ISSN 1518-3548

BANCO CENTRAL DO BRASIL

Working Paper Series 290

Sailing through the Global Financial Storm: Brazil's recent experience with monetary and macroprudential policies to lean against the financial cycle and deal with systemic risks

Luiz Awazu Pereira da Silva and Ricardo Eyer Harris

August, 2012

ISSN 1518-3548
CNPJ 00.038.166/0001-05

Working Paper Series	Brasília	n. 290	Aug.	2012	p. 1-59

Working Paper Series

Edited by Research Department (Depep) – E-mail: workingpaper@bcb.gov.br

Editor: Benjamin Miranda Tabak – E-mail: benjamin.tabak@bcb.gov.br
Editorial Assistant: Jane Sofia Moita – E-mail: jane.sofia@bcb.gov.br
Head of Research Department: Adriana Soares Sales – E-mail: adriana.sales@bcb.gov.br

The Banco Central do Brasil Working Papers are all evaluated in double blind referee process.

Authorized by Carlos Hamilton Vasconcelos Araújo, Deputy Governor for Economic Policy.

General Control of Publications

Banco Central do Brasil

Secre/Comun/Cogiv

SBS – Quadra 3 – Bloco B – Edifício-Sede – 1º andar

Caixa Postal 8.670

70074-900 Brasília – DF – Brazil

Phones: +55 (61) 3414-3710 and 3414-3565

Fax: +55 (61) 3414-1898

E-mail: editor@bcb.gov.br

Consumer Complaints and Public Enquiries Center

Banco Central do Brasil

Secre/Comun/Diate

SBS – Quadra 3 – Bloco B – Edifício-Sede – 2º subsolo

70074-900 Brasília – DF – Brazil

Fax: +55 (61) 3414-2553

Internet: <http://www.bcb.gov.br/?english>

Sailing through the Global Financial Storm: Brazil's recent experience with monetary and macroprudential policies to lean against the financial cycle and deal with systemic risks[*]

Luiz Awazu Pereira da Silva[†]
Ricardo Eyer Harris[‡]

Abstract

The Working Papers should not be reported as representing the views of the Banco Central do Brasil. The views expressed in the papers are those of the authors and do not necessarily reflect those of the Banco Central do Brasil.

Brazil sailed well through the global financial storm, using counter-cyclical policies to engineer its fast V-shaped recovery in 2010. In order to deal with inflationary pressures arising from its strong recovery, after the peak of the crisis, it used standard aggregate demand management instruments (tight fiscal and monetary policies). Brazil had also to deal with the post-QE global environment of excess liquidity in 2010-2011 where excessive capital inflows were exacerbating domestic credit growth with potentially destabilizing effects for price and financial stability. In that front, Brazil maintained and strengthened its strong financial sector regulation and supervision to continue to ensure financial stability, in particular, using a set of macroprudential instruments. While combining monetary and macroprudential instruments to lean against the financial cycle, the Central Bank of Brazil has always made clear that macroprudential measures are not a substitute for monetary policy action and are primarily geared at addressing financial stability risks. In fact, many policy makers after the global financial crisis seem to see now a complementarity between macroprudential measures and monetary policy. Accordingly, the (new) separation principle seems to evolve into using two instruments (the central bank's base rate and a set of macroprudential tools) to address two objectives (the inflation target and a composite set of financial stability indicators). Brazil's recent experience with monetary and macroprudential policies is a successful example of this new approach. More time and other countries' experiences are needed to assess properly if this policy option can be generalized and replicated with similar results elsewhere.

JEL Classification: E00; F31; G01.

Keywords: Policy response to global crisis; macroprudential policy; capital controls.

[*] We thank participants at the IMF- World Bank Conference in Bali (Indonesia) on November, 2011, the IMF Article IV Mission in May 2012, Benjamin Tabak (Central Bank of Brazil), Pierre-Richard Agénor (University of Manchester), Stijn Claessens (IMF) and Swati Ghosh (World Bank) for useful interactions and comments. All remaining errors are ours.

[†] Central Bank of Brazil. Corresponding author: luiz.apereira@bcb.gov.br

[‡] Central Bank of Brazil. E-mail: ricardo.harris@bcb.gov.br

I. Introduction:

The global financial crisis of 2008-2012 prompted a renewal of both analytical thinking and policy practices regarding the interaction and complementarity between monetary and prudential-regulatory policies, in reaching simultaneously the two objectives of macroeconomic and financial stability.

The issue of "leaning against the financial winds" was of course present before the global financial crisis, as we discuss below, but the debates were inconclusive and less urgent. Since then, they have been thoroughly revisited and made much more pressing, essentially because of: (1) overwhelming evidence of macro-financial linkages allowing for the build-up of significant financial risk in an environment of macroeconomic stability without adequate regulation; (2) the realization that the cost of mopping-up after crises such as 2008 is extraordinarily high, suggesting that in this regard too prevention is indeed better than remedy; and (3) despite their role in avoiding another Great Depression, the destabilizing side-effects of unprecedented injections[1] (e.g., QEs, LTROs, etc.) of global liquidity by monetary authorities of advanced economies, exacerbating sudden floods of capital into emerging economies.

BOX 1: The Global Financial Crisis: Origin and Policy Responses in Emerging and Advanced Economies

Long before the crisis – since the mid-1990s – Brazil had adopted standard macroeconomic policies to control inflation and anchor expectations, including an inflation targeting framework. Fiscal policies were strengthened to ensure that markets perceived debt dynamics as sustainable. Together with many (though not all) emerging markets, Brazil opted for a flexible exchange rate regime as a first buffer against capital market mood swings and volatility. Last but not least, Brazil did not embark on the fashionable financial deregulation movement of the 1990s, keeping a conservative prudential regulatory framework for its financial sectors, which remained tightly supervised and well-capitalized.

Advanced economies did not follow the same path, perhaps because of the absence of crisis emergencies, less pressure –at that time—from markets or rating agencies and a self-reassuring belief in their own singularity. In particular, private and public debt increased, sometimes beyond existing institutional fiscal pacts such as the Maastricht treaty in the Eurozone. Financial deregulation was conducted with great confidence on the capacity to dissipate risk, using sophisticated derivative products that priced financial instruments very well except under tail events. Last but not least, the monetary policy response to shocks in the US (e.g., the burst of the Internet bubble, 9/11, etc.) managed to produce quick recoveries. However, they relied upon prolonged periods of low interest rates that did not translate into higher inflation – in part due to the concomitant disinflationary pressure of China's exports of durable goods. Nevertheless, financial conditions were eased by

[1] There are several views of the effects of QEs, LTROs, etc., among economists and naturally many have argued that these policies were aimed at stabilizing the world economy. Put differently, without them, instability could have been much worse.

enough to conceivably trigger excessive risk-taking behavior by both lenders and borrowers. In that context, in addition to agency problems, classic Minsky problems of financial market behavior were exacerbated: pro-cyclicality; very high leverage; deterioration of lending standards; excessive credit financing increasingly riskier borrowers; etc.

In many advanced economies, excessive credit (including in the housing market) allowed for a pattern of arguably unsustainable consumption financed by debt. Current account deterioration was large enough to trigger the debate in many international meetings about "global imbalances". The benign view[2] was that these current account deficits and surpluses were a win-win situation for both developing and developed countries. Surplus developing economies would benefit from deep developed consumer markets to export their goods and services, and deficits could always be financed by a host of new financial instruments. The opposite view[3] was that this was an unstable equilibrium. In addition, lax macro-prudential regulation of financial sectors reacted with lags and/or too timidly to the accumulation of risks. And, since many financial institutions were global by definition, risks would cross borders and spread potential financial instability worldwide. The "benign view" prevailed but the crisis eventually struck with a vengeance, beginning in mid-2007 (the subprime debacle in the US) and continuing until the Lehman spike in mid-September 2008.

The crisis caught emerging and advanced economies in quite different positions in the spectrum of macro and financial fragility: the former were ending a cycle of macro policy consolidation and had stronger financial sectors that had been tested through crises; the latter were at the peak of a cycle of credit-fueled consumption growth and had allowed their financial sectors to become highly vulnerable to shifts in confidence and changes in asset price valuation in their balance sheets. But at least policy-makers in advanced economies had thoroughly studied the Great Depression and liquidity provision to troubled banks was swift and massive. Together with a first round of fiscal stimulus, that response avoided an even greater collapse of interconnected global markets. Happily, many emerging markets – and Brazil was a case in point— could also implement counter-cyclical policies to support activity thanks to the robust fundamentals and policy credibility built throughout a decade-long adjustment effort; that allowed for the first time many emerging markets to do so. But, after a rebound, advanced economies faced a dwindling recovery by the end of 2010. Additional fiscal policy action then met local political economy constraints in the US and the Eurozone, as well as bond market suspicion of how advanced economies' debt stocks would remain marketable (at sustainable prices) in an environment of prolonged mediocre growth. With all advanced economies at the zero bound of their monetary policy rates, unconventional monetary easing emerged as the option of last resort, first with the US QEs and (much) later with the ECB's LTROs. In that context, global liquidity increased and resulted in significantly higher than usual capital inflows into emerging markets. As economic recovery continued to lag in advanced countries, monetary policy remained loose. Global excessive liquidity is seen by many analysts as a major driving force behind recent capital flows into emerging markets in general and Brazil in particular.

Going back to where it began, by the end of the 1990s and early 2000s the world economy was enjoying the so-called "great moderation", partly due to the progressive – and successful – adoption by central banks of flexible inflation targeting monetary policy framework. The perceived attraction of inflation targeting was to deliver low and stable inflation while minimizing growth fluctuations, relying on a simple policy instrument – namely, a short-term interest rate. At the same time, the framework took advantage of flexible exchange rates to smooth external pressures, thus avoiding the recognized pitfalls of pegged or fixed regimes and turning reserve accumulation into a healthy precaution

[2] For example, Cooper (2007), Dooley, Folkerts-Landau, and Garber (2009), Caballero, Farhi, and Gourinchas (2008)
[3] For example, as early as 2005, Roubini and Setser (2005) and then Obstfeld and Rogoff (2009), Borio and Disyatat (2011)

rather than an absolute necessity. Provided that one's "house was in order", this combination brought credibility and stability to macroeconomic policies and policy-makers. The fact that the adoption of inflation targeting with flexible exchange rates was so widespread (despite notable holdouts) seemed to support, on a global as opposed to a merely local scale, a virtuous cycle of aggregate demand growth with low inflation and fewer threats to balance of payment positions. Meanwhile, regarding financial stability, a neat separation principle seemed to hold: regulators recommended the use of a set of well-tested and traditional micro-prudential instruments to ensure that financial intermediaries performed their function without engaging in practices that could undermine the robustness of the system. Things seemed to be going so well that central banking was becoming a "boring business", to such a point that some countries even chose to convert to the model of split institutional responsibilities between the objectives price and financial stability – and, in so doing, split into separate entities also the regulatory-supervisory and lender-of-last-resort functions.

The only nagging doubt was about how central banks should deal with asset price bubbles. The discussion was motivated by the late-1990s episodes of stock market booms and busts, after Japan's property market problems in the late-1980s. After all, should central banks react to rapidly rising asset prices, and, if so, how? As usual, the economics profession provided a divided answer, each side with a well-grounded rationale. One side of the divide[4] argued that higher asset prices had the propensity to enhance wealth effects transmitting into consumption and eventually consumer prices; thus it was warranted to "lean against the wind" of asset price surges, acting in a preventive way. They also noted that financial imbalances may very well build up in an environment of stable prices; low and stable rates of inflation may even foster asset price bubbles, due to excessively optimistic expectations about future economic prospects or to increased propensity to take on more risk. At a minimum, price stability should not be taken as sufficient condition for financial stability. The opposite camp[5] claimed that pricking asset price bubbles with monetary policy instruments was bound to take movements of the base interest rate so large

[4] Mostly from the BIS and not surprisingly from the Bank of Japan but also Blanchard (2000), Borio and Lowe (2002), Cecchetti, Genberg, Lipsky and Wadhwani (2000) and Goodhart (2000)
[5] Mostly from the anglo-saxon academic community, Bean (2003), Bernanke and Gertler (1999, 2001), Greenspan (2002), Kohn (2005), Miskhin (2008), etc.

as to do great damage to macroeconomic stability. These also argued that it is exceedingly hard to determine whether an ongoing rise in asset prices is justified by fundamentals or is otherwise a bubble. Therefore, the central banks could compromise their reputation by getting into the muddy business of attempting to identify bubbles ex ante.

In practical terms, the generally adopted protocol was to forsake any attempt to lean with the base policy rate against asset price inflation; but, if it turned out to have been a bubble, as it would prove to be by eventually bursting, the solution was to clean up afterwards. The collateral damage caused by the bursting of the bubble on macroeconomic performance could presumably be remedied with a more accommodative monetary policy stance.

One could arguably detect a partial departure from this general attitude was already present when the Federal Reserve, confronted with more evidence of herd behavior in stock and housing markets, tried to talk markets down[6] by suggesting that they were displaying "irrational exuberance". While that attempt involved a sort of official verdict about the departure of asset prices from fundamentals, the fact that intervention remained purely verbal ultimately helped to enshrine the notion that conventional monetary policy instruments should not go out chasing asset price inflation.

But other types of nuance were later introduced into the debate, bringing the 'clean after' camp[7] closer to those advocating prevention. One key step in this direction was the realization that bubbles based on credit – as was notably the case of housing bubbles, as opposed to garden-variety stock market bubbles – might more clearly call for preventive intervention, considering the much more deleterious effects of the eventual market downturn on banks' balance sheet as compared to households'. The argument was that, instead of getting into the tricky issue of whether increases in asset prices faithfully reflect the corresponding fundamentals, central banks should focus on the mutual interaction

[6] The warning was made during the dot.com bubble on December 5, 1996: [...] *Clearly, sustained low inflation implies less uncertainty about the future, and lower risk premiums imply higher prices of stocks and other earning assets. We can see that in the inverse relationship exhibited by price/earnings ratios and the rate of inflation in the past. But how do we know when irrational exuberance has unduly escalated asset values, which then become subject to unexpected and prolonged contractions as they have in Japan over the past decade?* [...] A. Greenspan, — "The Challenge of Central Banking in a Democratic Society", 1996-12-05
[7] Miskhin (2010)

between asset price and credit dynamics, with an eye on the potential for unstable feedback loops and another on their joint effect on aggregate demand.

Thus credit connections rather than asset prices per se moved to center stage as the critical variable to observe in the rethinking of monetary and prudential-regulatory policies. After the full manifestation of the global 2008 crisis, a number of voices[8] started calling on central banks to incorporate explicitly and systematically a financial stability objective into their reaction function, arguing that they should consider the interplay between the objectives of macroeconomic stability and financial stability. This new literature reflected a growing concern that, under lax regulation, the achievement of price stability may have been associated with an increased risk of financial instability.

In parallel, policy-makers were also realizing that traditional micro-prudential tools had been insufficient to dampen financial risk. A number of proposals started to revisit prudential guidelines and to extend them to a larger macroeconomic dimension, with a view on the build-up of systemic risk. That was the idea behind "macroprudential" regulation, aimed at strengthening the financial system and at encouraging more prudent lending behavior in economic upturns – for example, by raising capital requirements in a countercyclical way, to help choke off credit-related asset price bubbles in their early stages.[9] Macroprudential regulation became naturally the favorite candidate to fill this new role of guarding the crossroads between asset price and credit dynamics[10].

In 2010, a paper by the Committee on the Global Financial System (CGFS) of the BIS mapped the available set of macroprudential instruments and frameworks and summarized the experiences in using them. The variety of existing tools is illustrated by Diagram 1 below, which organizes the various instruments according to the vulnerability they address and the financial system component they target.

[8] Committee on International Economic Policy Reform, "Rethinking Central Banking" (2011)
[9] The Turner Review (see Financial Services Authority (2009)), Brunnermeier et al. (2009), Basel Committee on Banking Supervision (BCBS, September 12, 2010).
[10] See the financial regulatory agenda of the G20 and Financial Stability Board (FSB), Committee on the Global Financial System (2010), Galati and Moessner (2011), and International Monetary Fund (2011b, 2011c).

Diagram 1: Macroprudential instruments by vulnerability and financial system component

		Financial system component				
		Bank or deposit-taker		Non-bank investor	Securities market	Financial infrastructure
		Balance sheet*	Lending contract			
Vulnerability	Leverage	capital ratio risk weights provisioning profit distribution restrictions credit growth cap	LTV cap debt service / income cap maturity cap		margin/haircut limit	
	Liquidity or market risk	liquidity / reserve requirements FX lending restriction currency mismatch limit open FX position limit	valuation rules (eg. MMMFs)	local currency or FX reserve requirements	central bank balance sheet operations	exchange trading
	Interconnectedness	concentration limits systemic capital surcharge subsidiarisation				central counterparties (CCP)

* Capital and other balance sheet requirements also apply to insurers and pension funds, but we restrict our attention here to the types of institutions most relevant for credit intermediation.

Source: BIS-CGFS paper No 38, May 2010

The main underlying idea was to use existing microprudential instruments in a more comprehensive way (i.e. extending them to a macroprudential dimension) to “lean against the financial cycle”. That implied a countercyclical calibration of these tools across all financial sector institutions. For example, during upturns in the financial cycle, regulation would increase buffers that could be used in downturns: higher capital and liquidity requirements, more stringent and forward-looking provisioning rules, limits to concentration, loan size, maximum debt-to-income levels, foreign exchange exposure, and so on. The expected result of applying such brakes was that financial institutions would refrain – considering the higher costs of expanding certain components of their assets and the forward guidance provided by these messages — from engaging into excessive expansion of their lending, especially to riskier segments of the market. But the paper only alluded in passing to the possible interaction between monetary policy and macroprudential tools, listing strands of the literature that touched on how changes in the funding cost of banks would affect banks’ lending behavior, or how bank capital would affect the transmission of monetary policy.

At the same time, empirical studies were carried out by the BIS and the IMF, drawing lessons from country experiences in using macroprudential instruments. In particular, a comprehensive account of existing cases was produced by the IMF[11], finding that these tools were mostly introduced to reduce systemic risk, either in its time and/or cross-sectional dimension[12], and that they were quite effective. The study uses cross-country comparisons to show that macroprudential tools have helped to dampen pro-cyclicality of financial systems and that they do not seem to depend upon the particular policy regime adopted by each country[13].

The global financial crisis would provide a stressful opportunity to put to test these policy and analytical proposals, as we shall see below for Brazil.

II. The effects of the global financial crisis on Brazil

Brazil sailed quite well through the first acute phase of the global financial crisis. The effects of the crisis were nonetheless severe. After the Lehman Brothers episode, in the last quarter of 2008, trade flows contracted 6.9% YOY in value terms; industrial production fell by 27.0% QOQ; capital outflows rose by 36.0% QOQ causing an exchange rate depreciation spike of 32% YOY; and credit growth fell by 35% YOY. In one month (October 2008), trade financing fell by 30% and the debt rollover ratio went down from 167% to 22%. From July to October, liquidity ratios in Brazilian banks also fell from 1.73 to 1.43. The Brazilian authorities took immediate action in face of the shock[14]. First, they addressed liquidity problems both in domestic and foreign currencies: bank reserve requirements were lowered, injecting about BRL116 billion worth of liquidity (or 4% of GDP) into the economy; lines of credit in foreign exchange were provided to the private sector; the central bank offered USD14.5 billion (7% of total international reserves at the end of 2008) in spot market auctions. Foreign exchange swap contracts to the tune of USD33 billion were also offered by the Central Bank, helping an orderly wind down of

[11] See International Monetary Fund, Lim and alii, (2011) and Terrier, G., *et al.*, (2011).
[12] The time dimension of systemic risk deals with the evolution of aggregate risk in the financial system over time while the cross-section dimension is related to the distribution of risk across the financial system at a given point in time, and has to be understood looking at the interconnectedness and resilience of the market structure.
[13] See also Claessens, S. and Ghosh, Swati R., (2012), De Nicolò, G., Favara, G. and Ratnovski, L., (2012), Dell'Ariccia, G *et al.*, (2012), and Shin, Hyun S., (2012).
[14] Mesquita, M. and Torós, M. (2010).

large foreign exchange derivatives exposures by domestic corporations (amounting to an estimated USD37 billion at the end of September 2008). The second line of action was to calibrate policy instruments to provide stimulus to economic activity: the monetary policy base rate was lowered by a total of 500 bps, from 13.75% p.a. to 8.75% p.a.; a number of tax breaks were put in place and the fiscal surplus target was reduced from 3.8% in 2008 to 2.5% of GDP in 2009; credit extension by public financial institutions rose by BRL105 billion (3.3% of GDP).

The response of the Brazilian economy was swift, and produced the expected V-shaped recovery pattern. Despite the strong policy-driven rebound throughout 2009, GDP growth was still zero for that calendar year, but in 2010 GDP grew 7.5% YOY, domestic demand by 10.3%, with private consumption expanding 7.2% YOY and investment by 11.1% YOY.

Meanwhile, advanced economies were struggling with their own recoveries and that initiated a second phase of the crisis. The crisis had revealed severe problems in the global banking system, which continued despite the unprecedented initial response of governments and central banks, combining fiscal stimulus, monetary expansion (with significant purchases and holding of bank debt, MBS, and Treasury instruments by central banks) and institutional bailouts. After an initial recovery in the second half of 2009 and early in 2010, the Federal Reserve resumed its balance sheet expansion in August 2010 as it observed that the economy was not growing fast enough. In November 2010, the Fed announced a second round of quantitative easing, or "QE2". Other central banks, all with policy rates already pressed against the zero lower bound, followed suit.

As a result, in 2010, policy rates were negative in real terms in advanced economies and expansionary monetary policy (including unconventional measures) resulted in ample liquidity provision that affected international financial markets, contributing to high global liquidity. Although these policies of advanced economies may have been justified from the point of view of their domestic situation, it is now accepted that they created spillovers to emerging markets[15]. Sluggish recovery in advanced economies and weak credit multipliers and financial accelerators made liquidity injections remain largely in the balance sheets of

[15] See Terrier, G., *et al.*, (2011).

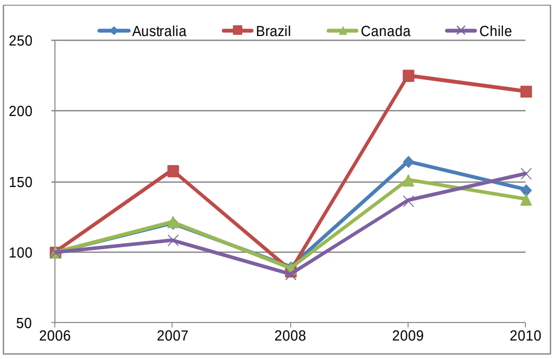
financial institutions. Yield, risk and growth differentials (low interest rates in advanced economies, narrowing relative risk premia, two speed growth prospects) led to stronger demand for emerging market assets and put pressure on emerging currencies to appreciate.

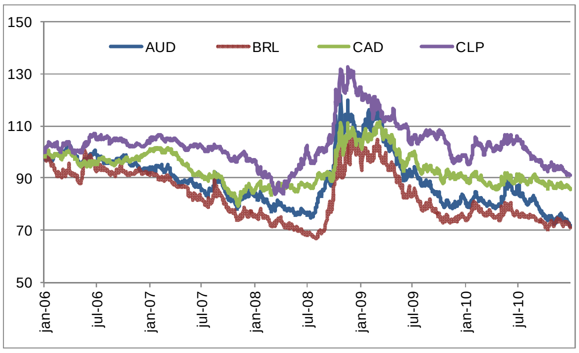
Moreover, global liquidity was also affecting EMEs through its effects on commodity prices, further contributing to the appreciation of commodity currencies[16]. Expanding global liquidity appears to be correlated with higher commodity prices, although fundamentals (excess LT demand) may have given crucial support to these price rises. On the real demand side, strong economic growth in EMEs, social structure changes in China and India, development strategies that are more resource-intensive, all have put pressure on commodity prices. But, most likely, global excess liquidity also played a role, in addition to fundamentals, compounding rising trends in commodities and energy prices. Of course, it is far from trivial to attest and quantify causal relationships, as there is limited robust empirical evidence that excess global liquidity favored commodity financialization, and it is even harder to determine to what extent financialization is the causal factor behind price rises.

Nevertheless, higher commodity prices do improve fundamentals of commodity exporters; that, in turn, triggers additional capital flows into these economies. Despite policy action in recipient countries, excess inflows contributed to the appreciation of several commodity-based currencies, as for instance in the cases of Australia, Canada, Brazil, Chile, among others (see Graph 1). The volume and intensity of capital flows in 2010 posed a challenge to policy makers in these countries because the impact of the overly liquid international environment was inflationary, in spite of the currency appreciation that inevitably took place, at a time when the strong post-crisis V-shapes recovery already gave rise to inflation pressures in EMEs.

[16] Refers to currencies that are closely tied to the value of commodities such as gold and oil. The Australian Dollar, Canadian Dollar, Brazilian Real and Chilean Peso all have a strong positive correlation with commodities and are sometimes referred to as commodity currencies.

Graph 1 – Commodity-based Countries – Foreign Net Portfolio Investments and Exchange Rates (base 100)





Source: IMF and Bloomberg

In a way, the strong capital inflows were actually compounding the inflationary pressures already suffered by EMEs as a consequence of their expanding domestic demand and globally rising commodity prices. The capital flows added fuel to local inflationary pressure as they exacerbated the pro-cyclicality of local financial sectors in recipient economies: they contributed to an excessive expansion of domestic credit by lowering funding costs and relaxing local credit standards. Not only did the ample foreign funding to local financial institutions intensify the impulse to aggregate demand, especially on the consumption side, but it also weakened the transmission of domestic monetary tightening as conventional monetary policy instruments operate essentially through the funding costs of banks. Finally, excessive capital flows increased the risks of financial instability, since banks increased their foreign currency exposure at the same time as they lowered credit standards in response to higher liquidity. Therefore, "sudden floods", i.e. surges in capital inflows – can lead to credit and asset price bubbles, including the exchange rate of commodity exporters.

In the second half of 2010 and early 2011, Brazil was facing quite exactly those challenges. The economy was showing signs of overheating (see Table 1), with domestic demand growing 5.7% YOY in the first quarter of 2011, and inflationary pressures resulting from the domestic supply-demand imbalances combined with global pressures on commodity prices. Local supply shocks and idiosyncratic regulated price adjustments also played a role: adjustments in urban transportation fares, which have a relevant weight in the CPI; atypical price hikes on food items, caused by unfavorable weather conditions in some production areas; a supply shock in ethanol, which is an important fuel for the passenger car fleet (either used separately or as part of the gasoline blend regularly sold). In addition, Brazil faced inflationary pressures stemming not from cyclical or momentary factors but rather from structural social transformation, with a growing middle class boosting the demand for non-tradables while their rising incomes also represented a cost shock on labor-intensive sectors. Inflation in the service sector was particularly affected by demand for services from this new middle-class.

The diagnosis of overheating in the economy was conducted *pari passu* with the monitoring of the buildup of potential threats to financial stability. Brazil had been going through an already long cycle of rapid credit expansion – about 22.2% p.a. on average between 2005 and 2011 – and that was especially true for consumer credit. To a large extent, such credit expansion corresponded to a process of natural deepening of financial markets in Brazil, with explanatory factors both structural and cyclical, including institutional improvements to loan contracts and collateral quality, strong fundamentals, in particular in the labor markets, and upward social mobility for about 40 millions Brazilians, with new middle-class members now accessing credit. However, the fragility of the recovery in mature economies, combined with favorable perspectives for the Brazilian economy, intensified the inflow of foreign financing, part of which was directed to the local credit market (see Table 1). The Central Bank was concerned that excessive volume of inflows could exacerbate the already strong growth in local credit markets by increasing credit multipliers. Lower cost of external funding could also weaken the transmission mechanism of monetary policy through channels related to credit, diminishing its potency as an aggregate demand management instrument, as well as causing distortions in the price of domestic assets.

Table 1: Activity, Credit, Capital Flows and Prices

	Unit	2009				2010				2011			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Activity													
GDP	% YOY	2.9	0.7	-1.4	-0.3	2.5	5.4	7.6	7.5	6.3	4.9	3.7	2.7
Domestic demand	% YOY	-0.5	-0.2	1.0	7.6	10.8	9.8	8.4	7.1	5.7	5.3	2.3	2.0
Ind. Production	% YOY	-14.6	-12.3	-8.2	5.9	18.2	14.3	8.0	3.3	2.8	0.6	0.0	-2.1
Unemployment	%	8.6	8.6	7.9	7.2	7.4	7.2	6.6	5.7	6.3	6.3	6.0	5.2
Capital Flows (Gross)													
Reserves	USD b	190.4	201.5	221.6	238.5	243.8	253.1	275.2	288.6	317.1	335.8	349.7	352.0
Reserves	% YOY	-2.5	0.3	7.3	23.1	28.0	25.6	24.2	21.0	30.1	32.7	27.1	22.0
Portfolio	USD b	25.1	46.4	55.0	46.9	29.7	30.1	38.7	35.1	24.5	28.6	22.7	25.2
Portfolio % of GDP	%	8.6	13.4	11.9	8.9	5.8	5.6	7.1	6.4	4.1	4.6	3.6	4.0
Bank credit	USD b	2.3	5.2	4.0	8.1	10.3	7.6	12.3	13.2	25.7	15.3	14.4	4.8
Bank credit % of GDP	%	0.8	1.5	0.9	1.5	2.0	1.4	2.2	2.4	4.3	2.5	2.3	0.8
FDI	USD b	6.6	5.0	7.6	11.2	6.7	12.1	11.9	24.7	15.6	16.8	19.1	17.3
FDI % of GDP	%	2.3	1.4	1.6	2.1	1.3	2.3	2.2	4.5	2.6	2.7	3.0	2.7
Total	USD b	72.5	101.2	106.6	127.2	94.8	104.9	119.1	146.4	134.9	139.0	146.8	127.4
Total Percent of GDP	%	24.9	29.3	23.0	24.2	18.5	19.5	21.8	26.7	22.5	22.3	23.4	20.2
Credit (Oustanding)													
Consumer	% YOY	18.5	17.0	15.7	17.7	18.4	16.3	17.1	19.1	17.9	18.2	16.9	13.9
Payroll-guaranteed	% YOY	22.6	30.3	33.9	36.1	37.2	29.7	27.8	28.4	21.8	19.5	17.8	12.5
Housing	% YOY	40.3	41.8	43.0	40.8	48.1	50.1	50.7	55.5	49.9	49.4	47.1	44.1
Ear-marked	% YOY	27.2	24.3	32.0	28.9	30.7	34.9	28.6	27.1	25.8	23.8	26.4	26.6
Non-earmaked	% YOY	23.6	17.0	10.4	9.1	10.9	13.2	15.7	17.7	18.0	17.8	15.7	14.7
Total	% YOY	24.7	19.1	16.6	15.0	16.9	19.8	19.9	20.9	20.6	19.9	19.4	18.8
Total Percent of GDP	%	40.7	41.5	43.6	43.7	43.1	43.6	44.3	45.2	45.2	46.0	47.4	49.0
Prices / Asset Prices													
CRB Metals (USD)	% YOY	-48.1	-39.5	-10.3	48.6	85.2	43.5	17.6	27.8	30.0	35.1	25.9	-6.6
CRB Food (USD)	% YOY	-21.9	-23.0	-25.4	7.6	20.2	14.0	27.4	26.8	38.2	40.4	27.8	6.9
CRB Total (USD)	% YOY	-28.0	-24.7	-16.0	18.9	34.6	23.2	19.8	24.0	30.0	30.8	20.7	-0.4
CPI (IPCA)	% YOY	5.6	4.8	4.3	4.3	5.2	4.8	4.7	5.9	6.3	6.7	7.3	6.5
CPI-food	% YOY	9.3	5.0	4.1	3.2	5.6	5.1	5.4	10.4	8.8	8.9	9.9	7.2
CPI-services	% YOY	6.8	7.2	6.9	6.4	6.9	6.8	6.9	7.6	8.5	8.8	9.0	9.0
WPI (IGP-M)	% YOY	5.6	-0.6	-3.0	-4.4	0.5	5.0	9.3	13.9	13.5	9.7	7.6	4.3
ER nominal	% YOY	30.4	19.0	1.1	-31.3	-25.9	-8.0	-5.7	-3.3	-7.4	-13.0	1.8	8.1
REER	% YOY	13.2	6.5	-6.2	-26.0	-20.0	-13.3	-9.0	-7.9	-6.3	-6.7	0.8	5.2
Real estate (SP)	% YOY	22.8	23.5	23.9	24.2	24.5	25.1	26.2	27.4	24.5	27.4	28.8	27.8
Real estate (RJ)	% YOY	13.9	15.0	17.6	20.6	23.5	29.0	34.7	38.6	41.7	44.0	42.3	37.3
BOVESPA	% YOY	-39.9	-23.4	21.7	60.2	54.2	16.9	12.1	1.0	-2.6	2.4	-28.3	-20.0

Source: Central Bank of Brazil and authors´ calculations

A1) Credit market developments

Since the mid-2000s, the dynamism of the credit market in Brazil has been intense and translated into a continuous growth in the credit-to-GDP ratio. Greater levels of domestic credit penetration, among other factors, contributed to the amplification of the power of monetary policy in Brazil. In 2010, in particular, credit operations in the Brazilian financial system, having left behind the impact of the 2008-09 crisis, were again expanding briskly, in line with domestic demand growth, which was boosted by a buoyant job market, improvements of income levels and strong confidence indicators.

Credit growth to households did not change the stability of debt service to income ratios (see Table 2): higher volumes of debt as a proportion of income were compensated by lower cost and longer tenors. Interest rates and spreads for household loans declined, maturities lengthened and delinquency rates (NPL ratios) were following a downward trend. Social changes in Brazil explain the expansion of credit to households, especially car loans and loans guaranteed by automatic payroll deduction. However, that did not significantly affect the risk profile of the system's credit portfolio, even when taking into account the considerably larger group of new borrowers with little prior credit history and the impacts of the 2008-09 financial crisis on the domestic economic cycle. Indeed, payments overdue above 90 days for total credit to households were actually, in December 2010, at a historical low of 4.98%.

Credit growth was more intense for loans with earmarked resources, boosted by Banco Nacional de Desenvolvimento Econômico e Social ("BNDES") and mortgage lending (see Box 2). Total credit outstanding in the financial system reached R$ 1,706 billion in December of 2010, corresponding to 46.4% of GDP and resulting from YOY growth of 20.6%. The non-earmarked credit portfolio reached R$ 1,116 billion in December 2010, after an increase of 16.9% compared to the previous year. It represented 65.4% of the total credit of the financial system. The household credit portfolio increased by 19.2%, reaching R$ 560 billion. Loans for the acquisition of vehicles soared by 49.1% and personal credit, mostly for consumption, increased by 24.7%.

BOX 2: Housing loans in Brazil

Early in 2011, some observers began warning about the risk of a "housing bubble" in Brazil. Joe Leahy and Samantha Pearson of the Financial Times, for example, wrote in May 11, 2011: "*Across Latin America's largest economy, record prices for the country's commodities and surging foreign fund inflows – what the International Monetary Fund calls "favorable tailwinds" – are driving a historic boom. Property prices are soaring, consumer credit is booming and bank profits swelling. But there are growing concerns over whether Brazil is becoming addicted to this windfall of easy money. Increasingly, there are fears that Brazil is heading for a bubble. "Experience tells us that whenever there is a lot of credit available for emerging markets economies, especially in South America, and if that's coupled with very high commodity prices, the tendency of our economies is to spend too much," said IMF western hemisphere director, Nicolás Eyzaguirre, a former Chilean finance minister. (...). Anecdotes abound of beachfront apartments in Rio's fashionable Ipanema district selling for a third more than levels of late last year. In São Paulo, house prices have nearly doubled since 2008*". However, the observations did not disentangle the structural and cyclical factors behind the upswing in housing markets in Brazil, nor did they take into account the small basis upon which this segment of the credit market was growing. True, mortgage lending, whose primary funding source are saving account deposits and the Workers Severance Fund ("FGTS"), accounted for a major portion of the credit expansion. For decades, however, millions of Brazilians had stayed away from the housing market altogether, due to a nearly complete lack of financing. The rapid growth in mortgage lending helped many Brazilians start accessing the housing market. Mortgage lending in Brazil grew 56% in 2010, and approximately 44% in 2011. Nevertheless, mortgage debt is still quite low (4.6% of Brazil's GDP), compared to international standards (Table A). In Brazil, residential real estate loans still account for only 7.1% of total bank loans. Given its incipient state, it is expected to continue driving housing-sector growth in the long term.

Box 2 - Table A – Mortgage Loans – International Comparison

Selected countries	Mortgage loans/GDP (April 2011)	Residential real estate loans to total loans (December 2010)
Brazil	4.1	7.1
Eurozone	40.2	n.a.
Germany	37.7	16.8
Spain	61.2	27.4
USA 1/	70.3	36.5
France	39.8	n.a.
Netherland	66.1	23.6
Italy	22.9	18.1

Source: FED, Bureau of Economic Analysis, BCE, Eurostat and FSI.
1/ December 2010.

Mortgage lending gained momentum in Brazil not just because of the credit expansion and increases in income but also due to various legal and regulatory changes over the years. For instance, the Law 10.931/2004 reduced a lender's mortgage origination risk by making it easier and faster to repossess a property in the event of default[17]. Earlier, in the case of delinquency, it used to take as much as six years for a bank to foreclose on the pledged property[18].

[17] It was made possible by the use of a mechanism called "alienação fiduciária". In a mortgage issued with this feature, the title of the property used as loan collateral is placed with a trustee who, on behalf of the lender, has the right to sell such property in case of a borrower default – without court proceedings.
[18] Another important legal change that helped to boost mortgage lending in Brazil was the Law 10931/04 that amended the Civil Code to extend maximum mortgage tenors from 20 to 30 years.

Table 2: Credit market

	Unit	2009				2010				2011			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Firms													
Total (growth rate)	% YOY	28.5	19.7	16.0	12.6	14.5	20.4	19.9	19.6	20.1	18.2	17.8	18.4
Average interest rate	%	30.2	28.2	26.4	26.0	26.2	26.8	28.8	28.4	30.4	31.0	30.8	29.3
Spread	p.p.	18.6	18.4	17.8	17.1	17.1	16.8	18.3	17.7	19.0	19.2	19.1	18.7
NPL (90 days overdue)	%	1.94	2.55	2.75	2.43	2.20	1.97	1.80	1.68	1.73	1.84	1.90	1.91
Households - Total Credit													
Total (growth rate)	% YOY	20.1	18.4	17.3	18.3	20.0	19.0	19.9	22.5	21.2	22.0	21.5	19.3
Total Percent of GDP	%	17.7	18.5	19.3	19.3	19.3	19.3	19.6	20.2	20.3	20.7	21.4	22.0
Average rate	%	52.6	47.2	44.2	43.3	42.0	41.0	39.9	40.0	44.2	46.6	45.9	45.2
Spread over deposit	p.p.	41.6	37.3	34.3	32.5	30.9	29.2	28.5	28.3	31.7	34.1	34.2	35.0
Total Debt to Income	%	32.5	33.3	34.2	35.2	36.1	37.2	38.2	39.0	39.8	40.7	41.8	42.5
Total Debt Service to income	%	18.8	19.5	19.3	19.5	19.2	19.4	19.1	19.3	19.8	20.3	21.9	22.2
NPL (90 days overdue)	%	7.1	7.0	7.1	6.5	6.1	5.7	5.4	5.0	4.9	5.2	5.3	5.5
Worst risk category/Total	%	9.4	9.2	9.1	8.8	8.3	7.9	7.6	7.1	6.9	7.2	7.4	7.6
Households - Consumer Credit													
Total (growth rate)	% YOY	18.5	17.0	15.7	17.7	18.4	16.3	17.1	19.1	17.9	18.2	16.9	13.9
Total Percent of GDP	%	13.0	13.7	14.2	14.2	14.0	14.0	14.1	14.5	14.4	14.5	14.8	15.0
Average rate	%	53.9	47.0	44.6	44.6	43.8	42.6	41.9	43.2	47.9	49.5	49.3	49.7
Spread over deposit	p.p.	43.0	37.0	34.6	33.5	32.4	30.6	30.3	31.3	35.2	36.9	37.6	39.5
Average Maturity	months	13.0	14.8	15.1	15.2	15.5	15.7	16.1	16.2	16.2	16.3	16.5	17.6
NPL (90 days overdue)	%	8.5	8.5	8.3	7.9	7.3	6.9	6.5	6.2	6.2	6.6	7.0	7.3
Worst risk category/Total	%	9.9	9.7	9.7	9.4	8.8	8.4	8.0	7.5	7.4	7.8	8.2	8.5
Households - Car Loans													
Total (growth rate)	% YOY	-3.3	0.6	4.5	17.8	26.5	33.8	43.3	50.7	48.0	45.3	35.7	27.8
Total Percent of GDP	%	2.5	2.5	2.7	2.7	2.8	3.0	3.3	3.5	3.6	3.8	4.0	4.1
Average rate	%	32.0	28.6	26.0	25.4	24.3	24.0	23.6	23.8	28.1	30.4	29.1	27.3
Spread over deposit	p.p.	21.0	18.5	15.9	14.2	12.8	12.0	12.0	11.9	15.4	17.8	17.4	17.1
Average Maturity	months	N/A	16	17	17	18	19	19	20	20	19	19	19
NPL (90 days overdue)	%	6.4	6.9	6.1	5.5	5.0	4.4	3.8	3.2	3.7	4.5	5.2	5.9
Loan-to-Value (average)	%	71.2	72.0	74.7	74.9	77.4	77.9	78.6	77.8	70.6	74.9	73.6	71.9
Worst risk category/Total	%	6.3	6.6	6.0	5.5	4.8	4.2	3.6	2.8	3.1	3.6	4.2	4.8

Source: Central Bank of Brazil and authors´ calculations

On average and in aggregate terms, the general credit conditions were favorable, as most of the credit expansion was taking place in lower risk credit modalities. However, there were localized sources of risk coming from households' leverage increase and excessive lengthening of loan maturities in certain modalities of credit. That was especially noticeable in consumer credit extended with loan maturities beyond prudent levels (e.g., above 60 months for car loans) and with loans whose collateral was not compatible with its associated risk.

A2) Capital flow developments

In recent years, capital flows to Brazil have been related to a profound transformation of the Brazilian economy. For almost two decades already, Brazil has been enjoying an environment of stability, thanks to having implemented a consistent macroeconomic policy framework. Combined with the adoption of other sound public policies, this framework enabled the country to resume a process of sustainable and inclusive growth, after two decades of sluggish and irregular performance. Naturally, Brazil became an attractive destination for foreign capital, with attractive investment opportunities in numerous areas, resulting from the newly improved prospects combined with the backlog left by underinvestment in the preceding decades.

Alongside these structural factors, the long history of emerging markets booms and busts shows that the buildup of financial risks is usually associated with periods of capital bonanzas that fuel credit booms, asset bubbles, and exchange rate misalignments. Those episodes frequently end in sudden stops and reversals of capital inflows that endanger the financial system and the real economy. Short-term inflows in particular contribute to the buildup of financial mismatches with potentially severe financial and macroeconomic consequences arising from the combination of exchange rate pass-through and mismanaged aggregate demand expansions.

The strong recovery of the Brazilian economy in the aftermath of the more acute phase of the global financial crisis reinforced these structural factors, such as recognition for the soundness of the policy framework and favorable long-term growth prospects. Together with temporary factors such as the difference between international and local interest rates, and excessive global liquidity, all this resulted in large short term foreign inflows and domestic currency appreciation.

Table 1 describes recent developments regarding capital flows. During 2010, net capital inflows (defined as nonresidents' net flows into portfolio investments, depositary receipts, direct investment and external credits) amounted to US$125 billion[19], compared to close to US$80 billion in 2009. Brazil had a historically high amount of equity issuance, totaling R$146 billion (mostly by Petrobras), of which 26% were taken up by foreign investors. External debt issuance raised another US$ 48 billion, approximately. FDI net inflows amounted to US$ 38 billion.

Therefore, managing the effects of large capital inflows has been one of the main policy issues in Brazil since the global crisis. Brazil managed those massive inflows primarily in standard textbook fashion, with aggregate demand contraction through fiscal and monetary policies, allowing significant currency appreciation while smoothing movements through sterilized reserve accumulation – which reduced the volatility of the exchange rate, without, however, aiming at distorting its structural trend.

But Brazil's credit market was affected by capital inflows and a set of measures was consequently adopted, as discussed in the next section. There was evidence that, there were multiple sources of foreign funding that transmitted into credit markets, in addition to the confidence factors that are associated with periods of abundant liquidity[20]. External funding at low cost, despite tight domestic prudential rules, creates incentives to increase risk taking and usually ends by distorting asset prices, including the exchange rate (causing misalignment and excessive volatility). In Brazil, excessive capital inflows contributed to the brisk pace of domestic credit growth, which fueled inflationary pressures associated with domestic demand-supply mismatches and created fertile ground for the domestic transmission of pressures stemming from global commodity prices.

III. Brazil's policy responses to the crisis

Brazilian policymakers relied on a comprehensive textbook toolkit of policy measures (see Table 3) to deal with the emerging risks of macroeconomic and financial instability at the end of 2010 and early 2011. Standard aggregate demand management was conducted using

[19] For the purpose of this paper, the amounts of capital flows come from data on foreign exchange contracts, the same criteria used for IOF tax charges. Due to these methodological criteria, the figures may differ from balance of payments' data.

[20] See Tombini, Alexandre A., (2011).

fiscal and monetary policies, to dampen supply-demand imbalances and to control inflation expectations. Macroprudential measures were adopted to reduce systemic financial risk stemming from rapid credit growth and large capital inflows.

Table 3: Macroprudential, monetary and fiscal policy measures

Policy Measures:	Unit	2009				2010				2011			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
On Activity													
Selic Base rate (average)	%	12.6	10.3	8.9	8.8	8.8	9.5	10.6	10.8	11.3	12.0	12.3	11.4
Selic Base rate increase	(+bps)	-250	-200	-50	0	0	150	50	0	100	50	-25	-100
Primary Fiscal Surplus													
Target	% GDP	-	-	-	2.50	-	-	-	3.10	-	-	-	3.09
Achievement	% GDP	-	-	-	2.00	-	-	-	2.70	-	-	-	3.11
Public Debt (Net)	% GDP	39.1	41.2	42.8	42.1	41.1	40.0	39.4	39.2	38.9	38.6	36.3	36.4
On Capital Flows													
Tax on Financial Transactions (IOF)													
Nonresident Fixed Income	%	0	0	0	2	2	2	2	6	6	6	6	6
Derivative margin deposits	%	0.38	0.38	0.38	0.38	0.38	0.38	0.38	6	6	6	6	6
Equity	%	0	0	0	2	2	2	2	2	2	2	2	0
Reserve Requirement on Short FX Open Positions in Spot Market	%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minimum between 60% of what exceeds US$ 3 billion or Tier 1 capital	Minimum between 60% of what exceeds US$ 1 billion or Tier 1 capital	Minimum between 60% of what exceeds US$ 1 billion or Tier 1 capital	Minimum between 60% of what exceeds US$ 1 billion or Tier 1 capital
External Credit Inflows	%	5.38	5.38	5.38	5.38	5.38	5.38	5.38	5.38	6	6	6	6
taxable maturity	days	90	90	90	90	90	90	90	90	360	720	720	720
FX Derivatives	%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	1
On Credit													
Reserve Requirements (RR)													
Outstanding RR	R$ b	174.9	179.4	186.0	193.6	233.2	279.5	301.3	395.2	400.9	418.6	434.7	448.5
Outstanding RR	% credit	14.0	13.9	13.7	13.6	15.9	18.1	18.5	23.0	22.7	22.7	22.4	22.0
Average ratio on Demand Deposits	%	42.0	42.0	42.0	42.0	42.0	42.0	42.9	43.0	43.0	43.0	43.0	43.0
Average ratio on Term Deposits	%	15.0	15.0	14.5	13.5	13.5	14.9	15.0	15.8	20.0	20.0	20.0	20.0
Tax on Financial Transactions (IOF) on domestic credit	%	0.0041	0.0041	0.0041	0.0041	0.0041	0.0041	0.0041	0.0041	0.0041	0.0082	0.0082	0.0068

Source: Central Bank of Brazil and authors´ calculations

On the monetary policy front, between January and July 2011, the Central Bank took action and raised the policy rate by 175 bps in five consecutive monetary policy committee meetings. That followed the 200 bps increase of 2010 and totaled an overall rate hike of 375 bps[21].

[21] The reversal of the monetary policy tightening stance in August 2011 is discussed below in more detail.

On the fiscal front, in February 2011, the Government reaffirmed its commitment to a strong fiscal stance with a steady reduction of the public-debt to GDP ratio and proposed a fiscal consolidation of R$ 50 billion of expenditure cuts. In August, it announced an additional R$ 10 billion savings. At the end of the year, the public sector successfully delivered on its commitment to a primary fiscal surplus of 3.1% of GDP.

On the macroprudential front, the Central Bank and the Government were pro-active in anticipating potential sources of risk to the Brazilian economy and its financial system. As reported in a number of statements and minutes of the Monetary Policy Committee of the Central Bank of Brazil, the main macroprudential measures implemented were: (a) increased bank reserve requirements to dampen the transmission of excessive global liquidity to the domestic credit market; (b) increased capital requirements for specific segments of the credit market (essentially consumer loans) aiming at correcting a deterioration in the quality of loan origination; and (c) new reserve requirements on banks' short spot foreign exchange positions and taxation of specific inflows to correct imbalances in the foreign exchange market and to dampen the intensity and volatility of capital flows.

The scope and direction of these policies can be summarized below, using the same format of display as in diagram 1 above. In terms of macroprudential instruments, most of the balance sheet vulnerabilities listed above were addressed either comprehensively or for specific segments of the credit market with higher financial risk; similarly, loan contracts and foreign currency liquidity were strengthened. Other features were not tightened but were already in place in Brazil such as mark-to-market rules and the obligation for all financial institutions to register any derivatives contract in a clearing house or a data repository facility. The crisis revealed that this obligation had a loophole: non-financial firms with foreign exchange operations could use foreign counterparties to engage in derivatives trading outside Brazil's jurisdiction. This was subsequently corrected by extending the registration requirement of overseas derivatives to non-financial firms and demanding the disclosure, on the quarterly financial statements of publicly traded companies, of sensitivity analysis on three different scenarios based on their derivatives exposure.

Diagram 2: Macroprudential instruments by vulnerability and financial system component

Macroeconomic Policies by area

	2009	2010	2011Q1-Q2	2011Q3	2011Q4
Fiscal Policy	Loosening	Neutral	Tightening	Tightening	Tightening
Monetary Policy	Loosening	Tightening	Tightening	Loosening	Loosening

Macroprudential instruments by vulnerability and financial system component

		Financial system component				
		Bank or deposit-taker		Non-bank investor	Securities market	Financial infrastructure
		Balance sheet*	Lending contract			
Vulnerability	Leverage	capital ratio risk weights provisioning profit distribution restrictions credit growth cap	LTV cap debt service / income cap maturity cap margin/haircut limit tax on household credit		margin/haircut limit	
	Liquidity or market risk	liquidity / reserve requirements FX lending restriction currency mismatch limit open FX position limit	valuation rules (eg. MMMFs)	tax on FX deriv tax on ext credit	central bank balance sheet operations	exchange trading
	Interconnectedness	concentration limits systemic capital surcharge subsidiarisation				central counterparties (CCP)

* Capital and other balance sheet requirements also apply to insurers and pension funds, but we restrict our attention here to the types of institutions most relevant for credit intermediation.

used for some segments of the credit market

used for all financial system component

Source: Authors' calculations

A) Macroprudential measures in credit market

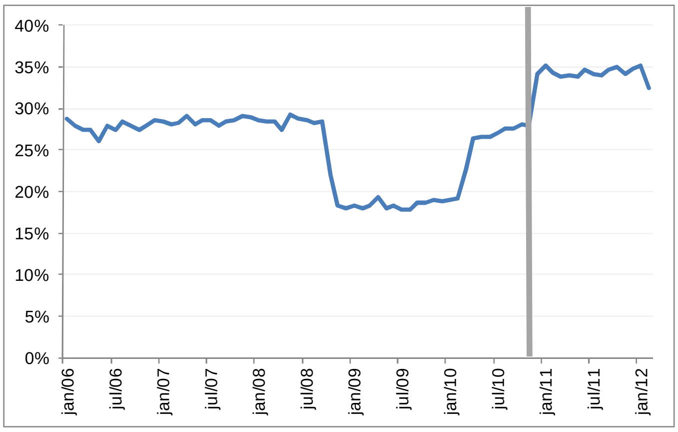
A1) The measures

Reserve requirements (RR). As mentioned above, during the 2008-09 crisis, Brazil used reserve requirements as an important mechanism to support financial stability and to facilitate liquidity reallocation among financial institutions[22]. In particular, in order to support the operations of small and medium size banks, the Central Bank allowed larger banks to draw on portions of their required reserves if these funds were to be used to extend liquidity to small and medium-sized banks (Circular 3,427/2008) These measures were progressively reversed and, in December 2010, the Central Bank moved further with the recomposition of reserve requirements by gradually eliminating these reductions. At the

[22] See Mesquita, M. and Torós, M. (2010) and. Terrier, G., *et al.*, (2011)

end of 2010 and in 2011, the Central Bank used reserve requirements once again as a countercyclical buffer in order to smooth rapid credit growth, raising unremunerated reserve requirements on term deposits from 15% to 20% (Circular 3513) and the additional remunerated reserve requirements on demand and term deposit from 8% to 12% (Circular 3514).

Graph 2 – Total Reserve Requirements/Total Deposits (%)



Nevertheless, the Central Bank protected sources of longer-term bank funding and exempted the Letras Financeiras (LF) -- a bank issued debenture with a minimum maturity of two years-- from reserve requirements (Circular 3,513). Previously, the Letras Financeiras were charged reserve requirements at the same rate as term deposits. While maturity mismatch is inherent to the banking business it is also a source of risk to be carefully monitored, so protecting LFs as a long-term source of funding for banks, in conjunction with the shortening of credit maturities for consumer credit as a result of the macroprudential measures adopted, were important initiatives to mitigate this risk.

Financial Transactions Tax (IOF). With the same objectives in mind, in April 2011, the Government raised the tax rate of the Tax on Financial Transactions (IOF) applying to credit operations for individuals (Decree 7,458). It was increased from 0.0041% to 0.0082% per day, limited to a maximum charge over 365 days. Therefore, the maximum tax rate increased from 1.5% to 3%.

Capital Requirements for Consumer Loans. As mentioned above, the diagnosis in the credit market was that the strong credit expansion to individuals, especially in car loans and payroll-guaranteed consumer loans, was increasingly done with a lengthening of maturities, increases in LTVs and reductions in interest rates that were incompatible with the quality of risk. That was translating into higher potential risk associated with higher household indebtedness and with maturity mismatches in the banking system. Since 2003, the tenors for consumption loans were extended and in some cases went above 72 months in the modality of car loans. As for payroll-guaranteed consumer loans, the tenors for public sector employees reached 60 months. This lengthening of loans tenors was not, however, accompanied by a similar extension in the maturity structure of banks' funding, which remained concentrated in demand deposits and term deposits with daily liquidity, thus constituting a source of financial vulnerability. The terms of some of these longer tenor loans to household were also not compatible with the quality of collateral and its associated risk. This characteristic was especially acute in vehicle financing, where the market value of pledged assets tends to decline rapidly. Given the growing size of these market segments, they represented a potential source of systemic risk if the prevailing market trends continued to go unchecked.

Macroprudential measures were thus adopted to curb the supply of excessively long term consumer credit and car loans. Circular 3,515 of December 3th, 2010, raised capital requirements for household loans above 24 months by increasing the Risk Weight Factor (RWF), used for capital requirements calculation, from 75% to 150% on most household credit modalities. In practice, the total capital required from financial institutions for those loans increased from 8% to 16.5% of Risk-Weighted-Assets (RWA). The rise on the RWF was not applicable to agricultural credit operations, mortgage loans, or credit for the acquisition of trucks and similar vehicles.

Diagram 3: Brazil - Maturity Limits and LTVs used to calibrate Risk-Weights for Auto and Personal Consumer Loans

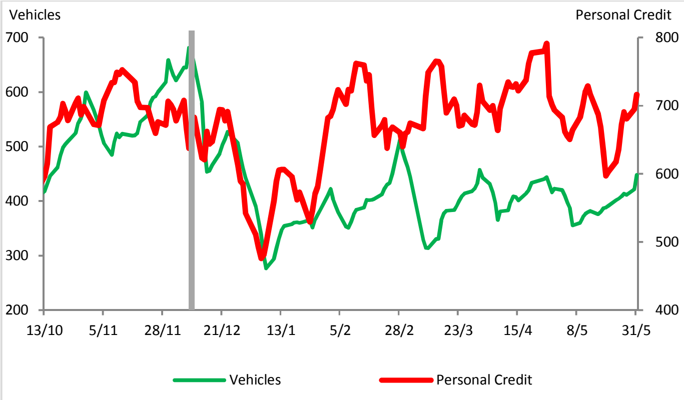
Operation	Maturity and LTV	Risk Weight
Vehicles (financing and leasing)	between 24 and 36 months and LTV > 80%	150%
	between 36 and 48 months and LTV > 70%	
	between 48 and 60 months and LTV > 60%	
	more than 60 months and any LTV	
Payroll-deducted loan	more than 36 months	
Personal loan	more than 24 months	
Other consumer loans		100%

A2) The results

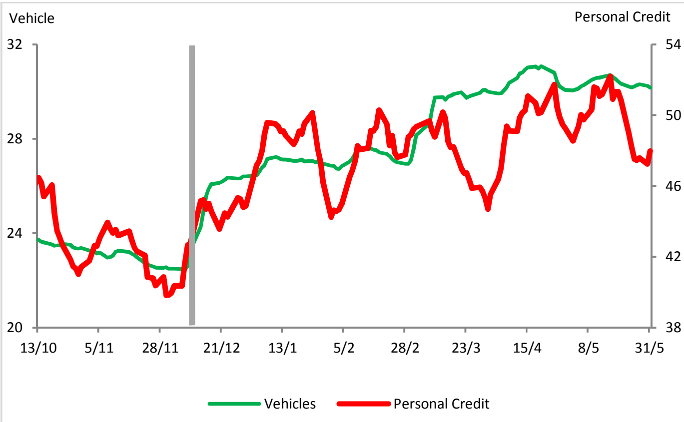
The increases on capital requirements for consumer loans, reserve requirements on demand and term deposits and the IOF tax rate on consumer credit, in conjunction to policy interest rate hikes, were successful in reducing the growth of household credit growth to a more sustainable pace[23]. These measures affected not only the volume of new loans, but also their interest rates and average maturities. The average interest rate rose to 30.4% p.a. in May 2011, compared to 22.8% p.a. in November of 2010. In the same period, the monthly origination of new loans fell from R$ 11.2 billion to R$ 8.8 billion and the average maturities declined from 45.7 to 43 months.

[23] Naturally a more rigorous approach would require modeling this segment of the credit market and defining a sustainable growth path, gaps, etc.

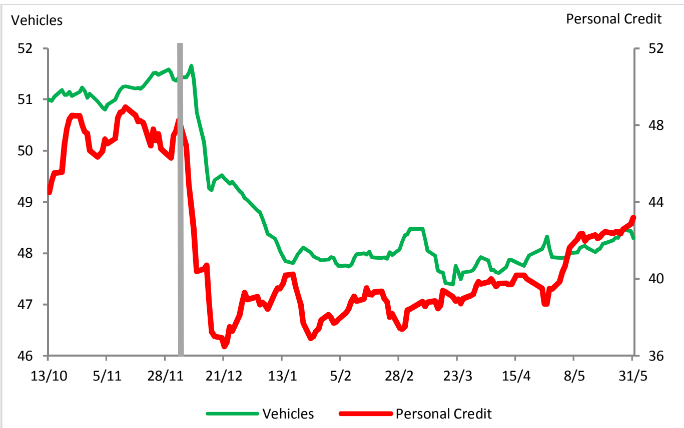
Graph 3 – New loans– 5 days moving average (R$ million)
Vehicles financing and personal credit



Graph 4 – Interest rate – 5 days moving average (% p.a.)
Vehicles financing and personal credit



Graph 5 – Average maturity – 5 days moving average (months)
Vehicles financing and personal credit



B) Macroprudential measures on foreign exchange market

IOF Tax on portfolio investments by nonresidents and on margin deposits on derivatives. In October 2010, the Tax on Financial Transactions[24] (IOF) for nonresidents' portfolio investment in fixed income instruments was raised[25], first from 2% to 4%, and later in the same month to 6%. The IOF was also raised to 6% (from 0.38%) on incoming remittances destined to posting collateral on derivatives positions held at central counterparties for stocks, commodities or futures trading.[26] Inflows for equity investments remained subject to a 2% IOF tax rate. The IOF rate increases were expected to curb excessive short-term and speculative capital inflows and lengthen flow composition, in particular by discouraging short term carry trades in both spot and futures markets, which were putting pressure on the domestic currency to appreciate[27].

Additional technical measures were subsequently adopted to close possible loopholes that would have allowed foreign investors to bypass the higher IOF tax rate on fixed income flows. For instance, to avoid arbitrage between the different IOF rates in force, any internal transfer of non-resident funds from equities to fixed income investments was required to be accompanied by a simultaneous foreign exchange transaction subject to IOF taxation[28]. Local banks were also forbidden to lend securities to foreign investors, which would allow them to avoid the tax on derivative margin deposits. With this same goal, BM&FBOVESPA was encouraged to exclude trust letters issued by domestic banks from the list of assets eligible as nonresident investors' collateral.

[24] The IOF is a tax of economic nature and is applicable to several operations, such as: credit, foreign exchange, securities and insurance transactions. Each tax origin is based on a different trigger; in the case of a foreign exchange transaction, it is the settlement of the respective foreign exchange contract.

[25] The IOF on nonresident inflows for portfolio investments was used to limit excessive inflows before the crisis during March to October 2008 with a 1.5% tax rate, both for fixed income and equities. In October 2009, it was introduced again with a 2% tax rate.

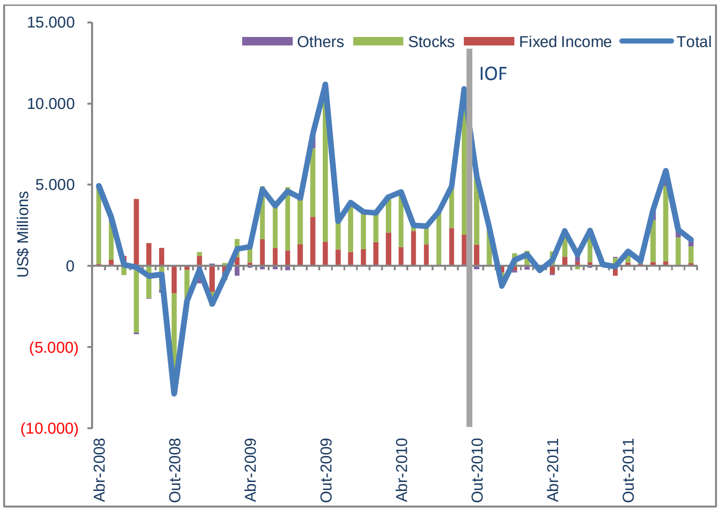
[26] In Brazil, around 90% of the derivatives are standardized exchange-traded and cleared through a central counterparty. The BM&F BOVESPA is currently the only exchange in Brazil acting as central counterparty for every trade registered on its systems.

[27] A synthetic carry trade can be performed in the derivatives market by acquiring long positions on a high yield currency (i.e. Brazilian real) and short position on a funding currency (i.e., dollars, yens, etc)

[28] Otherwise, nonresidents would be able to enter the market with a first investment in equity, taxed at the 2% IOF, and, later on, transfer funds to a fixed income investment, avoiding the payment of a higher 6% IOF rate.

As shown in Graph 6, the foreign net inflows to fixed income plummeted since then, and, so far, have not returned to the same levels as before the IOF tax rate hike. This happened despite the fact that, according to one estimate, when considering the domestic interest rate (Selic) at the time of the measure compared to the Libor rate (as a proxy for funding costs), the investment on a government bond by a foreign investor subject to the IOF would break even at a holding period around nine months.[29][30]

Graph 6 - Portfolio's Net Inflows by Asset Class – monthly data



On the other hand, carry trades on derivatives markets were not significantly affected. Because the tax on derivatives transactions applied only to margin deposits posted as collateral at the clearinghouse, and not on the actual notional exposure, it had limited effectiveness. In fact, the foreign investor could use other assets that he already possessed in the country, such as government bonds or equities, to deposit as margin for his exposures and avoid the tax. Therefore, currency positions taken in the derivatives market enjoyed a favorable tax treatment compared with positions in the underlying cash market.

Bank reserve requirement on open short positions in the FX spot market. In January 2011, the Central Bank imposed a 60% unremunerated reserve requirement on

[29] Although the flat one-time IOF hurdle is relatively less penalizing of returns on investments held for longer terms, the tax rate hike affected the liquidity of the primary market at the long end of the yield curve, where foreign investors are usually more active.

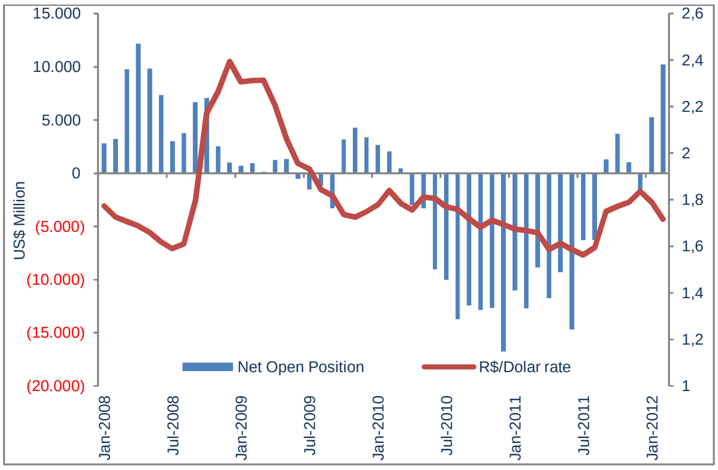
[30] Calculated as: $t = \log(1-IOF)/\log[(1+e)/(1+i)]$, where e= external interest rates and i= Selic.

banks' short positions in the foreign exchange spot market exceeding either US$3 billion or Tier 1 capital, whichever is lower. In July, the limit was further tightened to US$1 billion[31].

The diagnosis was that domestic banks could take advantage of the ample liquidity in global markets to significantly increase their funding abroad, and then invest those resources in BRL-denominated domestic assets, including loans, thus capturing the interest rate differential. There were concerns that such behavior could leave banks overexposed to currency mismatch and overly dependent on foreign liquidity, and hence vulnerable in the event of a large shock to the exchange rate or a rapid reversal of inflows. Technically, according to the regulations of the Brazilian foreign exchange market, banks open a short cash position when they sell foreign currency borrowed abroad resulting from drawings on external credit lines. Under those same regulations, although the operation is similar in accounting terms, when a bank contracts a direct loan or issues securities abroad (e.g. commercial paper), it opens a long position. This aspect is particularly important to understand the rationale behind subsequent IOF measures.

Indeed, throughout 2010, as shown in Graph 7, banks increased exponentially their open foreign currency position. During that year, the financial system came out of a long position of $3.4 billion to $16.8 billion short position by year end. Therefore, not only the system's position as a whole was excessive but also some smaller and medium size banks built positions in very large sizes compared to their respective Tier 1 capital.

Graph 7 – Net Open Positions of Banks – monthly data

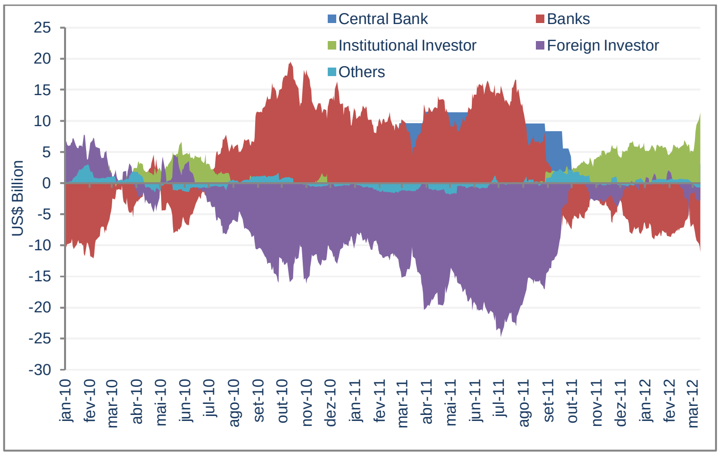


[31] A 5-day moving average methodology was also adopted for the calculation of the short position.

The reserve requirement on short foreign currency positions was also an important measure to complement the rise in IOF tax on nonresident's portfolio investments in reducing the attractiveness of carry trade operations through long BRL derivatives positions. That was expected to be indirectly achieved by making more expensive for banks – usually the counterparty of nonresidents' derivatives positions – to draw on their external credit lines. It was able to impair an important channel for carry trades while reducing vulnerabilities in the banking sector. By limiting banks' ability to operate in spot and derivatives markets, or by raising the cost of doing so, the authorities could, in theory, also make the market less liquid and potentially less attractive for foreign carry traders, even without targeting the latter directly[32].

The foreign investors are on the other side of the derivative transaction, usually large international banks acting as market makers in the USD/BRL offshore non-deliverable forward market. They take the role of bridge intermediaries between the onshore and offshore markets by relying on the domestic market to take the opposite net exposure of its offshore clients.

Graph 8 – FX Derivatives Exposure – by type of investor



[32] This happens because local banks usually perform a arbitrage transaction where they take a long foreign exchange position in the derivatives markets and hedge their exposures in the underlying cash market by drawing on an external credit line and selling the proceeds to the Central Bank, to another bank or in the primary market (i.e. to an importer) and invest it in BRL-denominated assets. They earn a currency risk-free arbitrage profit resulting from the difference between the onshore foreign currency interest rate – called cupom cambial – and the offshore external borrowing cost (Libor rate plus a spread). This transaction, in theory, does not influence the exchange rate trending path.

IOF Tax on external credit inflows. In March 2011, in order to curtail short term speculative inflows, while avoiding hampering longer-term flows (as mentioned in public declarations[33]), the authorities raised to 6% the IOF tax rate on inflows related to direct external borrowing or debt securities issued by residents[34] with a maturity below 360 days. Previously, a 5.38% tax rate applied only to debts with average tenors below 90 days. A week later, the minimum average tenor for IOF exemption was further increased to 720 days[35].

As shown on Table 4, the IOF on external credit Inflows was effective to lengthen the tenors of external credit for residents, therefore achieving its macroprudential goals. Despite the increase on the IOF tax rate, the net inflow of external credit amounted U$49.6 billion in 2011[36], a 14.6% increase compared to 2010, reflecting the global liquidity and strong foreign appetite for Brazilian assets.

[33] See inter alia the newspaper O Estado de São Paulo, March 1, 2012 "Government does not intend to tax FDI"

[34] The Law 4,131/62 requires that the total amount borrowed abroad by a resident to be fully internalized in the country.

[35] In order to provide more effectiveness to the measure it was imposed the performance of simultaneous foreign exchange operations for renewal, renegotiation and assumption of obligation of external loan (including securities) under registration requirement with the BCB.

[36] The authorities further extended the taxable average tenor from 720 days to 1080 days on March 1st, 2012 and to 1800 days in March 9th, 2012. In July 13th, 2012, it returned to 720 days.

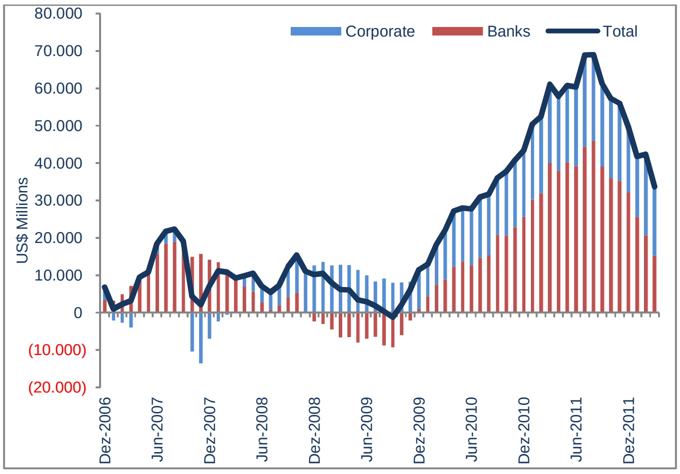
Table 4: External Credit by Average Tenors

Loans and securities
External credits - total

Date		Up to 360 days		From 361 to 720 days		From 721 to 1080 days		From 1081 to 1800 days		Above 1800 days	
		US$ millions	Perc. %	US$ millions	Perc. %	US$ millions	Perc. %	US$ millions	Perc. %	US$ millions	Perc. %
2011	Jan	7,772	54.1	3,155	22.0	324	2.3	1,199	8.3	1,917	13.3
	Feb	2,590	41.5	2,173	34.8	246	3.9	206	3.3	1,027	16.4
	Mar	6,517	49.5	3,501	26.6	371	2.8	1,155	8.8	1,633	12.4
	Apr	26	0.3	948	9.2	2,207	21.5	4,185	40.7	2,906	28.3
	May	76	0.8	126	1.3	3,804	39.8	3,488	36.5	2,073	21.7
	Jun	114	1.5	117	1.5	3,686	48.7	1,481	19.6	2,170	28.7
	Jul	24	0.2	158	1.1	6,668	47.2	3,683	26.1	3,599	25.5
	Ago	28	0.4	124	1.9	3,425	51.5	1,598	24.0	1,471	22.1
	Sep	18	0.5	185	4.9	1,743	46.6	1,044	27.9	755	20.2
	Oct	31	1.2	224	8.9	960	38.1	678	26.9	627	24.9
	Nov	26	0.6	209	5.1	949	23.0	546	13.2	2,399	58.1
	Dec	83	1.8	407	8.9	1,731	37.8	1,947	42.5	415	9.0
2012	Jan	4	0.1	33	1.0	936	27.8	744	22.1	1,649	49.0
	Feb	7	0.3	167	8.3	370	18.4	295	14.7	1,169	58.2
	Mar	5	0.1	48	1.1	151	3.4	1,129	25.3	3,129	70.1
	Apr	6	0.6	12	1.1	15	1.3	84	7.2	1,045	89.8
	May	8	0.4	6	0.3	2	0.1	123	6.1	1,878	93.1

Source: Central Bank of Brazil

Graph 9 – External Credit by Issuer – 12 months

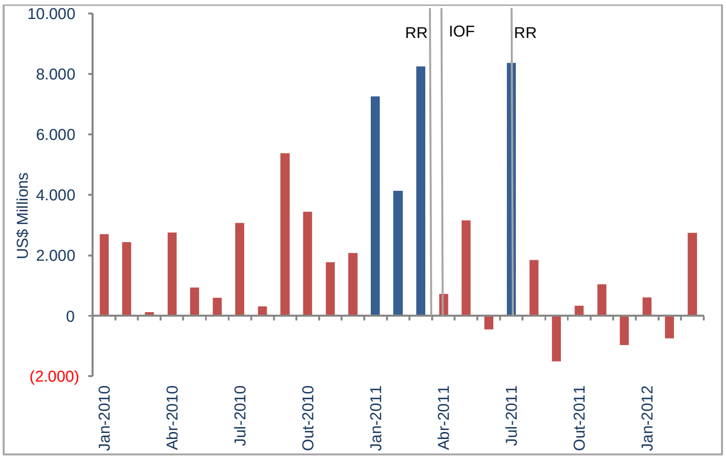


The hike of the IOF tax rate on external credit also had a complementary function. As mentioned before, according to Brazilian foreign exchange regulations[37], when a bank borrows abroad through a direct loan or a securities issue, it actually opens a long foreign exchange position. Therefore, local banks used this channel as a way to circumvent the reserve requirement on short positions while keeping their arbitrage trades.

[37] External credit flow rules are established by Resolution 3,844/2010.

As shown in Graph 10, upon the adoption of the US$3 billion limit on short positions in January 2011, the authorities allowed banks to comply with the new rule and recompose their positions until April 2011. As a consequence, from January to March 2011, banks raised US$19.6 billion in net external credit. In July, the limit was tightened to US$1 billion, but this time banks were given only one week for compliance. Banks raised an additional US$8.4 billion in external net borrowing in July[38].

Graph 10 – Net External Credit Inflows to Banks



IOF Tax on FX derivatives. In July 2011, the authorities announced two new prudential measures aimed to curb excessive and concentrated short positions that could cause detrimental effects to financial stability and speculative pressures on the exchange rate.

The first was Provisional Measure nº 539, of July 26, 2011 (MP 539/2011)[39], which authorized the National Monetary Council (Conselho Monetário Nacional – CMN) to establish specific conditions for the negotiation of derivates contracts, for monetary and exchange policy purposes, regardless of the nature of the investor, with powers to also (i) determine deposits over the notional value of the derivatives contract; and (ii) set forth limits, terms and other conditions for the negotiation of such contracts.

MP 539/2011 also amended the IOF legislation, in order to clarify that:

[38] Foreign exchange transactions related to direct investment in Brazilian companies remains subject to a rate of 0.38% on the inflow.
[39] Later approved by the Brazilian Congress and converted in the Law 12,543 of December 8th, 2011.

1. In the case of securities transactions involving derivatives contracts, the maximum IOF rate would be 25%. Up to this ceiling (25%), the Executive Branch can change the applicable rate at any time, considering its monetary and exchange policy goals. However, the current applicable IOF rate for derivatives transactions is 1%, as explained below; and
2. The amount of the securities transaction, for IOF purposes, is the adjusted notional value of the derivatives contract. The adjusted notional value is the reference value of the contract (notional value) multiplied by the factor resulting from the derivative's price variation with respect to the underlying asset's price variation.

It also established that in order to be valid all derivatives contracts must be registered with duly authorized entities, i.e. clearing houses or data repositories which have been accredited by the Central Bank or by the Brazilian Securities and Exchange Commission (Comissão de Valores Mobiliários – CVM) to operate with clearing, settlement and registry.

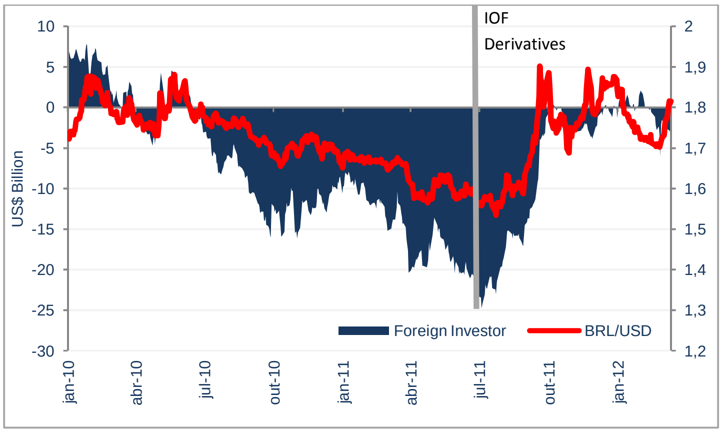
The second measure was Decree nº 7,536, also dated July 26, 2011, which amends the IOF regulation approved by Decree nº 6,306, of December 14, 2007. This decree repeats many of the same terms already defined in MP 539/2011. Pursuant to Decree 7,536/2011, the current applicable IOF rate to derivatives contracts is 1% and it is due upon the purchase, sale or maturity of financial derivatives contracts, whenever its settlement amount is affected by the exchange rate variation and results in increase in the net short exposure in relation to the amount calculated at the end of the previous business day. It applies both to resident and nonresident positions.

The applicable rate is reduced to zero if the purchases, sales or maturities of derivatives contracts, at the end of the day, result in net short exposure below US$ 10 million. Above this figure, the 1% rate will apply.

It also had the effect of creating a level playing field between the underlying cash and derivative market for nonresidents' carry trades. As above mentioned, initially the authorities adopted a 1%[40] tax rate that, although deemed insufficient to apply a burden equivalent to the 6% tax on fixed income instruments, apparently was enough to discourage short positions, as shown in Graph 11.

The empirical basis for judging the effectiveness of restrictions on derivative positions is limited, given that their effects were mixed with the worsening of the global economic situation, since August 2011, and that they were imposed in conjunction with other measures. However, there is anecdotal evidence that the latitude given to the CMN to adopt further measures on derivatives market for monetary and exchange policy purposes, and also the establishment of the maximum IOF rate at 25%, had an important psychological impact on investors' mindset that resulted on dismantling excessive positions in the derivatives market.

Graph 11 – FX Derivatives Exposure and Exchange Rate



All these measures were taken without losing sight that there is an important trade-off in taxing foreign exchange markets. First, the cost of hedging might increase for the real economy[41]. Second, the development of domestic derivatives markets, which is often a difficult to achieve stage of financial deepening, could be impaired or even reversed by excessive imposition of market restrictions.

Advanced Receipts of Export Agreements. In March 2012, the Central Bank of Brazil issued Circular 3,580, amending the rules applicable to export financing transactions

[40] The Law 12,543/2011 allows the IOF tax rate on derivatives up to 25%.

[41] On March 15th, 2012, the Government exempted certain exporters from the 1 percent financial transactions tax (IOF) that is levied on foreign exchange derivatives as long as they can provide evidence that the volume of their fx derivatives trades are below 1.2 times the export contracts they had in the previous year.

involving the advancement of payment to the Brazilian exporter, commonly known as "Advanced Payment" (Pagamento Antecipado - PA). This trade financing modality is specifically designed to finance production by Brazilian exporters and for that reason it enjoys favorable tax treatment (0% rates for IOF and for income tax on interest payments).

Pursuant to the new regulation, qualifying advanced payments can only be carried out by the actual importer[42] (the foreign buyer of the Brazilian goods or services) for a limited period of 360 days. Before Circular 3,580, the advanced payment could be made by any legal entity such as the importer or a foreign financial institution, and without any period limitation.

For values sent to Brazil as PA, within up to 360 days, one of the following situations shall occur: (i) the shipment of goods or the provision of the service; (ii) the conversion by the Brazilian exporter, with the prior written consent of the foreign payer, into direct investment (paying the corresponding 0.38% IOF tax) or external credit[43] (paying 6% IOF tax for operations with average maturity below the applicable tenor); or (iii) the return of the values sent to Brazil as PA, observing the tax regulations applicable to resources not destined to exports (paying 6% IOF tax on external credit and 10-25% income tax on interest payments).

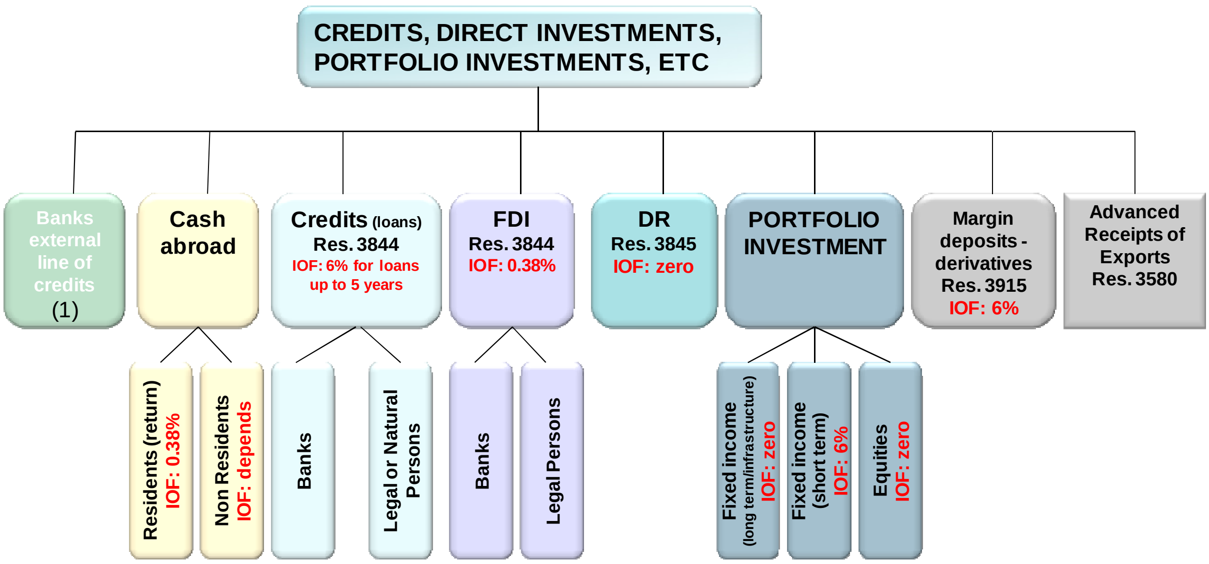
This measure was prompted by concerns that the "Advanced Payment" had been diverted from its main function. It also had a complementary scope to previous measures on foreign exchange inflows as much as it prevented regulatory arbitrage and closed a loophole that could otherwise be used to circumvent the 6% IOF tax on external credit operations. In fact, there was a strong growth of this kind of operation in January and February of 2012, when PA volume grew 46% as compared to the same period in 2011, while exports did not advance at a comparable pace.

Diagram 4 below summarizes the main channels for foreign inflows to Brazil and government actions to curb its excesses and improve its composition.

---

[42] By means of Circular nº 3604, of June 28, 2012, in addition to the importer, any legal entity headquartered abroad, including a foreign financial institution, is expressly authorized to lend PA funds to the Brazilian exporter and therefore increasing the number of originators of resources (lenders) for these transactions.
[43] Registered with BCB pursuant to Law nº 4131, of September 3, 1962, as amended by Law nº 4390, of August 29, 1964, and relevant regulation.

Diagram 4: Foreign inflows' channels and main Government measures



(1) There is no IOF, but short FX spot position reserves requirements may apply

Source: Authors' calculations

IV. The complex conjuncture of the second half of 2011 and early 2012

The results of the tightening cycle of 2010 and the first half of 2011 were very positive. The policy settings were adjusted in a timely manner and were instrumental to cool overheating pressures and gradually bring inflation – after reaching a peak of 7.3% YOY in September 2011 – down towards the target midpoint. Brazil was then and remains well-prepared to withstand changes in the global scenario, in terms of robustness of its financial sector, available liquidity buffers in local and foreign currency and space to conduct countercyclical demand management policies in either direction.

A) Macroeconomic policies with global volatility and rapid changes in risk perceptions

Policymakers in Brazil were justifiably cautious as they observed the developments in the global economy in the second quarter of 2011. The global mood was one of confidence that the recovery in advanced economies (and in the US in particular) was taking hold, especially after the initial boost to market sentiment brought by the battery of unconventional monetary easing measures put in place, which visibly permeated stock markets. The S&P 500 jumped from 1,286 in January 2011 to 1,320 in June 2011 and activity was indeed rebounding in the US. Nevertheless, in Brazil, local experience with debt crises suggested that the ensuing recoveries take longer than usual, and can be marked by volatility. Brazilian policymakers were concerned that many structural characteristics of advanced economies had not been fully appreciated: the new levels of debt in the balance sheet of the public sector, compounded by the fiscal cost of both the rescue and the slowdown in activity, could become a serious drag on growth prospects, especially in countries with significant built-in budgetary commitments to high levels of welfare spending[44]. That was the case in the Eurozone, aggravated by the lack of a federal fiscal framework (especially with the discredit of the Maastricht treaty targets), lack of policy coordination, and the particular fragility of the countries at the periphery of the monetary zone. Those weaknesses were seen as having the potential to undermine the recovery and subject markets to new waves of heightened risk aversion, if not outright panic. That overall assessment was one of the reasons behind the reduction by the Central Bank of Brazil in the pace of rate hikes towards the end of the tightening cycle of early 2011 (the three last moves of that cycle, in April, June and July, were all hikes of 25bps each).

And, indeed, things deteriorated rapidly towards the end of July 2011. A succession of idiosyncratic policy stalemates (notably, the debt ceiling debate in the US) together with a worsening in market sentiment, triggered by the Greek situation but reaching more systemic economies of the Eurozone (Spain and Italy) as well, revealed that the prevailing combination of political economy factors in the US and in the Eurozone was pushing the balance of risks to the downside. The data coming from US activity around July and August were also instrumental in affecting consumer sentiment, already negatively dented by stubborn levels of unemployment, the absence of a turnaround in the US housing market, still high levels of household debt, high gas prices reflecting buoyant commodities markets and the downgrade of US debt by one rating agency.

In that context of global deterioration, the Central Bank of Brazil was the first among its peers to reverse its stance. It started to reduce the base policy rate at the end of August

[44] See BCB, (2011) “Relatório de Estabilidade Financeira”.

2011. In the seven monetary policy committee held since then, the Selic rate was cut by 400bps altogether (including two cuts of 75bps each in March and April 2012). Monetary policy relaxation was accompanied by the tightening of fiscal policy in September (with the announcement of an increase of 0.1% of GDP in the primary surplus target), as the worsening of the debt crisis in advanced European economies discouraged any form of fiscal complacency. Despite the accumulating evidence that global economic conditions were taking a serious turn for the worse, monetary relaxation was widely criticized by market analysts (in Brazil and in global markets) who were focused on the still high inflation headline YOY in the last quarter of 2011, despite its declining trend initiated in September. In addition, these criticisms translated into a deterioration of market's inflation expectations.

But, by the end of 2011, domestic economic activity in Brazil was itself showing signs of deceleration. Eventually, growth figures surprised on the downside. Vindicating the chosen policy strategy, not only did activity slow as had been expected by policymakers, but the above mentioned worsening of global conditions affected business sentiment in Brazil by even more than anticipated, resulting in GDP growth of only 2.7 percent in 2011. Besides the obvious dent to business confidence, domestic factors may also have contributed to make the slowdown more pronounced than originally expected, including the dynamics of certain segments of the credit market (itself compounded by confidence effects) and the detrimental impact of a stronger exchange rate on industrial production. In the first half of 2012, domestic activity indicators remained as if suspended at a protracted inflexion, with flat industrial production indicators, subdued investment and business confidence, and smaller volumes of trade, while consumption continued to expand on the back of still robust overall credit growth, resilient consumer confidence, as well as buoyant labor market conditions, including record-low unemployment rates and rising household incomes. Activity is expected to pick-up with the economy regaining momentum during the second half of 2012, led by private domestic demand, as the transmission of the monetary easing and other stimulus measures gradually gathers strength — notwithstanding some delay in transmission as rising NPLs blunted the response of lending rates to monetary policy. After growing by 2.7 percent in 2011, output is expected to be expanding by more than 4 percent Q4/Q4 in 2012.

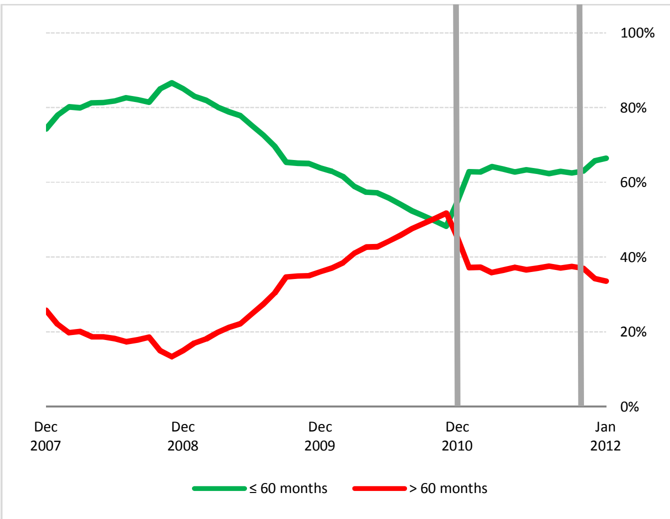
Inflation has been falling but expectations – albeit decreasing marginally – remain above the 4.5% target for end-2012, and kept rising for 2013. After its 7.3% peak in September 2011, headline inflation fell to 4.99 percent YOY in May 2012. This decline reflects the activity slowdown, transitory supply factors, the progressive removal of particularly adverse inflation readings from the one-year trailing window, and the effect of the regular periodic updating of the inflation index weights. The lagged impact of moderating growth and the negative output gap on more sticky components of the index—including services—has also exerted some downward pressure on inflation. On the other hand, wholesale price inflation has picked up in April, reflecting pass-through – albeit moderate – from the exchange rate depreciation observed since March.

The year 2012 saw quite a volatile, risk-off, risk-on environment for all policymakers alike. After the ECB's inauguration of the LTRO at the end of 2011, the new year began (as 2011 had) in quite a positive mood. But the implementation difficulties of the Greek program, the political economy debates about the pace of fiscal consolidation in many Eurozone countries and the missing of fiscal targets by Spain at the end of February 2012 threw markets in a downward spiral again. This negative external environment, notably the intensifying crisis in Europe, presents the most prominent downside risk in the near term. Important spillover channels include the potential for tighter external financing conditions and lower commodity prices should shockwaves from Europe lead to significantly lower global growth prospects.

B) Fine tuning macroprudential instruments

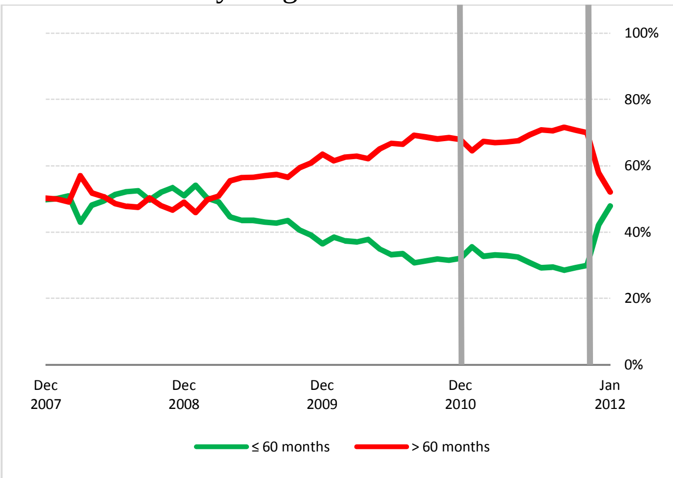
Together with these negative macroeconomic developments, by the end of 2011, the credit market was growing at more suitable rate and the average maturities for vehicles financing had declined. The average delinquency rate for vehicle financing in the first half of 2011 also declined 27.6% when compared to the same period in 2010. In November 2011, the Central Bank decided to adjust the macroprudential measures adopted in 2010, not only to simplify the implementation and monitoring of the regulation but also to tailor it to the new economic outlook. Circular 3,563 reduced from 150% back to the earlier value of 75%, the Risk Weight Factor (RWF) used for capital requirement calculation on all collateralized car loans with maturities below sixty months, regardless of loan to value ratios. However, for car loans with maturities above sixty months, deemed to be riskiest, the RWF was kept at 150%.

Graph 12 – % of new loans' by maturity
Vehicle financing



For the payroll guaranteed consumer loans market, the diagnosis was that the measure implemented in December 2010 – increasing to 150% the RWF on loans above 36 months – had only a modest temporary effect on the volumes of longer and riskier loans, falling well short of the desired impact. As shown in Graph 13, the share of longer-tenor loans in the payroll-guaranteed segment declined in the months immediately following the implementation of the measure, but even that was a weak and short-lived effect, as their participation soon resumed the upward trend.

Graph 13 – % of new loans' granting by maturity
Payroll guaranteed loans



As a consequence, the Central Bank decided to increase the RWF for payroll guaranteed loans above sixty months from 150% to 300%, and reduced to 75% for the other contracts. In order to avoid any regulatory arbitrage or distortion in the personal consumer credit market, it also increased to 300% the RWF for loans above 60 months in other modalities of non-earmarked consumer credit.

In December 2011, along with other Government measures to stimulate the domestic economy, Decree 7,632/2011 was published amending the legislation of the Tax on Financial Transactions (IOF) with respect to consumer credit transactions, reducing the rate to 0.0068%[45] per day (previously 0.0082%) for loans to individuals.

C) Policy going forward

Brazil will continue expanding its macroprudential toolbox on a precautionary basis, to increase its capacity to deal, whenever necessary, with exceptional foreign exchange volatility, destabilizing capital inflows, credit booms, and asset price bubbles. However, calibrating the already existing or new measures has proven to be a difficult task, due to the economics profession's incomplete understanding of how risks to the financial system develop and how macroprudential instruments act on those risks. Sometimes, as a result, decisions cannot be as firmly grounded on theory as one might desire; instead, Brazilian policy makers have been required to make genuine policy judgments, drawing on analysis,

[45] In May 21, 2012, the Decree nº 7,726 further diminished it to 0.0041%.

market intelligence and modeling, but still adopt a tentative, “step by step” approach, taking the necessary precautions in weighing the trade-offs inherent to those measures and to avoid excessive distortions and undesirable side effects.

Most of the macroprudential measures applied in Brazil since 2010 related to the time dimension of systemic risk, in other words to “leaning against the wind” and dealing with the cyclicality of the financial system. However, experience gained from 2008 crisis has illustrated that, as the financial system becomes more complex and sophisticated, risks can arise not only in a single sector but as an interlinked, system-wide issue. In fact, the Brazilian financial system is characterized by a high degree of conglomeration and concentration. It is organized around a few financial conglomerates that control over 75% of the system’s assets. Therefore, another challenge is to develop effective indicators and to monitor cross-sectional risks related to the interconnectedness of the financial system and the real economy. The main tasks will be to assess network effects, enhance stress tests, expand the supervisory scope to include nonbank financial intermediaries and distil the findings from various analytical strands into a consistent macroprudential perspective on policy. Information on exposures between institutions and on exposures commonly held by institutions is crucial. Much of this information will need to be obtained not only from financial institutions, data repositories and central depositories but also from corporations. This aspect reinforces the understanding that the mandate that allows the Central Bank[46] to access relevant information should be expanded in order to adequately fulfill its macroprudential supervisory role. Besides, closer coordination and action between the various Brazilian supervisory agencies will thus be increasingly important.

In that spirit, Brazil is committed to the full and timely implementation of the Basel III framework and has reiterated its position in all G20 fora (see diagram 5 below). Most Brazilian banks can raise sufficient capital to meet Basel III requirements in the agreed timeframe mainly through retained earnings but, given new definitions and requirements, some adjustment of instruments to be eligible for Tier 1 capital will be needed. In Brazil, the traditional non-risk based measure of leverage, given by the ratio between total assets

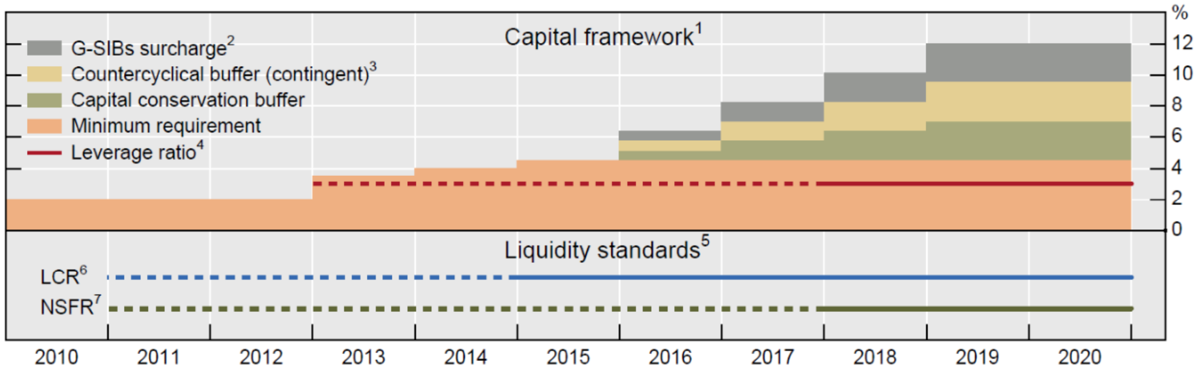
[46] The BCB mission is defined as “to ensure the stability of the purchasing power of the currency and the soundness and efficiency of the financial system”.

and equity, stands at low levels. The leverage ratios of Brazilian banks are particularly conservative considering the fact that our accounting rules are more restrictive compared to international standards when it comes to netting of short and long positions. In addition, off-balance sheet exposures are not significant. As a result, most banks should have no difficulties in meeting the new requirement given by the measure of leverage introduced in Basel III. Therefore no deleveraging process is expected in the near future.

There are, nevertheless, some refinements that will need more work. On the countercyclical capital buffer requirements[47], for example, further work may be required on its appropriate definition for a country undergoing structural changes and financial deepening, because it normally relies on an automatic adjustment based on a "Credit Gap" indicator[48]. In line with this, the Basel Committee (BCBS) issued guidance on the operation of Basel III's countercyclical capital buffer stating that national authorities are free to use other variables as well as other qualitative information that they deem appropriate to activate the buffer.

Diagram 5: The implementation of the capital and liquidity rules under Basel III

Phase-in schedule for higher minimum requirements for bank capital and liquidity



The dashed lines indicate observation periods and the solid lines indicate the maximum standard.

[1] Common equity capital requirements as a percentage of risk-weighted assets. [2] Maximum of the countercyclical buffers to be met with common equity or other fully loss-absorbing capital, implemented according to national circumstances. [3] Based on the results of the parallel run period, adjustments to be carried out in the first half of 2017 with a view to migrating to a Pillar 1 treatment on 1 January 2018 based on appropriate review and calibration. [4] Capital surcharge applicable to the top bucket of systemic importance. [5] Liquidity ratios to be monitored during the transition period. [6] Liquidity coverage ratio. [7] Net stable funding ratio.

Sources: Basel Committee on Banking Supervision; BIS calculations.

[47] The size of the countercyclical capital buffer varies over time and can amount from 0 to 2.5% of the bank's risk-weighted assets.
[48] The countercyclical capital buffer relies on a formula that considers the relation between the total lending to the country's GDP and the size of its deviation from a long term trend.

V. Concluding remarks: complementing monetary policy with macroprudential regulation

Brazil sailed well through the global financial storm. It used standard aggregate demand management instruments (combining tight fiscal and monetary policies) to deal with inflationary pressures arising from its V-shaped recovery in 2010. It maintained and reinforced its strong financial sector regulation and supervision, endorsed as a conclusion of the 2012 mission conducting Brazil's Financial Sector Assessment Program (FSAP). In banking, the risk-based supervisory process is robust and with a high degree of compliance with the Basel Core Principles, together with insurance and capital markets supervision. Brazil also took measures to manage credit growth risks, appropriately introducing various macroprudential measures to contain financial risks in specific market segments. The Central Bank of Brazil has made clear that macroprudential measures are not a substitute for monetary policy action and are primarily geared at addressing financial stability risks[49].

Brazil's large financial sector grew *pari pasu* with improvements in the strength of the system. Brazil's 2012 FSAP stress tests show that the banking system is well-capitalized, profitable, liquid and can withstand severe shocks[50]. After a public consultation process that ended in May 2012, the implementation of Basel III starting in 2013 will enhance the strength of the system. The interaction with the industry indicates that banks should be able to generate sufficient internal capital to manage this transition, including the replacement of deferred tax assets in their core capital base. Brazil's financial sector can also manage well shocks to liquidity and market conditions. There are over 20 percent of assets in required liquid reserves held as buffers at the central bank, and liquidity and market stress tests run by the FSAP find the system again well-positioned to manage strains, including those that could arise from tail risks such as in the Lehman episode or a new bout of severe stress in the Eurozone. It is true that credit has grown very fast in the last decade (Brazil's credit-to-GDP ratio rose from 26 percent in 2004 to about 50 percent in 2012) and cross-country studies have associated expansions of this duration and magnitude with risks to stability. However, as noted by the FSAP, a significant portion of this increase in Brazil reflects financial deepening, helped by institutional and legal reforms

49 See BCB, (2011) "Relatório de Estabilidade Financeira".

50 See IMF (2012) - Brazil, Financial System Stability Assessment (FSSA)

that have substantially strengthened creditor rights. Finally, the overall level of financial development remains low by international standards, which is associated with lower stability risks.

Brazil was also innovative during and after the peak of the global financial crisis in exploring how Tinbergen's separation principle (see diagram 6 below) could evolve: on the one hand, there are strong and established results such as monetary policy is very effective in addressing the transmission of excess demand into inflation; and that macroprudential instruments are very effective in addressing the built-up of excessive financial risk. The areas that had been less explored are the red quadrants of the diagram, i.e. the effects of monetary policy (respectively, macroprudential policies) on financial risk (respectively, inflation and activity), and also the interaction between these policies on both inflation control and financial stability[51]. The gravity of the global financial crisis and its current after-shocks is perhaps making the separation principle evolve into having two instruments (the central bank's base rate and a set of macroprudential tools) to address two objectives (the inflation target and a composite set of financial stability indicators). On the macroprudential side, a bias toward reducing excess credit growth and financial systemic risk requires a greater reliance on tighter regulation (around the Basel III framework) to reduce pro-cyclicality.

Other related issues are under discussion as well: financial stability remains in mandate of many central banks but should it be conducted by an unified agency (the central bank itself) or by two separate agencies? Finally, how this new separation can be clearly communicated to agents is important to enable an adequate anchoring of expectations.

[51] Although always separating the two policies, for illustration purposes, in February 2011, the Central Bank of Brazil surveyed market participants on what shift on policy rate would have the same effect on inflation as the one caused by the macroprudential measures in the credit market implemented in the end of the previous year. The median responses were 75bps.

Diagram 6: The "New" Separation Framework

	Monetary Policy (MP) **One** Instrument: CB Base Rate	**Macro-Prudential (MaP)** **Various** Instruments: RR, LTVs, DTIs, K req (Basel rules), etc
Price Stability (Inflation)	Effective on Activity/Inflation (e.g., Flex IT, divine coincidence, etc.)	Effects known but issues of anchoring expectations, **timing** & **communication**?
Financial Stability (Risk)	Old debate about Lean Against vs Clean After	Effective on Risk (credit & asset excess growth)

Brazil had to address all these issues with pragmatism, since it was painfully aware of the destabilizing effects of excessive levels of global liquidity, in particular when it transmits to domestic credit growth. Excessive capital inflows present several risks to recipient countries. They are potentially disruptive for emerging markets' price and financial stability. In the absence of any policy response, the economy may lose competitiveness and experience unsustainable trade account deficits. There is also a risk of financial instability. Banks tend to increase their foreign currency exposure and become more lenient in their credit standards when faced with higher foreign liquidity. Surges in capital inflows can lead to higher inflation[52] and to credit and asset price bubbles. Beyond those points, the issue is whether monetary policy itself needs to be expressly concerned with financial stability objectives. And then, if the answer is affirmative, what financial indicators monetary policy should respond to, and what would be the new set of instruments to be used as an additional component of the policy framework aimed at preventing financial crises. In short, to what extent should regulatory rules and monetary policy be combined to ensure both macroeconomic and financial stability?

That discussion is evolving alongside the emergence of analytical research, testing and studying how these policies interact[53]. This new analysis explores the roles of

[52] Although the exchange rate appreciation that comes with large inflows tend to exert a restraining effect (despite increases in aggregate demand).
[53] For a summary of the literature see Agénor and Pereira da Silva (2012a). For an analytical solution see Agénor, Alper and Pereira da Silva (2011, 2012). The stabilizing effect of a central bank reaction function

macroprudential regulation and monetary policy in mitigating pro-cyclicality and promoting macroeconomic and financial stability. One avenue is to bring the qualitative insights into typical dynamic stochastic general equilibrium framework with explicitly modeled credit markets featuring some counter-cyclical (Basel-type) rules. There are some promising results suggesting that when both macroeconomic stability and financial stability are properly defined by quantitative benchmarks (e.g., the volatility of stock or housing prices for the latter) monetary policy could go beyond its conventional mandate under inflation targeting frameworks and address the time-dimension of systemic risk—if only during a transitory period, while more is learnt about the implementation and performance of the new macroprudential rules that are currently being discussed. Hence, there are promising arguments in favor of monetary policy reacting in a state-contingent manner to a credit growth gap measure, because of financial stability considerations[54]. Nevertheless, monetary policy is not a replacement for macroprudential regulation either—because monetary policy cannot, in any event, address the cross-section dimension of systemic risk.

The broad direction of the new strand of literature that emerged after the crisis can be summarized in the following way: “leaning against the financial cycle”, (i.e. excessively rapid growth in credit) can be done through a combination of monetary and macroprudential policies to avoid financial fragility and some prevention is not only recommended but achievable in an effective way. A combination of policies is effective involving monetary and macroprudential policies to act in a complementary fashion to ensure both macroeconomic and financial stability.

Brazil’s recent experience with monetary and macroprudential policies to lean against the financial cycle and deal with systemic risks is an example of this new approach. We need more time to measure and assess properly if this policy direction can be generalized and replicated with success elsewhere. The present context of the global economy is challenging but it has also triggered new thinking among regulators and central bankers in order to be “ahead of the curve” for the on-going and the next episodes of financial stress.

---

with a credit rule is stronger than that of alternative rules following a classical Taylor-rule specification even when augmented by a set of macroprudential regulations. These results hold for an open-economy with a flexible exchange rate, incorporating the interaction between capital inflows (sudden floods), credit creation and the macroeconomy.

[54] See Agénor and Pereira da Silva (2012a)

References

Agénor, Pierre-Richard, Koray Alper, and Luiz A. Pereira da Silva, (2009) "Capital Requirements and Business Cycles with Credit Market Imperfections," Policy Research Working Paper No. 5151, World Bank (December 2009). Forthcoming, Journal of Macroeconomics.

——, (2011) "Capital Regulation, Monetary Policy and Financial Stability," Working Paper No. 154, Centre for Growth and Business Cycles Research (March 2011). Forthcoming, International Journal of Central Banking.

——, (2012) "Sudden Floods, Macroprudential Regulation and Stability in an Open Economy," Working Paper No. 267, Central Bank of Brazil (February 2012).

Agénor, Pierre-Richard, and Luiz A. Pereira da Silva, (2010) "Reforming International Standards for Bank Capital Requirements: A Perspective from the Developing World," in International Banking in the New Era: Post-Crisis Challenges and Opportunities, ed. by S. Kim and M. D. McKenzie, IFR Vol. No 11, Emerald (Bingley: 2010).

——, (2012a) "Macroeconomic Stability, Financial Stability, and Monetary Policy Rules" unpublished, forthcoming Journal of International Finance.

——, (2012b) "Cyclical Effects of Bank Capital Requirements with Imperfect Credit Markets," Journal of Financial Stability, 8 (January 2012), 43-56.

Ariyoshi, A., *et al.*, (2000) "Capital Controls: Country Experiences with Their Use and Liberalization", IMF Occasional Paper 190, 2000.

Bean, C., (2003). "Asset Prices, Financial Imbalances and Monetary Policy: Are Inflation Targets Enough?" Bank for International Settlements, Basel, Switzerland, BIS Working Paper 140.

BCB, (2011) "Relatório de Estabilidade Financeira", April 2011.

——, (2011) "Relatório de Inflação", June, 2011.

Bernanke, B. and Gertler, M. (1999). "Monetary Policy and Asset Volatility". Federal Reserve Bank of Kansas City Economic Review, 84, 17-52.

——, (2001) "Should Central Banks Respond to Movements in Asset Prices?", American Economic Review, 91, 253-257.

Bernanke, Ben (2002). "Asset-Price "Bubbles" and Monetary Policy", Proceedings of New York Chapter of the National Association for Business Economics. October 15, 2002. http://www.federalreserve.gov/boarddocs/speeches/2002/20021015/default.htm

——, (2010). "The Effects of the Great Recession on Central Bank Doctrine and Practice". Speech at 56th Economic Conference Federal Reserve Bank of Boston, Boston, Massachusetts.

BIS-Committee on the Global Financial System, (2009) "Capital Flows and Emerging Market Economies," CGFS Working Paper No. 33, Bank for International Settlements, January, 2009.

——, (2010) "Macroprudential Instruments and Frameworks: A Stocktaking of Issues and Experiences", CGFS Working Papers Nº 38, Bank for International Settlements, May 2010.

Blanchard, O., (2000) “What Do We Know About Macroeconomics That Fisher and Wicksell Did Not?”, NBER Working Paper Series Nº 7550, February 2000.

Blanchard, O. and Galí, J., (2005) “Real Wage Rigidities and the New Keynesian Model” Working Paper 11806, http://www.nber.org/papers/w11806, NBER, November 2005.

Blanchard, O., Dell’Ariccia, G. and Mauro, P., (2010) “Rethinking Macroeconomic Policy”, IMF Staff Position Note SPN/10/03, February 2010.

Blanchard, O., *et al*., (2012) “In the wake of the crisis”, MIT Press, 2012.

Blinder, Alan S., (1998) “Central Banking in Theory and Practice”, MIT Press, 1998.

——, (2010) “How Central Should the Central Bank Be?”. Journal of Economic Literature, March 2010, pages 23-133.

Borio, C. (2011). “Central banking post-crisis: What compass for uncharted waters?”. BIS Working Papers No 353, September 2011.

Borio, C. and Lowe, P. (2002). “Asset Prices, Financial and Monetary Stability: Exploring the Nexus”. Basel: Bank for International Settlements Working Paper 114. http://www.bis.org/publ/work114.htm

——, (2002) “Assessing the Risk of Banking Crises”, BIS Quarterly Review, December 2002.

Borio, C. and Disyatat, P., (2011) “Global Imbalances and The Financial Crisis: Link Or No Link?”, BIS Working Paper Nº 346, May 2011.

Brunnermeier, *et al*., (2009) “The Fundamental Principles of Financial Regulation”, International Center for Monetary and Banking Studies, The Geneva Report on the World Economy, January 6, 2009

Cardoso, E. and Goldfajn, I. (1997) “Capital Flows to Brazil: The Endogeneity of Capital Controls”, IMF Working Paper 97/115, September, 1997.

Caballero, Ricardo, Farhi, Emmanuel and Gourinchas, Pierre-Olivier (2008), “Financial Crash, Commodity Prices and Global Imbalances”, CEPR Discussion Papers 7064.

Cecchetti, S., Genberg, H., Lipsky, J., and Wadhwani, S. (2000). Asset Prices and Central Bank Policy. Geneva Reports on the World Economy 2, International Centre for Monetary and Banking Studies and Centre for Economic Policy Research, ICMB/CEPR Report, Nº 2, 2000.

Claessens, S. and Ghosh, Swati R., (2012). “Macro-Prudential Policies: Lessons for and from Emerging Markets”. EWC–KDI Conference: Financial Regulations on International Capital Flows and Exchange Rates. Paper Number 2. Honolulu, Hawaii, 19–20 July 2012.

Committee on International Economic Policy and Reform (Barry Eichengreen and alii). (2011) “Rethinking Central Banking”, The Brookings Institutions, September 2011.

Cooper, Richard N., (2007) “Living with Global Imbalances”, Brookings Papers on Economic Activity 2:91-107

De Gregório, J., (2011). “Capital flows and the interaction between macroprudential policy and monetary policy”. Speech at Central Bank of Chile Annual Conference on Capital Mobility and Monetary Policy, Santiago, Chile. November 17th, 2011.

De Nicolò, G., Favara, G. and Ratnovski, L., (2012). “Externalities and Macroprudential Policy”. IMF Staff Discussion Note SDN/12/05, June 7th, 2012.

Dell’Ariccia, G *et al.*, (2012). “Policies for Macrofinancial Stability: How to Deal with Credit Booms”. IMF Staff Discussion Note SDN/12/06, June 7th, 2012.

Dooley, Michael P, David Folkerts-Landau and Peter M. Garber (2009), “Bretton Woods II Still Defines the International Monetary System”. NBER Working Paper 14731 (February).

Financial Services Authority, (2009) “The Turner Review: A regulatory response to the global banking crisis”. March, 2009.

Galati, G and Moessner, R., (2011) “Macroprudential Policy – A Literature Review”, BIS Working Paper Nº 337, February, 2011.

Greenspan, A., (2002). “Economic Volatility”. Proceedings of Federal Reserve Bank of Kansas City Symposium, Jackson Hole.
http://www.federalreserve.gov/boarddocs/speeches/2002/20020830/default.htm

——, (1996). “Central banking in a democratic society”. Remarks by Chairman Alan Greenspan At the Annual Dinner and Francis Boyer Lecture of The American Enterprise Institute for Public Policy Research.
http://www.federalreserve.gov/boarddocs/speeches/1996/19961205.htm

International Monetary Fund, (2011a) “Recent Experiences in Managing Capital Inflows—Cross-Cutting Themes and Possible Policy Framework”, February 14th, 2011.

——, (2011b) “Macroprudential Policy: An Organizing Framework,” unpublished, Monetary and Capital Markets Department (March 2011b).

——, (2011c) “Toward Operationalizing Macroprudential Policies: When to Act?,” Chapter 3 in Global Financial Stability Report, September 2011, International Monetary Fund (Washington DC: 2011).

——, (2012) - “Brazil, Financial System Stability Assessment (FSSA)”, June 20, 2012

International Center for Monetary and Banking Studies (2009), The Geneva Report on the World Economy, “The Fundamental Principles of Financial Regulation” (Brunnermeier, Markus, Andrew Crocket, Charles Goodhart, Martin Hellwig, Avinash D. Persaud, Hyun Shin), January 6, 2009

Kohn, Donald (2005), “Financial Markets, Financial Fragility, and Central Banking”, Remarks at a symposium sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, WY, 27 August.

Lim, C., *et al.*, (2011) “Macroprudential Policy: What Instruments and How to Use Them?, Lessons from Country Experiences”, IMF Working Paper, WP/11/238, October 2011.

Mesquita, M. and Torós M., (2010) “Considerações sobre a Atuação do Banco Central na Crise de 2008”, Working Papers Series WP 202, Central Bank of Brazil (March 2010)

Mishkin, F. (2008), "How Should We Respond to Asset Price Bubbles?", Speech at the Wharton Financial Institutions Center and Oliver Wyman Institute's Annual Financial Risk Roundtable. Philadelphia: Federal Reserve. http://www.federalreserve.gov/newsevents/speech/mishkin20080515a.htm

——, (2010), "Monetary Policy Strategy: Lessons from the Crisis" paper at the ECB Conference "Monetary Policy Revisited: Lessons from the Crisis", Frankfurt, November 18-19, 2010

Montoro, C. and Moreno, R., (2011) "The Use of Reserve Requirements as a Policy Instrument in Latin America", BIS Quarterly Review, March 2011.

Moreno, R., (2011) "Policymaking From A "Macroprudential" Perspective in Emerging Market Economies", BIS Working Paper Nº 336, January 2011.

Obstfeld, M. and Rogoff, K., (2009) "Global Imbalances and the Financial Crisis: Products of Common Causes", November 2009.

Roubini, Nouriel and Brad Setser (2005), "Will the Bretton Woods 2 Regime Unravel Soon? The Risk of a Hard Landing in 2005-2006", Feb 1, 2005, RGE Monitor, http://www.roubini.com/analysis/38641.php

Shin, Hyun S., (2012). "Adapting Macroprudential Approaches to Emerging and Developing Economies". June 22th, 2011.

Stark, J., (2010) "In Search of a Robust Monetary Policy Framework". Speech at the 6th ECB Central Banking Conference, Frankfurt, Germany, November 19, 2010.

Svensson, Lars E. O, (2010a) "Inflation Targeting". NBER, Working Paper 16.654.

——, (2011b), "Inflation Targeting and Financial Stability," keynote lecture at the CEPR/ESI, 14th Annual Conference, hosted by the Central Bank of Turkey (October 2010b).

Terrier, G., *et al.*, (2011) "Policy Instruments to Lean against the Wind in Latin America", IMF Working Paper, WP/11/159, July 2011.

Tombini, Alexandre A., (2011). Speech at the Commission of Economic Affairs of the Brazilian Federal Senate. March 2011.

Trichet, Jean-Claude, (2010) "Reflections on the Nature of Monetary Policy Non-Standard Measures and Finance Theory". Speech at the 6th ECB Central Banking Conference, Frankfurt, Germany, November 19, 2010.

VI. ANNEX

Brazil's Matrix of Macroprudential Measures

Tools	Risk dimensions	
	Time dimension	**Cross-sectoral dimension**
Category 1. Instruments developed specifically to mitigate systemic risk		
	• Minimum capital ratio requirement above international standards (Circular 3360 - Sept 12, 2007) • Countercyclical change in risk weights for exposure to auto and payroll loans related to longer maturities and higher LTV ratios (Circular 3515 - Dec 03, 2010) • Prohibit payroll loan's maturity above 60 months (Circular 3563 - Nov 11, 2011) • Increase financial transaction tax on consumption credit operations for individuals (Decree 7456 – Apr 06, 2011)	• Higher capital charges for trades not cleared through CCPs (Circular 3360 - Sept 12, 2007) • Increase capital risk weights to exposures to mutual fund's quota (Circular 3563 - Nov 11, 2011)
Category 2. Recalibrated instruments		
	• Loan loss provisioning incorporates expect losses but also incurred losses' data (Resolution 2682 - Dec 21, 1999) • Increase financial transaction tax on foreign inflows for fixed income investments (Decree 7330 - Out 18, 2010) • Increase reserve requirements on demand and time deposits and exempt "Letras Financeiras" (Circular 3513 and 3514 – Dec 03, 2010). • Increase financial transaction tax on inflows related to foreign credit with maturities below 720 days (Decree 7457 - Apr 6, 2011) • Unremunerated reserve requirement on currency short open positions above certain limits (Circular 3520 - Jan 6, 2011 and Circular 3,548 - Jul 8, 2011) • Stressed VaR to build additional capital buffer against market risk during a boom for internal and standardized models (Circular 3478 – Dec 24, 2009 and Circular 3568 – Dec 21, 2011)	• Financial transaction tax on derivatives' positions that increase fx short net exposure (Decree 7536 - Jul 26, 2011) • Remunerated reserve requirements on time deposits conditioned upon acquisition of medium and small banks' credit portfolio (Circular 3569 – Dec 22, 2011)

IOF Tax measures on foreign exchange transactions

IOF

TAX ON CREDIT AND EXCHANGE TRANSACTIONS, INSURANCE AND SECURITIES

MAIN MEASURES INVOLVING NON RESIDENT OPERATIONS

Date format: dd.mm.yy

FINANTIAL AND CAPITAL MARKETS	Dec. 6,306	Dec. 6,391	Dec. 6,613	Dec. 6,983	Dec. 7,011	Dec. 7,323	Dec. 7,330	Dec. 7,412	Dec. 7,456	Dec. 7,632	Dec. 7,683
	14.12.2007	17.03.2008	22.10.2008	19.10.2009	18.11.2009	04.10.2010	18.10.2010	30.12.2010	28.03.2011	01.12.2011	01.03.2012
Fixed income	zero	1.5%	zero	2%	-	4%	6%	6%	6%	6%	-
Fixed income - Law 12,431 art.1 and 3	-	-	-	-	-	-	-	-	-	zero	-
Variable income (stocks)	zero	zero	zero	2%	-	2%	-	2%	2%	zero	-
IPO	zero	zero	zero	2%	-	2%	-	2%	2%	zero	-
Emerging Companies Investment Funds (FIEE)	zero	1.5%	zero	2%	-	4%	6%	2%	2%	zero	-
Private Equity Funds (FIP)	zero	1.5%	zero	2%	-	4%	6%	2%	2%	zero	-
FDI to variable income/stocks (migration)	zero	zero	zero	zero	-	zero	-	2%	2%	zero	-
Margin deposits	zero	0.38%	0.38%	0.38%	-	0.38%	6%	6%	6%	6%	-
Cancellation of DR into local shares	zero	zero	zero	zero	-	zero	-	2%	2%	zero	-
BDR/secondary market	-	-	-	-	-	-	-	-	-	6%	zero
Deliver of Brazilian shares to issue DR[1]	-	-	-	-	1.5%	-	-	-	-	-	-

1/ This is not IOF on foreign exchange operation, but IOF on securities.

EXTERNAL LOANS	Dec. 6,306	Dec. 6,339	Dec. 7,456	Dec. 7,457	Dec. 7,683	Dec. 7.698
	14.12.2007	03.01.2008	28.03.2011	06.04.2011	01.03.2012	09.03.2012
Tax rate	5%	5.38%	6%	6%	6%	6%
Taxable maturity	90 days	90 days	360 days	720 days	1.080 days	1.800 days

CREDIT CARD	Dec. 7,412	Dec. 7,454
	30.12.2010	25.03.2011
Credit card company obligation for client`s purchase abroad	2.38%	6.38%

DERIVATIVE CONTRACTS[1]	Law 12,543[2]	Dec. 7.536	Dec. 7.563	Dec. 7.699
	08.12.2011	26.07.2011	15.09.2011	15.03.2012
Exposure: short net exposure increases	Max IOF 25%	1%[3]	1%[4]	1%[5]

1/ This is not IOF on foreign exchange operation, but IOF on FX derivatives.

2/ Law converted from Provisional Measure 539, de 26.07.2011.

3/ Tax applies on adjusted notional value, which results from notional value x price variation of derivatives with respect to the price variation of underlying assets. Applied to increases on short exposure.

4/ It details the calculation of the adjusted notional value and makes some aditional adjustments to this value in order to disregard foreign exchange variations (which are not related with opening or liquidation of positions).

5/ Tax = 0 on positions that increase the net short exposures acquired by exporters for purpose of hedging, upon specific conditions established in the decree.

FOREIGN DIRECT INVESTMENT[1]	Dec. 6,306	Dec. 6,339	Dec. 7,412
	14.12.2007	03.01.2008	30.12.2010
FDI	zero	0.38%	0.38%

1/ General rule: tax on foreign exchange operation is 0.38%, unless specified differently.

Banco Central do Brasil

Trabalhos para Discussão

Os Trabalhos para Discussão do Banco Central do Brasil estão disponíveis para download no website
http://www.bcb.gov.br/?TRABDISCLISTA

Working Paper Series

The Working Paper Series of the Central Bank of Brazil are available for download at
http://www.bcb.gov.br/?WORKINGPAPERS

246	**Impacto do Sistema Cooperativo de Crédito na Eficiência do Sistema Financeiro Nacional** *Michel Alexandre da Silva*	Ago/2011
247	**Forecasting the Yield Curve for the Euro Region** *Benjamim M. Tabak, Daniel O. Cajueiro and Alexandre B. Sollaci*	Aug/2011
248	**Financial regulation and transparency of information: first steps on new land** *Helder Ferreira de Mendonça, Délio José Cordeiro Galvão and Renato Falci Villela Loures*	Aug/2011
249	**Directed clustering coefficient as a measure of systemic risk in complex banking networks** *B. M. Tabak, M. Takami, J. M. C. Rocha and D. O. Cajueiro*	Aug/2011
250	**Recolhimentos Compulsórios e o Crédito Bancário Brasileiro** *Paulo Evandro Dawid e Tony Takeda*	Ago/2011
251	**Um Exame sobre como os Bancos Ajustam seu Índice de Basileia no Brasil** *Leonardo S. Alencar*	Ago/2011
252	**Comparação da Eficiência de Custo para BRICs e América Latina** *Lycia M. G. Araujo, Guilherme M. R. Gomes, Solange M. Guerra e Benjamin M. Tabak*	Set/2011
253	**Bank Efficiency and Default in Brazil: causality tests** *Benjamin M. Tabak, Giovana L. Craveiro and Daniel O. Cajueiro*	Oct/2011
254	**Macroprudential Regulation and the Monetary Transmission Mechanism** *Pierre-Richard Agénor and Luiz A. Pereira da Silva*	Nov/2011
255	**An Empirical Analysis of the External Finance Premium of Public Non-Financial Corporations in Brazil** *Fernando N. de Oliveira and Alberto Ronchi Neto*	Nov/2011
256	**The Self-insurance Role of International Reserves and the 2008-2010 Crisis** *Antonio Francisco A. Silva Jr*	Nov/2011
257	**Cooperativas de Crédito: taxas de juros praticadas e fatores de viabilidade** *Clodoaldo Aparecido Annibal e Sérgio Mikio Koyama*	Nov/2011

258	**Bancos Oficiais e Crédito Direcionado – O que diferencia o mercado de crédito brasileiro?** *Eduardo Luis Lundberg*	Nov/2011
259	**The impact of monetary policy on the exchange rate: puzzling evidence from three emerging economies** *Emanuel Kohlscheen*	Nov/2011
260	**Credit Default and Business Cycles: an empirical investigation of Brazilian retail loans** *Arnildo da Silva Correa, Jaqueline Terra Moura Marins, Myrian Beatriz Eiras das Neves and Antonio Carlos Magalhães da Silva*	Nov/2011
261	**The relationship between banking market competition and risk-taking: do size and capitalization matter?** *Benjamin M. Tabak, Dimas M. Fazio and Daniel O. Cajueiro*	Nov/2011
262	**The Accuracy of Perturbation Methods to Solve Small Open Economy Models** *Angelo M. Fasolo*	Nov/2011
263	**The Adverse Selection Cost Component of the Spread of Brazilian Stocks** *Gustavo Silva Araújo, Claudio Henrique da Silveira Barbedo and José Valentim Machado Vicente*	Dec/2011
264	**Uma Breve Análise de Medidas Alternativas à Mediana na Pesquisa de Expectativas de Inflação do Banco Central do Brasil** *Fabia A. de Carvalho*	Jan/2012
265	**O Impacto da Comunicação do Banco Central do Brasil sobre o Mercado Financeiro** *Marcio Janot e Daniel El-Jaick de Souza Mota*	Jan/2012
266	**Are Core Inflation Directional Forecasts Informative?** *Tito Nícias Teixeira da Silva Filho*	Jan/2012
267	**Sudden Floods, Macroprudention Regulation and Stability in an Open Economy** *P.-R. Agénor, K. Alper and L. Pereira da Silva*	Feb/2012
268	**Optimal Capital Flow Taxes in Latin America** *João Barata Ribeiro Blanco Barroso*	Mar/2012
269	**Estimating Relative Risk Aversion, Risk-Neutral and Real-World Densities using Brazilian Real Currency Options** *José Renato Haas Ornelas, José Santiago Fajardo Barbachan and Aquiles Rocha de Farias*	Mar/2012
270	**Pricing-to-market by Brazilian Exporters: a panel cointegration approach** *João Barata Ribeiro Blanco Barroso*	Mar/2012
271	**Optimal Policy When the Inflation Target is not Optimal** *Sergio A. Lago Alves*	Mar/2012

287 **Some Financial Stability Indicators for Brazil** Jul/2012
Adriana Soares Sales, Waldyr D. Areosa and Marta B. M. Areosa

288 **Forecasting Bond Yields with Segmented Term Structure Models** Jul/2012
Caio Almeida, Axel Simonsen and José Vicente

289 **Financial Stability in Brazil** Aug/2012
Luiz A. Pereira da Silva, Adriana Soares Sales and Wagner Piazza Gaglianone