

# Revue de la régulation

Capitalisme, institutions, pouvoirs

27 | 1er semestre/spring 2020

Varia

Varia

---

## Out of policymaker's sight: the role of banks' liquidity preference in credit supply in Brazil

*Hors de la vue des décideurs politique : le rôle de la préférence pour la liquidité des banques pour l'offre de crédit au Brésil*

FERNANDA ULTEMARE AND OLÍVIA BULLIO MATTOS

<https://doi.org/10.4000/regulation.16602>

---

### Abstracts

English Français

In modern, sophisticated banking systems, in addition to endogenously creating money, banks have the ability to innovate and stretch constraints on their portfolio to potentially raise profits. They fulfill demand for credit according to their liquidity preference and expectations of profits. On the other hand, the monetary authority influences credit supply by changing the availability of liquid assets compared to other assets through monetary policy instruments. By managing liquidity in the reserves market, central banks modify the price of access to short-term liquidity – the interest rate – and, thereby, cause changes in the yield curve and transform banks' propensity to expand credit. Even though determining credit supply is a difficult task since it depends on expectations and cannot be calculated in advance, this paper aims to determine a credit supply function for Brazil. Our empirical strategy was to estimate a dynamic panel data model on a large cross-section bank-level dataset from the Brazilian Central Bank using balance sheet information from the fifty largest banks operating in the country from 1999 to 2016. Credit outstanding was matched with time-varying indicators that were prepared using data from banks' portfolios and then combined with macroeconomic variables. We use a Post-Keynesian framework to analyze the relation between credit supply and the balance sheet composition of banks. Our findings suggest that variations in banks' liquidity preference which are reflected on their changes in flexibility and leverage indicators have a significant impact on credit supply in Brazil.

JEL codes: E51, E52, E47

Dans les systèmes bancaires modernes et sophistiqués, en plus de créer de la monnaie de forme endogène, les banques ont la capacité d'innover et d'étirer les contraintes sur leur portefeuille et d'augmenter le profit potentiel. Ils satisfont la demande de crédit en fonction de leur préférence de liquidité et des attentes de gains futurs. L'autorité monétaire, à son tour, influence l'offre de crédit en modifiant la disponibilité des actifs liquides par rapport à toutes les autres classes d'actifs par le biais de ses instruments de politique monétaire. En gérant la liquidité sur le marché

des réserves, la banque centrale peut modifier le prix d'accès à la liquidité à court terme - le taux d'intérêt - et, de ce fait, provoquer des changements dans la courbe de rendement et transformer la propension des banques à accroître le crédit. Cet article vise à déterminer une fonction d'offre de crédit pour le Brésil, bien qu'il s'agisse d'une tâche intrinsèquement difficile, car l'offre de crédit dépend des attentes et n'est pas calculée à l'avance. Notre stratégie empirique consistait à estimer un modèle de données de panel dynamique sur un grand ensemble de données transversales de la Banque centrale du Brésil au bilan des cinquante plus grandes banques opérant dans le pays de 1999 à 2016. Le crédit total a été jumelé à des indicateurs variant dans le temps qui ont été préparés à partir des données du portefeuille des banques, puis combinés avec des variables macroéconomiques. Nous utilisons un cadre Post-Keynésien pour analyser la relation entre l'offre de crédit et la composition du bilan des banques. Nos résultats suggèrent que les changements dans la préférence de liquidité des banques qui se reflètent dans les ajustements qu'ils apportent aux indicateurs de flexibilité et de l'effet de levier ont un impact significatif sur l'offre de crédit au Brésil.

---

## ***Index terms***

**Mots-clés :** préférence pour la liquidité, banques, crédit, politique monétaire, GMM

**Keywords:** liquidity preference, banks, credit, monetary policy, GMM

**JEL codes:** E51 - Money Supply; Credit; Money Multipliers, E52 - Monetary Policy (Targets; Instruments; and Effects), E47 - Forecasting and Simulation

---

## ***Full text***

# **Introduction**

- 1 Credit expansion reflects the choice banks and non-banks make between more liquid and illiquid assets given their profit prospects and liquidity preference (Berger & Bouwman, 2017; Chick, 1993). Throughout the business cycle, banks are more or less willing to increase their lending activity and change the composition and size of their balance sheet, based on the perceived uncertainty. When the economy is prosperous, expectations that asset prices will increase encourage banks to create credit both on and off their balance sheets. If uncertainty rises, liquidity preference grows, and assets are sold. Banks then become less inclined to fulfill the demand for loans both from firms and households, choosing to stay liquid and further accentuating the procyclical movement. In other words, when one considers banks' liquidity preference, money supply is endogenously determined. Adding to Keynes' liquidity preference theory presented in the General Theory (GT) as a model of asset choice, Minsky (1976) included cash outflow commitments and balance sheet maturity mismatches in wealth-holders' decision-making process. In the case of banks, which main activity involves liquidity and maturity transformation, taking on illiquid positions when issuing shorter-term liabilities to buy longer-term assets is part of doing business (Carvalho, 2015). Therefore, the endogeneity of money is subjected to a recurring choice between profitability and liquidity under an inherent uncertain scenario (Davidson, 1965; Keynes, 1937; Robertson, 1938).
- 2 Although the central bank (CB) can influence credit supply by changing the availability of liquid assets compared to other assets via monetary policy instruments, it cannot fully control credit supply (Carvalho, 1999). Through liquidity management in the banks' reserves market, the CB may modify the price of access to short-term liquidity and, thereby, have banks adjust their asset portfolio, which may or may not constrain credit creation (Arestis & Sawyer, 2002; Fontana & Palacio-Vera, 2003). The monetary authority faces the challenge of fitting a "monetary collar" (Palley, 2013, p. 30) on the economy yet it does not have a sharp control over credit creation (Guttman, 2016; Minsky, 1982, 1976; Palley, 2008, 2013).
- 3 Understanding the determinants of credit supply is therefore a difficult task. First, since credit supply depends on expectations, it is not explicitly calculated in advance

and is not completely determined by monetary policy, i.e. we can only see actual credit outcomes after they have happened. Second, there are other factors that also affect the demand for credit, which can or cannot be fulfilled by credit supply. Hence, identifying the factors determining credit creation is not straightforward, even though one “can read banks’ liquidity preference from their balance sheets” (Carvalho, 1999, p. 14).

4 Nevertheless, some progress in this area has been recently made through the use of matched bank-firm lending datasets and macroeconomic variables, which can be summarized in two distinct groups: i) panel data models on bank specific information, such as the total liquid and illiquid assets, profitability and leverage, and macroeconomic variables (Awdeh, 2017; Everaert *et al.*, 2015; Lima, 2016; Vinhado, 2014; Mendonça & Sachsida, 2013; Vinhado & Belém, 2013; Stepanyan & Guo, 2011); ii) structural vector autoregression models, especially vector error correction models built to analyze the impulse and response of macroeconomic variables that are endogenously determined, in which aggregate credit information is included (Busch *et al.*, 2010; Dib, 2010; Gambetti & Musso, 2016; Goodhart & Hofmann, 2008; Hofmann, 2004; Hristov *et al.*, 2012; Kollmann *et al.*, 2011; Mumtaz *et al.*, 2018; Tamási & Világi, 2011). Our contribution relates to the first group by estimating the credit supply function based on variables that capture the liquidity preference of banks expressed on the adjustment of their balance sheets over the years.

5 More specifically, we test the hypothesis that banks’ credit supply is strongly determined by their liquidity preference and this is reflected on decisions regarding the composition of their portfolio. To this end, we use two complementary approaches: first we review the theoretical aspects of the behavior of banks and credit creation in modern capitalist economies, exploring banks’ liquidity preference with a Post-Keynesian endogenous money approach; then, we econometrically investigate the responsiveness of banks’ credit creation in Brazil to the liquidity preference indicators calculated based on the actual bank’s balance sheet lines.

6 Our empirical strategy is to use the GMM estimator, based on Arellano & Bond (1991) and Holtz-Eakin *et al.* (1988), which accounts for the persistence, over time, of both autocorrelations, given the presence of lagged variables, and individual effects that control for the heterogeneity between entities. For these estimators, additional instruments are created by the differences among lagged variables and disturbances in order to estimate coefficients for the credit supply function with the generated regressors as instruments. We are then able to use a large cross-section bank-level panel dataset with information from the Brazilian Central Bank (BCB) over the 1999-2016 period. Credit expansion was then matched with time-varying information on banks’ portfolio constructed indicators and, finally, combined with macroeconomic variables also from the BCB dataset.

7 This paper has five sections. After this introduction, we address the theoretical aspects of incorporating liquidity preference within banks’ decisions to expand credit. Section 3 discusses the Brazilian banking system and monetary policy instruments used by authorities after the adoption of the Inflation Targeting Regime (ITR), which influences the system’s liquidity by restraining excess demand over the potential output. Section 4 tackles the econometric model for the credit money supply function in Brazil, highlighting the importance of banks’ financial and ownership variables for the dynamics of credit growth, as well as responses to macroeconomic variables. Finally, the last section presents some concluding remarks.

## 1. Banks’ liquidity preference

8 The Post-Keynesian structuralist<sup>1</sup> view focuses on the relationship between money, credit, and liquidity preference: credit expansion is the result of the combined action of banks and non-banks, according to their preference between liquidity and profitability (Dow, 1996; Chick, 1994). Lending expansion is not limited by the volume of existing reserves but is endogenously determined by banks when deciding on their balance sheet

composition. Money endogeneity is so that financial institutions have the capacity to expand credit, provided it is profitable, in order to meet demand conditions, irrespective of restrictions placed by the CB<sup>2</sup> (Carvalho, 2015). Consequently, in the process of expanding credit, banks create deposits, endogenously expanding money and quasi-money supply, and interfering on the liquidity status of the whole economy (Chick & Dow, 2002; Madi, 1993).

9 In a narrow interpretation of Keynes' liquidity preference theory, especially from chapters 13 and 15 of the General Theory (GT), liquidity preference can be seen as simply the demand for money, which originates<sup>3</sup> mainly from the uncertainty about the future and the plan to finance spending. In this simple perspective, if the public anxiety to increase their liquid positions is not accompanied by the disposition of banks to become more illiquid and acquire the assets that are being sold, interest rates may rise. The rate of interest is the pecuniary sacrifice one thinks is worth making in order to let go of liquidity, renouncing other claims and assets with an equal present value (Keynes, 1936).

10 In chapter 17 of the GT, Keynes expands his view for the liquidity preference theory as an asset choice theory. Wealth-owners would demand a particular asset by comparing its rate of return, calculated according to a few attributes that all assets possess in different degrees. Assets with higher rates of return would have higher demand and consequently higher prices, while other assets would be the opposite. In an aggregate scheme, the individual rates of return based on the asset's attributes would differ until there would be no more advantages in monetary terms between them (Keynes, 1936).

11 Keynes characterized at least four attributes for assets: yield or capacity to generate a return; carrying costs; change in market value over time; and liquidity premium. The last one is key to understand Keynes's theory of asset choice and is related to the "power of disposal". Liquidity premium is, thus, defined as the monetary rate of return agents may be willing to forego in exchange for the potential convenience or security given by this "power of disposal" (Keynes, 1936 and 1937). As emphasized by Davidson (1978) and stressed by Carvalho (1999), the "power of disposal" of an asset, *i. e.*, its degree of liquidity, is a bidimensional measure of its easiness to be sold and the related capital risk.

12 In times of increased uncertainty, agents tend to value the liquidity premium of an asset higher than other attributes. As pointed out and expanded by Robinson (1979), since these attributes are evaluated differently by different individuals, assets with higher liquidity premium may be more demanded even if that means less monetary returns. When there is uncertainty about the capacity of a particular portfolio to be disposed of, a high degree of liquidity may be especially valuable, and wealth-owners may choose to waive high monetary returns in order to remain liquid. As the basis for comparison, money has the maximum liquidity premium as it is readily disposable (Carvalho, 2015).

13 Taking the liquidity preference theory one step further, Minsky expanded the choice between monetary returns and liquidity premium to portfolio decisions as a whole. He emphasized the concept of liquidity both in terms of assets' evaluation and in one's ability to serve debts acquired to finance assets (Minsky, 1976). Liquidity is then dependent on an agent's portfolio, which is constituted of different types of cash flows over time. The degree of liquidity of one's balance sheet is given by the "ability to honor contractually fixed cash outflow commitments" (Carvalho, 1999, p. 7). From this perspective, assets impact the portfolio liquidity due to: (i) the degree of confidence in the expected monetary returns of the assets, (ii) their "power of disposal", as well as (iii) their ability to serve as collateral for debt issuance (Carvalho, 1999).

14 Minsky (1976) highlights the fact that when banks give loans to finance expenditures, they expand their balance sheets and reduce the liquidity of their portfolio. That is, by leveraging equities, reserves, and a range of "safe" assets, banks would eventually feel the pressure to charge higher interest rates in order to compensate for greater perceived risks and uncertainty (Chick & Dow, 2002; Dow, 1996). Even though continuous financial innovations and guidelines revisions on the appropriate leverage ratios may

allow credit expansion with no pressure on interest rates, a time must come when leverage ratios and illiquid positions will be considered imprudent and banks will start to demand a larger compensation for perceived risk (Minsky, 1976).

15 When liquidity preference changes, credit creation also fluctuates as the perception of risk of both borrowers and lenders changes, according to Minsky's (1976, 1986) financial instability hypothesis<sup>4</sup>. During the ascending phase of the cycle, liquidity preference is low and asset prices are expected to keep increasing. Banks reshuffle their balance sheets towards less liquid assets and expand lending. Thus, a booming economy implies that banks' portfolios will be more concentrated on lower-liquidity, higher-profitability assets, such as business and household loans<sup>5</sup> (Carvalho, 1999).

16 With higher expected returns and scarcity of more liquid assets, the cycle will move to a speculative phase. The increasing financial fragility in the economy eventually prompts a rise in liquidity preference and assets start to be sold. The economy may move into a downturn, which also increases liquidity preference, discouraging both spending and lending (Guttman, 2016; Minsky, 1986). Banks become less inclined to fulfill the public's demand for loans, choosing to purchase existing securities and discriminating among potential borrowers by risk category. This more prudent lending behavior can progressively confine banks into becoming financial intermediaries rather than lenders, redistributing rather than creating liquidity (Fontana, 2003, 2004).

17 That said, banks are not passive lenders. Instead, they balance their needs for earnings and liquidity so as to be active agents in the money supply process. They can choose between creating loans or buying securities, which also creates deposits (Chick & Dow, 2002; Dow & Dow, 1989). The ability of deposits created by banks in credit operations to serve as money rests on banks converting this liability into a government IOU<sup>6</sup> when demanded, either to the public or to other banks in the interbank market. So, each bank's assessment of its portfolio's liquidity will take into consideration not only the specific credit risks of each individual borrower, but also its whole liability structure to meet contractual cash outflows (Dow, 1996).

18 This means that the "the rate at which the bank can, with safety, actively create deposits by lending and investing has to be in a proper relation to the rate at which it is passively creating them against the receipt of liquid resources from its depositors" (CWJMK, vol. 5, p. 21). Formally, money is endogenously created by banks through credit operations – and other asset-buying operations – that create deposits, and this money creation is determined by banks' liquidity preference. As stressed by Carvalho (2015, p. 66), "[t]aking liquidity preference of banks into consideration leads to the acknowledgment that banks may not be just the transmission belt linking the general public and monetary authorities, as it is assumed both by verticalists and horizontalists [theorists of money supply]".

19 Therefore, the CB is not capable of fully controlling the demand and supply of liquid assets through the management of interest rates – or even the reserve requirement ratio<sup>7</sup> –. Modern monetary policy focuses on the short-term nominal interest, incorporating expectations of future inflation. In a context of uncertainty, agents try to anticipate policy decisions, in order to obtain arbitrage gains. Although the CB cannot prevent the sudden change of expectations, it can influence the behavior of financial institutions. This depends, however, on the impact that policy rate and the reserves' policy will have on the expectations of financial institutions (Modenesi *et al.*, 2013; Palley, 1993, 2006).

20 Changes in the very short-term rate of interest by the CB can alter the balance between risk and yield for all range of assets with different maturities, which can lead investors to realign their portfolios by selling and/or buying assets with a new preferred maturity. These operations would realign all asset prices, shifting the yield curve. From the standpoint of non-banking agents, it may change the willingness to increase spending, both investment and consumption. Credit, on the other hand, will depend on banks willingness to lend, which also depends on the new yield curve and, therefore, on expected gains (Carvalho *et al.*, 2017).



21 In summary, the monetary authority holds the ability just to influence liquidity preference of banks by changing the availability of liquid assets compared to all other classes of assets via monetary policy instruments. The result is a change in the structure of the balance sheet of banks which may impact their propensity to expand credit supply.

## 2. The Brazilian banking system: structure, evolution, and monetary policy

22 The adoption of the Inflation-Targeting Regime (ITR) a few years after the Real Plan was implemented in Brazil meant to serve as an anchor to maintain price stability and enable economic growth. According to Decree 3,088 of June 1999, it is the responsibility of the BCB<sup>8</sup> to implement proper monetary policy in order to achieve a predetermined target – the inflation target fixed by the National Monetary Council (CMN in Portuguese), based on a proposal by the Minister of Finance<sup>9</sup>. Under the Regime, monetary policy is conducted to influence the level of the short-term interest rate by adjusting the supply of bank reserves using three different instruments: i) *reserve requirements*; ii) *liquidity discount window*; and iii) *open market operations*. Although monetary policy does not have the sole purpose of fixing the short-term interest rate, this task constitutes an important operational goal, making it possible to achieve the final goal of price stability<sup>10</sup> (Paula & Saraiva, 2016; Mishkin, 2011, 2012).

23 Hence, the BCB conducts monetary policy by choosing a target for the interest rate on overnight interbank loans collateralized by domestic government securities registered in and traded on the *Sistema Especial de Liquidação e Custódia (SELIC)*<sup>11</sup>. This rate is the so-called *Selic* rate, which is defined as the “adjusted average rate of daily financings determined in the SELIC for government securities” (BCB, 2017b). It includes all overnight operations with bank reserves between financial institutions – the secondary/interbank market – and between them and the CB – the primary market<sup>12</sup>(Araújo, 2002).

24 In order to meet its required reserve balance, banks can either borrow directly from the BCB at the discount window or go the interbank market, where the lower bound rate for borrowed reserves is the interest rate the BCB pays on some types of reserve requirements<sup>13</sup>. Reserves can be borrowed from the BCB at the liquidity discount window, where loans are priced at the discount rate in order to alleviate liquidity problems for banks and provide stability to financial markets. Nonetheless, access to liquidity assistance operations in Brazil is restricted to financial institutions that hold bank reserve accounts. The BCB is, thus, able to limit the access of financial institutions to these liquid funds, managing the balance between its function as a lender of last resort and as a guarantor of the payment system.

25 To guarantee the target and the desired behavior of the short-term interest rate, the BCB works to estimate the needs for liquidity in the interbank market, adding or withdrawing money accordingly. Changes in the level of reserves are a result of both the BCB’s actions to manage liquidity and of autonomous changes in the CB net external assets<sup>14</sup>, paper money in circulation, and deposits in the Treasury account<sup>15</sup>. In this sense, liquidity forecasting is the initial stage towards the implementation of monetary policy; it is the baseline for the decisions on the volume, frequency, and maturity of operations designed to balance the reserve market (Figueiredo *et al.*, 2002). If the CB does not want greater fluctuations in the market short-term interest rate, it must act accordingly, either by providing the necessary funds to banks, or by removing excess reserves. In the Brazilian case, these adjustments are mainly made through open market operations, given their greater versatility in accommodating daily variations in market liquidity (Carvalho *et al.*, 2017).

- 26 When doing open market operations, the BCB may also choose between permanent operations or temporary repurchase agreement operations. The former are usually chosen when the CB intends to make a permanent removal of reserves or when it wishes to intervene over a medium or long-term horizon. The latter are the main option when there is a need for managing short-term or very short-term conditions in the bank's reserve market. These operations, also known as *repos* or *reverse repos*, are meant to fine-tune liquidity conditions, offsetting unpredicted changes in the level of bank reserves resulting from an unexpected behavior by the agents, as in a sudden reversal of expectations, or from seasonal variations. For this reason, they are regularly preferable when dealing with defensive interventions (Almeida, 2014).
- 27 Given the temporal lag between actions taken by the monetary authority and their effect on macroeconomic variables and on prices, the CB decides on monetary policy according to movements in the expected inflation (forward looking) to anticipate future price pressures and volatility on output. One of the main features of Brazil's monetary policy regime is, therefore, to look at the market's expectations of future inflation to decide the interest rate in the present (Lima *et al.*, 2011).
- 28 According to the 2011 BCB report on ITR in Brazil– “Dez Anos de Metas para a Inflação no Brasil: 1999-2009” (BCB, 2011) – and other BCB working papers, like “Implementing Inflation Targeting in Brazil” (Bogdanski *et al.*, 2000) – the system of equations the BCB estimates (and calibrates) in order to identify the monetary policy transmission mechanism is a combination of an IS type equation, a Phillips curve, an exchange rate passthrough specification, and a Taylor rule (BCB, 2011; Bogdanski *et al.*, 2000; Lima *et al.*, 2011).

## 2.1. The Brazilian banking system

- 29 As in most Latin American countries, the Brazilian financial system remains bank-based despite all changes brought by financial liberalization and the liberal policies taken over the last decade of the 20th century. BIS (Bank of International Settlements) data indicate that, with a capital market still under development, the banking sector accounts for 94% of all credit to the private sector in the country. However, the credit-to-GDP ratio was approximately 50% in 2016, far below what is observed in developed countries. The short maturity on liabilities, high interest rate spreads, and high profitability rates even with increasing defaults all point to a non-functional system that is unable to contribute effectively to the long-term investment financing that is required for economic development. The ability of Brazilian banks to sustain high returns and profits in any economic scenario reflects a system shaped by high inflation periods, unstable exchange rate and frequent crises. Institutions that better adapted to changes prevailed.
- 30 The price and exchange rate stability brought by the Real plan in 1994 forced the banking system to change its structure, resulting not only in a shift of activities, but also in a new market design. Over the past three decades Brazil has had two very different banking systems. The system in place before 1994 had a strong presence of public banks, at both the federal and state levels, a limited number of foreign banks, important earmarked credit lines, low competition, and banks' profits substantially reliant on revenues coming from high inflation (“float”). In contrast, the second system (currently in place) has a smaller (but important<sup>16</sup>) number of public banks, a larger presence of foreign banks, a generally non-earmarked allocation of credit, and banks with a solid capital structure. The passage from the first to the second system took place in the 1990s along with a more open economy in terms of both trade and capital flows (Goldfajn *et al.*, 2003; Hermann, 2010; Puga, 1999). The Brazilian banking system today is characterized by concentration of assets and liabilities in five large, universal banks: Banco do Brasil (government-controlled bank), Caixa Econômica Federal (government-owned bank), Banco Itaú (domestic private bank), Banco Bradesco

(domestic private bank), and Banco Santander (foreign-owned bank). There are hundreds of medium and small-sized banks, with more specialized operations.

31 The new scenario has been characterized by a more solid financial structure, converging with international standards of prudential regulation through improvements on monitoring and mitigation of risks (Prates & Biancareli, 2009; Prates *et al.*, 2015). Nonetheless, with banks preferring to invest in highly liquid government securities indexed by the Selic rate, credit expansion only gained impulse in the beginning of 2003. The new left-wing government that took over that year had to ensure the political economy implemented by the previous administration would be preserved, with the so-called “macroeconomic tripod”, i.e. inflation targeting regime, floating exchange rate, and primary surplus initially adopted in 1999 (Paula *et al.*, 2013; Prates *et al.*, 2015).

32 Downward expectations for the exchange rate, inflation, and, consequently, for the Selic rate were confirmed by a new boom of capital flows to emerging markets. In addition, lower risk aversion of global investors and the increasing Chinese demand for commodities helped fuel the economic boom in the Brazilian economy from 2003 onwards. The improvement in trade balance, the liquidity cycle towards peripheral countries, and market’s expectations that the CB would continue to reduce the Selic rate induced banks to redefine their operational strategies. They started to prioritize credit expansion with the intent to expand their market share and profit margins. The conditions for a decrease in banks’ liquidity preference moving to a riskier portfolio composition were in place (Freitas, 2009; Prates & Biancareli, 2009).

33 In this context of a greater expansion of the Brazilian economy, associated with a growing domestic market supported in part by bank credit, a financial innovation gave a second impulse to credit expansion by offering companies financing contracts linked to foreign exchange derivative operations, which guaranteed a reduction in the cost of credit while the Real was appreciating. This extremely risky mechanism contributed to maintain the credit-to-GDP ratio in the first eight months of 2008. However, the financial environment became much more fragile and susceptible to contagion effects from financial crises and sudden exchange rate shocks.

34 So, with the failure of Lehman Brothers in September of 2008, banks started to face greater obstacles renewing their external credit lines that supported loans and operations with FX derivatives. Also, to cover losses in the subprime mortgage markets, foreign banks operating in Brazil transferred funds to their parent companies, which meant a reduction in the share of these institutions in the Brazilian private financial system. The capital flight and subsequent exchange rate depreciation following Lehman Brothers meant losses to companies and banks with derivative operations. The scenario was of absolute risk aversion and liquidity preference by banks. The uncertainty about the degree of exposure of the other agents led banks to withdraw credit for companies and individuals and for other banks, prompting companies to revise production and investment plans. Since most bank credit in Brazil is short-term, banks find it easier to rearrange their portfolio in the face of a crisis, especially when they have Brazilian government bonds indexed to the Selic rate as an alternative. The result was a rapid deceleration of economic activity in the last quarter of 2008 (Mora, 2015).

35 In response, the federal government took a sequence of unprecedented measures: unlike what happened during the international crises of the 1980s and 1990s, in 2008-2009 Brazilian authorities were able, giving the favorable external conditions of the previous years, to adopt countercyclical policies<sup>17</sup> with the utmost objective of recovering economic growth. The most important one by far was the use of public banks to continue supporting credit and preventing a sharp decline in the credit-to-GDP ratio during the most critical periods of the 2008 financial crisis.

### **3. Credit money supply function: an econometric appraisal**



36 By using the Post-Keynesian theory of money supply that incorporates the liquidity preference of banks, we can analyze how banks modify their balance sheet according to changes in perceived uncertainty. Liquidity preference of banks determines their chosen “basket” of assets and liabilities (Carvalho, 2015, 1999). Indeed, monetary advances to households, business investments, bills of exchange, and call loans to the money market are all classes of assets that will be demanded in proportion to their degree of liquidity preference. As pointed out by Carvalho (1999, p. 17):

Banks’ liquidity preferences describe their balance sheet strategies, not their demand for money, not even their demand for outside money. On the other hand, banks with liquidity preferences will not accommodate passively the demand for credit but will compare expected returns and liquidity premia of all purchasable assets.

37 In order to capture movements in banks’ liquidity preference and the corresponding swings in their balance sheet accounts, we have estimated a GMM model, based on Arellano & Bond (1991) and Holtz-Eakin *et al.* (1988) that relates cross section variations on the volume of credit and nine different balance sheet indicators, in addition to other macroeconomic variables. Even though it is impossible to accurately measure each agent’s liquidity preference, given its own subjective characteristic, we may proceed to construct a liquidity preference schedule if we recognize that such preference is expressed in combined variations in credit operations, portfolio-based liquidity ratios, and macroeconomic variables. Besides, as we have applied a logarithmic transformation of the data in the model, we can also understand that this is the elasticity of credit with respect to each indicator and the other variables considered in the study.

38 The hypothesis is that a change in credit volume indicates a change in agents’ liquidity preference, as credit is one – a riskier and less likely to be sold – of several asset types chosen by banks to structure their portfolio. Under the same hypothesis, credit variations should be accompanied by certain variations in selected liquidity indicators and the macroeconomic and policy variables. Based on the works of Oliveira (2009), Brown (1938), Vodová (2011a; 2011b; 2012), Moore (2009), Praet & Herzberg (2008), and Rychtárik (2009), these indicators are various balance sheet ratios which should identify main liquidity – or illiquidity – trends. This might involve the volume of easily marketable assets, such as reserves or government securities, in comparison with others that are less ready to sell; or holding more stable liabilities, as long-term obligations, in contrast to maintaining credit lines with other financial institutions.

39 The dataset was completed with three macroeconomic variables also released by the BCB.<sup>18</sup> The objective was to take into consideration the impact of both economic activity and especially the CB power over banks’ decision to expand credit and the balance sheet indicators. It is worth noting that the vast majority of GMM models employed to identify factors that alter the supply of credit use these three macroeconomic variables – demand, inflation, and interest rates<sup>19</sup> –, and account for their endogenous determination (Everaert *et al.*, 2015).

40 The expected coefficient signs of variations in these indicators and variables in line with changes in credit operations are shown in Table 1<sup>20</sup>. The first measure of speculative position of banks, i.e. the ratio between operational revenue and expenses, is expected to have a negative coefficient sign. This reflects the fact that banks with “hedge” financial positions tend to turn into “speculative” ones, and then “speculative” into “Ponzi” in the upward phase of the cycle. Therefore, the more speculative the position, the lower this indicator will be, indicating low liquidity preference and, thus, a greater possibility of credit expansion. For the same reasons, a positive relation is expected for the leverage indicator, which represents the ratio between third-party resources and equity, and measures the aggressiveness of a bank under a low-uncertainty scenario. Consequently, the higher the indicator, the higher the bank’s speculative position and the greater must be the credit supply.

**Table 1. Description of variables and expected coefficient signs**

<i>Output variable</i>	
<i>Credit Supply</i>	Variations of the volume of credit (logarithm of total credit volume)
<i>Domestic macroeconomic variables</i>	
<i>Real domestic demand (+)</i>	Reflects the demand intensity and is expected to have a positive impact on credit supply. Domestic demand was used instead of GDP because it was a critical driver of the financial credit cycle in Brazil from 2004 to 2015. From the perspective of an individual bank, domestic demand growth is assumed to be an exogenous variable, and does not depend on the banks' own credit supply. Hence, no lags are used for this variable.
<i>Selic (-)</i>	Measures the impact of monetary policy on credit supply. Changes in the Selic rate alter the yield curve of banks which in turn respond with balance sheets adjustments. The coefficient sign is expected to be negative as liquid assets become relatively more attractive than credit.
<i>Average inflation (-)</i>	Captures expectations for macroeconomic conditions. The coefficient sign is expected to be negative as a lack of price stability deters financial transactions, and inflation erodes bank capital.
<i>Crisis (-)</i>	Dummy variable to account for the potential effects of the 2007-2008 financial crisis. The value of the dummy variable was set equal to 1 for the 2007Q4 to 2009Q1 period and 0 for all other years.
<i>Bank's balance sheet indicators</i>	
<i>Previous credit supply (+)</i>	Reflects previous expectations and the anticipation of demand growth; both having a positive impact on future credit supply.
<i>Speculative position (-)</i>	Reflects payment of interest and principal using revenues from a bank's regular operations. The expected coefficient sign is negative since the lower the ratio between operating revenues and operating expenses, the lower the degree of liquidity preference, i.e., the more risk the bank takes, the greater the supply of credit.
<i>Leverage (+)</i>	Ratio between third-party resources and equity. Measures the aggressiveness of banks. The higher the indicator, the higher the bank's speculative grade, and the greater the credit supply.
<i>Assets flexibility (-)</i>	At times of declining liquidity preference, banks tend to increase their positions in assets with a high monetary return and low liquidity premium, such as credit operations. This reduces the ratio of more liquid assets, such as short-term public and private securities, to total assets.
<i>Liabilities flexibility (+)</i>	Ratio between the sum of resources that have no reserve requirements, and the total current and long term liabilities. The more the bank is able to raise liabilities that do not have reserve requirements, the greater its ability to offer credit.
<i>Risk exposure (-)</i>	Ratio between the lowest risk credit portfolio (A and AA) and the total credit portfolio. The lower this ratio, the more prone the bank is to risky operations, tending to increase the supply of credit.
<i>Foreign currency exposure (+)</i>	Ratio between obligations and rights in foreign currency. The higher the indicator, the greater the risk taken, and the greater the funds for credit.
<i>Financial Independence (+)</i>	Ratio between shareholders' equity and adjusted total assets (total assets less shareholders' equity). The higher the indicator, the more the bank is independent of third-party capital, and the greater its ability to offer credit.
<i>Return on Equity (+)</i>	Quotient between net income and shareholders' equity, indicating bank profitability. More profitable banks are expected to be in a better position to extend credit.

Note: All variables are on a log scale.

**Please use the enlarge mode to view this table properly**

Sources: authors based on BCB (2017c), Oliveira (2009), Brown (1938), Vodová (2011a; 2011b, 2012), Moore (2010), Praet & Herzberg (2008), Rychtárik (2009) and Everaert *et al.* (2015)

41 The next two indicators – assets and liabilities flexibility – are based on banks' need to maintain flexible positions both in the assets and in liabilities sides of their balance sheets. As stated by Oliveira (2009), banks will favor flexibility every time uncertainty and liquidity preference increase. In moments of high macroeconomic instability, for instance, opting for a more liquid asset portfolio allows rapid adjustments in equity, necessary to both protect shareholders and benefit from opportunities to expand capital. Therefore, the ratio between liquid assets to total assets – the assets' flexibility indicator – is negatively related to credit expansion.

42 On the other hand, the liabilities flexibility indicator stands for the ratio between the sum of resources that do not require banks to keep reserve requirements and short and long-term liabilities. Banks have an array of possibilities for raising funds, rather than just deposits. Thus, their need for reserves resulting from risky positions taken when managing assets can be compensated either by influencing depositors' preferences or by fundraising from different sources, different markets, or arbitraging. In addition to the use of conventional liability management practices, banks are constantly working on

financial innovations that are not subject to regulatory restrictions and consolidating different operational strategies. They are, therefore, active players in managing their liabilities to increase their wealth. In this way, the greater the liabilities flexibility indicator, the greater the possibilities of offering credit (Hastings, 2006; Tufano, 2003).

43 The risk exposure indicator, i.e. the ratio between the lowest risk credit portfolio (A and AA) and the total credit portfolio, refers to the inherent risk of credit supply given the possibility of default. Even though banks may minimize this source of risk through the diversification of their customer base, loan ceilings, guarantees, securitization of assets, and operations in derivatives markets, banks tend to reduce their safety margins when confidence is high, increasing risks (Gennaioli *et al.*, 2012; Santomero & Trester, 1998). In this sense, Kregel (1997) points out that banks generally do not realize their safety margins are being reduced. The very expansion of business tends to increase the confidence of bankers that potential borrowers can afford to repay their debt, granting credit that they would not otherwise. Thus, the greater the risk exposure indicator, the greater the credit supply may also be.

44 Then, we have an indicator related to bank leverage with external resources: foreign currency exposure. This is the ratio between obligations and rights in foreign currency and indicates the risk of exchange rate variation. According to Saunders (2000), banks can mitigate this type of risk through on- and off-balance hedging strategies. Among balance sheet strategies are attempts to match maturities and values of assets and liabilities in foreign currency and the diversification of portfolio positions in different currencies, since the correlation between exchange rates and interest rates are not perfect among markets. The author points to the use of derivative transactions such as forward and futures contracts, swap transactions, and options as off-balance sheet activities. Nonetheless, with an expanding economy, these institutions tend to minimize the risks of currency mismatch and increase the proportion of liabilities in foreign currency when compared to the volume of assets denominated in the same currency. That said, the higher this indicator is, the greater the risk assumed, and the greater the credit supply (Davanzo, 2004; Hastings, 2006).

45 Finally, we included three additional bank specific variables, which are: i) credit supply in the previous period; ii) the financial independence variable; and iii) the return on equity indicator. As for the first one, an increase in the lagged credit supply variable may indicate both past optimistic expectations of banks and a reliable forecast of future demand growth. The financial independence indicator is based on the ratio between shareholders' equity and adjusted total assets (total assets less shareholders' equity) and reflects how much banks can expand their lending operations based on their own resources. It can also be understood as another leverage indicator. Lastly, the return on equity indicates a bank's profitability and shows the more profitable the bank is, the more likely it is to expand credit supply. In summary, the higher these indicators are, the greater must be the volume of credit supply; that is, they are expected to show a positive coefficient sign.

46 We used a large quarterly cross-sectional dataset from the BCB consisting of 50 banks from 1999 to 2016. Even though the Brazilian banking system is highly concentrated<sup>21</sup>, we included a large number of institutions to better grasp the behavior of the whole system. The period covered conforms to data availability: before 1999, data was less reliable due to structural changes taking place; 2016 was the last year for which data published by the BCB was available at the time the model was created.

47 The basic regression uses the following specification, where outstanding credit for bank  $i$ , at the time  $t$ , is given by:

$$credit_{i,t} = c_i + \alpha \cdot credit_{i,t-1} + \beta \cdot macro_t + \gamma \cdot bank_{i,t} + \varepsilon_{i,t} \quad (1)$$

Being,  $c_i$ , the bank-specific fixed effects,  $credit_{i,t-1}$ , credit in the previous period,  $macro_t$ , macroeconomic variables at time  $t$ , and  $bank_{i,t}$  the bank – specific balance sheet indicators estimated at time  $t$ .

### 3.1. Estimation results and discussion

48 Output estimation is found in Table 2<sup>22</sup>. One may see that roughly every coefficient showed the expected sign. The exceptions were inflation, risk exposure, both of which are not statistically significant, and return on equity. In Brazil, a negative risk exposure may be related to the credit profile of Brazilian banks, which is dominated by A and AA categories during the whole period of analysis. This reflects institutional changes observed in the system that favored banks high level of profitability whilst working with low risk credit<sup>23</sup>. On return on equity indicator, the negative coefficient sign may be related to persistent high capital ratios featured by the majority of Brazilian banks, which was also part of the 1990s restructuring process (BCB, 2017a). Domestic demand featured the expected coefficient sign, although that is not significant.

**Table 2. Dynamic Panel Data 1**

Dependent Variable: Credit					
Method: Panel Generalized Method of Moments					
Transformation: First Differences					
Sample (adjusted): 2000Q1 2016Q2					
Periods included: 66					
Cross-sections included: 50					
Total panel (unbalanced) observations: 1180					
White period instrument weighting matrix					
White period standard errors & covariance (d.f. corrected)					
Instrument specification: @DYN(LNCREDIT,-2,-3) AD SELIC INFLATION SPECULATIVEPOSITION LEVERAGE ASSETS FLEXIBILITY LIABILITIES FLEXIBILITY RISK EXPOSURE FINANCIAL INDEPENDENCE FOREIGN CURRENCY EXPOSURE RETURN ON EQUITY @LEV(INFLATION)					
Constant added to instrument list					
Variable	Coefficient	Std. Error	t-Statistic	Prob.	
Credit(-1)	0,1177	0,0452	2,6028	0,0094	
DomesticDemand	0,1747	0,1239	1,4100	0,1588	
Selic	-0,0064	0,0023	-2,8374	0,0046	
Inflation	0,0009	0,0010	0,9019	0,3673	
SpeculativePosition	-0,1877	0,0690	-2,7200	0,0066	
Leverage	1,0619	0,0918	11,5652	0,0000	
AssetsFlexibility	-0,4546	0,0576	-7,8951	0,0000	
LiabilitiesFlexibility	0,0454	0,0185	-2,4589	0,0141	
RiskExposure	0,0090	0,0059	1,5361	0,1248	
ForeignCurrencyExposure	0,0447	0,0257	1,7367	0,0827	
FinancialIndependence	0,5446	0,0607	8,9779	0,0000	
ReturnOnEquity	-0,0188	0,0066	-2,8632	0,0043	
Effects Specification					
Cross-section fixed (first differences)					
Mean dependent var	0,0174	S.D. dependent var	0,1889		
S.E. of regression	0,2282	Sum squared resid	60,8348		
J-statistic	27,0498	Instrument rank	36		
Prob(J-statistic)	0,3021				

Source: authors, based on Eviews software output

49 The model resulted in the Selic rate featuring a negative coefficient sign, which is expected and statically significant, since policy rate has a negative effect on credit supply. An increase in the short-term interest rate stimulates investment in assets more liquid than credit, changing the yield curves of banks, and shuffling their liquidity preference. Therefore, we can infer that banks' liquidity preference and credit supply in Brazil are both endogenously influenced by monetary policy.

50 By the same token, there is enough evidence that credit and liquidity preference indicators respond to uncertainty as predicted in the Post-Keynesian theory of endogenous money. That is, the more optimistic expectations about the future are, the lower the urge for a flexible portfolio, the greater the propensity to leverage positions and, therefore, the greater the volume of credit supply. In this regard, speculative

position of banks, i.e. the ratio between operational revenue and expenses, featured a negative coefficient sign, while the coefficient for leverage – the ratio between third-party resources and equity – was positive. Also, asset flexibility and liability flexibility showed the expected signs, which means banks in Brazil are more likely to lend at times of declining liquidity preference, increasing their positions in assets with high monetary return and low liquidity premium.

51 The foreign currency exposure indicator presented a positive coefficient sign, confirming the propensity for riskier balance sheet positions in times of lower perceived uncertainty. Lastly, there is the financial independence ratio, which captures a bank's independence from third-party capital. Given the fact that all indicators are in percentage form of the same unit variables, we can highlight the relative importance of this coefficient in explaining the supply of credit. Brazilian banks are fairly independent from third-party funds to finance credit, and that is a characteristic of a concentrated and exceptionally cautious system. Accordingly, the indicator presented a positive coefficient sign, suggesting that the higher the bank's independence, the greater its ability to fulfill the demand for credit.

52 Summing up, the model estimation gave us enough evidence to validate the hypothesis that liquidity preference of banks can be perceived in their balance sheet adjustments and, therefore, in the volume of credit supply. Most of the variables and portfolio indicators considered presented the expected concomitant swings. It is possible to infer that banks in Brazil are affected by monetary policy, but their behavior is not entirely determined by monetary policy. Their liquidity preference determines their behavior and the money supply.

## 4. Concluding Remarks

53 In modern economies, banks can endogenously create money according to their degree of liquidity preference. This implies that monetary policy, while influencing banks' preferences, is not the most determinant factor taken into account. Through the management of liquidity in the reserves market, the CB may modify the price of access to short-term liquidity – the interest rate – and, thereby, trigger adjustments in banks' portfolios, i.e. on their liquidity preference, shuffling the composition of assets and liabilities. The resulting change in the yield curve transforms the propensity of banks to expand credit supply, which is one of many types of assets banks can carry.

54 Connected to the main framework of the Post-Keynesian approach to the relation between credit supply and the composition of banks' balance sheets, and also considering other macroeconomic variables, our findings suggest that changes in the liquidity preference of banks, reflected on their portfolio adjustments, are tightly related to credit supply in Brazil. For instance, when there is a decrease in the liquidity preference of banks, they are more likely to increase their degree of financial leverage, which indicates a search for riskier liability positions in order to subsidize larger gains in riskier asset positions, such as credit. Thus, banks tend to choose more illiquid and profitable assets, waiving a more flexible portfolio.

55 Therefore, credit supply in Brazil is endogenously determined – as expected according to Post-Keynesian theory – by the liquidity preference of banks. Monetary policy attempts to control inflation by managing the short-term interest rate affects but does not completely constrain credit supply.

---

## *Bibliography*

Almeida L.F.C.R. (2014), « A política monetária e a curva de rendimentos dos títulos públicos federais: a atuação do Banco Central do Brasil no período 2003–2012 », Dissertação de mestrado em economia, Instituto de Economia da Universidade Federal do Rio de Janeiro.



- Araújo C.H.V. (2002), Mercado de títulos públicos e operações de mercado aberto do Brasil: aspectos históricos e operacionais, Notas técnicas do Banco Central.
- Arellano M. & S. Bond (1991), « Some tests of specification for panel data: Monte Carlo evidence and application to employment equation », *The Review of Economic Studies*, vol. 58, nº 2, p. 277-297. DOI: <https://doi.org/10.2307/2297968>  
DOI : 10.2307/2297968
- Arestis P. & M. C. Sawyer (2002), « *Can monetary policy affect the real economy* », *Macroeconomics* nº 0209012, Munich, University Library of Munich.  
DOI : 10.2139/ssrn.335620
- Awdeh A. (2017), « The determinants of credit growth in Lebanon », *International Business Research*, vol. 10, nº 2, p. 9. DOI:10.5539/ibr.v10n2p9  
DOI : 10.5539/ibr.v10n2p9
- Barbosa N. & J. D. Souza (2010), « *A inflexão do governo Lula: política econômica, crescimento e distribuição de renda* », in Sader E. & M. A. Garcia (eds), *Brasil: entre o Passado e o Futuro*, São Paulo, Fundação Perseu Abramo e Boitempo Editorial, p. 57-110.
- BCB – Brazilian Central Bank (2017a), Balancetes e demonstrações financeiras – contábeis. URL: <https://www4.bcb.gov.br/fis/cosif/balancetes.asp?frame=1> [accessed on 15/06/2020]
- BCB – Brazilian Central Bank (2017b), Time Series Management System (SGS). URL: [www3.bcb.gov.br/sgspub/localizarseries/localizarSeries.do?method=prepararTelaLocalizarSeries](http://www3.bcb.gov.br/sgspub/localizarseries/localizarSeries.do?method=prepararTelaLocalizarSeries) [accessed on 15/06/2020]
- Berger A.N. & C. H.S Bouwman (2017), « Bank liquidity creation, monetary policy, and financial crises », *Journal of Financial Stability*, vol. 30, p. 139-155.  
DOI : 10.2139/ssrn.1952728
- Bogdanski J., Tombini A.A. & S.R. da Costa Werlang (2000), « Implementing inflation targeting in Brazil », Working Paper Series nº 1, Brasília, Banco Central do Brazil.  
DOI : 10.2139/ssrn.247507
- Brown A.J. (1938), « The liquidity-preference schedules of the London clearing banks », *Oxford Economic Papers*, vol. os-1, nº 1, p. 49-82.  
DOI : 10.1093/oxepap/os-1.1.49
- Busch U., Scharnagl M. & J. Scheithauer (2010), « Loan supply in Germany during the financial crisis », Discussion Paper Series 1: Economic Studies, Deutsche Bundesbank Deutsche Bundesbank.
- Carvalho F.J. C. (de) (1999), « On banks' liquidity preference », in Davidson P. & J. Kregel (eds), *Full Employment and Price Stability in a Global Economy*, Cheltenham, Edward Elgar, p. 123-138.
- Carvalho F.J. C. (de) (2015), *Liquidity Preference and Monetary Economies*, London and New York, Routledge, coll. « Routledge Critical Studies in Finance and Stability ».  
DOI : 10.4324/9781315734385
- Carvalho F.J.C., Paula L.F. de, Sicsú J., Souza F. & R. Studart (2017), *Economia Monetária e Financeira: Teoria e Política*, vol. 3, Elsevier Brasil.
- Chick V. (1993), « Sources of finance, recent changes in bank behaviour and the theory of investment and interest », in Arestis P. (ed.), *Money and Banking: issues for the twenty-first century*, London, Palgrave Macmillan, p. 55-74.
- Chick V. (1994), « A evolução do sistema bancário e a teoria da poupança, do investimento e dos juros », *Ensaios FEE*, vol. 15, nº 1, p. 9-23. URL: <https://revistas.fee.tche.br/index.php/ensaios/article/view/1663/2031> [accessed on 15/06/2020]
- Chick V. & S. Dow (2002), « Monetary policy with endogenous money and liquidity preference: a nondualistic treatment », *Journal of Post Keynesian Economics*, vol. 24, nº 4, p. 587-607.  
DOI : 10.1080/01603477.2002.11490345
- Clarida R., Gali J. & M. Gertler (1999), « The science of monetary policy: a new Keynesian perspective », *Journal of Economic Literature*, vol. 37, nº 4, p. 1661-1707.  
DOI : 10.1257/jel.37.4.1661
- Davanzo M. Q. (2004), « Gestão de riscos em instituições financeiras: a atuação da tesouraria », Dissertação de mestrado em economia, Fundação Getúlio Vargas.
- Davidson P. (1965), « Keynes's finance motive », *Oxford Economic Papers*, vol. 17, nº 1, p. 47-65.  
DOI: <https://doi.org/10.1093/oxfordjournals.oep.a040978>  
DOI : 10.1093/oxfordjournals.oep.a040978
- Davidson P. (1978), *Money and the Real World*, London, Palgrave Macmillan.  
DOI : 10.2307/2230209
- Paula L.F. de, Oreiro J.L. & F.A. Basilio (2013), « Estrutura do setor bancário e o ciclo recente de expansão do crédito: o papel dos bancos públicos federais », *Nova Economia*, vol. 23, nº 3, p. 473-520. URL:

<https://revistas.face.ufmg.br/index.php/novaeconomia/article/view/2472/1333> [accessed on 15/06/2020]

DOI : 10.1590/S0103-63512013000300001

Paula L.F. de & P.J. Saraiva (2017), « A review of the research program of the new consensus macroeconomics: an assessment of the mainstream debate after the US financial crisis », procedimentos de *IX Encontro Internacional da Associação Keynesiana Brasileira*.

Dib A. (2010), « Banks, credit market frictions, and business cycles », *Working Paper*, nº 2010-24, Ottawa (Ontario), Bank of Canada.

Dow A.C. & S.C. Dow (1989), « Endogenous money creation and idle balances », in Pheby J. (ed.), *New directions in Post-Keynesian economics*, Aldershot (UK) and Brookfield (USA), Edward Elgar, p. 147.

Dow S.C. (1996), « Horizontalism: a critique », *Cambridge Journal of Economics*, vol. 20, nº 4, p. 497-508.

DOI : 10.1093/oxfordjournals.cje.a013629

Everaert G. *et al.* (2015), « Does supply or demand drive the credit cycle? evidence from Central, Eastern, and Southeastern Europe », IMF Working Paper nº 15/15, International Monetary Fund.

DOI : 10.5089/9781484379981.001

Figueiredo L.F., Fachada P. & S. Goldenstein (2002), « Monetary policy in Brazil: remarks on the inflation targeting regime, public debt management and open market operations », Working Paper Series nº 37, Brasília, Banco Central do Brazil

Fontana G. (2003), « Post Keynesian approaches to endogenous money: a time framework explanation », *Review of Political Economy*, vol. 15, nº 3, p. 291-314.

DOI : 10.1080/09538250308431

Fontana G. (2004), « Rethinking endogenous money: a constructive interpretation of the debate between Horizontalists and Structuralists », *Metroeconomica*, vol. 55, nº 4, p. 367-385.

DOI : 10.1111/j.1467-999X.2004.00198.x

Fontana G. & A. Palacio-Vera (2003), « Is there an active role for monetary policy in the endogenous money approach? », *Journal of Economic Issues*, vol. 37, nº 2, p. 511-517.

DOI : 10.1080/00213624.2003.11506600

Freitas M.C.P. de (2009), « Os efeitos da crise global no Brasil: aversão ao risco e preferência pela liquidez no mercado de crédito », *Estudos avançados* [online], vol. 23, nº 66, p. 125-145. DOI: <https://doi.org/10.1590/S0103-40142009000200011>

DOI : 10.1590/S0103-40142009000200011

Gambetti L. & A. Musso (2017), « Loan supply shocks and the business cycle », *Journal of Applied Econometrics*, vol. 32, nº 4, p. 764-782.

DOI : 10.1002/jae.2537

Gennaioli N., Shleifer A. & R. Vishny (2012), « Neglected risks, financial innovation, and financial fragility », *Journal of Financial Economics*, vol. 104, nº 3, p. 452-468.

DOI : 10.1016/j.jfineco.2011.05.005

Goldfajn I., Hennings K. & H. Mori (2003), « Brazil's financial system: resilience to shocks, no currency substitution, but struggling to promote growth », Working Paper Series nº 75, Brasília, Brasília, Banco Central do Brazil.

Goodhart C. & B. Hofmann (2008), « House prices, money, credit, and the macroeconomy », *Oxford Review of Economic Policy*, vol. 24, nº 1, p. 180-205.

DOI : 10.1093/oxrep/grn009

Guttman R. (2016), *Finance-Led Capitalism: shadow banking, re-regulation, and the future of global markets*, New York, Palgrave Macmillan.

Hastings D. F. (2006), *Banking: gestão de ativos, passivos e resultados em instituições financeiras*, São Paulo, Editora Saraiva.

Hermann J. (2010), « Liberalização e desenvolvimento financeiro: lições da experiência Brasileira no período 1990-2006 », *Economia e Sociedade*, vol. 19, nº 2, p. 257-290.

DOI : 10.1590/S0104-06182010000200003

Hofmann B. (2004), « The determinants of private sector credit in industrialized countries: do property prices matter? », *International Finance*, vol. 7, nº 2, p. 203-234.

Holtz-Eakin D., Newey W. & H.S. Rosen (1988), « Estimating vector autoregressions with panel data », *Journal of the Econometric Society*, vol. 56, nº 6, p. 1371-1395.

DOI : 10.2307/1913103

Hristov N., Hülsewig O. & T. Wollmershäuser (2012), « Loan supply shocks during the financial crisis: evidence for the euro area », *Journal of International Money and Finance*, vol. 31, nº 3, p. 569-592.

DOI : 10.1016/j.jimonfin.2011.10.007

Keynes J.M. (1930), *The Collected Writings of John Maynard Keynes*, London, MacMillan, volumes are referred to as CWJMK, followed by volume number.

DOI : 10.1017/UPO9781139520140

Keynes J. M. (1936), *The General Theory of Employment, Interest and Money*, Whitefish (Montana), Kessinger Publishing.

DOI : 10.1007/978-3-319-70344-2

Keynes J.M. (1937), « Alternative theories of the rate of interest », *The Economic Journal*, vol. 47, nº 186, p. 241-252.

DOI : 10.2307/2225525

Kollmann R., Enders Z. & G.J. Müller (2011), « Global banking and international business cycles », *European Economic Review*, vol. 55, nº 3, p. 407-426.

DOI : 10.1016/j.euroecorev.2010.12.005

Kregel J.A. (1997), « Margins of safety and weight of the argument in generating financial fragility », *Journal of Economic Issues*, vol. 31, nº 2, p. 543-548.

DOI : 10.1080/00213624.1997.11505945

Lima D.G.D. (2016), *Efeitos das Reformas Institucionais no Setor Bancário sobre a Produtividade dos Bancos Brasileiros*, Tese de doutorado em economia, Universidade de São Paulo.

Lima E. J. A., F. Araújo & J. D. C. Silva (2011), « Previsão e modelos macroeconômicos no Banco Central do Brasil », in Banco Central do Brasil, *Dez Anos de Metas para a Inflação no Brasil (1999-2009)*, Brasília, Banco Central do Brasil.

Madi M.A.C. (1993), « Política monetária no Brasil: uma interpretação Pós-Keynesiana », Tese de doutorado em economia, Instituto de Economia da Universidade Estadual de Campinas.

Mendonça M. J. & A. Sachsida (2013), « Identificando a demanda ea oferta de crédito bancário no Brasil », Texto para Discussão nº 1837, Instituto de Pesquisa Econômica Aplicada (IPEA).

Minsky H.P. (1976), *John Maynard Keynes*, London, Macmillan.

DOI : 10.1007/978-1-349-02679-1

Minsky H.P. (1982), *The Financial-Instability Hypothesis: capitalist processes and the behavior of the economy*, Hyman P. Minsky Archive. 282, URL: [https://digitalcommons.bard.edu/hm\\_archive/282](https://digitalcommons.bard.edu/hm_archive/282) [accessed on 15/06/2020]

Minsky H. P. (1986), *Stabilizing an Unstable Economy*, New Haven and London, Yale University Press.

Mishkin F.S. (2011), « Monetary policy strategy: lessons from the crisis », NBER Working Paper nº 16755, National Bureau of Economic Research.

DOI : 10.3386/w16755

Mishkin F.S. (2012), « Central banking after the crisis », lecture at the 16<sup>th</sup> Annual Conference of the Central Bank of Chile, Santiago, November 15 and 16, 2012, p. 15-16.

Modenesi A.D.M., Modenesi R.L., Oreiro J.L. & N.M. Martins (2013), « Convention, interest rates and monetary policy: a Post-Keynesian–French-Conventions-School approach », *European Journal of Economics and Economic Policies: Intervention*, vol. 10, nº 1, p. 76-92.

DOI : 10.4337/ejeep.2013.01.07

Moore W. (2009), « How do financial crises affect commercial bank liquidity? Evidence from Latin America and the Caribbean », MPRA Paper nº 21473, Munich, University Library of Munich.

Mora M. (2015), « A evolução do crédito no Brasil entre 2003 e 2010 », Texto para discussão nº 2022, Instituto de Pesquisa Econômica Aplicada-IPEA.

Mumtaz H., Pinter G. & K Theodoridis (2018), « What do VARs tell us about the impact of a credit supply shock? », *International Economic Review*, vol. 59, nº 2, p. 625-646.

DOI : 10.1111/iere.12282

Oliveira G.D. (2009), « Estrutura patrimonial e padrão de rentabilidade dos bancos privados no Brasil (1970-2008): teoria, evidências e peculiaridades », Tese de doutorado em economia , Universidade Estadual de Campinas.

Palley T.I. (1993), « Uncertainty, expectations, and the future: if we don't know the answers, what are the questions? », *Journal of Post Keynesian Economics*, vol. 16, nº 1, p. 3-18.

DOI : 10.1080/01603477.1993.11489965

Palley T.I. (2006), « A Post-Keynesian framework for monetary policy: why interest rate operating procedures are not enough », in Gnos C. & Rochon L. P. (eds), *Post-Keynesian Principles of Economic Policy*, Cheltenham, Edward Elgar, coll. « New Directions in Modern Economics series », p. 78-98.

Palley T.I. (2008), « Endogenous money: implications for the money supply process, interest rates, and macroeconomics », Working Paper Series nº 178, Political Economy Research Institute, University of Massachusetts, Hamherst. URL: [https://scholarworks.umass.edu/cgi/viewcontent.cgi?article=1149&context=](https://scholarworks.umass.edu/cgi/viewcontent.cgi?article=1149&context=peri_workingpapers)

[peri\\_workingpapers](https://scholarworks.umass.edu/cgi/viewcontent.cgi?article=1149&context=peri_workingpapers) [accessed on 15/06/2020]

- Palley T.I. (2013), « Horizontalists, Verticalists, and Structuralists: the theory of endogenous money reassessed », *Review of Keynesian Economics*, vol. 1, nº 4, p. 406-424.  
DOI : 10.4337/roke.2013.04.03
- Praet P. & V. Herzberg (2008), « Market liquidity and banking liquidity: linkages, vulnerabilities and the role of disclosure », *Financial stability Review*, nº 11, Banque de France, p. 95-109.
- Prates D.M. & A.M. Biancareli (2009), « Panorama do ciclo de crédito recente: condicionantes e características gerais », in Carneiro R.M., Prates D.M., Freitas M.C.P. & A.M. (eds), *Projeto de Estudos Sobre as Perspectivas da Indústria Financeira Brasileira e o Papel dos Bancos Públicos, Subprojeto Mercado de Crédito Bancário - Primeiro Relatório*. Campinas, FECAMP, vol. 44.
- Prates D.M., Ferreira A.N. & D. Gorayeb (2015), « The Brazilian credit market: recent developments and impact on inequality », Working Paper nº 44, Global Labour University.
- Puga F.P. (1999), « Sistema financeiro Brasileiro: reestruturação recente, comparações internacionais e vulnerabilidade à crise cambial », Texto para Discussão nº 68, Banco Nacional de Desenvolvimento Econômico e Social.
- Rychtárik Š. (2009), « Liquidity scenario analysis in the Luxembourg banking sector », Working paper nº 41, Banque Centrale du Luxembourg.
- Robertson D.H. (1938), « Mr. Keynes and finance », *The Economic Journal*, vol. 48, nº 190, p. 314-322.  
DOI : 10.2307/2225463
- Robinson J. (1979), « The generalisation of the general theory » in *The Generalisation of the General Theory and Other Essays*, London, Palgrave Macmillan, p. 1-76.  
DOI : 10.1007/978-1-349-16188-1
- Santomero A.M. & J.J. Trester (1998), « Financial innovation and bank risk taking », *Journal of Economic Behavior & Organization*, vol. 35, nº 1, p. 25-37.  
DOI : 10.1016/S0167-2681(97)00103-0
- Saunders A. (2000), *Administração de Instituições Financeiras*, São Paulo, Gen/Atlas Edição.
- Stepanyan V. & K. Guo (2011), « Determinants of bank credit in emerging market economies », Working Paper nº 11/51, International Monetary Fund, p. 11-51.  
DOI : 10.5089/9781455218035.001
- Tamási B. & B. Világi (2011), « Identification of credit supply shocks in a Bayesian SVAR model of the Hungarian economy », MNB Working Papers nº 7, Central Bank of Hungary.
- Tufano P. (2003), « Financial innovation », in Constantidines G., Harris M. & R. Stulz (eds), *Handbook of the Economics of Finance*, vol. 1, chap. 6, p. 307-335.  
DOI : 10.1016/S1574-0102(03)01010-0
- Vinhado F.D.S. (2014), « Evidências empíricas sobre a rentabilidade dos ativos dos bancos no Brasil antes da crise Americana do subprime », *Revista Evidenciação Contábil & Finanças*, vol. 2, nº 3, p. 73-87.  
DOI : 10.18405/recfin20140305
- Vinhado F.D.S. & V.C. Belém (2013), « Preferência pela liquidez dos bancos no Brasil: uma investigação empírica com dados em painel dinâmico », *Revista de Gestão, Finanças e Contabilidade*, vol. 3, nº 2, p. 24-38.  
DOI : 10.18028/2238-5320/rgfc.v3n2p24-38
- Vodová P. (2011a), « Liquidity of Czech commercial banks and its determinants », *International Journal of mathematical models and methods in applied sciences*, vol. 5, nº 6, p. 1060-1067.
- Vodová P. (2011b), « Determinants of commercial bank's liquidity in Slovakia », in Polouček S. & D. Stavárek (eds), *Lessons Learned from the Financial Crisis* [Proceedings of 13th International Conference on Finance and Banking, 2011], Ostrava, Silesian University, School of Business Administration, p. 740-747.
- Vodová P. (2012), « Determinants of commercial banks' liquidity in Poland », in Ramík J. and Stavárek D. (eds), *Proceedings of 30th International Conference Mathematical Methods in Economics*. Karviná, Silesian University, School of Business Administration, 2012, pp. 962-967. ISBN 978-80-7248-779-0.
- Wray L.R. (2007), « Endogenous money: Structuralist and Horizontalist », Working Paper nº 512, The Levy Economics Institute.  
DOI : 10.2139/ssrn.1010462

---

## Attachments

- 
- Appendix 1. Banks' balance sheet accounts released by the BCB in accordance with the Financial System Standards Manual (application/pdf – 289k)



- 
- Appendix 2. Arellano-Bond Serial Correlation Test (application/pdf – 209k)

---

## Notes

1 This paper uses the structuralist view of money endogeneity in the Post Keynesian tradition. This view considers that taking liquidity preference of banks into account allows us to understand money as an endogenous variable since it is created as a result of private decisions. We acknowledge the existing dispute between “verticalists” and “horizontalists”, where the discussion of endogeneity is driven by the debate on whether the monetary authority controls the monetary base or the interest rate (Wray, 2007; Carvalho, 1999).

2 In addition to the reserves requirements and the interest rate policy rules, banking activity is highly regulated, subject to quantitative restrictions such as capital requirements (Palley, 2013).

3 The aggregate demand for money is a composite result of different motives in the GT: the Income-motive, meaning the demand for cash to bridge the interval between the receipt of income and its disbursement; the business-motive, where similarly, money is held to fill the interval between the time of incurring business costs and that of the receipt of the sale-proceeds; the precautionary-motive, meaning being able to provide for contingencies requiring sudden expenditure and for unforeseen opportunities of advantageous purchases; and finally, the speculative-motive, which is particularly important in transmitting the effects of a change in the quantity of money to the rates of interest when there are changes in expectation affecting the liquidity function (Keynes, 1936, p. 124-125).

4 Minsky (1982) builds his financial fragility hypothesis based on three financial postures that relate to different degrees of financial fragility. Hedge financial structures are described as having a comfortable margin between expected returns from assets and committed cash outflows on liabilities with no maturity mismatch between them. Speculative financial structure occurs when debt service is greater than expected cash flows for some periods, even though the present value of the expected returns is greater than the present value of the payment commitments. When cash flow starts to be insufficient to cope with debt service and the unit has to roll over principal and finance the interest (thus increasing total debt), there is a Ponzi financial structure. Changes of risk perception by both borrowers and lenders are the fuel to the cyclical dynamic that leads agents to speculative and Ponzi structures, endogenously increasing the fragility of the system.

5 As already stressed by Keynes in his Treatise on Money, banks could choose between three different classes of assets: bills of exchange and call loans, investments, and advances to customers. These assets have different liquidity premiums and monetary returns, being bills of exchange and call loans the most liquid ones, although with lower returns. Advances to costumers, less liquid with higher returns. Minsky (1982) made the discussion more comprehensive in the complexity of modern banking systems and the balance sheet dilemma faced by banks.

6 As pointed out by Carvalho (2015, p. 66): “It is government debt which is the bedrock of liquidity in a capitalist economy.”

7 Reserve requirement’s only effect is increasing the cost of the liability acquired by the bank in the credit operation. Besides, as highlighted by Keynes: “except in exceptional circumstances, all banks use their reserves to the hilt; that is to say, they seldom, if ever, maintain idle reserves in excess of what is their conventional or legal proportion for the time being” (CWJMK, vol. 6, p. 47).

8 The main functions of the BCB are set by the National Monetary Council (CMN), as determined by law.

9 The targets are for annual variations in the National Broad Consumer Price Index (IPCA).

10 The framework is grounded on controlling demand inflation, i.e. short-term excess of aggregate demand over the potential output – and price stability could be achieved through the short-term interest rate. The real interest rate is thought to influence investment and consumer expenditure (Clarida *et al.*, 1999).

11 In English, Special System for Settlement and Custody.

12 For more on Selic legislation and norms: <http://www.bcb.gov.br/htms/demab/circular3587-english.pdf>

13 These operations are processed through entries in participants’ accounts kept in the central bank through the Reserve Transfer System (STR), which is the “heart” of the National Financial System (NFS). For more on the STR: <http://www.bcb.gov.br/htms/novaPaginaSPB/str.asp?IDPAI=STR>.

14 Changes in the net external assets account result both from the balance between exports and imports, and from financial operations. In Brazil, the central bank operates in the foreign exchange market, buying and selling foreign currency (to/from banks) through auctions, in order to maintain the exchange rate at a level considered appropriate, and these operations directly



impact the bank's reserves account. These auctions are of two types: spot market or swap. In 2002, the BCB and the Treasury began to carry out foreign exchange swap operations in conjunction with primary offers of LFT - Treasury Financial Bills. The use of this instrument enables the market itself, more than the central bank, to offer foreign exchange hedge to companies. The new system also made it possible to reduce the issuance of securities indexed to the exchange rate (Carvalho *et al.*, 2017).

15 The Treasury account with the BCB is called *Conta Única* and it keeps all government spending and revenue information, such as tax revenue, public bond auctions, and payments to public employees (BCB, 2017a).

16 In Brazil, some important public banks that managed to wave through the structural transformations of the 1990s are currently some of the biggest financial corporations in terms of assets.

17 Countercyclical monetary policy finally included a substantial cut in the Selic rate, but it was only taken after the BCB's fears about the inflationary impact of the depreciation of the Real were surpassed by the concern with the abrupt drop in the level of economic activity. However, the delay in monetary policy to stimulate economic recovery was offset by the implementation of a series of temporary tax reliefs for sales and consumption in 2009 (Barbosa & Souza, 2010).

18 We have opted not to include a dummy variable for the 2007-2008 financial crisis because we understand it may be incorporated in the liquidity preference schedule; we did not want to obtain a separate crisis effect. We even tested the coefficient for the crisis dummy but it was not statistically significant. Introducing such variable led to a minor change in the magnitude of the estimated coefficients without affecting their significance level. Technically, when differenced, a dummy variable "disappears" in GMM estimation.

19 The reserve requirement ratio is not included in the model since we understand that its impact on the liquidity preference of banks is covered by the SELIC rate. Managing the short-term interest rate with open market operations is the most used instrument by the monetary authority to fine-tune market expectations. Also, the reserve requirement ratio (for demand deposits) hovered around 45% for the whole period of analysis, with only three minor changes of one percentage point (BCB, 2017a).

20 Banks' balance sheet accounts can be seen in Appendix 1.




21 The five largest institutions – Banco do Brasil, Caixa Econômica Federal, Santander, Bradesco and Itaú – accounted for roughly 80% of total credit supply in the period under analysis (BCB, 2017a).

22 Arellano–Bond test for serial correlation in the first-differenced residuals is in Appendix 2. Sargan-Hansen test of overidentifying restrictions is reported by J-Statistic and Prob(J-statistic) in Table 2, which fails to reject the null of overidentifying restrictions.

23 One example is the institutionality created for the payroll loans for formal workers and pensioners in 2003 (10,820 Law of December 17th, 2003).

---

## List of illustrations

	<b>Title</b>	Table 1. Description of variables and expected coefficient signs
	<b>Caption</b>	Note: All variables are on a log scale.
	<b>URL</b>	<a href="http://journals.openedition.org/regulation/docannexe/image/16602/img-1.jpg">http://journals.openedition.org/regulation/docannexe/image/16602/img-1.jpg</a>
	<b>File</b>	image/jpeg, 266k
	<b>URL</b>	<a href="http://journals.openedition.org/regulation/docannexe/image/16602/img-2.png">http://journals.openedition.org/regulation/docannexe/image/16602/img-2.png</a>
	<b>File</b>	image/png, 6.1k
	<b>Title</b>	Table 2. Dynamic Panel Data 1
	<b>Credits</b>	Source: authors, based on Eviews software output
	<b>URL</b>	<a href="http://journals.openedition.org/regulation/docannexe/image/16602/img-3.jpg">http://journals.openedition.org/regulation/docannexe/image/16602/img-3.jpg</a>
	<b>File</b>	image/jpeg, 79k

---

## References

### Electronic reference

Fernanda Ultremare and Olívia Bullio Mattos, "Out of policymaker's sight: the role of banks' liquidity preference in credit supply in Brazil", *Revue de la régulation* [Online], 27 | 1er

## ***About the authors***

### **Fernanda Ultremare**

Assistant Professor of Economics, Federal University of Rio Grande do Sul, 52 João Pessoa Ave., Porto Alegre, RS, Brazil; [fernanda.ultremare@ufrgs.br](mailto:fernanda.ultremare@ufrgs.br)

### **Olivia Bullio Mattos**

Assistant Professor of Economics, St. Francis College, 180 Remsen St., Brooklyn, NY, USA 11201; [obulliomattos@sfc.edu](mailto:obulliomattos@sfc.edu)

---

## ***Copyright***



The text only may be used under licence CC BY-NC-ND 4.0. All other elements (illustrations, imported files) are “All rights reserved”, unless otherwise stated.