A Modified Taylor Rule for the Brazilian Economy: convention and conservatism in 11 years of inflation targeting (2000-2010)*

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Abstract: With the purpose of evaluating Brazilian Central Bank’s (BCB) conduct of monetary policy after the adoption of inflation targeting (IT), we estimate a modified version of Taylor rule for the Brazilian economy in the period 2000-2010. The term modified refers to an important innovation with regard to the reviewed literature: the inclusion of a proxy for international interest rate in the original equation. This study reinforces and expands results achieved by Modenesi (2011) and also provides as a novelty the evidence that BCB reacts to foreign interest rates when setting its basic rate. BCB has reduced autonomy: basic interest rate (Selic) is endogenous not only to domestic conditions (inflation and output gaps), but also to foreign interest rate (measured by Libor). The evidence provided might support the argument that BCB policy is ruled by a pro-conservative convention substantiated in the adoption of a Taylor rule containing three distinctive features: 1) high degree of interest rate smoothness; 2) high pure domestic equilibrium interest rate; and 3) high interest rate differential. Items 2) and 3) largely explain the overvaluation of real, a key element of price stabilization. Results also contest the idea that Brazilian equilibrium interest rate has recently experienced a sharp fall. The reduction of Selic reflects to a great extent the recent abnormal decline of foreign interest rates.

Keywords: Monetary Policy; Taylor rule; Inflation Targeting; Selic; Convention.

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1 – Introduction

Almost two decades after the launching of the Real Plan (RP), in mid-1994, and the achievement of price stability, a satisfactory reduction in Brazilian basic interest rate (hereafter referred to as Selic\(^1\)) is yet to be seen. In fact, the country is known to lead the ranking of the world’s highest interest rates.

Initially, the Central Bank of Brazil (BCB) used the need to offset current account deficit (4.3% of GDP in 1998) and, eventually, to preserve international reserves as a justification for maintaining Selic rate at a high level. The loose fiscal policy of President Cardoso’s first term has also been also cited as a cause of the rigidity in monetary policy.

The abandonment of the exchange rate anchor in 1999, the improvement in external accounts, and the adoption of a contractionary fiscal policy – with a primary surplus of around 3.5% of GDP – were expected to bring the basic interest rate down, but they proved to be insufficient to cause a substantial decline in Selic nonetheless. The real Selic non-negligibly indeed fell over the period 2000–2010 to an average of 10% p.y.\(^2\) However, it still remained at a very high level – almost four times the real basic interest rate of 2.7% p.y. on average practiced by developing countries over the same period. Therefore, one may affirm that BCB has been extremely conservative in setting Selic.

The phenomena of Brazil’s high interest rate have been offered many explanations. Among them we highlight the existence of a convention, in Keynesian terms, shared by the economic agents (BCB among them) justifying the long-lasting high levels of Brazilian interest rate and the overvaluation of Real.

This paper aims at assessing the conduct of monetary policy after the introduction of a floating exchange rate regime and the adoption of inflation targeting (IT). More specifically, the main

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\(^1\) In Brazil, the basic interest rate goes by the acronym (Selic) for Sistema Especial de Liquidação e de Custódia (Special System for Settlement and Custody), the settlement system for most domestic securities of Brazilian central government.

\(^2\) It is also important to observe what happened to the volatility of the interest rate, which has gone down, because now the exchange rate absorbs some of the shocks. But in Keynes’s theory, a stable interest rate is important to preclude bearish speculative demands for money (the people that demand money because they expect interest rates to rise and so securities prices to go down).
purpose is to estimate BCB’s reaction function in the period 2000-2010. We propose a modified version of Taylor rule that includes a proxy for the international interest rate. This modification represents an important innovation with respect to the reviewed literature. The results, as we shall see, provide new evidence on BCB’s behavior and might support the argument that a so-called pro-conservative convention justifies BCB monetary policy. It is worth to note that our approach is essentially empirical, rather than theoretical.

This paper contains five sections in addition to this introduction. Sections 2 and 3 undertake a review of the literature on the Keynesian concept of convention and on Taylor rule, respectively. In section 4, we present our model, and estimate BCB’s reaction function using our modified version of Taylor rule. Based on estimated results, an evaluation is made of BCB’s conduct. In section 5, we argue that the empirical evidence might corroborate the pro-conservative convention thesis, and section 6 brings our conclusions.

2 – Convention: a brief review

2.1 – Keynes’ contribution

The concept of convention plays an essential role in Keynes’s theory given his understanding that in a capitalistic society some relevant political, social and economic variables are uncertain. According to Davidson (2002), Keynes implicitly assumes that an entrepreneurial economy is characterized by a nonegordic stochastic process. In it, “decision makers ‘know’ that they cannot reliably predict the future on the basis of any statistical analysis of past market data” (Davidson, 2002, p. 52). Agents’ behavior is based on expectations they form by “creating” the inexistent

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3 According to Keynes (1936, p. 162), “human decisions affecting the future whether personal or political or economic cannot depend on strict mathematical expectation, since the basis for making such calculations does not exist”. Hicks (1977, p. vii) put it more literally: “[agents] do not know what is going to happen and know that they do not know what is going to happen. As in history!”. This is a nonergodic concept of uncertainty, although Hicks did not know this when he elaborated it. He revealed to Davidson (2002, p. 52) in a 1983 letter: “You have now rationalized my suspicious, and have shown me that I missed a chance of labeling my own point of view as nonergodic” (emphasis in the original).

4 “Keynes implicitly rejected the classical ergodic axiom… With the later development of the theory of ergodic stochastic process analysis, it is possible now to interpret Keynes’s uncertainty concept in terms of this stochastic process” (Davidson 2002, p. 52). See also Carvalho (1992, ch. 3 and 4) and Dequech (2003, 2011).
information they need to make their decisions. Particularly, current knowledge is insufficient to
determine the mathematical expectation of the yield of an investment. Convention is fundamental in
this context: it is one of the devices deployed to circumvent such difficulties.

One can argue that Keynes himself did not formulate a proper definition of convention. Rather,
his presented concepts of convention and examples of conventional behavior (Dequech, 2011; Davis,
1997, 2005). Nevertheless, some authors consider such formulations as “definitions” of convention.
Following Orléan (1986), Dupuy (1989) argued that Keynes formulated two “definitions” of
convention.

The first one appears in chapter 12 of The General Theory to explain how evaluation of existing
“investments” is made in the stock exchange, as reflected in the price of shares:

[i]n practice we have tacitly agreed, as a rule, to fall back on what is, in truth, a convention. The
essence of this convention – though it does not, of course, work out quite so simply – lies in assuming
that the existing state of affairs will continue indefinitely, except in so far as we have specific reasons
to expect a change. This does not mean that we really believe that the existing state of affairs will
continue indefinitely (Keynes, 1936, p. 152; italics in the original).

Keynes (ibid., p. 148) justified the above quoted “definition” of convention as a consequence of
the weak confidence in forecasts of the future, because they are based on “facts about which our
knowledge is vague and scanty” and “for this reason the facts of the existing situation enter, in a
sense disproportionately, into the formation of our long-term expectations”. Keynes later on added
that, having to act without knowing what the future is likely to be, agents need to assume some
hypothesis about the future, which is, in fact, a convention: “[w]e tend, therefore, to substitute for the
knowledge that is unattainable certain conventions, the chief of which is to assume, contrary to all
likelihood, that the future will resemble the past” (Keynes, 1973, p. 124).

The propensity to follow the majority or average opinion is what Orléan (1986) and Dupuy
(1989) consider Keynes’s second “definition” of convention: “[t]he psychology of a society of
individuals each of whom is endeavoring to copy the others leads to what we may strictly term a

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5 Keynes uses the term “investment” to designate not only the purchase (or own production) of capital assets, but also the
purchase of financial assets, as of shares in the stock market (e.g., 1936, pp. 157-158).
conventional judgment” (Keynes, 1937a, p. 214; emphasis in the original). This concept of convention or example of conventional behavior is firstly mentioned in *The General Theory* to describe the logic of financial speculation, metaphorically illustrated by the beauty contest “in which the competitors have to pick out the six prettiest faces from a hundred photographs, the prize being awarded to the competitor whose choice most corresponds to the average preferences of the competitors as a whole” (1936, p. 156). In such situations where common references are not provided to the agents, as prevails in the financial markets, Keynes (1937a, p. 214) prescribed that the only rational behavior is to follow the others: “[k]nowing that our own individual judgment is worthless, we endeavor to fall back on the judgment of the rest of the world which is perhaps better informed. That is, we endeavor to conform to the behavior of the majority or the average”. In sum, “imitation” (Dupuy, 1989) or “informational mimetism” (Orléan, 1986; 1999) is Keynes’s second “definition” of convention.

Dequech (2011, p. 482), in his turn, suggests that Keynes formulated an “implicit concept” which, nevertheless, contained the essential features of a general concept of convention: social sharing, conformity with the conformity of others, and arbitrariness. The first one means that convention is an institution or “a socially shared pattern of thought (and possibly of behavior)” (Dequech, 2009, p. 73). The second implies that people follow conventions because others also do (partially at least). Arbitrariness denotes that a pattern which is not perceived as evidently inferior to the one being followed may replace it. Keynes (1936) argued that, in the case of a decision to buy capital goods, arbitrariness is mainly due to uncertainty, that is, to the precarious basis of knowledge for estimating its prospective yield. In the decision-making process of buying a share, conventional valuation “is established as an outcome of the mass psychology of a large number of ignorant individuals” (ibid., p. 154), which reinforces precariousness. Thus, “[it]is liable to change violently as a result of a

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6 Davis (1997, p. 150) argued that “Keynes’s post-*General Theory* writings do not add significantly to our understanding of Keynes’s thinking on the subject [convention]”.
sudden fluctuation of opinion due to factors which do not really make much difference to prospective yield; since there will be no strong roots of conviction to hold it steady” (ibid, p. 154).

In chapter 15 of *The General Theory* (“The Psychological and Business Incentives to Liquidity”), Keynes focuses on the phenomenological aspects of the interest rate. He at first affirms that it is a psychological phenomenon, but eventually concludes that “[i]t might be more accurate, perhaps, to say that the rate of interest is a highly conventional, rather than a psychological, phenomenon” (ibid., p. 203). He reached that conclusion based on the following reasoning. A monetary policy that public opinion perceives as having an experimental nature or being easily subject to change may not achieve the target level of the interest rate. Instead, it “may prove easily successful if it appeals to public opinion as being reasonable and practicable and in the public interest, rooted in strong conviction, and promoted by an authority unlikely to be superseded” (ibid., p. 203). Summing up, the interest rate is mostly conventional “for its actual value is largely governed by the prevailing view as to what its value is expected to be” (ibid, p. 203).

Another relevant issue addressed in chapter 15 is whether conventions are short or long-lived. As mentioned before, Keynes’s financial convention is precarious and liable to drastic changes. Keynes emphasized the link between convention being short-lived and it being built upon a precarious basis of knowledge. In a very relevant statement about monetary policy he warned that precariousness may benefit the monetary authority in its aim of reducing the long term interest rate in order to achieve full employment:

(...) precisely because the convention is not rooted in secure knowledge, it will not be always unduly resistant to a modest measure of persistence and consistency of purpose by the monetary authority. Public opinion can be fairly rapidly accustomed to a modest fall in the rate of interest and the conventional expectation of the future may be modified accordingly; thus preparing the way for a further movement (...) (ibid, p. 204).

According to him, the abandonment of the gold standard in Great Britain represents a very illustrative example of this expected result. As a matter of fact, major movements of the interest rate were then achieved by “a series of discontinuous jumps, as the liquidity function of the public,
having become accustomed to each successive reduction, became ready to respond to some incentive in the news or in the policy of the authorities” (ibid, p. 204).

However, conventions are not always fragile and can be long-lived. Keynes asserted that “[a]ny level of interest which is accepted with sufficient conviction as likely to be durable will be durable” (ibid., p. 203; italics in the original), a proposition further reinforced by the following statement:

(...) it [the rate of interest] may fluctuate for decades about a level which is chronically too high for full employment; – particularly if it is the prevailing opinion that the rate of interest is self-adjusting, so that the level established by convention is thought to be rooted in objective grounds much stronger than convention (…) (ibid., p. 204).

Finally, it is worth mentioning that, as proposed by Davis (1997, p. 155), Keynes “did not go very far in The General Theory towards explaining the various different ways in which conventions operated and changed” and, more specifically, if Keynes were to write a second edition of The General Theory “he would have at least attempted to say more about how confidence affects stability or instability of convention governing investment”.

2.2 – The case of Brazil: the problem of high interest rates and the overvaluation of Real

The concept of convention may be useful to explain the long-lasting high level of Selic rate, as proposed by Bresser and Nakano (2002), Nakano (2006), Erber (2008a, 2011), Chernavsky (2007, 2008), Corrêa (2011) and Oreiro (2012).

Since 1995, Brazilian inflation has been under control (average of 7.5% p.y. from 1995 to 2010). In 1999, the exchange rate anchor was abandoned and current account deficit was offset. After 2000, government managed to achieve primary surplus that nearly peaked 4% of GDP in 2005. Such positive results were expected to produce a substantial cut in the basic interest rate, but they did not. The economic fundamentals seem not to be the reason why Selic remained (and still remains) so high. There must be other reasons to explain this awkward fact, and the concept of convention may help us find them.

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7 For the debate on the so called “problem of the interest rate” in Brazil, see Modenesi and Modenesi (2012).
Bresser-Pereira and Nakano (2002) originally sought inspiration in the concept of convention to explain Selic long-lasting excessive high level. They suggest that a convention has been established according to which “after a long period of a persistently high interest rate, it is natural that a fear of reducing it arises and grows to a point of becoming a convention. This is a perverse convention indeed, and needs to be overcome” (p. 169, our translation).

According to Nakano (2006), in the period 2005-2006, inflation had been put under control, demand pressure was inexistent – unemployment was high, industrial production was falling and fiscal primary surplus was 4% of GDP. The international conjuncture was also highly favorable: the world economy was growing, international liquidity conditions were propitious, Brazil’s sovereign risk was at its lowest historical level, and current account surplus reached US$ 13 billion. In sum, economic fundamentals and external conditions were exceptionally suitable for a sharper decrease in Selic. However, BCB did not take advantage of that conjuncture. As Nakano argued (ibid.), the (too) slow process of Selic reduction that started in 2005 could only be justified by BCB’s accepting a convention according to which: i) Selic nominal rate floor, although considerably high, should remain around 14% p.y.; and ii) monetary policy should be based on a Taylor rule, aligned with the New Consensus on Monetary Policy, in order to smooth interest rate movements (more details in section 3). Nakano concluded his analysis hopelessly: “None of this makes much sense in the present conjuncture” (2006, p. A-12, our translation).

It is implicit to Nakano’s argument the idea that, having put inflation under control by imposing a high interest rate policy, economic agents, BCB among them, came to share a convention that lower interest rate levels (in line with the rates of low-inflationary economies) would jeopardize the economically and socially costly process of price stabilization initiated with the Real Plan in 1995. In effect, the memory of the undesirable consequences of chronic and extremely high inflation is believed to have arisen the socially shared feeling that lowering the interest rate would represent the threat of hard old times returning – and nobody wants to go through that ever again. So, given that
uncertainty makes it foolish to believe that one can forecast the real consequences of faster cuts in interest rates, agents eventually came to agree (share the convention) that keeping the interest rate at a high level was the best course of action in the case of Brazilian economy.

Summing up in Keynesian terms, knowing their knowledge to be insufficient to form true expectations, agents establish the convention, “contrary to all likelihood, that the future will resemble the past” (Keynes, 1973, p. 124). We agree with Correa (2010) that this convention has the three main features of a general concept of convention as proposed by Dequech (2009, 2011): social sharing, since the understanding that Selic rate must remain high is clearly a socially shared pattern of thought; conformity with the conformity of others, which implies that agents agree to the high level of Selic, partially at least, because others also do; and arbitrariness, meaning that, given the lack of knowledge or the uncertainty as to the consequences of lowering Selic faster, agents prefer to take the slow course. As Nakano observed, “no country other than Brazil, in the history of mankind, has kept interest rates so high for such a long period” (Nakano, 2005, p. 10, our translation).

Nowadays, a growing number of economists recognize the arbitrariness of Brazilian high interest rate level, including some who were policy-makers when Selic was subject to a major overshooting during the Real Plan in the period 1995-98. A good example is Bacha (2010, p. 1; our translation), who wrote:

The interest rate in Brazil is 5.5% per year and, thus, is most probably a point out of the curve in the distribution of the world’s real interest rates. Since 1999, the macroeconomic triad – primary surplus, floating exchange rate and inflation targeting – has allowed for cuts in the real interest rate. But the lowering has been insufficient to adjust it to the level practiced by most countries.

Erber (2008a, 2008b, 2011) took an innovative approach when stated that Brazilian excessively tight monetary policy can only be understood from the perspective of political economy. The question is not merely macroeconomic, but the result of a coalition of interests revolving around the maintenance of interest rate level so high. In his own words:

8 According to Correa (2010) it is not an easy task to support the thesis that convention determines Selic. Notwithstanding, she eventually identifies the three essential features of a convention in the process of Selic setting. She aims at demonstrating the conventional character of Selic setting under IT, but not explaining why its level is so high.
(...) a coalition of interests was formed, structured by the public debt and the high interests earned on such debt. Such coalition operates under a tacit agreement that the Brazilian state has to pay high interests. In order words, there is a convention firmly grounded on powerful interests about the payment of interest rates. (…) what count is the convention that interests are due. (Erber, 2008a, p. 34)

According to Erber (2011), the overvaluation of real is another pillar of the coalition of interests sustaining BCB conservatism: “[t]he exchange rate appreciation is the Siamese-sister of high interest rates”. As Erber (2011, p. 16) pointed out, the long-lasting appreciation of Real has significantly benefited importers, consumers and enterprises; and the two sisters act in the benefit of “companies that are able to access external credit and all who want to send resources abroad, either for investment (especially commodity producers) as interest, profits and dividends”. In his opinion, such a convention benefits not only the agents of the financial markets, the “rentiers” and financial institutions, providing them with high earnings derived from high interest rate payments, but also the BCB itself, which collects as a benefit the reputation of being able to achieve his targets. As he says:

A coalition of interests has been formed in support of the high interest and the overvalued currency, and has established a convention that those are key elements to the country’s development... This coalition of interests has access to powerful tools to consolidate and disseminate its development convention. The most explicit of those instruments is controlled by the financial system, as demonstrated by the way it effectively handled Brazilian new government’s expectations during the crises that took place in the year 2002. But there are other, more subtle instruments, such as political campaign financing, liaisons with Congressmen, engagement in “entrepreneurial-bureaucratic circles” (…) and the relations with media groups responsible for disseminating the convention of stability. The Central Bank is a key member of that coalition (…) but this does not mean that it has been “captured” by the financial system in the sense of a “public choice”. Establishing the coalition as well as the convention that socially represents it requires that the Central Bank and private agents benefit from the same policy – in this case, the good reputation of achieving targets and the profits from high interest and an overvalued currency. (Erber, 2011, p.43-4, our translation)

Chernavsky (2007, 2008) also suggested the high level of Selic relates to a convention that has been established by the BCB and public debt holders, seeking to obtain the highest payoffs possible. In this context, self-referencing logic – rather than economic fundamentals – is the basis for determining Selic.

Finally, as pointed out by Stiglitz (2008), monetary policy-making has historically been subject to “fads and fashions”. In Keynesian terms, we may properly say that anti-inflationary policy has
been marked by different conventions according to which a specific monetary regime is seen as the best one and offers a simple way – the use of a single instrument – to control inflation.

In fact, the history of monetary regimes has three paradigmatic moments. The gold standard was the conventional policy of the late 19th and early 20th centuries. In the 1970’s and early 1980’s, it was replaced by the use of monetary aggregates targets – prescribed by Friedman’s monetarism. Since the 1990’s, IT (and the belief that interest rate is the only instrument apt to curb inflation) has become the conventional regime prescribed by the New Consensus on Monetary Policy (NCMP). None of those regimes is rooted in solid theoretical grounds or robust empirical evidence. Nevertheless, they all represent, at their turn, a socially shared belief as to the correct way of conducting monetary policy. In Stiglitz’s view:

[t]he World’s central bankers are a close-knit club, given to fads and fashions. In the early 1980’s, they fell under the spell of monetarism, a simplistic economic theory promoted by Milton Friedman. After monetarism was discredited – at great cost to those countries that succumbed to it – the quest began for a new mantra. The answer came in the form of “inflation targeting,” which says that whenever price growth exceeds a target level, interest rates should be raised. This crude recipe is based on little economic theory or empirical evidence; there is no reason to expect that regardless of the source of inflation, the best response is to increase interest rates. One hopes that most countries will have the good sense not to implement inflation targeting; my sympathies go to the unfortunate citizens of those that do. Among the list of those who have officially adopted inflation targeting [is] Brazil. (Stiglitz, 2008)

3 – The Taylor Rule: a Brief Review

A keystone of the New Consensus on Monetary Policy, the Taylor rule holds that central banks should determine interest rates aiming at achieving an (explicit or implicit) inflation target and keeping GDP growth rate near is potential level. NCMP represents the new conventional way of understanding the macroeconomic phenomena and thus offers the new conventional way of dealing with macroeconomic issues (e.g. inflation and unemployment) (Blinder, 1981; 1997; Taylor, 2000; Allsopp e Vines, 2000; Romer, 2000). It has emerged from the growing popularity of IT regime and the eventual acceptance that, even where such regime is not adopted, the main instrument of monetary policy still is the interest rate, and no longer the monetary aggregates of some decades ago, as proposed by Friedman’s monetarism.
Taylor (1993) suggests that the conduct of monetary policy should be modeled by a feedback rule that (positively) relates the basic interest rate to output gap and to deviations of actual inflation rate from its target. He proposes that the Federal Reserve determines the FED Funds rate in accordance with the following reaction function:

\[ i_t = \alpha_1 + \alpha_2 (\pi_{t-1} - \pi^*) + \alpha_3 y_t, \quad \pi_t = \pi_{t-1} + \tilde{i} \]  

(1)

Where: \( i_t \) is Federal Funds rate; \( \tilde{i} \) is long-run equilibrium real interest rate; \( \pi_{t-1} \) is inflation rate (past year); \( \pi^* \) is inflation target; and \( y_t \) is percent deviation of GDP from its trend. Considering that the real GDP trend in the USA (between the first quarter of 1984 and the third quarter of 1992) was of 2.2%, with an inflation target of 2%, the author holds that equation (1) should show the following parameters:

\[ i_t = \pi_{t-1} + 2 + 0.5(\pi_{t-1} - 2) + 0.5 y_t \]

(2)

According to equation (2), the FED Funds rate raises when: inflation increases above the (2% per year) target; and/or GDP rises above its trend (target). When both rates – inflation and GDP growth – are equal to their respective targets, interest rate is maintained (by construction) at 4% p.y. (or 2% in real terms). A rise in inflation produces a (positive) response more than proportionate to interest: higher inflation results in an amplified real interest rate. Taylor revealed he had chosen the coefficients of equation (2) based on informal judgment, and did not hide his surprise in finding that they represented fairly well the interest rate trajectory from 1987 to 1992.

Despite providing an accurate description of the actual behavior of the FED Funds rate, Taylor rule does not incorporate what orthodoxy stresses as a stylized fact – which we may properly call a convention – concerning contemporary monetary policy conduct: central banks tend to calibrate basic interest in a smooth and continuous way. In fact, monetary authorities are usually contrary to interest rate shocks: inflation and/or GDP deviations from their targets do not usually lead to drastic and immediate reaction from monetary authorities, who prefer adjusting them gradually, instead (Goodfriend, 1987; Mankiw and Miron, 1991; Rudebusch, 1995; Thorton, 2004).
According to orthodox theory, two of main reasons for the high degree of serial correlation in interest rates are: the fear that abrupt movements in interest may lead to crises in the financial markets (Goodfriend, 1991); and the uncertainty regarding the effects of interest rate variations (Sack, 2000). In the first case, central banks act gradually in order to avoid a financial crisis resulting from an interest rate shock. In the second case, due to imperfect knowledge about the monetary policy transmission mechanism, central banks base their decisions on a sequential trial-and-error process that would smooth down interest rate movements. Clarida, Galí and Gertler (1999) proposed a major modification to Taylor’s rule (1993) to incorporate that convention, by adding a smoothing term (or an autoregressive component) that may capture the relation between the (current) interest rate and its past values. Thus, the (current) interest rate equals its lagged value, plus a Taylor component, as represented in equations (3) and (4):

\[ i_t = \alpha_1 i_{t-1} + (1 - \alpha_1) i^*_t \]  
\[ i^*_t = \alpha_2 + \alpha_3 (\pi^E_{t+1} - \pi^*) + \alpha_4 y^E_{t+1} \]  

\( \alpha_1 \in (0,1), \ \alpha_2 = \pi^* + \tilde{i}, \ \alpha_3 > 1, \alpha_4 > 0 \)

Replacing (3) by (4), we have:

\[ i_t = \alpha_1 i_{t-1} + (1 - \alpha_1) \left[ \alpha_2 + \alpha_3 (\pi^E_{t+1} - \pi^*) + \alpha_4 y^E_{t+1} \right] \]  

Parameter \( \alpha_1 \) represents the degree of smoothing of interest rate changes. The higher is its value, the greater is the value of the interest rate inertia (or serial correlation). One should note that equation (5) refers to a more general formulation than Taylor’s original proposition: if \( \alpha_1 = 0 \), equation (5) is reduced to equation (1). In this case, interest rate is adjusted immediately: there is no smoothing. In opposition, if \( \alpha_1 \to 1 \), interest rate comes near a first-order autoregressive process. BCB’s reaction function is similar to this case, as we will show in section 4. If \( \alpha_3 < 1 \) or \( \alpha_4 < 0 \), equation (5) is said to be destabilizing both inflation and the GDP (Clarida, Galí and Gertler, 2000). In the first case, the
central bank let real interest rate decline as inflation rises. In the second case, monetary policy is procyclical: a rise in GDP growth (in relation to its potential level) is accompanied by a drop in interest.

Equation (5) represents a forward-looking rule as opposed to Taylor’s (1993), which is backward-looking. According to (5), interest rate rises in response to a rise in inflation expectation (\( \pi_{t+1}^E \)) and in the expected output gap (\( y_{t+1}^E \)). This formulation is more explicit in acknowledging the fact that lags in the transmission of monetary policy (Friedman, 1948) require central banks to adopt a prospective behavior. It is indeed a more general formulation, that allows monetary authorities for forming their expectations based on a wider set of information, and not just on the lagged values of the studied variable. However, this is not a substantial difference, as in the absence of a reliable antecedent indicator for inflation its lagged values may be a good proxy for future inflation.

Clarida, Galí and Gertler (1999) apply equation (5) to the USA economy over the period 1960-1996. Table 1 shows the values of the parameters estimated for two sub-samples, the pre-Volcker era (between the first quarter of 1960 and the second quarter of 1979), and the Volcker-Greenspan era (between the third quarter of 1979 and the fourth quarter of 1996).

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<tr>
<th>Table 1 – FED’s Reaction Function: 1960: T1 to 1996: T4</th>
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<tr>
<td>Period</td>
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<td>Pre-Volcker</td>
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<td>Volcker-Greenspan</td>
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Note: Standard error in parentheses.
Source: Clarida, Galí and Gertler (1999).

Clarida, Galí and Gertler (2000) conclude that in the era before Paul Volcker monetary policy was strongly accommodating. On average, the real interest rate declined as inflation expectations rose (\( \alpha_3 = 0.83 \)). In contrast, in the Volcker and Alan Greenspan era, FED adopted a clearly proactive attitude. On average, the real interest rate rose along with the inflation expectations (\( \alpha_3 = 2.15 \)).

The aforementioned articles are main references in a wide literature which, however, is not of specific interest in this paper. The volume organized by Taylor (1999) provides a good overview of
the extensive literature (mostly orthodox) on the subject. Haight (2008) presents a Post Keynesian critique of what he correctly identifies as being the essence of Taylor rule – the proposition that interest rates should always be raised (reduced) proportionally more than a given rise (fall) in inflation rate. For a critical review on the Taylor rule (and the NCPM) literature, see Rochon (2006).

Especially after the adoption of IT, estimates of Taylor rule were made for the Brazilian economy, amongst which the works undertaken by Figueiredo and Ferreira (2002), Minella et al. (2002), Favero and Giavazzi (2002), Mendonça (2007), Gonçalvez and Fenolio (2007), and Modenesi (2011).  

In brief, Brazilian literature provides strong evidence that BCB’s interest rate policies follow a Taylor rule. Since the adoption of IT in mid-1999, BCB has been acting proactively in regard to inflation. There is strong evidence that a rise in inflation generates a more than proportional response from Selic: the coefficient of inflation gap is greater than the one verified in reviewed literature. However, there is only weak evidence showing that BCB reacts counter-cyclically to the output gap, as it was expected. Only a few works have included this variable in their regressions. For instance, Minella et al. (2002) found that the output gap is not significant or does not have the expected sign. Gonçalvez and Fenolio (2007) and Modenesi (2011), in their turn, showed that BCB reacts to output gap: although the corresponding coefficient has the expected sign it is not strongly statistically significant. There is also evidence that the equilibrium interest rate is quite high and that BCB has been practicing a high degree of interest rate smoothing. However, the reviewed literature presents one major empirical problem: most papers use very small samples, ranging from (only) 28 to 71 observations, which definitely reduces the robustness of the results.

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10 Despite working with 71 observations, Mendonça (2007) includes the year 1999 in his sample. But including data of a period of transition between two different monetary regimes may have jeopardized the robustness of his results. As an exception, Modenesi (2011) works with a bigger sample (96 observations) that excludes the year 1999.
4 – A Modified Version of Taylor Rule for 11 years of Inflation Targeting (2000-2010)

4.1 – Data base, functional form, and unit root test

The adoption of IT in June 21, 1999, represented an important structural break, resulting in deep changes in the conduct of monetary policy, which until then had been based on an exchange rate targeting regime (Modenesi, 2005, chap. 4 and 5). To enhance robustness, we excluded the first six months of IT adoption from our sample, which therefore covers the period from January, 2000, to December, 2010. Also, our sample contains 132 monthly observations, a number much higher than the average of observations contained the aforementioned works. Thus, our estimates are considerably robust.

With the purpose of evaluating BCB’s behavior during the adoption of IT, we have estimated a backward-looking modified Taylor rule for the Brazilian economy. The term “modified” refers to an important innovation with respect to the reviewed literature: the inclusion of a proxy for international interest rate in the original equation, resulting in model (I):

\[
i_t = \alpha_1 i_{t-1} + (1 - \alpha_1) \left[ \alpha_2 + \alpha_3 (\text{IPCA}_{t-1} - \pi^*_t) + \alpha_4 (\text{Ind}_{t-1} - \text{Ind}_{t-1}^*) + \alpha_5 \text{libor}_t \right]
\]  

(I)

Where: \(i_t\) is Selic rate (in month \(t\)); \(\text{IPCA}_{t-1}\) is inflation (last 12 months before month \(t\)); \(\pi^*_t\) is inflation target (last 12 months before month \(t\)); \(\text{Ind}_{t-1}\) is industrial output growth rate (last 12 months before month \(t\)), used as proxy for GDP; \(\text{Ind}_{t-1}^*\) is potential industrial output growth rate (last 12 months before month \(t\)); and \(\text{libor}_t\) is London interbank rate (in month \(t\)). All variables are in logarithmic form.\(^{11}\)

The estimates of model (I) presented serial correlation in the residuals, as usually happens. This problem was overcome by introducing a second lag of the dependent variable, resulting in model (II):

\[\ln(y_t) = \ln(y_{t+100})\]  

Note that the estimated coefficients represent the variable-elasticity of Selic. Selic is set by BCB. The index of industrial production and IPCA are provided by IBGE. The potential industrial output growth rate is given by the HP filter. Libor is the short-term interest rate of United Kingdom and is provided by Ipeadata.

\(^{11}\) Where \(\ln(y_t) = \ln(y_{t+100})\).
Usually the constant term represents the equilibrium interest rate (item 3.2), but the usual interpretation does not apply here. In our model the equilibrium interest rate has been broken into two components: i) what we may call the pure domestic equilibrium interest rate ($\alpha_3$) in equation (II); which must be added to ii) an external component, given by (a fraction of) the international interest rate ($\alpha_3 \text{libor}_t$). This innovative solution is due to accommodate the fact that in open small economies, like Brazil’s, domestic interest rate are not set independently of the external rate (accordingly with the so called interest rate parity rule).

Table 2 shows the results of Augmented Dickey-Fuller (ADF), DF-GLS, and KPSS tests. Given the well-known low power of unit root tests (Elder and Kennedy, 2001), we have performed three different tests to enhance robustness. In face of the provided set of evidence we will take all series as stationary (as found in the literature review).

<table>
<thead>
<tr>
<th>Variable</th>
<th>ADF (Statistic t)</th>
<th>ADF-GLS (Statistic t)</th>
<th>KPSS (LM Statistic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selic</td>
<td>-2.430142</td>
<td>-2.026433*</td>
<td>0.992916*</td>
</tr>
<tr>
<td>Dipca</td>
<td>-3.259937*</td>
<td>-3.202539*</td>
<td>0.323417</td>
</tr>
<tr>
<td>Dind</td>
<td>-2.952180*</td>
<td>-2.319252*</td>
<td>0.045902</td>
</tr>
<tr>
<td>libor</td>
<td>-1.221146</td>
<td>-0.267400</td>
<td>0.687763**</td>
</tr>
</tbody>
</table>

Notes: *Reject $H_0$ at 5% level of significance. **Reject $H_0$ at 5% but not at % level. See Hamilton (1994). Source: Authors’ elaboration.

4.2 – Results

Table 3 shows the main results of the three variants of model (II). They differ only as to output gap lags (Dind): the first line shows its present value; the second line, its lagged value; and the last line, the second lag.

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12 All tests have been made using the test equation with an intercept and without a trend. This choice is based on the observation of the graphics of the series, which does not present a clear trend (Elder and Kennedy, 2001).
13 At a first sight the results may not appear very conclusive. Notwithstanding, for all variables, at least one of the performed tests indicates stationarity. Considering the usual low power of those tests we can accept that all series are stationary.
Table 3 – Estimates of BCB’s Reaction Function (AR(2)): 2000-2010

<table>
<thead>
<tr>
<th>Model</th>
<th>AR (1) ($\alpha_1$)</th>
<th>AR (2) ($\alpha_2$)</th>
<th>Constant ($\alpha_3$)</th>
<th>Dipca ($\alpha_4$)</th>
<th>Dind ($\alpha_5$)</th>
<th>Libor ($\alpha_6$)</th>
<th>Adj. $R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>II.1: Dind</td>
<td>1.741124*</td>
<td>-0.774549*</td>
<td>-4.30635***</td>
<td>0.786957*</td>
<td>0.234580</td>
<td>0.933836**</td>
<td>0.994631</td>
</tr>
<tr>
<td></td>
<td>(0.057716)</td>
<td>(0.053556)</td>
<td>(2.346044)</td>
<td>(0.280995)</td>
<td>(0.181230)</td>
<td>(0.425894)</td>
<td></td>
</tr>
<tr>
<td>II.2: Dind (-1)</td>
<td>1.727800*</td>
<td>-0.759561*</td>
<td>-4.30006***</td>
<td>0.795660*</td>
<td>0.315758†</td>
<td>0.843171***</td>
<td>0.994696</td>
</tr>
<tr>
<td></td>
<td>(0.058157)</td>
<td>(0.054423)</td>
<td>(2.440262)</td>
<td>(0.291371)</td>
<td>(0.217320)</td>
<td>(0.455975)</td>
<td></td>
</tr>
<tr>
<td>II.3: Dind (-2)</td>
<td>1.710648*</td>
<td>-0.743240*</td>
<td>-4.31925***</td>
<td>0.798397*</td>
<td>0.336203†</td>
<td>0.824242**</td>
<td>0.994723</td>
</tr>
<tr>
<td></td>
<td>(0.059751)</td>
<td>(0.056317)</td>
<td>(2.370368)</td>
<td>(0.282513)</td>
<td>(0.214742)</td>
<td>(0.443743)</td>
<td></td>
</tr>
</tbody>
</table>

Notes: Standard error in parentheses. * Significant at 1%. ** Significant at 5%. *** Significant at 10%. † Significant at 15%. Source: Authors’ elaboration.

Amongst the three variants of this model, (II.2) has the best statistical properties. Particularly, the Breusch-Godfrey test for serial correlation of residuals (LM) is more favorable to model (II.2) than to (II.3) (Table 4). Therefore, for analytical purpose, we have chosen model (II.2), hereafter simply referred to as simply “the model”. It represents BCB’s behavior quite fairly. Such high adherence results from a high adjusted $R^2$ (0.99), which was also found in the reviewed literature (between 0.92 and 0.98).

Table 4 – Breusch-Godfrey Test for Serial Correlation (LM): Model II Class

<table>
<thead>
<tr>
<th>Model</th>
<th>Lags</th>
<th>F Statistics</th>
<th>Probability</th>
<th>Obs. $R^2$</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.1: Dind</td>
<td>2</td>
<td>1.684850</td>
<td>0.196671</td>
<td>1.755539</td>
<td>0.185182</td>
</tr>
<tr>
<td>II.2: Dind (-1)</td>
<td>2</td>
<td>2.039466</td>
<td><strong>0.155787</strong></td>
<td><strong>2.119101</strong></td>
<td><strong>0.145472</strong></td>
</tr>
<tr>
<td>II.3: Dind (-2)</td>
<td>2</td>
<td>3.601762</td>
<td>0.060025</td>
<td>3.696937</td>
<td>0.054512</td>
</tr>
</tbody>
</table>

Source: Authors’ elaboration

As we have used a sample and an equation considerably different from the ones adopted in the reviewed literature, the results we have produced are also different. The main difference concerns the degree of inertia of interest rate changes, which is extremely high. As seen in (item 3.2), interest rate inertia is measured by the weight of the parameters of autoregressive component(s). In the estimated model, the sum of the coefficients of both autoregressive terms is around 1 ($\alpha_1 + \alpha_2 = 0.97$), meaning a very high degree of interest rate autocorrelation. In the reviewed literature, the weight of the autoregressive component(s) is lower, ranging from 0.72 to 0.92.

A high degree of interest smoothing means reduced sensibility to the state of domestic economy. In other words, when setting Selic, BCB barely takes into account inflation ($Dipca$) and output ($Dind$) gaps. Intuitively, one can realize that, even in the face of a significant drop in inflation...
and/or a drastic slowing down of the economy, BCB acts very gradually, reducing interest much too slowly and by much too little.

The insensitiveness of BCB gets more serious when it comes to the output gap. As found in the literature review, BCB seems not to pay much attention to it: output gap coefficient is statistically significant only at 15% percent level of significance and has very low magnitude ($\alpha_5 = 0.316$). The sensitiveness of BCB to inflation gap ($\alpha_6 = 0.796$) is highly statistically significant (at 1%). Similar results have also been achieved by Modenesi (2011). The novelty presented here is the evidence that BCB reacts to foreign interest rate when setting the basic interest rate. Libor coefficient presents relatively high magnitude ($\alpha_6 = 0.843$) and is statistically significant at 10% level of significance.

Finally, as long as the estimated model refers to variables in logarithm, the constant obtained above is meaningless. Howsoever, through a simple algebraic manipulation we can obtain what we call pure domestic equilibrium interest rate. The constant term is positive and high ($\alpha_3 = 10.07$) – a result also found in the reviewed articles –, showing a very high level of what we define as the pure domestic equilibrium interest rate. As mentioned before, the usual interpretation of the constant term does not directly apply here: this level is lower than the one obtained in the reviewed studies, because we have controlled for foreign interest rates (see Section 5 for more details). The constant term high magnitude is a fundamental sign of conservatism that marks monetary policy in Brazil.

5 – The Pro-Conservatism Convention in Monetary Policy

Although one cannot really prove the existence of a convention, the evidence presented in section 4 might support the thesis according to which Selic setting is based on a pro-conservative convention, and might as well support the conclusion that monetary policy is marked by excessive conservatism. Evidence shows that BCB sets Selic based on a Taylor rule, aligned with NCMP. In addition, BCB’s reaction function presents three distinctive features: 1) a high weight of autoregressive components; 2) a high level of pure domestic equilibrium rate, which must be added
to the external component; meaning that BCB sets Selic aiming at maintaining 3) a very high
differential between domestic and foreign interest rates.

As proposed by Nakano (2006), BCB strictly follows a Taylor rule, a key element of the pro-
conservative convention endorsing high interest rates in Brazil (Item 2.2). The adoption of Taylor
rule “ties the hands” of BCB as it targets no other variable than inflation. Additionally, interest rate is
considered the only instrument that should be used to maintain price stability. Consequently, the
complexity of inflation dynamics is put aside: inflation is conventionally considered a demand
phenomenon – always and everywhere, as proposed by Friedman (1968). Besides that, BCB’s
reaction function parameters are quite singular. For instance, they differ significantly from the ones
estimated for the US by Clarida, Galí and Gertler (1999).

The first distinctive parameter implies that BCB has stretched much too far the orthodox
convention that interest movements should be gradual. It has practiced smoothing to an extremely
high degree, as measured by the high weight of the estimated autoregressive components. The weight
of autoregressive components in BCB’s reaction function ($\alpha_1 + \alpha_2 = 0.97$) is considerably higher
than the weight of the autoregressive components in FED’s reaction function, whether in the pre-
Volcker era ($\alpha_1 = 0.68$) or in the Volcker-Greenspan period ($\alpha_1 = 0.79$). As mentioned (items 3.2 and
4.2), the counterpart of autoregressive component high weight is the little importance BCB gives to
the state of domestic economy. In Brazil, monetary authority is insensitive notably to the behavior of
inflation and to the level of economic activity ($1 - \alpha_1 - \alpha_2 = 0.03$), unlike FED, who pays more
attention to the economic situation ($1 - \alpha_1 = 0.21$) in the making of its decisions.

To say that BCB conducts monetary policy based on the orthodox convention that interest rate
movements should be smooth is nothing new. The agency openly defends this position and BCB’s
conservatism is of public domain. For instance, its former chairman declared that: “[the] most
prudent attitude seems indeed to adjust the variables more gradually than if there were absolute
certainty regarding the economy and its parameters” and, as a consequence, “gradualism minimizes
the chances of monetary policy undergoing sudden reversion” (Meireles *Apud* Ribeiro, 2008). What *does* surprise is BCB’s degree of conservatism. The evidence shows us a central bank that is extremely loath to make any movements – however small – in the interest rate. BCB virtually does not take the state of domestic economy into account. In short, changes in interest only happen in an excessively gradual pace (accordingly to Nakano, 2006).

The high inertia of Selic can also be seen in Table 5, which shows absolute variations in Selic by magnitude. Indeed, BCB was highly reluctant to alter Selic by more than 0.5 p.p. at COPOM meetings. From January/2000 to December/2010, the Committee met 118 times (ordinarily and extraordinarily) and most of the times BCB kept Selic unchanged. Variations of up to 0.5 p.p. represented 79% of the total of changes. The rate was adjusted more than 1.0 p.p. in less than 7% of the Committee’s meetings. No changes were higher than 3.0 p.p., and changes of 3.0 p.p. of magnitude happened in only 2% of the meetings. (Note that as Selic averaged 15.7% p.y. a change of 0.5 p.p. may be considered irrelevant).

<table>
<thead>
<tr>
<th>Absolute Magnitude (p.p.)</th>
<th>Absolute Frequency</th>
<th>Relative Frequency</th>
<th>Cumulative Relative Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>48</td>
<td>40.7</td>
<td>40.7</td>
</tr>
<tr>
<td>0.25</td>
<td>13</td>
<td>11.0</td>
<td>51.7</td>
</tr>
<tr>
<td>0.50</td>
<td>32</td>
<td>27.1</td>
<td>78.8</td>
</tr>
<tr>
<td>0.75</td>
<td>9</td>
<td>7.6</td>
<td>86.4</td>
</tr>
<tr>
<td>1.00</td>
<td>8</td>
<td>6.8</td>
<td>93.2</td>
</tr>
<tr>
<td>1.50</td>
<td>4</td>
<td>3.4</td>
<td>96.6</td>
</tr>
<tr>
<td>2.00</td>
<td>1</td>
<td>0.8</td>
<td>97.5</td>
</tr>
<tr>
<td>2.50</td>
<td>1</td>
<td>0.8</td>
<td>98.3</td>
</tr>
<tr>
<td>3.00</td>
<td>2</td>
<td>1.7</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>118</strong></td>
<td><strong>100.0</strong></td>
<td></td>
</tr>
</tbody>
</table>

Source: Authors’ elaboration based on BCB data.

However, inertia is not sufficient to explain the conservatism in monetary policy. In fact, inertia is symmetric: a rise in inflation or in output gap (or even in Libor) also does not cause an abrupt hike in the basic rate.

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14 COPOM is the acronym for Federal Open Market Committee (FOMC).
The second distinctive parameter of the estimated reaction function reveals that BCB is not only averse to changing Selic. The key-element of its conservatism is the high level of the *pure domestic* equilibrium interest rate: 10.1% p.y. It means that, if inflation target is systematically achieved ($Dipca = 0$) and output systematically equals its potential ($Dind = 0$), Selic would converge to 10.1% plus an *external* component, which is related to the actual level of *libor, ceteris paribus* (solid gray line in Graph 1).\(^{15}\)

**Graph 1 – Simulations of Selic for Dipca = Dind = 0**

Source: Authors elaboration.

The third distinct estimated parameter implies that, when setting Selic, BCB aims at keeping the interest rate differential around 10 p.p. with respect to international interest rate (measured by Libor). Other simulations can also illustrate the high level of *pure domestic* equilibrium rate – as well as the relevance BCB holds to the *external* component. Supposing that both inflation and output gaps and also Libor equal zero ($Dipca = Dind = libor = 0$, for all $t$), Selic converges to 10.1%, *ceteris paribus* (dashed line in Graph 1). Alternatively, when both inflation and output gaps equals zero and if libor equals 4.0% ($Dipca = Dind = 0$ and *libor = 4%*, for all $t$), Selic converges to 13.8%, *ceteris paribus* (solid black line). For instance, to achieve the (average) level of interest rates set in developing countries during the analyzed period, around 6.0% p.y., a permanent and drastic deflation of 9.5% would be needed, *ceteris paribus* (i.e., $Dipca = -9.5\%$, for all $t$, given the actual behavior of

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\(^{15}\) The simulations presented here assume the constancy of all relevant parameters of BCB’s reaction function (model II.2). They do not constitute a model for forecasting Selic. From now on, the terms *Selic, Dind, Dipca* and *libor* refer to the level and not to the logarithmic form.
Dind and libor). Alternatively, it would be necessary a huge and perennial output gap of 25%, ceteris paribus (i.e., \(Dind = -25.0\%\), for all \(t\), given the actual behavior of Dipca and libor).

Briefly, one may say that, as long as the pro-conservative convention prevails, Selic rate will hardly be reduced in a satisfactory way. Massive and chronic deflation or recession would be needed if Selic were to reach a reasonable level.

It is worth to mention that our results contradict the current widespread idea that the Brazilian equilibrium interest rate has experienced a sharp decline recently (especially after 2008). According to our model, the reduction of Selic reflects to a great extent the abnormal decline of foreign interest rates that followed the subprime crisis. The pure domestic equilibrium interest rate remains stable and very high. The external component varies systematically according to Bank of England’s decisions. Remind that amongst the non-autoregressive terms the libor-elasticity of Selic is the greater. This means that BCB reacts more intensively to changes in foreign interest rates than to changes in output and inflation gaps. Indeed, Graph 2 shows that recent cuts in Selic can be attributed to a great extent to the decline in foreign interest rates – keeping the spread between them roughly constant. Consequently, one can expect that if the international interest rate converges to their normal levels, BCB will accordingly raise Selic, ceteris paribus.\(^{16}\)

As a matter of fact, maintaining a high differential between domestic and foreign interest rates has been BCB’s main instrument to ensure price stabilization since the adoption of IT, with two main implications: it has stimulated large inflows of foreign capital, which finance the balance of payments, and has been one of the main causes of the overvalued real (Bresser-Pereira, 2010a, 2010b). As pointed out by Erber (2011) the overvaluation of Real is the flip side of the coin – that has Selic high level (item 2.2) on the other side. Also, it has been a crucial element of the pro-conservative convention supporting BCB’s conduct. Indeed, the overvaluation of real has played a

\(^{16}\) We do not argue that if and when foreign interest rates return to their normal levels Selic will eventually converge to its average. Evidence shows that BCB has changed its policy in President Dilma’s term, which has begun in January, 2011. For instance, BCB uses other instruments besides Selic, especially the use of credit control. At the same time policy mix also seems to have changed. Fiscal policy has been tightened in order to open space for a more flexible monetary policy. The prevailing of this new policy mix will imply changes in the parameters of BCB’s reaction function.
key role in price stabilization. As Modenesi (2005), Arestis, Ferrari-Filho and Paula (2011), Modenesi and Araújo (2011) among others have shown, the exchange rate has been the main channel of monetary policy transmission mechanism.


Source: Authors elaboration.

6 – Conclusion

The present study reinforces and expands the results achieved by Modenesi (2011), with the novelty that evidence shows that BCB reacts to foreign interest rates when setting Selic. This means that BCB has reduced autonomy when setting its rate. In this sense, Selic is endogenous not only to domestic conditions (inflation and output gaps), but also to foreign interest rate (measured by Libor).

Summing up, our results might corroborate the argument that BCB policy is ruled by a pro-conservative convention substantiated in the adoption of a Taylor rule with three distinctive features: 1) high degree of interest rate smoothness; 2) high *pure domestic* equilibrium interest rate; and 3) high interest rate differential. Items (2) and (3) largely explain the overvaluation of real, a key element to ensure price stabilization in Brazil during the analyzed period.

Our results also seem to contradict the current widespread idea that Brazilian equilibrium interest rate has recently experienced a sharp decline. Accordingly, Selic cuts may be mostly a reflection of the *abnormal* decline of foreign interest rates that followed the subprime crisis. In other words, according to our model, the argument that the decline in the basic interest rate results from...
improvements in the fundamentals of Brazilian economy may be fallacious. BCB reacts more intensively to changes in foreign interest rates than to changes in output and in inflation gaps. Recent cuts in Selic are mostly related to the decline in foreign interest rates – keeping the interest rate differential roughly constant. In a few words, BCB has not changed its behavior and one can say that it still sets Selic based on the so called pro-conservative convention.

Finally it must be said that the body of evidence shown, though robust, can be improved. Therefore, a note of caution is warranted concerning the conclusions presented: in the face of the importance of the consequences involved, further studies are still called for.

7 – References


   ______. “The ‘ex-ante’ theory of the rate of interest.” The Economic Journal 47, no. 188 (1937c): 663-9


