Paper to be presented at the 13th Conference of the Research Network Macroeconomic and Macroeconomics Policies (RNM)

Title: "Exchange rates policies: a theoretical discussion and some appointments of the Brazilian case".

Leonardo Loureiro Nunes: Université Paris I Panthéon-Sorbonne (PhD Student)

Abstract: This paper approaches the feasible ways of exchange rate intervention, taking into account the existence of a "dirty" floating exchange rate regime in a significant part of the peripheral countries. The analysis aims to approach the distinct objectives of the exchange rate intervention, such as inflation control, keeping external competitiveness and financial stability. Each objective brings embedded variable and distinct goals to be monitored. Afterward we will analyze the Real appreciation determinants during the period of 2003 to 2008. The adopted hypothesis assumes that this phenomenon has a "fundament" component, linked to the change in the current transactions, but there is also a "speculative" component, which takes place especially in exchange operations (speculative and arbitration) in the derivative market, in order to take advantage of the significant interest rate differential in the context of a broad financial liberalization. In addition we will present the advantages and disadvantages of the different intervention types which can be used by the monetary authority.

Contact: leonardo.nunes@malix.univ-paris1.fr

1. Introduction

Despite of the multilateral organisms rhetoric and the discourse of most of the monetary authorities pro flexible exchange rate regime, after the successive 1990s financial crisis, in practical terms we can realize that those countries practice "dirty" floatation exchange rate, that is, in principle the exchange rate is determined by the market forces, but, at the same time, is subjected to the monetary authority intervention[1]. This phenomenon was called "fear of floating" (Calvo and Reinhart, 2000). The authors of this line of thought point out the monetary policies lack of credibility as the main reason for the existence of this phenomenon. By the way, from our perspective, the fear of floating has other roots and the adoption of defensive strategies, regarding the exchange rate, can be justified through several factors[2].

First of all, we can mention the low deepness and liquidity of the financial asset and currency markets of most of the peripheral countries[3], which can induce the "herd behavior" in uncertainty periods[4]. Secondly, the market participant agents, such as the hedge funds, equity private funds and other institutional investors with speculative profile, have higher weight in the financial markets size and contribute for their instability as well. Thirdly, the exchange rate instability can result in discouragement to exports, given the relevance of the exchange rate as expectation anchor and account unit for exporter's remuneration. Fourthly, the existence of pass-through, meaning the transference of the exchange rate variations to the prices, to a certain extent, can encourage the exchange rate intervention. Fifthly, we can mention the flow higher volatility given the narrowness of those markets and the need for accumulating reserves to intervene in the periods of "nervousness" (Mohanty and Scatigna, 2005; Moreno, 2005).

The efficacy of monetary authority intervention in the exchange rate market has been a point of controversy in the literature. In a "dirty" floating regime, the

[1] Here we predominantly refer to the Latin America countries, which chose the insertion through financial account. There are other peripheral countries, for instance, several Asian countries, which chose the insertion through commercial account.
[2] It is relevant to underline that the discussion on the need of exchange market intervention or not, either through floating exchange rate regime or regimes such as the currency board, has, as its background, the controversy on the need or not of the State intervention in the economy.
[3] This is a general characteristics of the peripheral countries, but there are exceptions. Brazil, for instance, has a developed and sophisticated derivative and exchange market.
[4] The core countries can also be subjected to the "herd behavior". However, in the peripheral countries this effect may have worse consequences given the lower deepness and liquidity of these markets.

intervention efficacy is directly related to the force correlation between the private agents and the monetary authority, that is, the capacity of making the private agent expectations converge into the monetary authority objectives. In addition, the success of the intervention is negatively correlated to the grade of financial openness (Fahri, 2006). Besides that, the higher foreign investors' participation makes the market expectations shape more complex, since their behavior may be conditioned to other financial market events.

The several "capital management techniques" can be accomplished through direct restrictions to international flow of private capital or the consolidation of the prudential supervision for the domestic financial institutions. The "capital management techniques" may be static or dynamic. While the static ones are not modified by the authorities in an eventual conjunctural change, the second ones are (Epstein *et al*., 2003).

Finally, three types of circumstances can lead to the adoption of these techniques, that is, changes in the economic environment, vulnerability identification and the attempt of hindering the usage of eventual breaches in the legislation (Epstein *et al*., 2003). In the next section we will analyze more specific "capital management techniques", regarding the intervention in the exchange rate market in a dirty floating regime. In addition to define them, we will discuss the objectives, methods and efficacy of each one.

2. Intervention in the exchange rate market

2.1. Definition

The official interventions in the exchange rate market can be understood as the foreign exchange transactions designed to act on the exchange rates, but can also broadly refer to other policies for this purpose (Neely, 2000, p. 1).

The concept proposed by Neely (2000) joins the "narrower" definition of intervention discussed by Moreno (2005). According to him, the "interventions" in the exchange rate value would be deemed as "interventions" just in case they were sterilized, that is, wouldn't impact the monetary basis and, at the same time, would have as objective to act on the exchange rate. The broad definition of sterilized intervention is associated with a change in the position of the net assets in foreign currency, which is offset by a corresponding change in the position of the net assets in domestic currency making the monetary authority's monetary asset to stay with no changes. In case there is a change in its monetary asset resulting from a change in the position of the net assets in foreign currency (so that, for instance, a reduction in reserves in foreign currency would result in a reduction of the monetary basis); the intervention is called unsterilized, according to Jurgensen, 1983.

However, Moreno (2005) warns for the fact that the "narrower" definition despises important points regarding the interventions really practiced by the monetary authorities, especially in the peripheral countries. Firstly, generally, the interventions can't be immediately sterilized, due to the monetary authority' option. Secondly, the monetary authority can undertake operations in the exchange rate market as a monetary policy instrument, which mandatorily involves the no sterilization of the operation[5]. Therefore all those operations are very relevant and may be despised in the case of narrow definition. For this work purpose, we will incorporate into the exchange rate market intervention set the interventions related to the monetary basis, spot and forward markets and option market and indirect interventions.

2.2. Interventions in the exchange rate market in a flexible exchange rate regime

2.2.1. Macroeconomic objectives and variables to be monitored

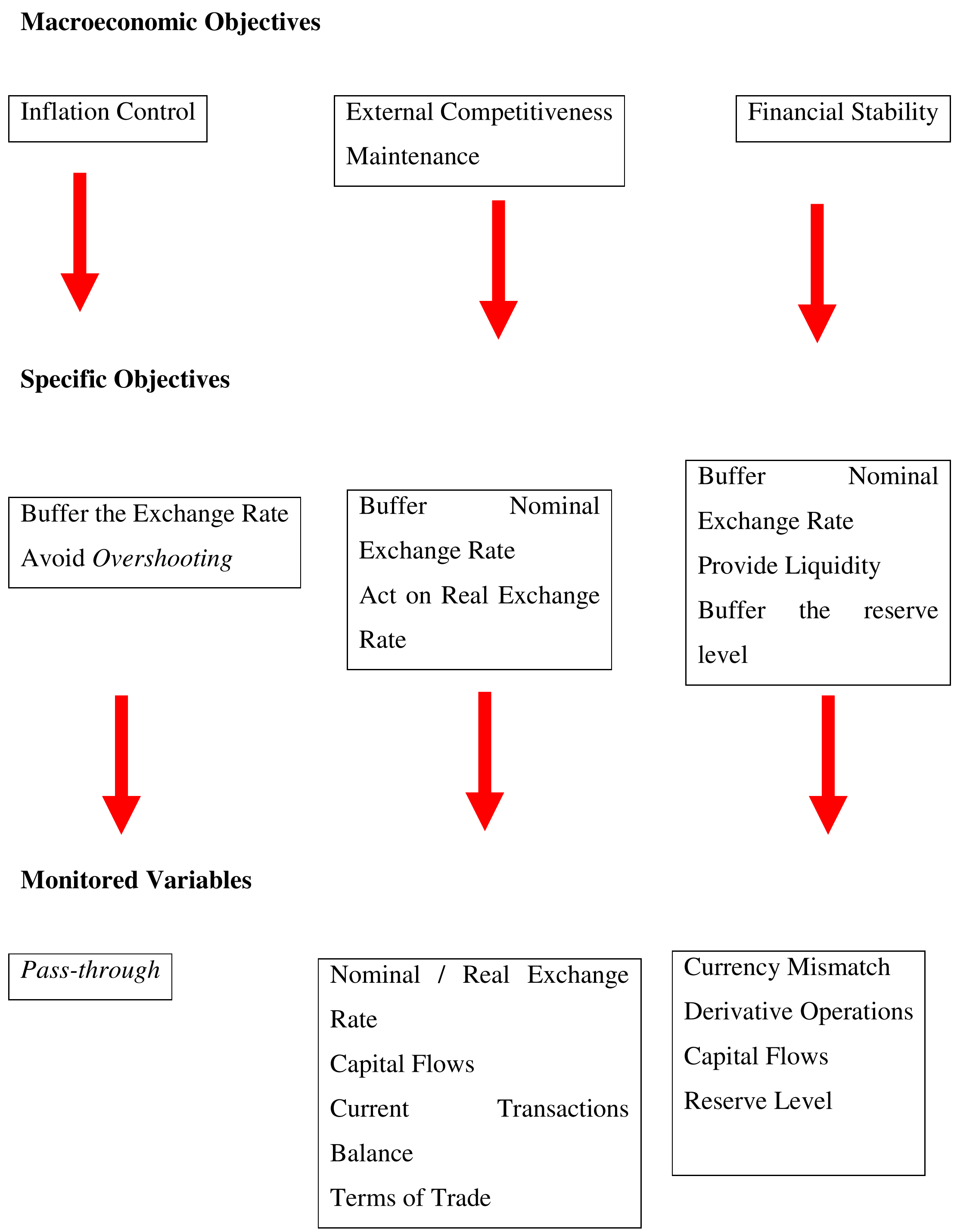
The exchange rate market interventions can be justified through three basic macroeconomic objectives: inflation control, the warranty of external competitiveness and the maintenance of the financial stability. It is important to underline that the interaction among the objectives and the several intervention forms is tied to factors as economic development level of the countries, level of the financial openness, deepening and integration of the markets, commercial and financial integration and impact vulnerability. In a more specific level we can underline three additional objectives for

[5] The analysis of sterilization or no sterilization of an operation should not be based on the fact that it can or not modify the monetary basis. While the standard textbook distinction between sterilized and unsterilized intervention is based on a quantity criterion (the impact on base money), in practice the relevant condition is whether or not interest rates are affected. Since both the demand for and supply of base money changes significantly day to day due to autonomous factors, maintaining short-term interest rates does not always require that the entire amount of intervention be offset in the domestic money market (Disyatat and Galati, 2005, p. 98).

the intervention: act on the level of exchange rate, buffer the exchange rate volatility and provide liquidity to the markets (Moreno, 2005).

In the first case, whose macroeconomic objective is the inflation control, the specific target is to buffer the exchange rate floating and avoid sharp changes. In this case, the variable to be monitored is the nominal exchange rate, which can affect the inflation via pass-through. In the second case, in which the macroeconomic objective is the maintenance of the competitiveness and the external balance, the specific objectives should be associated with the attempt to act on the real exchange rate and avoid sharp changes in the nominal exchange rate. Therefore, the variables to be monitored are the real and nominal exchange rates, current account behavior, capital flows and the terms of trade. After all, if the macroeconomic objective is the financial stability, the specific objectives should be tied in order to avoid sharp changes in the nominal exchange rate, provide the exchange rate value market with liquidity and act on the reserve level. On the other hand the monitored variables would be the currency mismatch, reserve level, capital flow and derivative operations (Moreno, 2005, p. 5). Figure 2.1 summarizes the analysis above.

Figure 1. Exchange Rate Policy Assessment: Macroeconomic Objectives / Specific Objectives / Monitored Variables.



Source: Moreno (2005). Own Elaboration.

2.3. Methods and Efficacy of the Techniques for Capital Management

The intervention in the exchange rate market may occur in four levels: interventions related to the monetary basis, spot and forward markets, options market and indirect interventions. The interventions in the exchange rate market can be broken down into the ones that affect the interest rate and the others that don't affect it. The first type of intervention is called unsterilized and the second type sterilized. For instance, when buying foreign currency the monetary authority increases, *coeteris paribus*, the monetary basis. However, in some cases, debt titles can be sold in order to take out of circulation the same amount of resources injected by the exchange rate operation, which means a sterilization mechanism (Neely, 2000).

The sterilization can bring three problems. The first one refers to the fact that the monetary policies and the exchange rate policies may have inconsistent objectives among them. The usage of the sterilization to keep a certain level of interest rates, deemed necessary for inflation control, can encourage capital inflow, increasing the intensity of this type of intervention. Secondly, the interventions can puzzle the agents, as an increase in the interest rate may be understood as a result of an intervention or an action to face the inflation. Finally, the sterilization operations bring a fiscal cost equivalent to the difference between internal and external interest rates. Therefore, the interventions could undermine the objectives of the monetary policies, create problems in the financial sector, in the case of lack of efficacy of the sterilization instruments and produce a high cost in case there is a differential between internal and external interest rates (Mohanty e Turner, 2004).

The sterilized intervention can affect the exchange rate market through four channels, according to Archer, 2005. Firstly, there is the "portfolio balance channel", in which a change in the relative scarcity of the domestic assets vis-à-vis the foreign assets, resulting from an intervention in the exchange rate market, causes the portfolio reallocation which, in its turn, changes the relative prices, such as exchange rate[6] (Archer, 2005). This channel is especially valid for peripheral economies, due to the fact that many assets are not perfect substitutes (for instance, debt titles in domestic and foreign currency), which increases its impact in the exchange rate. On the other hand, through the "warning channel", the monetary authority warns the market about its

[6] Refer to Dominguez and Frankel (1993) and Sarno and Taylor (2001), *apud* Archer (2005).

intention to protect certain exchange rate trend or level (Galati e Melick, 2002). This channel, in its turn, is less efficient in the peripheral countries with significant level of openness, given the economic policies background that decreases its credibility in relation to the agents[7] (Domaç e Mendonza, 2002)[8].

In addition, we should also deem the "channel of order flow", through which the monetary authority attempts to control the pattern of the order flow (related to the purchase and sale of foreign currency) in order to affect the exchange rate, and the "coordination channel", in which the monetary authority intervenes to contribute for the agent expectation formation, specially in the peripheral countries with low deepen and level of liquidity financial markets. In this case, the success of the operation is more usual in the peripheral countries, due to the higher weight of the interventions regarding the market turnover, difference between the valuation of purchase and sale, higher level of information of the monetary authority than the agents and lower liquidity of these markets (Archer, 2005, p. 43).

In a second level, the interventions may occur in the exchange rate spot or forward market. Future operations are those where the currency sale or delivery occurs within more than two days. The spot and future exchange rates are tied through the condition of covered interest rate parity, according to which the interest rates differential should be equal to the difference between the future and spot exchange rates. The interventions in the spot market have as an advantage the direct interference in the exchange rate. However, it can bring a high fiscal cost in the case of sterilization. In addition, its efficacy depends directly on the force correlation between the monetary authority and the market. On the other hand the advantage of the intervention in the future market is the fact that it doesn't necessarily require immediate disbursement and doesn't change the international level of reserves, which grants a higher maneuver range to the monetary authority. However, it is usually deemed less transparent by many agents (Archer, 2005, p. 49)[9].

A third type of intervention occurs through options offer. An options contract grants the right to carry out or not the purchase (or sale) of a certain asset in a certain date. In the case of exchange rate intervention, if there is an expectation on the

[7] This is valid in the case of liberalized financial markets. The monetary authority will have higher warning capacity in case there are restrictions that widen its maneuver margin.

[8] According to Domaç and Mendonza (2002), there is no evidence that in México or Turkey the monetary policy warnings have affected the level of volatility of their respective exchange rates. On the other hand Tapia and Tokman (2004) found reverse evidences regarding Chile.

[9] However in the case of exchange swaps auctions, the transparency is higher.

depreciation of the corresponding currency (for instance, due to the currency mismatch), the monetary authority can sell purchase options of the domestic currency or sell sale options of the foreign currency. In this case, the speculators don't need to purchase the weak currency, pressing the currency fall down. When offering these options and increasing the liquidity of those markets, the monetary authority provides a hedge to the agents, who don't need going to the spot market in order to accomplish their transactions. In addition, this type of operation doesn't require government international reserves expenditure, in case the option is not accomplished, and the sale of the options becomes a source of revenues. The disadvantage is that it is a passive mechanism, as the option is accomplished according to the agents will, which weakens the "warning channel" regarding the exchange rate trajectory (Archer, 2005, p. 48).

The last intervention type is the indirect intervention, which is not related to the operations in the exchange rate market aimed at affecting the exchange rate. We can mention, as examples, capital control or exchange rate control, for instance, the prohibition of the transactions with certain currencies.

Regarding the interventions efficacy, in the peripheral countries they have higher influence as in the level as in the volatility of the exchange rate compared to the core countries. The intervention efficacy will depend on the market conditions and the agent expectations. As a practical example we can mention the relative success of the interventions accomplished by some Asian countries, in the last years, in order to avoid the exchange rate appreciation, through two successful strategies to reach this objective. The first one is to intervene for long periods. In the same way, this strategy can affect the agent expectation formation. The systematic accumulation of reserves by those countries is an indication that this policy is in force. The second strategy is the execution of an incomplete sterilization, which can affect the level of the exchange rate (Disyatat e Galati, 2005, p. 99).

After all, it is worthy to underline that the portfolio channels and the order flow have higher validity for the emergent countries and the interventions are more efficient for avoiding an exchange rate appreciation than depreciation. In addition, its impact is directly proportional to the credibility of the policies announcement by the monetary authority (Disyiatat e Galati, 2005). Figure 2.2 summarizes the discussion above.

Figure 2. Types of Intervention

Type of Intervention	Affects or not the Monetary Basis	Advantages	Disadvantages
Spot Exchange Rate Market	Depends on	Interferes directly in the exchange rate	May have high fiscal cost / depends the force correlation: CB x Market
Future Exchange Rate Market	No	Doesn't require disbursement of reserves (lower intervention cost)	Lack of transparency
Derivative Market (*Swap*)	No	Doesn't require disbursement of reserves / Transparency	Higher cost than intervention in options
Derivative Market (Options)	No	Doesn't require disbursement of reserves	Lack of transparency

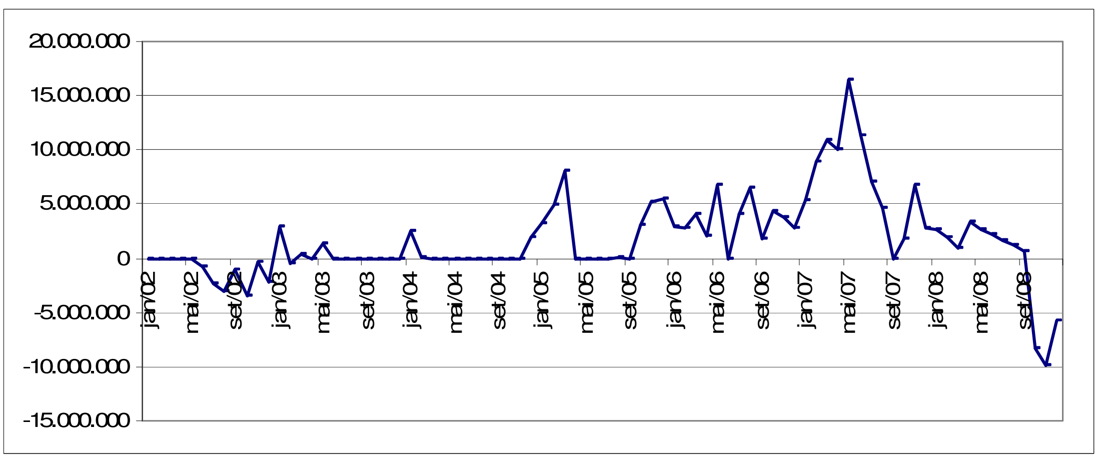
Source: Archer (2005). Own Elaboration.

When the interventions in the market are few, it is easy to keep the monetary policies fundaments through the sterilization operations. However, when the interventions reach a high number, and in the same direction, the conflict between monetary policies and exchange rate policies increases and may become an *aporia*. In this case, the agents themselves can realize the inconsistency of the government actions regarding both policies, as distortions in the financial system associated with the significant increase in the cost of these interventions can be created (Mohanty and Turner, 2004, p. 34). However, the interventions have significant impact in the improvement of the credit assessment and in the reduction of the external vulnerability, due to the accumulation of international reserves, especially among the countries that don't hold the assessment "investment grade" (Mihaljek, 2004, p.91). Next we will analyze the specific case of the exchange rate behavior in the period from 2003 to 2008.

3. The CBB Intervention Policy

As already mentioned, the monetary authority intervention can occur as much in the spot exchange rate market as in the future exchange rate market (via options)[10] or through exchange rate swaps. According to graph 1, we verify that between 2002 and September of 2004, the CBB acted in a more restricted way in the spot market[11]. Between June and December of 2002, the CBB acted selling dollars, probably aiming at preventing the depreciation associated to uncertainty of the electoral race. Since December of 2004, the CBB started acting more intensively in the spot market, due to the Real appreciation trajectory[12]. In 2006 and 2007 the interventions reached their peak, because of the exchange rate appreciation in a context of high internal interest rates and the drop of the country-risk. On the other hand since 2008, with the peak in October of the same year, the CBB started selling dollars, in order to avoid the Real excessive depreciation (Graph 1).

Graph 1. Brazilian Central Bank Intervention in the Spot Market – R$ (Thousands)



Source: CBB.

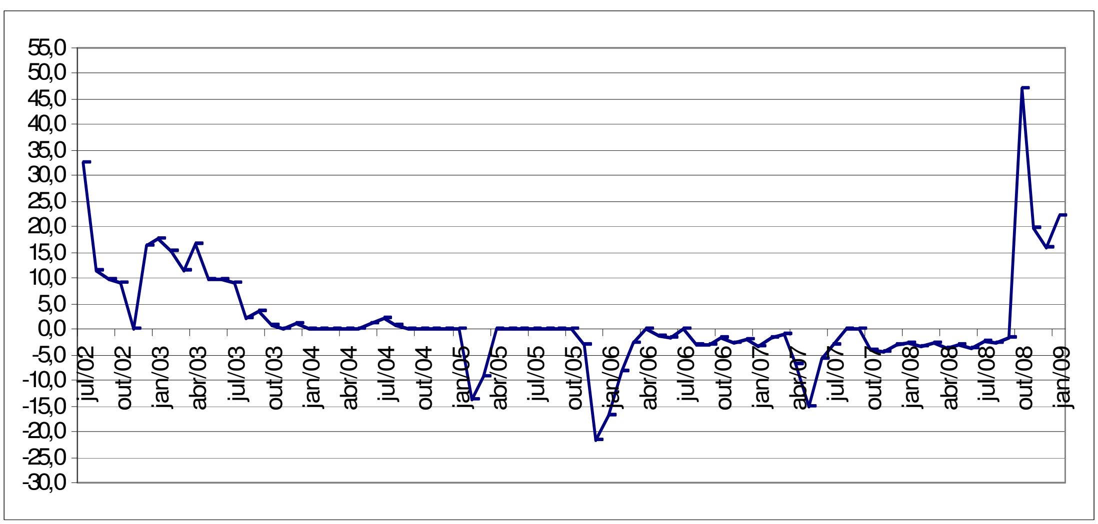
[10] However, the Brazilian Central Bank is impeded to carry out this kind of intervention since 1998.

[11] In 2004, for instance, the Treasury carried out buys of US$ 7.3 billions in order to pre-finance external obligations; these acquisitions were higher than the CBB acquisitions (US$ 5.3 billions). This procedure drastically decreased the proportion of the exchange debt in relation to the total debt (Prates, 2007b, p. 52).

[12] Between May of 2004 and May of 2005, the Real appreciated more than 20% in relation to the dollar. In this same period, a 16 countries currency basket appreciated 7% in relation to the North American currency. Refer to FIESP (2005).

The interventions in the future market occur, especially, through the exchange rate swaps offers. The swap operation occurs when the agents exchange profitability of distinct financial assets. In the exchange rate swap the CBB receives an interest rate and pays the exchange rate variation to the agents. On the other hand for the "reverse swap", the CBB pays an interest rate (for instance, the Selic, the Brazilian interest rate similar to the Fed rate) and receives the exchange rate variation of the period. Through Graph 2, we can analyze the CBB intervention in the period, where positive values are exchange rate swap offers and negative values represent reverse swap offers. In the second half of 2002 and beginning of 2003, the CBB acted offering exchange rate swaps, as well as selling dollars to the spot market (Graph 1), which shows their concern about the exchange rate depreciation occurred in this period. Between the years of 2003 and 2004, the CBB acted in a not much incisive way in this market. Since 2005, the monetary authority started offering reverse swaps, as well as buying dollars in the spot market, which reinforces the hypothesis that the CBB acted through both instruments to avoid the Real excessive appreciation. Finally, since July of 2008, the highest intervention being registered in October of this year, the CBB acted offering exchange rate swaps, which in association with the sales of foreign currency in the spot market corroborates the attempt of the monetary authority to interfere in the process of the dollar appreciation in relation to the Real (Graph 2).

Graph 2. Exchange Rate Swap Supply – R$ (billions)

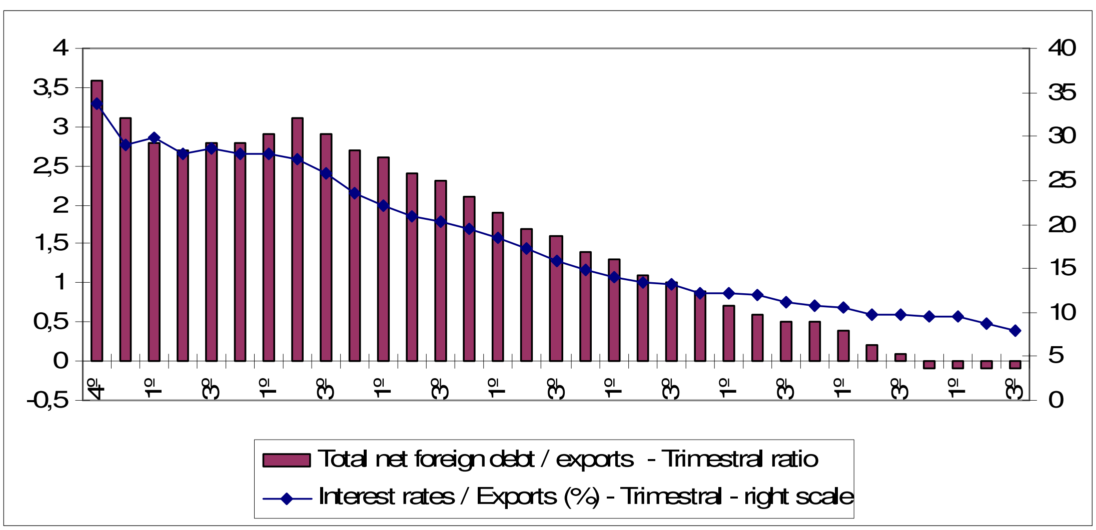


Source: CBB.

The analyzed period (2003-2008) also evidences the external solvency indexes improvement and this fact is directly related to the intervention strategy of the monetary authority. Three reasons can be raised for such improvement (Graph 6). Firstly, the appreciated exchange rate with the complacency of CBB, was a decisive factor in this improvement. This posture in relation to the exchange rate behavior reflects the strategy of the government monetary policy, that is, the exchange rate appreciation, resulting, among other reasons, from the intensity and kind of CBB intervention, was used to put the inflation within the target established by the monetary authority in the context of inflation target regime, since the inflation is directly affected by the pass-through. Therefore the exchange rate appreciation is decisive for keeping the prices in a suitable level for the inflation target established by the government.

Secondly, the CBB used this exchange rate appreciation conjuncture to carry out an aggressive strategy for external debt settlement. Further, the prices increase of many commodities (between 2003 and July of 2008), even with the appreciated exchange rate, provided support for the strong commercial balance. Thirdly, we should mention the dollar buy policy which aimed, according to the CBB, at strengthening the foreign exchange reserves level[13] (Graph 7).

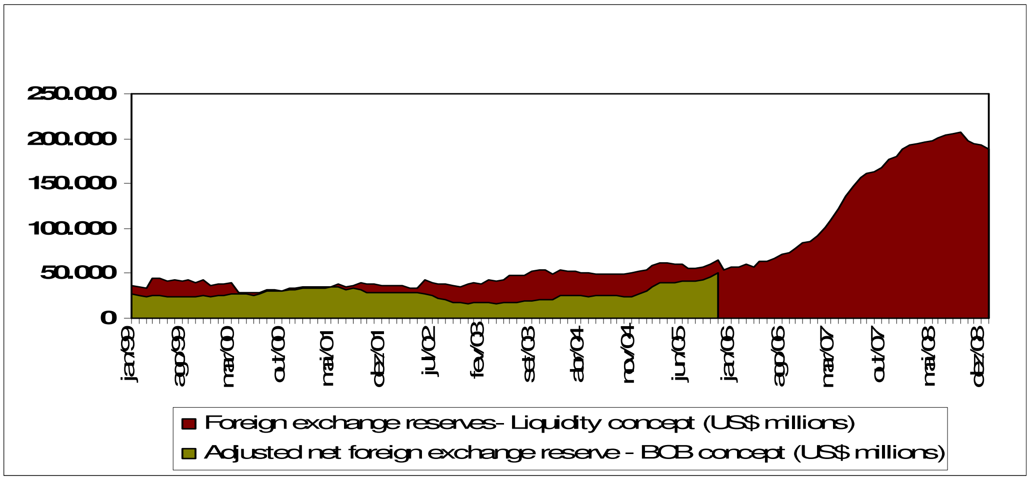
Graph 3. Foreign Debt Indexes



Source: CBB.

[13] However it is important to note that the foreign exchange reserves accumulation phenomenon is not restricted only to Brazil, but it also regards to most of the peripheral countries, due to the plenty liquidness wave occurred in this period (refer to table 1). Refer also to United Nations (UN) Trade Development Report (2006).

Graph 4. Foreign Exchange Reserves



Source: CBB.

Regarding the intervention purposes, we should underline that the strategies for reduction of public sector exposition to the exchange rate and foreign exchange reserves accumulation[14] can be deemed the central elements of the exchange rate policies carried out by the CBB[15]. Further, the strategy for expanding the foreign exchange reserves stock is conditioned to the objective of not to add volatility to the exchange rate market and not to interfere in the exchange rate floatation trend, that is, according to the monetary authority there is not any commitment to a level for the exchange rate (Bacen, 2006, p. 99).

4. The Speculative Operations and the Arbitration in the Brazilian Exchange Rate Market

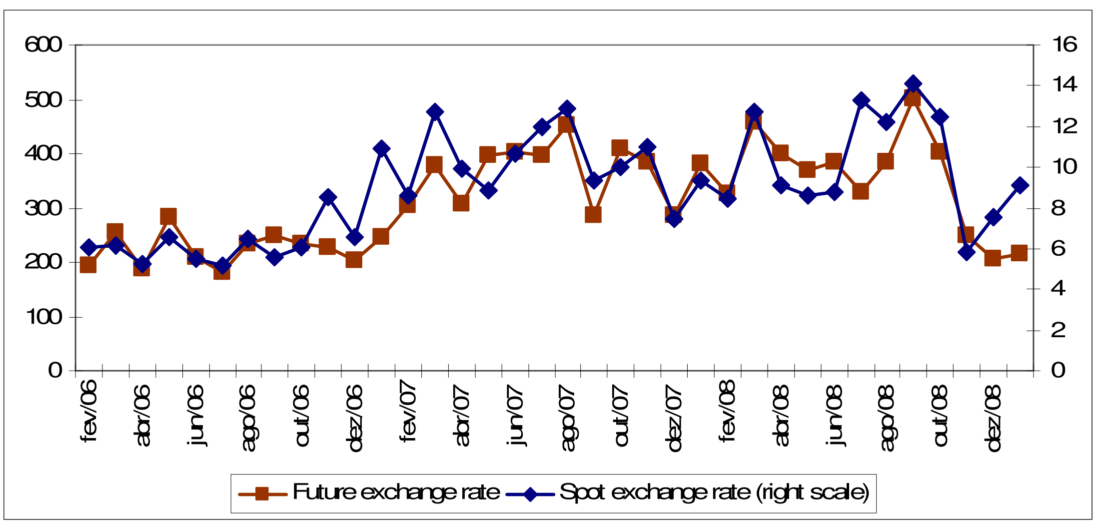
We can impute the exchange rate appreciation of the economic cycle expansion period to the speculative and arbitration operations carried out in the exchange rate market, which are directly linked to operations as the NDF, the carry trade and the exploitation of the forward premium enigma[16]. The Brazilian exchange rate appreciation didn't reflect just a possible asymmetry between offer and foreign currency demand in a

[14] Refer to Graph 7.
[15] However the monetary authority doesn't clarify the necessity of accumulating reserve if officially the exchange regime is floating. After all in this case the adjustment mechanism is the price variation and the foreign exchange reserves are, in principle, useless.
[16] For a precise definition of these terms, refer to Nunes (2008).

floating exchange rate regime. Between 2004 and 2006, the government (CBB and Treasury) bought US$ 90 billions, amount higher than the external transaction liquid balance (US$ 87.2 billions) (Prates, 2007a, p. 2)[17]. So the exchange rate appreciation is related to not only the exchange rate financial and commercial operations, but also to the operations in the exchange rate derivatives market.

When we analyze the operations in the exchange rate derivatives market, we verify the relevance of the speculative and arbitration operations in the Real appreciation process. The context of the significant differential in the interest rates and country-risk led the investors to take positions sold in the future exchange rate market, betting on a Brazilian currency higher appreciation, and to take a position in the sold end in the future interest rates market, in the belief that the interest rates would be reduced in a near future. Graph 5 shows the comparative performance of the future and spot exchange rate market. The higher volume negotiated in the first one depicts this fact[18]. In March of 2007, the future commercial market dollar reached the target US$ 377 billions in negotiated contracts, only US$ 12 billions ahead of the spot market.

Graph 5. Future and Spot Exchange Rate Markets (US$ billions)



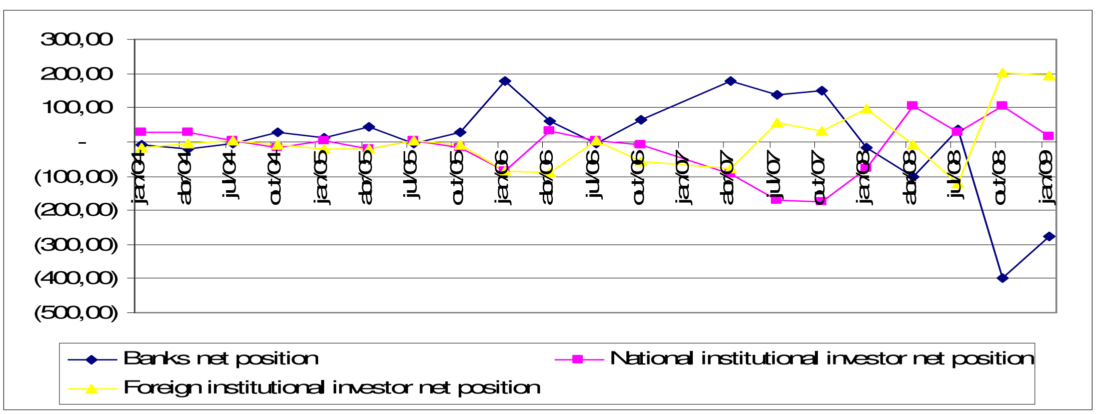
Source: ***BM&F*.**

Nevertheless the derivatives market only works with expressive volume when

[17] This gap was covered by the change in the bank exchange position (Prates, 2007b, p. 3).
[18] In a general way, the negotiated volume in the exchange derivatives market is higher than the volume negotiated in the primary and secondary markets. However, the magnitude of the difference in the negotiated volume reflects the relevance of the speculative and arbitration operations in this market.

there are heterogeneous opinions. In this case the foreign investors remained, most of the time between 2004 and July of 2008, in sold position in the future exchange rate market, betting on the Real appreciation, and in bought position in the interest rate derivatives market, betting on a future fall of Selic rate, which couldn't stay in these levels indefinitely (Farhi, 2006, p. 161). Since then, with the beginning of exchange rate depreciation process[19], they inverted their positions, remaining in sold position in the future exchange rate market – betting on the exchange rate depreciation – and in bought position in the future interest rate market, that is, betting on a increase of the future interest rate. The banks, on the other hand, took position in the reverse way, that is, bought in future exchange rate and sold future interest rate, maybe to make hedge for their operations in the primary market. Since July of 2008, the Banks changed to the sold liquid position in future exchange rate, maybe to keep the hedge operations. In addition, the CBB acted in order to intensify these bets, offering the reverse exchange rate swap, operation equivalent to the buy of future dollar and sale of DI contract, that is, remunerated through the interbank deposit rate. This rose the market opinion divergence, which significantly intensified the process described above (according to Prates, 2007b, p. 64; refer to graphs 9 and 10).

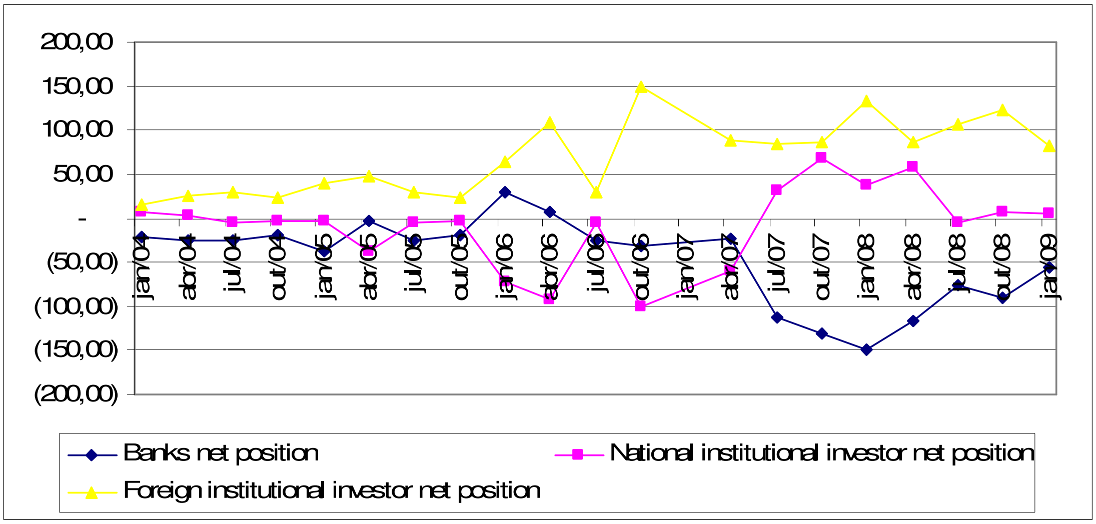
Graph 6. Liquid Position: Future Exchange Rate



Note: The liquid position consists in the diminution between the bought and sold contracts – in thousands. The positive figures represent a liquid balance in bought position and the negative figures a liquid balance in the sold position.
Source: Prates (2007a) and BM&F.

[19] According to Silber (2008) the exchange rate depreciation between July and December of 2008 was 36%.

Graph 7. Liquid Position: Future Interest Rates



Note: The liquid position consists in the diminution between the number of bought and sold contracts – in tens of thousands. The positive figures represent a liquid balance in the bought position and the negative figures a liquid balance in the sold position.

Source: Prates (2007a) and BM&F.

Therefore, the excessive exchange rate appreciation occurred between 2002 and 2006, but especially since 2005, is associated to a combination of singular events: financial openness deepening, associated to one of highest interest rates in the world[20], which shows the differential of the real interest rate, when the country-risk was falling. This anomaly encouraged the increase of arbitration operations in the exchange rate derivatives market and the Brazilian asset market appreciation, especially the interest rate, according to Farhi, 2006, p. 152 (Graphs 6 and 7). The BIS, in its Quarterly Review (March of 2007), points out an increase in the carry trade operations since middle of 2006, which aim at taking resources, especially in Yen and Swiss Franc at lower interest rates to apply them in the appreciated Brazilian currency. The high interest rates offered by our monetary authority and the expectation of a higher appreciation of the Real stimulated significantly these operations. These operations disassembling, resulting from the international financial crisis may be one of the responsible for the Brazilian exchange rate depreciation.

Further the context of monetary policies tightening associated to the fall of the

[20] Refer to Nunes (2008).

country-risk and deepening of the financial liberalization led to the paroxysm the speculative and arbitration operations involving, especially, exchange rate derivatives, which result in the excessive exchange rate appreciation. Besides that, the offshore markets development, such as the NDFs, in a more liberalized environment, enhanced the possibility of arbitration operations execution among the different markets, which potentially underlined the exchange rate volatility. Therefore, the exchange rate structuring start depending on these markets decisively. A change in the investors' perception, even originated from changes in the other countries, can cause serious problems for these countries through the contagion effect. The arbitration between the onshore and offshore exchange rate markets in the countries that don't adopt capital flow controls makes the exchange rate more vulnerable to contamination from the offshore markets, due to the existent "communicating vessels", making them to play a relevant role in the exchange rate structuring (Farhi, 2004, p.4)[21]. Finally the free access allowed for the investors, in general, acting in the exchange rate and interest rate future market segment, associated to its deepness and liquidness, enhance the transmission channel in the exchange rates structuring, which amplifies the effects of the exchange rate instability.

5. The Intervention Instruments in the Exchange Rate Market

The interventions in the spot exchange rate market have the disadvantage of depending on the force correlation between the market and the monetary authority, which may become problematic in a flexible exchange rate regime and the high cost in case of sterilization, which may also be problematic in the case of countries with significant interest rate differentials and level of debt. The advantage would be the fact that these interventions would affect directly the exchange rate. Despite that what the practice shows is that the exchange rate appreciation was not reverted until July of 2008, even with the considerable interventions of the government in the spot market, with the acquisition of about US$ 90 billions between the years of 2004 and 2006.

The CBB intervention would be a hypothesis for this unsuccessful. Instead of intervening in a more continued way, with smaller quantities and by surprise, the CBB

[21] In opposition to the Brazilian case, in the countries where the fixed exchange regime is adopted (for instance, China and Indonesia) the offshore currency negotiations are concentrated in longer terms (Ma, Ho and McCauley, 2004), which decreases the possibility of contamination and the relevance of the offshore markets in the exchange rate structuring.

acted buying the “surplus” (covering all the offers at market prices) by the end of the auction, which on the one hand, made the intervention less effective, especially due to its higher foreseeability, and on the other hand was in consonance with the strategy announced by the CBB of not intervening either in the level or the volatility of the exchange rate[22] (Prates, 2007b, p.62). However the sterilized intervention may cause the reverse effect (appreciation), as the buy of dollars in cash increases its price, decreasing the forward premium. As the interest rate doesn’t change (the operation was sterilized), the exchange rate bond raises (interest rate discounted off the exchange rate variation), which stimulates the banks to collect more dollars to apply in the country and take advantage of this higher exchange rate bond. Therefore this type of intervention may be ineffective causing even the undesirable reverse effect (Garcia and Diógenes, 2007p. 12).

The sale of “reverse” exchange rate swap[23] is equivalent to the buy of dollar in the future market. So the American currency increases when the institution carries out the auction in the future market. It is the same as the demand for American currency had increased. The monetary authority loss is the exchange rate appreciation added to the rate that remunerates the Certificado de Depósito Interbancário (CDI) – Certificate of Interbank Deposit. These bonds are called “reverse” because the most common fact is the Central Bank receive an interest rate and pay the exchange rate variation (exchange rate swap). The main characteristic of this operation is the transparency, as the CBB previously announces the auctions. The reverse swap operations, combined with interventions in the spot market can be better successful. When the dollar is bought in cash its price increases. However, the reverse swap sale, which corresponds to buy future dollar, presses the future dollar price up. This price increase impedes the forward premium fall and the increase of the exchange rate bond, which don’t stimulate the inflow of additional dollars. The disadvantage of this instrument is its higher cost associated to the CDI and also to the exchange rate appreciation. In case the intervention is carried out through operations in the future market, it will be less transparent, but there will be only the interest rate basic rate cost[24].

---

[22] Refer to the discussion on the objectives of the exchange rate policies of the Brazilian Central Bank in the sub-section 3.2.2.

[23] The name comes from the fact that this operation is opposite to the one carried out by the CBB until 2002, called exchange swap.

[24] This proposal is included in Cagnin *et al.* (2007).

Further the prudential and administrative steps, such as bank restriction to exchange rate exposition in relation to its reference asset[25], not remunerated deposits setup, end of the benefits established by the Resolution 2689 of 2000 (reviewing the smooth over for investments in stocks and fixed profit bonds the unrestricted access for foreign investors in the domestic derivatives markets), the need of immediate internalization of the exporter resources, the increase in the warranty margin for future market operations and the change of the possible instruments (for instance, replacement of the public bonds with no remunerated deposits) for this deposit in the future exchange rate operations and the introduction of capital flow controls (for instance through the IOF setup and need of no remunerated deposits). Further the CBB could act in the exchange rate market in a less foreseeable way, which would increase the agent risks in taking some positions, making the interventions more effective (Cagnin *et. al.*, 2007, p. 68).

Therefore the conjuncture of the international liquidness expansion, fall of the country-risk associated to the deepness of the financial liberalization in Lula's government in a context of restrictive monetary policy, between 2003 and July of 2008, significantly stimulated speculative and arbitration operations execution in the Brazilian exchange rate market, especially the derivatives market. These were made possible, among other reasons, by the carry trade operations and instruments such as non-deliverable forwards (NDFs). This environment greatly liberalized increased the relevance of the "communicating vessels" among the onshore and offshore markets, and made the exchange rate structuring more and more dependent on the offshore and international financial markets behavior. This reality made the exchange rate policy instruments more necessary and, at the same time, more difficult to be implemented.

Conclusion

The exchange rate management of the Brazilian monetary authority aims at the maintenance of an exchange rate compatible with an inflation level positioned within the target established by the government in the context of the inflation goal regime. The main instrument used for establishing such exchange rate was the interest rate. Further, in the period of 2003 to July of 2008, we observed the advance of the financial account

[25] In 2007, the CBB reduced this relation from 60% to 30%.

opening, which together with a monetary policy greatly restrictive subordinated to the inflation target regime, resulted in a remarkable exchange rate appreciation and low growth rates compared to similar countries. Further, this last phenomenon stimulated the inflow of short term capital, which aimed at exploiting the interest rate differential through speculative and arbitration operations, especially in the exchange rate derivatives market. It is relevant to underline the significant increase in the derivatives operations volume associated to steps such as export exchange rate cover smooth over made the exchange rate definition more and more dependent on the exchange rate value flow, as much the flow related to current account as the financial account.

Therefore we advocate that the reduction of the interest rate differential and the introduction of mechanisms for intervention in the exchange rate market and administrative procedures can discourage the arbitration operations and reduce the short term capital inflow, decreasing the dependency on the exchange rate definition and subsequently the interest rate, the market stocks, allowing these variables to be less volatile. Further this differential reduction can stimulate the inflow of direct investments, which will significantly impact the composition of the capital flows, which, through a virtuous circle (since the direct investment has a more stable feature) would stabilize much more the capital flows with benign consequences on the exchange and interest rates.

Bibliography

ARIDA, P. (2003) "Por uma Moeda Plenamente Conversível". *Revista de Economia Política*, v. 23, n. 3 (91), pp. 151-154, Julho-Setembro.

BANCO CENTRAL DO BRASIL (2006). *Relatório de Inflação*. Vol. 8. n. 4, Dezembro, www.bacen.gov.br.

BANSAL, R., DAHLQUIST, M. (1999) "The Forward Premium Puzzle: Different Tales from Developed and Emerging Economies". *Journal of international Economics*, v. 51, Issue 1, June, pp. 115-144.

BELLUZZO, L. G. M.. (2006) "As Transformações da Economia Capitalista no Pós-Guerra e a Origem dos Desequilíbrios Globais". *In:* CARNEIRO, R. (Org.). *A Supremacia dos Mercados e a Política Econômica do Governo Lula.* São Paulo, Unesp.

BIS (Bank of International Settlements) (2007). *Quarterly Review*, Março, www.bis.org.

CAGNIN, R. F., CINTRA, M. A. M., FARHI, M. (2007). “Fundos Cambiais e Estratégias de Intervenção no Mercado Brasileiro de Câmbio”. *Relatório para o Instituto de Estudos para o Desenvolvimento Industrial (IEDI)*, Agosto, Não-Publicado.

CAVALLO, M. (2006) “Interest Rates, Carry Trades, and Exchange Rate Movements”. *Federal Reserve Bank of San Francisco Economic Letter*, Novembro.

FARHI, M. (1998). *O Futuro no Presente: Um Estudo dos Mercados de Derivativos Financeiros*. Tese de Doutorado, Instituto de Economia da Universidade Estadual de Campinas, Campinas.

_________, (2004) “Mercados de Câmbio Offshore e Moedas Inconversíveis”. *Política Econômica Em Foco*, Centro de Conjuntura e Política Econômica (Cecon), Instituto de Economia, Unicamp, v. 03.

_________, (2006) “O Impacto dos Ciclos de Liquidez no Brasil: Mercados Financeiros, Taxa de Câmbio, Preços e Política Monetária”. *In:* CARNEIRO, R. (Org.). *A Supremacia dos Mercados e a Política Econômica do Governo Lula*. São Paulo, Unesp.

FEDERAÇÃO DAS INDÚSTRIAS DE SÃO PAULO - FIESP (2005). “As sete quedas das exportações: o que a história nos ensina?”. Disponível em http://www.fiesp.com.br/download/pesquisa/as_sete_quedas.doc

GARCIA, M. G. P; URBAN, F. (2004) “O Mercado Interbancário de Câmbio”. PUC-RJ, *Texto para Discussão n. 509*, www.econ.puc-rio.br.

_________. DIÓGENES, F. P. (2007) “Fluxos de Capitais, Derivativos Financeiros e Intervenções nos Mercados de Câmbio II”. *Seminário Rumos da Política Cambial*, Rio de Janeiro, PUC-RJ.

IBRE (2006). “Carta do Ibre”. *Revista de Conjuntura Econômica*, Março. www.ibre.fgv.br.

INTERNATIONAL MONETARY FUND. (2006). *Global Financial Stability Report*. www.imf.org.

MA, G.; HO, C.; McCAULEY, R. N. (2004) “The Markets for Non Deliverable Forwards in Asian Currencies”. *BIS Quarterly Review*, June.

MEREDITH, G. MA, Y. (2002). “The Forward Premium Puzzle Revisited”. *International Monetary Fund Working Paper n. 28*.

NUNES, L. L. (2008). *As Restrições à Política Cambial num País com Moeda Inconversível: Uma Interpretação da Experiência Brasileira Recente de Apreciação*

Cambial (2003-2007). Dissertação de Mestrado, Instituto de Economia – Unicamp. Campinas.

PRATES, D. M. (2007a). "Os Determinantes das Taxas de Câmbio Nominal e Real no Brasil após a Adoção do Regime de Câmbio Flutuante". Sub-projeto III: Integração Cambial e Monetária, Dinâmica do Balanço de Pagamentos e Trajetória da Taxa de Câmbio. *Projeto de pesquisa: O Brasil na Era da Globalização: Condicionantes Domésticos e Internacionais ao Desenvolvimento*. BNDES, Não-Publicado.

_________ (2007b). "Os Dilemas da Gestão do Regime de Câmbio Flutuante no Brasil". Sub-projeto III: Integração Cambial e Monetária, Dinâmica do Balanço de Pagamentos e Trajetória da Taxa de Câmbio. *Projeto de Pesquisa: O Brasil na Era da Globalização: Condicionantes Domésticos e Internacionais ao Desenvolvimento*. BNDES, Não-Publicado.

SICSÚ, J. (2006) "Rumos da Liberalização Financeira". *Revista de Economia Política*, v. 26, n. 3 (103), pp. 364-380, julho-setembro.

SILBER, S. D (2008). Setor Externo. *Boletim Informações FIPE*. Dezembro, disponível em www.fipe.org.br/publicacoes/downloads/bif/2008/12_12_bif339.pdf

United Nations (2006). *Trade Development Report*. Disponível em www.un.org.