changes inside the economic environment. He argues that in some cases the regulation may increase the instability: "Deposit insurance, as insurance, was an outmoded and inefficient means of systemic macroprudential regulation in the presence of systemic instability and of banks being too big to fail" (Kregel, 2014, p.9) and he adds "The solution Minsky proposed to the problems faced by deposit insurance and the stability of the system in general was for the government to accept full responsibility" (Kregel, 2014, p.9).

Twenty years before the international financial crisis of 2008, Misnky in his article called "Global Consequences of Financial Deregulation" already pointed out the concern with securitization at the global level and with the question of who will be responsible for financial regulation:

> The emergence and internationalization of securitized financial instruments, together with the continued growth of offshore banks, means that is a vast pool of dollar-denominated and other currency-denominated assets which lies outside the formal domain of responsibility of the Federal Reserve or any other central bank. Before a crisis emerges, this question should de put in place, But there is no indication that the authorities will soon take appropriate steps (Minsky, 1986, p.28).

5. Brazilian context

5.1. Macroprudential policy in Brazil

The next three subsections explain the main macroprudential policies implemented in Brazil from 2007 to 2015, particularly between 2010 and 2011. The policy orientation of these measures can be divided in two markets: credit and foreign exchange. The intention is to

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characterize the evolution of risk from 2007 to 2015 using a descriptive analysis and an econometric model. Brazilian authorities aimed to minimize the financial instability caused by the rapid grow of credit in certain sectors and massive international capital inflows into the Brazilian financial market (and the resulting spillovers to the real economy).

5.1.1. Credit market

Table 2 summarizes the main measures taken in the credit market between 2008 and 2014. Due to the assumption of accumulated instability in the Brazilian credit market, the federal government, in conjunction with the central bank, established three main measures: A financial operations tax (the IOF) - the maximum rate was increased from 1.5% to 3% in April 2011. Capital requirements - measures of personal consumer loans were implemented in December 2010, and the BCB raised the risk weight on loans with longer maturities in light of the higher potential risk of indebtedness of those loans (and reduced loans with shorter maturities). It removed the LTV ratio rule in November 2011. Reserve requirement - the RR was revised in 2010 to reverse measures taken during the 2008 financial crisis that reduced the RR in order to reallocate liquidity between banks. In February 2010, the central bank raised the RR on term deposits to 15%; in June, to 20%. It also increased the RR on additional eligibility of demand deposits and term deposits in February to 8%; in June, to 12%. The central bank took two additional measures: it raised the minimum credit card payment and exempted bank-issued debentures (called Letras Financeiras) from the RR.

Table 2. Macroprudential measures in the Brazilian credit market

| 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				
	Apr. 2011	Dec. 2011	May. 2012	Jan. 2015
Credit operations for individuals	3%	2.5%	1.5%	3%
Capital requirements - risk weighting factor				
	Dec. 2010	Nov. 2011	Mar. 2013	Aug. 2014
Personal loan (between 24 and 60 months)	150%	[b]75% Ăă 150%	75% Ăă 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 (Da Silva 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) For a maturity of less than 36 months, the risk-weighting factor (RWF) is 75% or 100%; for maturity between 36 and 60 months, the RWF is 150%. (c) Application of an RWF of 300% to personal loans with terms of over sixty months with no specific destination on the contractual period.

Most of these measures were reversed at the end of 2011. However, as the measures had modest effects on long-term credit operations, the central bank raised the RWF for personal and payroll loans over sixty months to 300% and maintained an RWF of 150% for those related to vehicles (Da Silva et al., 2012). In August 2014, the central bank reduced the RWF for loans to 75% in order to continue convergence toward the international standards set by the Basel Committee and the reversal of the macroprudential measures implemented since 2010.

Figure 1 shows charts related to the evolution of credit between 2007 and 2015. Especially in the period in which the macroprudential measures were implemented (with a combination of policy interest rate hikes), the volume of new loans, the maturity and the average rate were affected, mainly in acquisition of vehicles credit. The change in the trend can be seen only in news loans and average maturity of acquisition of vehicles in Figure 1 (c) and (e). Also, the credit growth rate, especially bank credit, contracts in the figure. Non-earmarked credit decreased by 17\% between December 2010 and January of 2011; however, the data do not reveal a particular change in credit trend over the entire period.

Figure 1. Credit evolution from 2007-2015
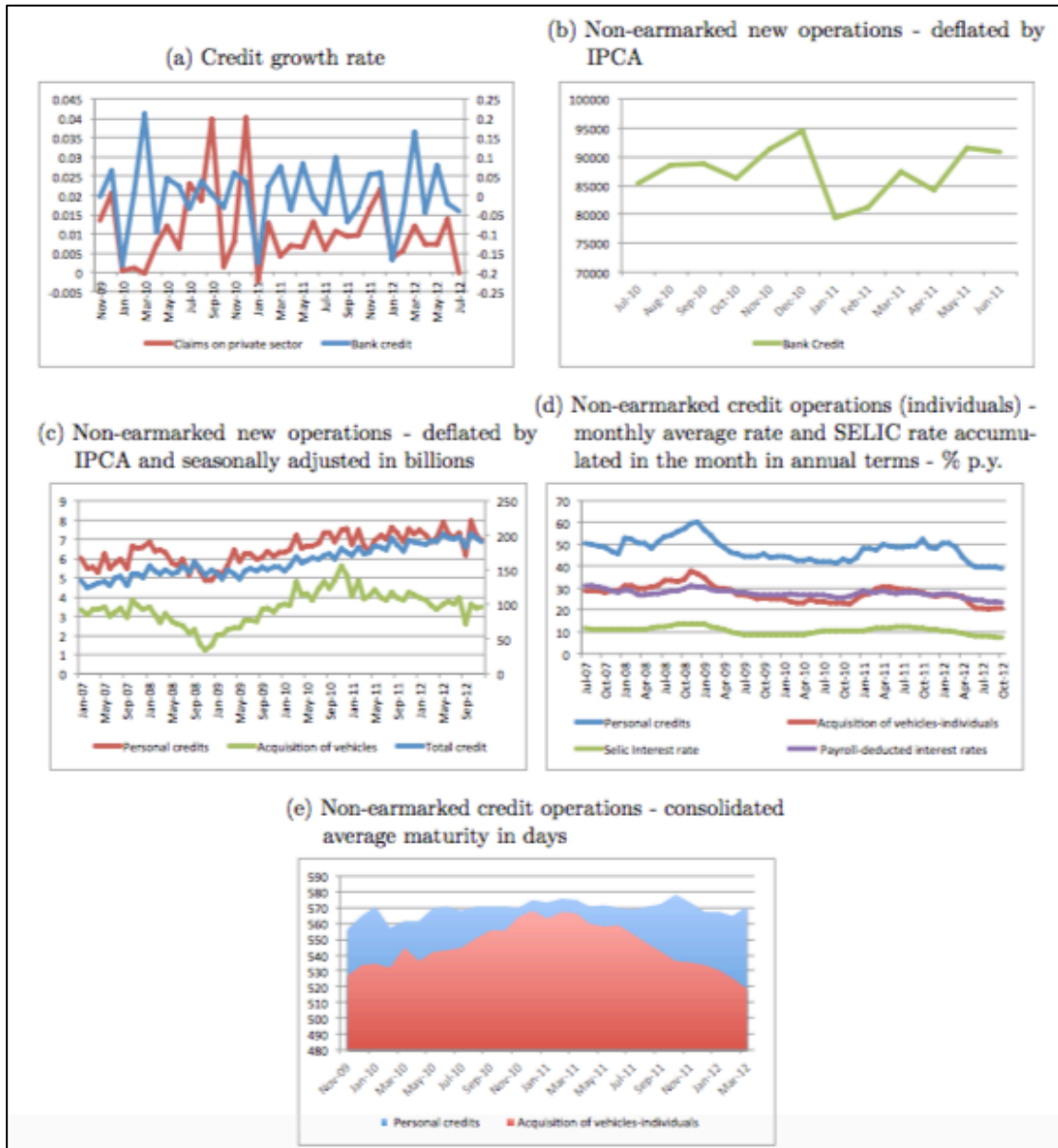
Source: Own elaboration based on the data available in the Brazilian Central Bank database. Figure 2a: Secondary axis: bank credit: non-earmarked new operations in growth rate. Figure 2c: Secondary axis: total non-earmarked new operations.

5.1.2. Foreign Exchange Market

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

Table 3. Macroprudential measures for the Brazilian foreign exchange market

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 credit cards rose in Dec. 2010 to 2.38% and in Mar. 2012 to 6.38%								
Tax rate of 1% on excessive short positions in contracts for 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, the RR was 60% for dollar short positions								

Source: Own elaboration based on the data available in The Brazilian Central Bank; (Da Silva et al., 2012) (a) Emerging Companies Investment Fund (FIEE) and Private Equity Funds (FIP). (b)Decree 8,263 / 2014 reduced the IOF on foreign loans with minimum average term of 180 days. (c)This operation has an IOF of 0%.

Preceding macroprudential policies to limit flows of speculative capital, in January 2011, the central bank instituted a RR of 60% (not remunerated) for dollar short positions in the spot forward exchange market that exceeded US$ 3 billion, that is, "Tier 1" capital. In July, the size limit decreased to US$ 1 billion. The Brazilian government also stipulated a tax rate of 1% on the net change in short positions for foreign exchange derivatives traded on the stock exchange (changes in the forward exchange market below US$ 10 million with a ceiling of 25% are stipulated by law) and made some changes to legislation. In March 2011, the IOF on foreign direct loan or debt securities issued by residents with maturity of 360 days increased to 6% (in the same month, this period changed to 720 days). This IOF adjustment stretched the loan terms.

The goal of the measures implemented in the first half of 2011 was to create a disincentive for banks to take risky positions in derivative and credit markets due to abundant liquidity in the foreign market. The measures were introduced in order to limit the funding of assets in dollars. All measures for 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 on 1% of the increase in short operations in currency derivatives and the IOF on portfolio investments. In March 2012, to prevent arbitrage between foreign currency loans, financial transactions with advance payment (AP) from Brazilian exporters that could be made by any entity and without time limits were changed so that only the current importer can provide AP for a limited period of 360 days (this operation has a 0% IOF).

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The measures for capital flows can also be defined as capital controls (based on the investor's residence) and are based primarily on the market. According to Garcia and Chamon (2013), they were effective in making financial assets more costly, reducing the incentive to pursue 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 and Chamon, 2013). In contrast, Araújo and Leão (2015) stress that capital controls had an impact on the non-financial sector, suggesting that banks passed the costs of new macroprudential measures to non-deliverable forward contracts. These operations are usually carried out by companies (importers, for example) seeking hedging instruments.

Figure 2 reveals the portfolio and derivative flows for the years with IOF measures, especially between 2009 and 2011. Portfolio inflows plummeted at the end of 2010, showing the effectiveness of those measure at that time. Debt securities did not show spikes in the data as large as those of equities; nor did they show significant changes in trends over the entire period. Figure 2b also displays considerable shrinkage in derivative flows after macroprudential measures were implemented at the end of 2010 and the beginning of 2011. The effect of the July 2011 measure on the national value of derivatives is small compared to the behavior of the series throughout the period, and they are visualized in Figure 2d (series details the stock of non-resident investors in financial derivatives).

Figure 2. Financial Flows – US$ (Millions)
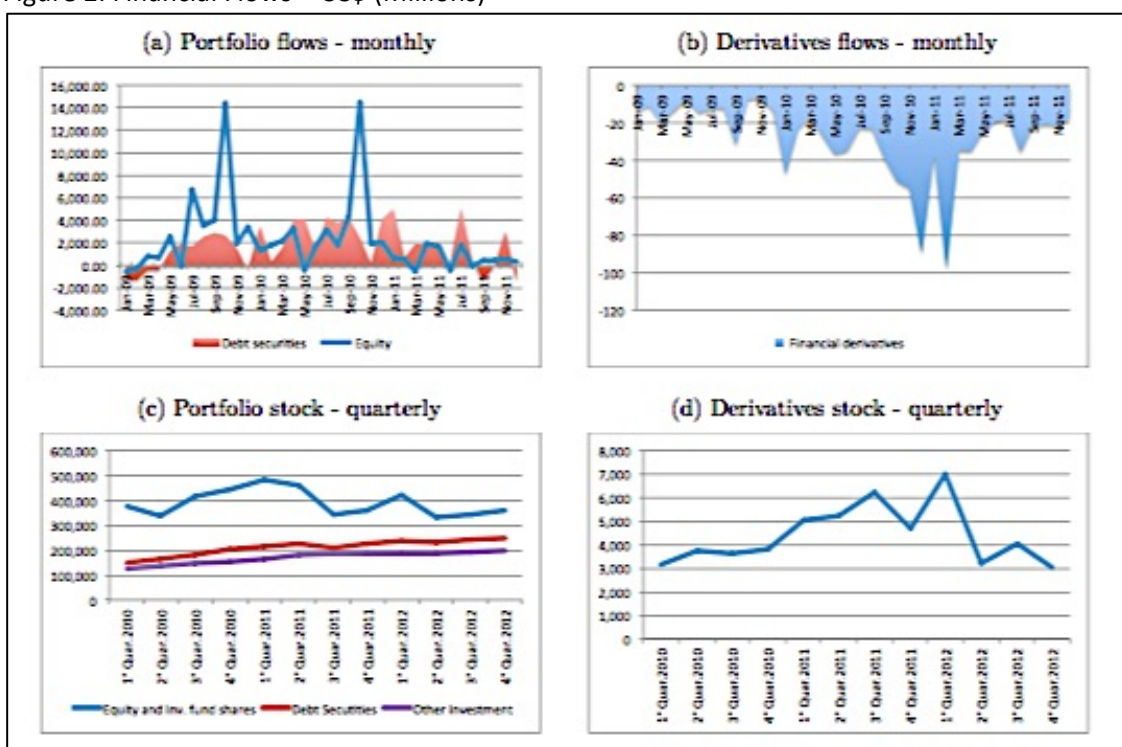
Source: Own elaboration based on the data available in the Brazilian Central Bank database. Note: The financial flows series is from the balance payment data, which encompasses the net incurrence of liabilities of residents and non-residents. The financial stock series is the liabilities of non-resident investors (data obtained from the BCB via the CVM database).

Figure 3 describes some characteristics of foreign investors during the analyzed period. Equity represents a larger share of the portfolio investment of foreign investors at 77.39% in

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2007 and 66.77% in 2010. Also, charts 3a and 3b show the growth of participation in fixed income investment between 2007 (19.05%) and 2010 (31.33%). The measures did not reduce the fixed income investments of foreign investors whose fixed income share of total investment was 35.02% in 2011 and 39.25% in 2012. In 2014, that share was 48.45%. Participation in derivatives of total investment was 0.83% in 2007, 0.99% 2010 and 1.33% in 2011. The percentage was lower in 2012 (0.76%), but it increased again in 2013 (1.69%)and 2014 (9.52%). Figure 3c displays the portfolios flows in annual terms from the CVM data. The flows declined between 2009 and 2011. Portfolio inflows decreased by more than US$ 100 billion between 2008 and 2011. However, in 2012, the upward trend recovered and reached US$ 397 billion in 2014.

Figure 3. Foreign investors in Brazil's financial market
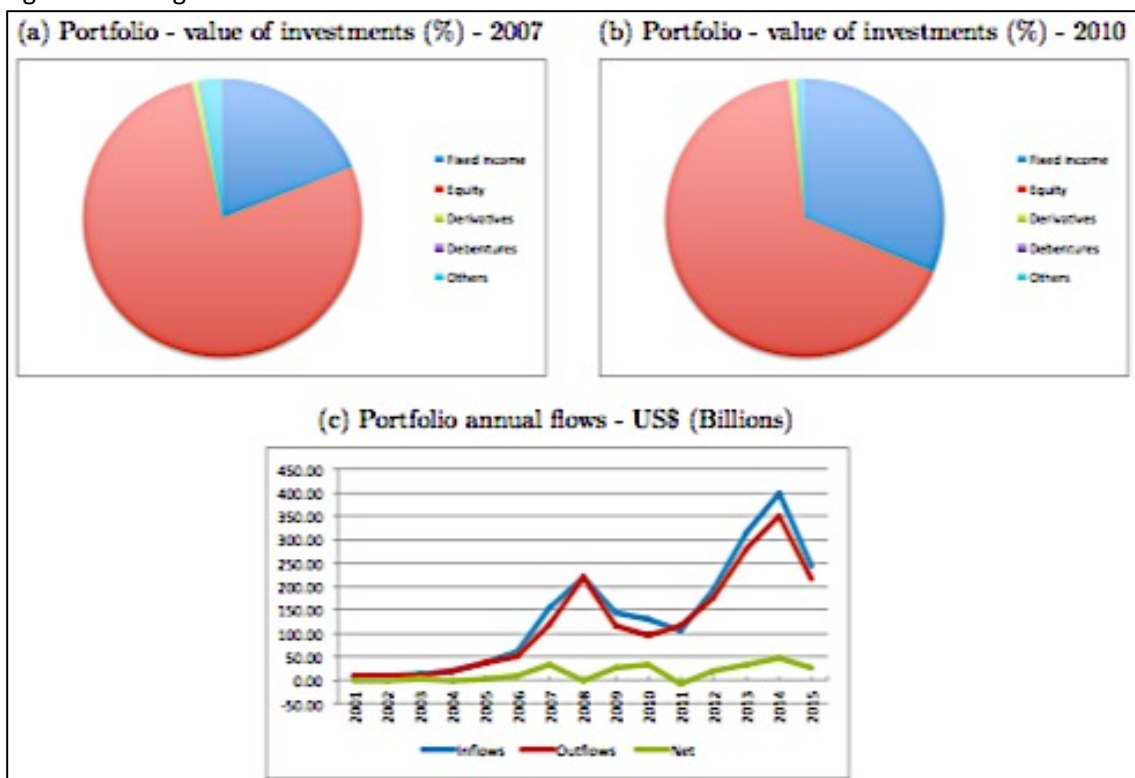
Source: Own elaboration based on the data available in the CVM database.

Figure 4 indicates that short-term external borrowing declined after the first measure in April 2011, while long-term loans showed a large increase (peaking in July 2011), followed by a reduction in September. Figure 10b displays a spike in external bank borrowing in the first months of 2011 and after the IOF on external loans was increased to 6% in March (on 90- and 360-day loans) and April (720 days) 2011. External borrowing had a steep decline between April and September.

Figure 4. External Loans (billions)
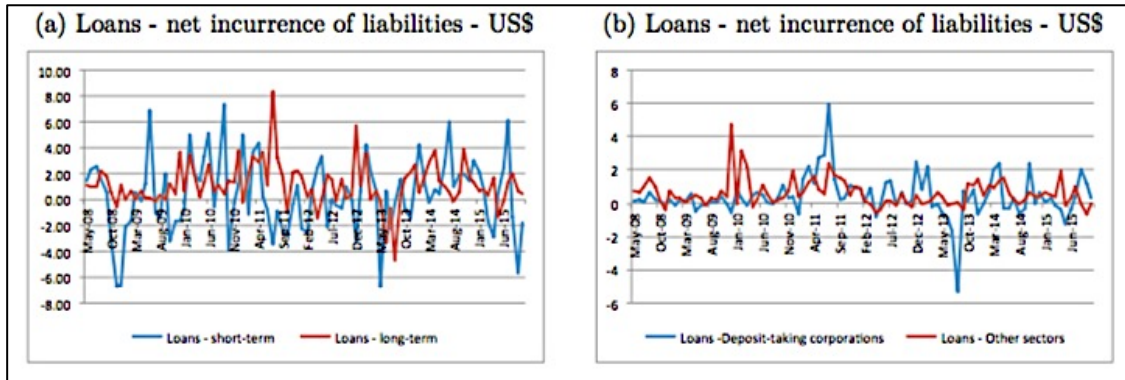
Source: Own elaboration based on the data available in the Brazilian central bank database.

Another way of analyzing the growth of financial imbalances is to observe the balance sheets of banks and other financial institutions in order to verify whether this period of large financial flows changed the series behavior of those institutions. This would also highlight the role of other financial institutions, which also perform credit intermediation and maturity transformation activities that could involve myriad connections with banks and be a source of instability.

Figure 5. Assets and liabilities – depository corporations and other financial corporations deflated by the consumer price index (IPCA) in billions
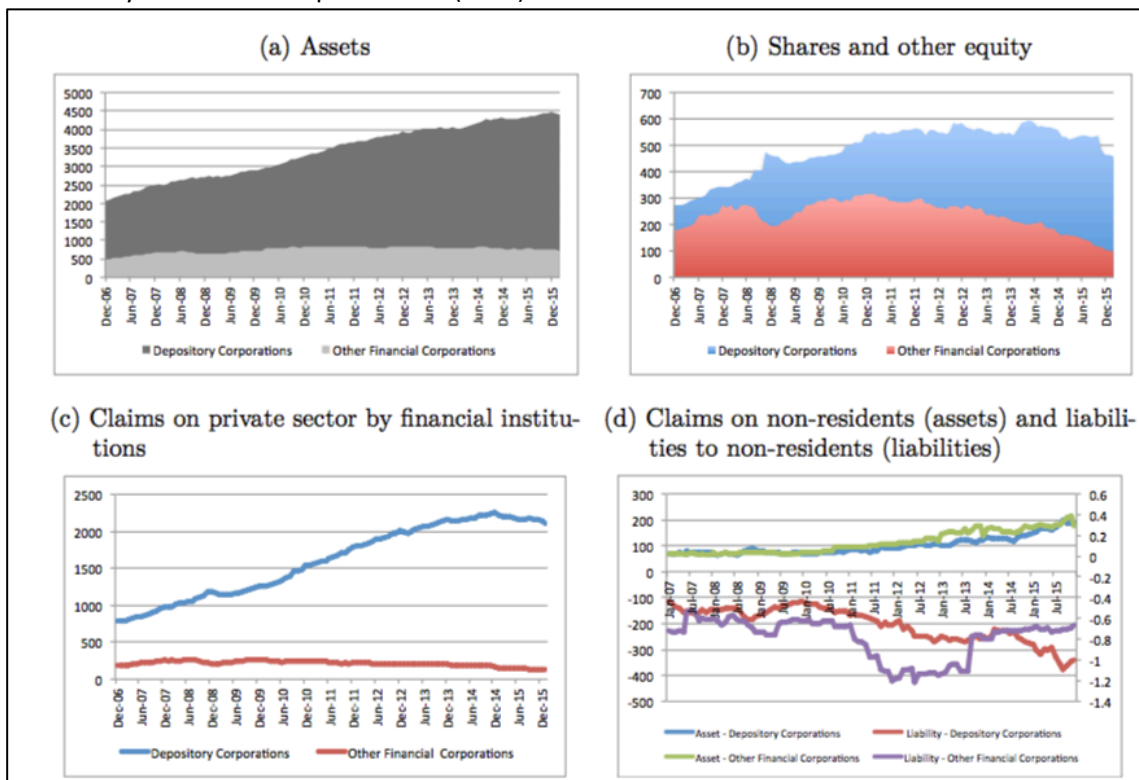
Source: Own elaboration based on the data available in the Brazilian Central Bank database Figure: 5d Secondary axis: Asset and liability of other depositary corporation. Notes: 1- Depository corporations: commercial banks; multiple banks; federal savings banks; credit cooperatives; investment and development banks; credit, finance and investment companies; savings and loan institutions; mortgage companies; real estate credit companies; state savings banks (which existed until November 1998); and financial investment funds (short-term, fixed-income, multi-market, referenced and exchange funds). 2- Other financial corporations (OFC): leasing companies, exchange banks, development agencies, corporations of loan for small entrepreneurs, brokerage companies, securities dealers, equity funds, foreign debt funds and pension funds.

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Figure 5 shows that in terms of absolute values, banks have the largest volumes and the highest balances. Banks have the highest value claims on the private sector (which is considered credit for the private sector). Annual growth was 14% between 2007 and 2014. Regarding the liabilities of residents, banks smoothly reduced heir volume after the 2008 financial crisis, while other financial corporations increased their liabilities to non-residents between 2011 and 2013. The series does not indicate any significant changes in 2010 or 2011 when the main macroprudential measures were implemented. The exception is the increase in the liabilities of other financial institutions to non-residents after 2011.

5.1.3. Econometric analysis

The analysis considers macroprudential data in an exploratory way in order to investigate the statistical relationship between macroprudential measures and systemic risk measures through different types of regressions. The choice of period (2007-2015) is determined mainly by the intense use of macroprudential measures in these years and by the availability of data from the BCB, as some calculations were released recently or, as the credit data did in 2007, experienced a change of methodology. The data series allow a descriptive analysis that shows that macroprudential policy reduces systemic risk at a given point in time but does not change the series trend. This result was confirmed by the econometric analysis, which generally displays no significant models and, hence, no significant average changes in data series that represent the systemic risk of the financial system.

The estimation considers four main principles of systemic risk analysis: leverage, capital flows, credit growth and liquidity indices. This concept is taken from Lim et al. (2011). We follow Zdzienicka et al. (2015) in first estimating a Distributed lag (DL) and ADL model that assumes that macroprudential policy for the designed dummies are exogenous variables and then estimating a vector autoregression (VAR) model. The equations estimate the increase/decrease in systemic risk over the course of the month in which the macroprudential policy change occurs.[20]

The models produced unfavorable results using several types of estimations, that is, in general, the policies analyzed do not affect the trends of the series. The DL and ADL estimations did not produce significant coefficients and the VAR estimation showed congruent results (non-correlated and homoskedastic errors and roots that are all outside the unit circle); however, the impulse-response functions do not show statistically significant confidence intervals (with zero in the range). The econometric analysis indicate that macroprudential policy does not change the series averages, which are proxies for systemic risk, as the analysis of the graphs of the specific policies does not reveal structural breaks.

5.2. Basel III and implementation in Brazil

Given the processes that generated the 2008 crisis and its repercussions for the global financial system, the Basel Committee has corrected some regulatory shortcomings and recognized that financial institutions face liquidity risk in addition to insolvency risk, which was the exclusive focus of the Basel I and II agreements. The recognition that two types of risk lead to bank failure and cause financial instability was a breakthrough.

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[20] The estimation details are in Oliveira (2017).

Before the Basel III agreement, the Brazilian regulatory system had set a CR rate of 11%. In 2013, the BCB adjusted these rules in accordance with international recommendations, which are to be gradually implemented between 2013 and 2019. The CR is aligned with international standards according to the RWFs of assets and the levels and types of capital. Banks in the Brazilian financial system had high capitalization between 2006 and 2015: the Basel index reached values greater than 15% in a majority of months. However, the CRs of core capital and Tier 1 capital were higher than 10% between 2013 and 2015 (BCB, 2015a).

The BCB also implemented a liquidity ratio[21] that is similar to the liquidity coverage ratio (LCR) recommended in the Basel III accord. The index for all types of banks – public, private and foreign – remained over one unit throughout the decade, except in a few months during the 2008 crisis. The BCB initiated the calculation of structural liquidity ratio[22] (ILE) that incorporates the notion of funding liquidity risk, which checks whether banks have enough available and stable resources to finance its long-term activities (here, those over 1 year). According to BCB (2015a), the ILE decreased from 1.12 % in 2011 to 1.07 % in the first half of 2015.

Furthermore, in September 2011, the Brazilian National Monetary Council (Conselho mon- etário nacional - CMN), a regulatory agency, issued resolution No. 4.019 establishing standards for preventive prudential measures for financial institutions. The resolution divides the implementation of macroprudential policy by the Brazilian Central Bank (BCB) into three main parts: conditions that may lead to the adoption of prudential measures, indicators of such conditions and possible measures that can be adopted. For instance, conditions such as exposure to risks not included or inadequately considered when calculating the required reference equity, non-compliance with operational limits and deficient internal controls, among others, are listed. Moreover, the resolution listed leverage, liquidity, stress tests, and risk management structures (among others) as indicators of vulnerabilities and some macroprudential measures: reducing the degree of risk exposure, compliance with more restrictive operational limits, recomposition of liquidity levels, and limitation or suspension. This resolution formalized the measures that have already been taken in previous years.

5.3. Macroprudential policy and shadow banks in Brazil

The BCB divides shadow banks in two types using broad and strict measures following the FSB characterization. The first concept seeks to measure financial assets focusing on non-bank entities that perform the credit intermediation[23]. The strict concept focuses on the typical activities of shadow banks held by any entity outside the traditional banking system. It is divided in five main economic functions.

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[21] 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%).

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

[23] 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 microenterprise credit companies – capitalization companies and non-bank credit card companies.

The first are the funds involved in maturity and/or leverage transformation and credit intermediation activities that are subject to runs. Financial companies (leasing companies, credit for microenterprises, real estate credit companies and real estate credit redistributors) with rates of credit to financial assets of more than 10% compose the second function of the shadow bank economy, because they do not have access to credit guarantor funds (FGC – i.e., deposits insurance) or the central bank's liquidity provision. Moreover, organizations with the third function (brokers and distributors of stocks and securities not linked to banking conglomerates) are monitored because of their engagement in short-term funding to provide financing for their customers. The fourth function includes insurance companies and the financial assets of entities that perform an insurance role parallel to a financing agreement or loan. Finally, the fifth function comprises direct credit investment funds (FIDC).

In Brazil, the financial assets of the investment funds representing the majority of shadow banking, based on the strict estimate. These activities have a total value of R\$ 308 billion (79.3% of the total). According to the BCB (2015b), the majority of investment funds assets (almost 60% in December, 2013) are composed of government securities and RPs (guaranteed by those government securities), reducing liquidity and credit risk. Total shadow banking assets grew from R\$ 338 billion in 2013 to R\$ 382 billion in 2014. This value is scarcely representative compared to the total assets of the traditional banking system, since it represents only 6.6% of the total in 2014. Regarding the connection between banks and banking conglomerates and shadow banks, banks have 0.3% of their assets invested in shadow banks, while the latter invest 25.5% of their assets in the banking system. A total of 2% of bank funding comes from shadow banks, mainly represented by bank-issued debentures (called *letras financeiras*) and not including (in this measure) RPs with federal securities (BCB, 2015a).

In accordance with FSB (2015) estimates, the growth rate of the shadow banking system during the 2011-2014 period was 15% in Brazil. Compared to other emerging countries – Mexico (7.2%), Turkey (8.6%) and Chile (12.4%) – this percentage is high, but it is well below the growth rates of countries such as China (48.7%), Argentina (47.7%) and Russia (32%). The FSB measures the size of this system by comparing the size of banks and other financial intermediaries (OFI)[24] as a percentage of GDP. Note that the shadow banking systems of countries such as Argentina, Russia, Saudi Arabia, and Turkey exhibit share of GDP that are lower than 10%. In Brazil, the share is 33% of GDP. Regarding the total assets of the global system, FSB (2015) points out that the US and the UK had the first- (40%) and second-largest (29%) shares of total assets of the shadow banking system, respectively, in 2014. The Brazilian system had 1.9% of the total.

Regulatory and supervisory agencies in Brazil operate with a broad view of the financial system including shadow banking entities. Brazilian authorities include normative agencies and supervisory agencies, and they are arranged according to the scope of their activity in the market. Coordination among the supervisory bodies is performed by Coremec (the Committee for Regulation and Supervision of Financial, Capital, Insurance, Pension Fund and Capitalization Markets), which receives information about the stability of the Brazilian

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

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financial system from Sumef (the subcommittee monitoring national financial system stability). The BCB also established a financial stability committee (COMEF) to act within the entity itself and to provide guidance to Coremec (BCB, 2015b).

Financial companies, brokers, and distributors are regulated and supervised similarly to the traditional banking system. Those entities must manage liquidity, structural, market, credit and operational risks, and they must submit quarterly financial reports to supervisors. They also provide prudential information on a monthly basis. Depending on the relevance of their activities to the market, institutions are subject to the same minimum CRs and market, credit and operational risks. The regulation and supervision of investment funds is vast with jurisdiction over redemption policies (e.g., suspension of redemptions in extreme liquidity situations), portfolio composition (e.g., concentration limits of assets/issuers, derivatives and repos), leverage (e.g., funds cannot borrow/lend and all derivatives are registered with a clearinghouse) and risk management. Like investment funds, the FDIC is regulated and supervised by the CMN and CVM, and it should also engage in liquidity risk control (e.g., redemptions policy), perform stress testing, and report monthly (BCB, 2015b).

6. Conclusion

What is expected of macroprudential policy? The recent academic literature seeks economic policies for monitoring and controlling the stability of the financial system. This article attempts to summarize the recent mainstream policy debate on the supervision, regulation, and control of systemic financial market risks, as well as the instruments that can prevent financial crises, particularly transmission to the real economy. Ultimately, the goal is reducing macroeconomic instability. The endogenous nature of risks in the financial system, mainly discussed by Pos-keynesian literature, especially for Minsky, has gained increasing acceptance within the post-crisis mainstream authors, because of the recognition that some mechanisms within the financial system (credit creation) and financial cycle (interaction between agents) that may cause financial system instability. Therefore, macroprudential policy seeks to monitor the stability of the aggregate system through indicators that represent the evolution of systemic risk between institutions and throughout the financial cycle. This allows 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, and asset prices, taking into account liquidity and market risks, as well as connections between firms and within the market structure and financial infrastructure.

It should be noted that the mitigation of systemic risk and the containment of financial crises, is expected from macroprudential policy. However, will this result appear in historical data or in the historical averages of the data series? This article also contextualizes the Brazilian financial system with respect to the sectors responsible for containing instability and the main policies implemented during this period. Brazilian institutions have a broad scope to regulate the financial system, although this task falls mainly to the BCB. The descriptive data and the econometric analysis indicate that macroprudential policy does not change the series averages, which are proxies for systemic risk. The descriptive analysis in this article indicates that policies are periodic and are implemented with instruments directed to the each area of risk.

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Another point is of paramount importance: the role of macroprudential policy is ex ante, that is, it seeks to act before the materialization of a risk and before the risk can spread through the macroeconomy and the financial system. Theoretically, the effects will not be realized, and thus, they do not appear macroeconomically. Because of the macroprudential policy role in ex ante risk identification, the determination of institutional tools and arrangements is subjective and often dependent on discretionary determinations. That is, macroprudential policy must be analyzed on a case-by-case basis given its multiplicity of factors, institutional arrangements, relationships with other countries and available tools.

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