

Sailing through the Global Financial Storm

Brazil's Recent Experience with Monetary and Macro Prudential Policies to Lean Against the Financial Cycle and Deal with Systemic Risks

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Introduction

The global financial crisis of 2008–12 prompted a renewal of both analytical thinking and policy practices regarding the interaction and mutual complementarity between monetary and prudential regulatory policies, given the simultaneous objectives of macroeconomic and financial stability.

Many of these issues were present before the global financial crisis but have been thoroughly revisited since, essentially because: (1) overwhelming evidence showed that macro financial linkages allowed for the buildup of significant financial risk in an environment of macroeconomic stability without adequate regulation; (2) analysts realized that the cost of mopping up after crises such as that of 2008 is extraordinarily high, suggesting that prevention is preferred to remedies; and (3) destabilizing side effects resulted from the unprecedented injections of global liquidity by monetary authorities of advanced economies, exacerbating sudden floods of capital into emerging economies.

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

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Box 6.1 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, including an inflation-targeting framework, to control inflation and anchor expectations. 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 emergencies, less pressure—at that time—from markets or rating agencies, and a self-reassuring belief in their own singularity. In those countries, private and public debt increased, sometimes beyond existing institutional fiscal pacts such as the Maastricht treaty in the Euro zone. 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 United States (for example, the burst of the Internet bubble or the 9/11 attack) managed to produce quick recoveries. However, they relied on prolonged periods of low-interest rates that did not translate into higher inflation because of the concomitant disinflationary pressure of China's exports of durable goods. Nevertheless, financial conditions were eased by 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, including: procyclicality; very high leverage; deterioration of lending standards; and excessive credit financing increasingly riskier borrowers.

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 about global imbalances. The benign view^a 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^b 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 and the crisis eventually struck, beginning in mid-2007 (the subprime debacle in the United States) and continuing until the Lehman Brothers spike in mid-September 2008.

The crisis caught emerging and advanced economies in different positions along 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

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Box 6.1 The Global Financial Crisis: Origin and Policy Responses in Emerging and Advanced Economies *(continued)*

latter were at the peak of a cycle of credit-fueled 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. Because policy makers in advanced economies had thoroughly studied the Great Depression, 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, for the first time, many emerging markets—Brazil was a case in point—could also implement countercyclical policies to support activity. 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 United States and the Euro zone, 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 United States quantitative easing and (much) later with the European Central Bank's long-term refinancing operations. 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 became a major driving force behind recent capital flows into emerging markets in general and Brazil in particular.

- a. For example, Cooper (2007); Dooley, Folkerts-Landau, and Garber (2009); Caballero, Farhi, and Gourinchas (2008)
- b. For example, as early as 2005, Roubini and Setser (2005) and then Obstfeld and Rogoff (2009) and Borio and Disyatat (2011).

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 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 the point that some countries even chose to convert to

the model of split institutional responsibilities (that is, to separate the two objectives of price stability and financial stability)—and, in so doing, also split into separate entities 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. 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 divide¹ 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 a sufficient condition for financial stability. The opposite camp² claimed that pricking asset price bubbles with monetary policy instruments was bound to impact the base interest to such a degree as to do great damage to macroeconomic stability. They also argued that it is exceedingly hard to determine whether an ongoing rise in asset prices is justified by fundamentals or is 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 that a partial departure from this general attitude was present when the Federal Reserve, confronted with more evidence of herd behavior in stock and housing markets, tried to talk markets down³ by suggesting that they were displaying "irrational exuberance." While that attempt involved a quasi-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 up after" camp⁴ 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 those of 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 between asset price and credit dynamics, with one eye on the potential for unstable feedback loops and the other 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 voices⁵ 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 and reflecting about macro financial policies.⁶ A number of proposals started to revisit prudential guidelines and to extend them to a larger macroeconomic dimension, with a view on the buildup of systemic risk. That was the idea behind “macro prudential” 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).⁷ Macro prudential regulation became, naturally, the favorite candidate to fill this new role of guarding the crossroads between asset price and credit dynamics.⁸

In 2010, a paper by the Committee on the Global Financial System (CGFS) of the Bank for International Settlements (BIS) mapped the available set of macro prudential instruments and frameworks and summarized the experiences in using them. The variety of existing tools is illustrated in table 6.1, which organizes the various instruments according to the vulnerability they address and the financial system component they target.

The underlying idea was to use existing micro prudential instruments in a more comprehensive way (that is, extend them to a macro prudential 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 in 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 macro prudential 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.

Table 6.1 Macro Prudential Instruments by Vulnerability and Financial System Component

		Financial system component				
		Bank or deposit-taker		Non-bank investor	Securities market	Financial infrastructure
		Balance sheet ^a	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
	Interconnect- edness	concentration limits systemic capital surcharge subsidiarisation				central counterparties (CCP)

Source: BIS 2010.

^a 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.

At the same time, empirical studies were carried out by the BIS and the International Monetary Fund (IMF), drawing lessons from country experiences in using macro prudential instruments. In particular, the IMF produced a comprehensive account of existing cases⁹ showing that these tools were mostly introduced to reduce systemic risk, either in its time dimension and/or its cross-sectional dimension, and that they were quite effective. The study used cross-country comparisons to show that macro prudential tools have helped to dampen procyclicality of financial systems and that they do not seem to depend on the particular policy regime adopted by each country.

The global financial crisis would provide a stressful opportunity for Brazil to put to test these policy and analytical proposals.

The Effects of the Global Financial Crisis on Brazil

Brazil sailed quite well through the first acute phase of the global financial crisis. Nonetheless, the effects of the crisis were severe. After the Lehman Brothers episode, in the last quarter of 2008, trade flows contracted 6.9 percent year-on-year (YOY); industrial production fell by 27 percent quarter-on-quarter (QOQ);

capital outflows rose by 36 percent QOQ causing an exchange-rate depreciation spike of 32 percent YOY; and credit growth fell by 35 percent YOY. In one month (October 2008), trade financing fell by 30 percent and the debt rollover ratio went down from 167 percent to 22 percent. From July to October, liquidity ratios in Brazilian banks fell from 1.73 to 1.43. The Brazilian authorities took immediate action in face of the shock.¹⁰ First, they addressed liquidity problems both in domestic and foreign currencies: bank reserve requirements were lowered, injecting about R\$116 billion worth of liquidity (or 4 percent of GDP) into the economy; lines of credit in foreign exchange were provided to the private sector; the central bank offered US\$14.5 billion (7 percent of total international reserves at the end of 2008) in spot market auctions. Foreign exchange swap contracts to the tune of US\$33 billion were also offered by the central bank, helping an orderly wind-down of large foreign exchange derivatives exposures by domestic corporations (amounting to an estimated US\$37 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 basis points (bps), from 13.75 percent per annum (p.a.) to 8.75 percent p.a.; a number of tax breaks were put in place and the fiscal surplus target was reduced from 3.8 percent in 2008 to 2.5 percent of GDP in 2009; credit extension by public financial institutions rose by R\$105 billion (3.3 percent 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 percent YOY, domestic demand by 10.3 percent, with private consumption expanding 7.2 percent YOY and investment by 11.1 percent 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, mortgage-backed securities (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 Federal Reserve announced a second round of quantitative easing. 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 provision of ample liquidity 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 (EMs). Sluggish recovery in advanced economies and weak financial

accelerators caused liquidity injections to remain largely on the balance sheets of 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 EMs through its effects on commodity prices, further contributing to the appreciation of commodity currencies. Expanding global liquidity appears to be correlated with higher commodity prices, although fundamentals (excess long-term demand) may have given crucial support to these price rises. On the real demand side, strong economic growth in EMs, social structure changes in China and India, and more resource-intensive development strategies have put pressure on commodity prices. But, most likely, global excess liquidity also played a role, in addition to fundamentals, in 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 it was the causal factor behind price rises.

Nevertheless, higher commodity prices do improve fundamentals of commodity exporters; and 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 Australia, Canada, Brazil, and Chile, among others. 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-shaped recovery already gave rise to inflation pressures in EMs.

In a way, strong capital inflows were actually compounding the inflationary pressures already suffered by EMs as a consequence of their expanding domestic demand and globally rising commodity prices. Capital flows added fuel to local inflationary pressures as they exacerbated the procyclicality 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 credit markets 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," that is, surges in capital inflows, can lead to credit and asset price bubbles, and can impact the exchange rates of commodity exporters.¹¹

In the second half of 2010 and early 2011, Brazil was facing exactly those challenges. The economy was showing signs of overheating (see table 6.2), with

Table 6.2 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 (Outstanding)													
Consumer Payroll-guaranteed	% 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
Housing	% 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
Ear-marked	% 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
Non-earmarked	% 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
Total	% 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 percent of GDP	%	24.7	19.1	16.6	15.0	16.9	19.8	19.9	20.9	20.6	19.9	19.4	18.8
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: Based on data from the Central Bank of Brazil.

domestic demand growing 5.7 percent YOY in the first quarter of 2011, and inflationary pressures resulting from the resulting 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 consumer price index (CPI); atypical price hikes on food items, caused by unfavorable weather conditions in some production areas; and a supply shock in ethanol, an important fuel for the passenger car fleet (either used separately or as part of the regular gasoline blend). 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 nontradables, while their rising incomes also represented a cost shock on labor-intensive sectors. Inflation in services was particularly representative of these latter trends.¹²

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 percent p.a. on average between 2005 and 2011—especially 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 million 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 6.2). 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.

Credit Market Developments

Since the mid-2000s, the dynamism of the credit market in Brazil has been intense and has translated into a continuous growth in the credit-to-GDP ratio. Greater levels of 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 and 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 6.3): higher volumes of debt as a proportion of income were compensated by lower costs and longer tenors. Interest rates and spreads

Table 6.3 Credit Market

Unit	2009				2010				2011			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Firms												
Total (growth rate)	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	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)	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	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)	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	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	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)	-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	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	n.a.	16.0	17.0	17.0	18.0	19.0	19.0	20.0	20.0	19.0	19.0	19.0
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: Based on data from the Central Bank of Brazil.

Note: n.a. = not applicable.

for household loans declined, maturities lengthened, and delinquency rates (non-performing loan [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 at a historical low of 4.98 percent in December 2010.

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 6.2). Total credit outstanding in the financial system reached R\$1,706 billion in December of 2010, corresponding to 46.4 percent of GDP and resulting from YOY growth of 20.6 percent. The nonearmarked credit portfolio reached R\$1,116 billion in December 2010, after an increase of 16.9 percent compared with the previous year. It represented 65.4 percent of the total credit of the financial system. The household credit portfolio increased by 19.2 percent, reaching R\$560 billion. Loans for the acquisition of vehicles soared by 49.1 percent and personal credit, mostly for consumption, increased by 24.7 percent.¹³

Box 6.2 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 on May 11, “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, these 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 sources 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, because of a nearly complete

box continues next page

Box 6.2 Housing Loans in Brazil (*continued*)

lack of financing. The rapid growth in mortgage lending helped many Brazilians start accessing the housing market. Mortgage lending in Brazil grew 56 percent in 2010, and approximately 44 percent in 2011. Nevertheless, mortgage debt is still quite low (4.6 percent of Brazil's GDP), compared to international standards (table B6.2.1). In Brazil, residential real estate loans still account for only 7.1 percent of total bank loans. Given its incipient state, it is expected to continue driving housing-sector growth in the long term.

Table B6.2.1 Mortgage Loans: International Comparison

<i>Selected countries</i>	<i>Mortgage loans/GDP (April 2011)</i>	<i>Residential real estate loans to total loans (December 2010)</i>
Brazil	4.1	7.1
Euro zone	40.2	—
Germany	37.7	16.8
Spain	61.2	27.4
United States ^a	70.3	36.5
France	39.8	—
The Netherlands	66.1	23.6
Italy	22.9	18.1

Source: FED, Bureau of Economic Analysis, BCE, Eurostat and FSI.

Note: — = not available.

^a December 2010.

Mortgage lending gained momentum in Brazil not just because of the credit expansion and increases in income but also because of various legal and regulatory changes over the years. For instance, 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.^a Earlier, in the case of delinquency, it took as long as six years for a bank to foreclose on a property.^b

- a. 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.
- b. Another important legal change that helped 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.

On average and in aggregate terms, the general credit conditions were favorable because 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 credit modalities. That risk was especially noticeable in consumer credit extended with loan maturities beyond prudent levels (for example, above 60 months for car loans) and with loan-to-value (LTVs) ratios incompatible with the actual quality of the collateral.

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, 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 during the preceding decades.

Alongside these structural factors, the long history of emerging market 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 6.2 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 US\$125 billion,¹⁴ compared with nearly US\$80 billion in 2009. Brazil had a historically high amount of equity issuance, totaling R\$146 billion (mostly by Petrobras), of which 26 percent were taken up by foreign investors. External debt issuance raised another US\$48 billion, approximately. Foreign direct investment 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.

When Brazil's credit market was affected by capital inflows, a set of measures was consequently adopted, as discussed in the next section. There was evidence that multiple sources of foreign funding were transmitted into credit markets, in

addition to the confidence factors associated with periods of abundant liquidity. 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. In Brazil, excessive capital inflows contributed to the brisk pace of domestic credit growth, which fueled inflationary pressures associated with domestic supply-demand mismatches and created fertile ground for the domestic transmission of pressures stemming from global commodity prices.

Brazil's Policy Responses to the Crisis

Brazilian policy makers relied on a comprehensive textbook toolkit of policy measures (see table 6.4) to deal with the emerging risks of macroeconomic and financial instability at the end of 2010 and in early 2011. Standard aggregate demand management was conducted using fiscal and monetary policies to dampen supply-demand imbalances and to control inflation expectations. Macro prudential measures were adopted to reduce systemic financial risk stemming from rapid credit growth and large capital inflows.

Monetary policy. On the monetary policy front, in the first half of 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.¹⁵

Fiscal policy. 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 percent of GDP.

Macro prudential policy. On the macro prudential front, the central bank and the government were proactive in anticipating potential sources of risk to the Brazilian economy and its financial system. Employing macro prudential measures they: (1) increased bank reserve requirements to dampen the transmission of excessive global liquidity to the domestic credit market; (2) increased capital requirements for specific segments of the credit market (essentially consumer loans) to correct a deterioration in the quality of loan origination; and (3) created reserve requirements on banks' short spot foreign exchange positions and taxed specific inflows to correct imbalances in the foreign exchange market and to deal with the intense and volatile inflows of capital.

The scope and direction of these policies is summarized in table 6.5, using the same format as table 6.1. In terms of macro prudential instruments, most of the balance sheet vulnerabilities listed earlier 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

Table 6.4 Macro Prudential, Monetary, and Fiscal Policy Measures (continued)

Policy measures	Unit	2009				2010				2011				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
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: Based on data from the Central Bank of Brazil.
Note: n.a. = not applicable.

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: nonfinancial firms with foreign exchange operations could use foreign counterparties to engage in derivatives trading outside Brazil's jurisdiction. This loophole was subsequently corrected by extending the registration requirement of overseas derivatives to nonfinancial firms and demanding the disclosure on the quarterly financial statements of publicly traded companies of sensitivity analysis of three scenarios based on their derivatives exposure.

Table 6.5 Macro Prudential Instruments by Vulnerability and Financial System Component

<i>Macroeconomic policies by area</i>						
	2009	2010	2011Q1-Q2	2011Q3	2011Q4	
Fiscal Policy	Loosening	Neutral	Tightening	Tightening	Tightening	
Monetary Policy	Loosening	Tightening	Tightening	Loosening	Loosening	
<i>Macroprudential instruments by vulnerability and financial system component</i>						
		<i>Financial system component</i>				
		<i>Bank or deposit-taker</i>		<i>Non-bank investor</i>	<i>Securities market</i>	<i>Financial infrastructure</i>
		<i>Balance sheet^a</i>	<i>Lending contract</i>			
Vulnerability	Leverage	Capital ratio	LTV cap		Margin/hair-cut limit	
		Risk weights	Debt service/income cap			
		Provisioning	Maturity cap			
		Profit distribution restrictions	Margin/Haircut limit			
		Credit growth cap	Tax on household credit			
	Liquidity or market risk	Liquidity/reserve requirements	Valuation rules (for example, MMMFs)	Tax on FX deriv	Central bank balance sheet operations	Exchange trading
		FX lending restrictions				
		Currency mismatch limit		Tax on ext credit		
		Open FX position limit				
	Interconnectedness	Concentration limits				Central counterparties (CCP)
		Systemic capital surcharge				
Subsidiarisation						

^a 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 components

Macro Prudential Measures in the Credit Market

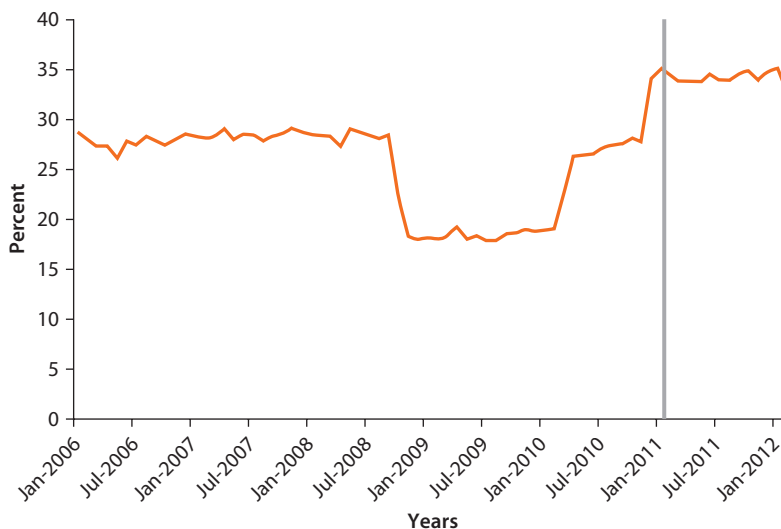
This section looks at macro prudential measures used in the credit market and their results. Measures used in the credit market include reserve requirements, a tax on financial operations; and setting capital requirements for consumer loans.

The Measures

Reserve Requirements As mentioned earlier, during the 2008–09 crisis, Brazil used reserve requirements (RRs) as an important mechanism to support financial stability and to facilitate liquidity reallocation among financial institutions.¹⁶ In particular, to support the operations of small- and medium-sized 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.¹⁷ 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. As demonstrated in figure 6.1, at the end of 2010 and in 2011, the central bank used reserve requirements again as a countercyclical buffer to smooth rapid credit growth, raising unremunerated reserve requirements on term deposits from 15 to 20 percent¹⁸ and the additional remunerated reserve requirements on demand and term deposit from 8 to 12 percent.¹⁹

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.²⁰ Previously, the Letras Financeiras were charged reserve requirements at the same rate as term deposits. Although 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

Figure 6.1 Total Reserve Requirements/Total Deposits
percent



Source: Central Bank of Brazil.

source of funding for banks, in conjunction with shortening credit maturities for consumer credit as a result of the macro prudential measures adopted, is important to mitigate this risk.

Financial Operations Tax

With the same objectives in mind, in April 2011, the government raised the tax on financial operations (imposto sobre operações financeiras; IOF) applying to credit operations for individuals²¹ from 0.0041 to 0.0082 percent per day, limited to a maximum charge over 365 days. Therefore, the maximum tax rate increased from 1.5 to 3 percent.

Capital Requirements for Consumer Loans

As mentioned earlier, 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 by lengthening maturities, increases in LTVs (see table 6.6), and reductions in interest rates that were incompatible with the quality of risk. These changes were 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 beyond 72 months for car loans. As for payroll-guaranteed consumer loans, the tenors for public sector employees reached 60 months. This lengthening of loan 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 households were 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.

Macro prudential measures were thus adopted to curb the supply of excessively long-term consumer credit and car loans. In December, 2010, the central bank raised capital requirements for household loans above 24 months by

Table 6.6 Maturity Limits and LTVs Used to Calibrate Risk-Weights for Auto and Personal Consumer Loans, Brazil

<i>Operation</i>	<i>Maturity and LTV</i>	<i>Risk Weight</i>
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%

Source: Central Bank of Brazil.

increasing the risk-weight factor (RWF), used for capital requirements calculation, from 75 to 150 percent on most household credit modalities.²² In practice, the total capital required from financial institutions for those loans increased from 8 to 16.5 percent 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.

The Results

The reserve requirements on demand and term deposits, the IOF tax rate on consumer credit, and increases on capital requirements for consumer loans were successful in reducing the growth of household credit to a more sustainable pace. These measures affected not only the volume of new loans, as shown in figure 6.2, but also their interest rates and average maturities. The average interest rate rose to 30.4 percent p.a. in May 2011, compared with 22.8 percent p.a. in November of 2010 (see figure 6.3). 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 (see figure 6.4).

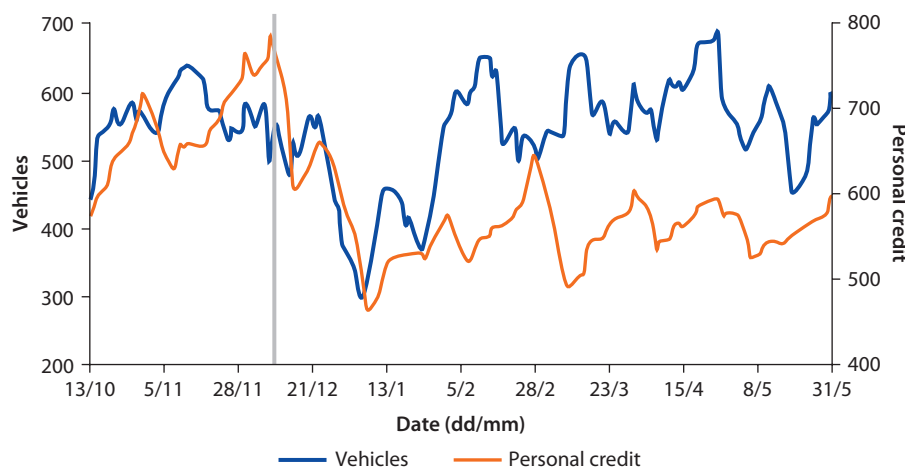
Macro Prudential Measures on the Foreign Exchange Market

This section outlines the various instruments employed by Brazil to address systemic risk in the foreign exchange market, and provides an evaluation of their efficacy in the Brazilian context.

IOF Tax on Portfolio Investments by Nonresidents and on Margin Deposits on Derivatives

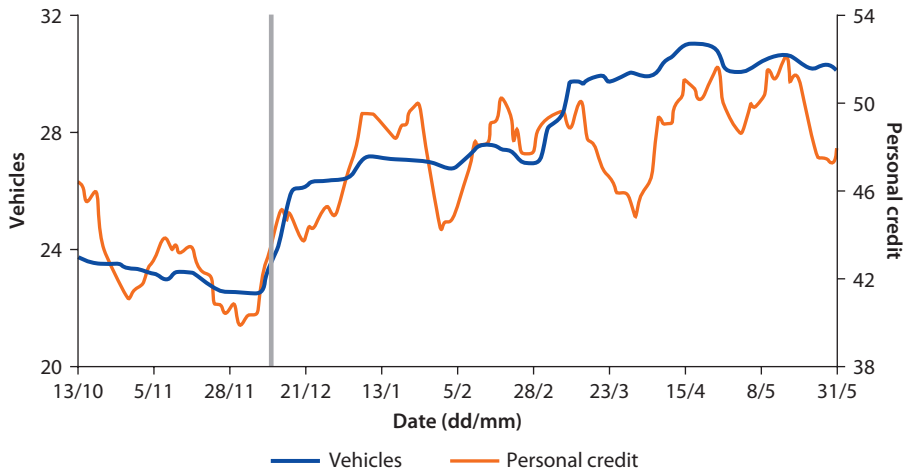
In October 2010, the IOF tax²³ for nonresidents' portfolio investment in fixed income instruments was raised,²⁴ first from 2 to 4 percent, and later in the same

Figure 6.2 New Loans: Five-Day Moving Average for Vehicle Financing and Personal Credit
R\$, millions



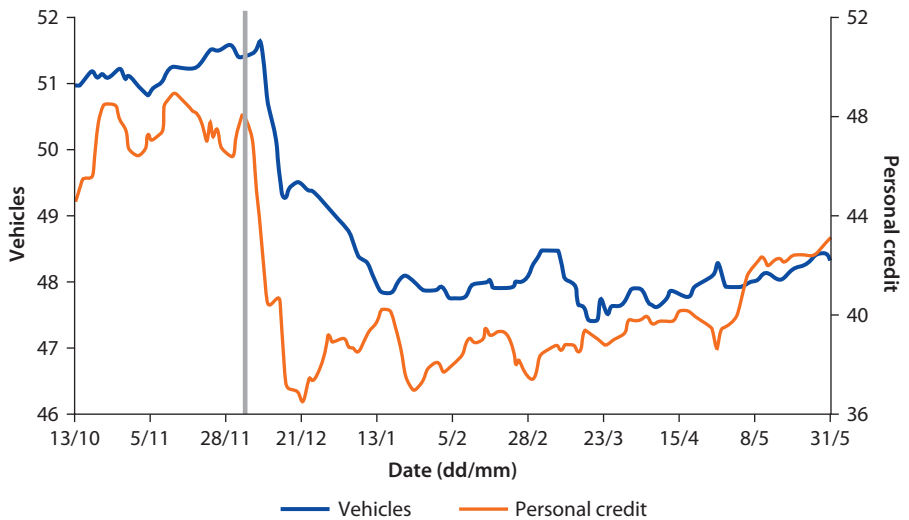
Source: Central Bank of Brazil.

Figure 6.3 Interest Rates: Five-Day Moving Average for Vehicle Financing and Personal Credit
percent per annum



Source: Central Bank of Brazil.

Figure 6.4 Average Maturity: Five-Day Moving Average for Vehicle Financing and Personal Credit
months



Source: Central Bank of Brazil.

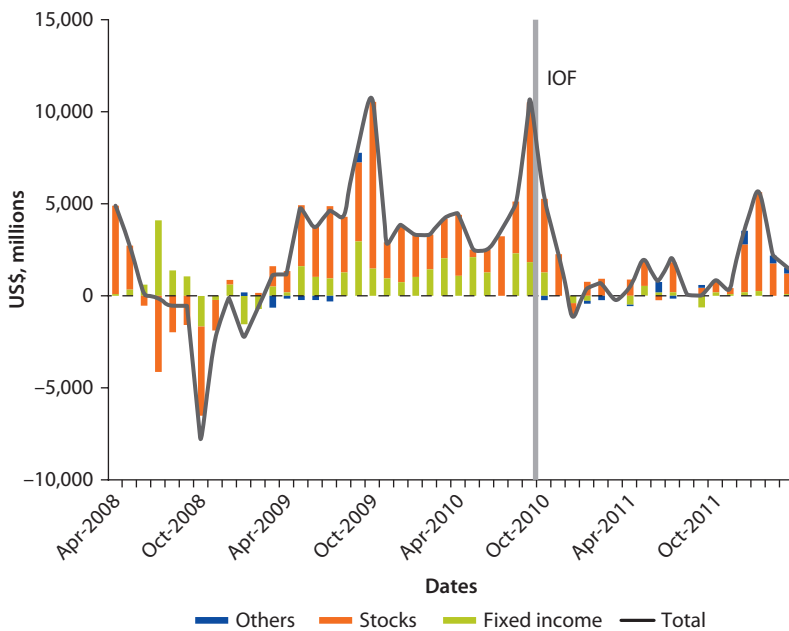
month to 6 percent. The IOF was also raised to 6 percent (from 0.38 percent) on incoming remittances destined to posting collateral on derivatives positions held at central counterparties for stocks, commodities, or futures trading.²⁵ Inflows for equity investments remained subject to a 2 percent IOF tax rate. The IOF rate increases were meant 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.²⁶

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 nonresident funds from equities to fixed income investments was required to be accompanied by a simultaneous foreign exchange transaction subject to IOF taxation.²⁷ 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 goal, the BM&F BOVESPA, Latin America’s major securities, commodities, and futures exchange, was encouraged to exclude trust letters issued by domestic banks from the list of assets eligible as nonresident investors’ collateral.

As shown in figure 6.5, the foreign net inflows to fixed income plummeted after the IOF tax rate hike in October 2010, and have not yet recovered. This happened despite the fact that, according to one estimate, when considering the domestic interest rate, the Special Clearance and Escrow System (Sistema Especial de Liquidação e Custodia; SELIC) at the time of the measure compared with the Libor rate (as a proxy for funding costs), investment in a government bond by a foreign investor subject to the IOF would break even at a about nine months.^{28,29}

Conversely, 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,

Figure 6.5 Portfolio’s Net Inflows by Asset Class, Monthly Data



Source: Central Bank of Brazil.

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.

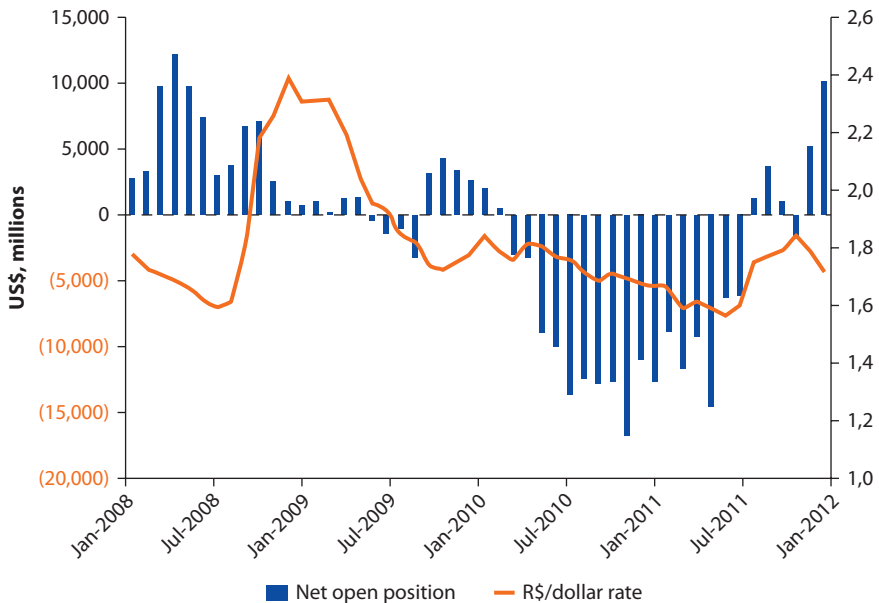
Bank Reserve Requirement on Open Short Positions in the FX Spot Market

In January 2011, the central bank imposed a 60 percent unremunerated reserve requirement on 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.^{30,31}

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 Brazilian real (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 (for example, commercial paper), it opens a long position. This aspect is particularly important to understanding the rationale behind subsequent IOF measures.

Indeed, throughout 2010, as shown in figure 6.6, banks increased exponentially their open foreign currency position. During that year, the financial system

Figure 6.6 Net Open Positions of Banks, 2008–12



Source: Central Bank of Brazil.

came out of a long position of US\$3.4 billion to a short position of US\$16.8 billion by year end. Therefore, not only was the system's position as a whole excessive but also some small- and medium-sized banks built positions in very large sizes compared to their respective Tier 1 capital.

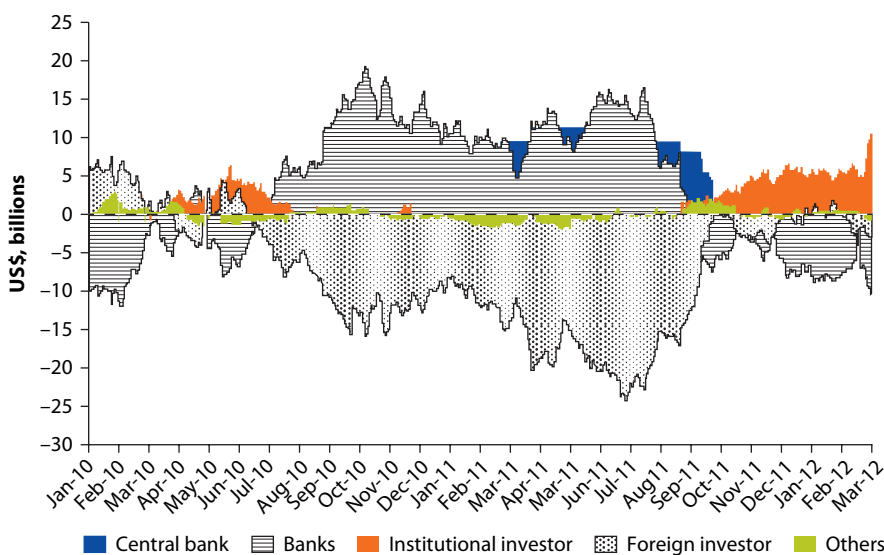
The reserve requirement on short foreign currency positions was also intended to complement the rise in the IOF tax on nonresident's portfolio investments in reducing the attractiveness of carry-trade operations through long BRL derivatives positions. That was expected to be indirectly achieved by making it more expensive for banks—usually the counterparty of nonresidents' derivatives positions—to draw on their external credit lines. It was designed 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

As shown in figure 6.7, foreign investors are on the other side of the derivative transaction, usually large international banks acting as market makers in the U.S. dollar/BRL offshore nondeliverable 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.

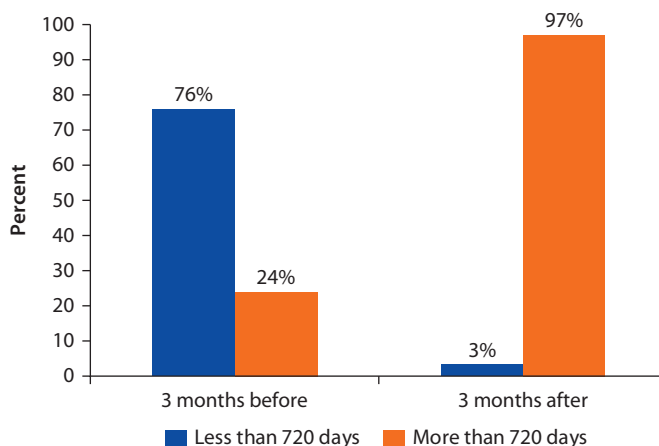
IOF Tax on External Credit Inflows

In March 2011, to curtail short-term speculative inflows while avoiding hampering longer-term flows, the authorities raised to 6 percent the IOF tax rate on inflows related to direct external borrowing or debt securities issued by residents³³ with maturity below 360 days. Previously, a 5.38 percent tax rate applied

Figure 6.7 FX Derivatives Exposure by Type of Investor



Source: Central Bank of Brazil.

Figure 6.8 External Credit Profile Three Months Before and After IOF

Source: Central Bank of Brazil.

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.³⁴

Empirical evidence suggests that the IOF on external credit inflows was effective in lengthening the tenors of external credit for residents, therefore achieving its macro prudential goals (see figure 6.8). Despite the increase in the IOF tax rate, the net inflow of external credit amounted US\$49.6 billion in 2011, as shown in figure 6.9,³⁵ a 14.6 percent increase compared with 2010, reflecting the global liquidity and strong foreign appetite for Brazilian assets.

The hike of the IOF tax rate on external credit also had a complementary function. As mentioned earlier, according to Brazilian foreign exchange regulations,³⁶ when a bank borrows abroad through a direct loan or a securities issue, it actually opens a long foreign exchange position. Local banks used this channel as a way to circumvent the reserve requirement on short positions while keeping their arbitrage trades.

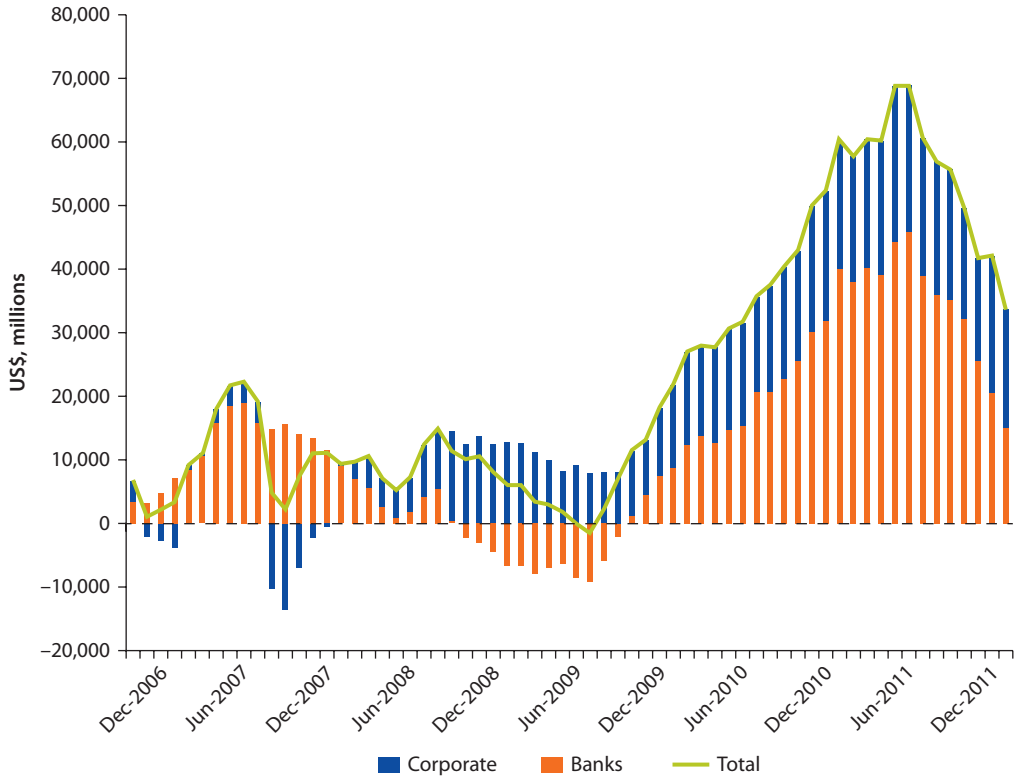
As shown in figure 6.10, upon the adoption of the US\$3 billion limit on short positions in January 2011, the authorities allowed banks to comply with the new rule and recompose their positions until April 2011. As a consequence, from January to March 2011, banks raised US\$19.6 billion in net external 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.³⁷

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.

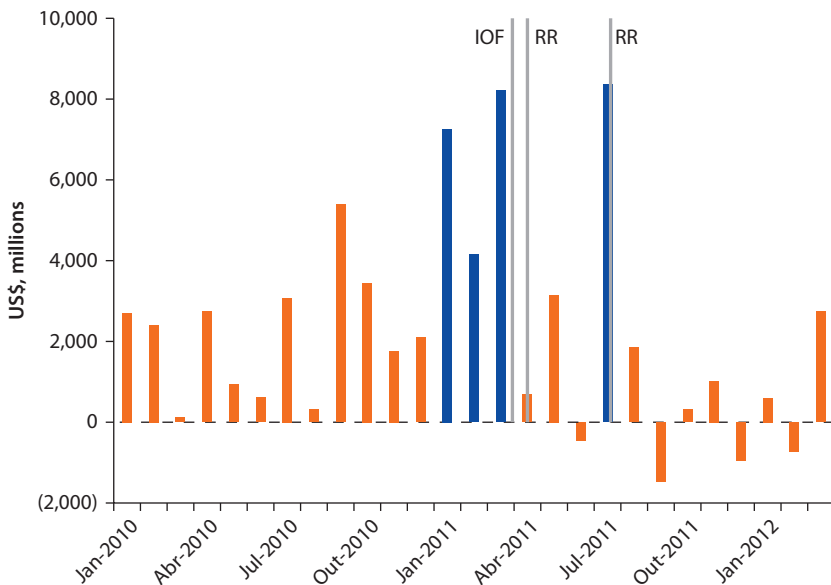
The first was a provisional measure dated July 26, 2011,³⁸ which authorized the National Monetary Council (Conselho Monetário Nacional; CMN)

Figure 6.9 External Credit by Issuer, 2006–11



Source: Central Bank of Brazil.

Figure 6.10 Net External Credit Inflows to Banks



Source: Central Bank of Brazil.

to establish specific conditions for the negotiation of derivatives contracts, for monetary and exchange policy purposes, regardless of the nature of the investor, with powers to (1) determine deposits over the notional value of the derivatives contract; and (2) set forth limits, terms, and other conditions for the negotiation of such contracts.

The measure also amended the IOF legislation, to clarify that:

- In the case of securities transactions involving derivatives contracts, the maximum IOF rate would be 25 percent. Up to this ceiling (25 percent), 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 percent, as explained later.
- 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.

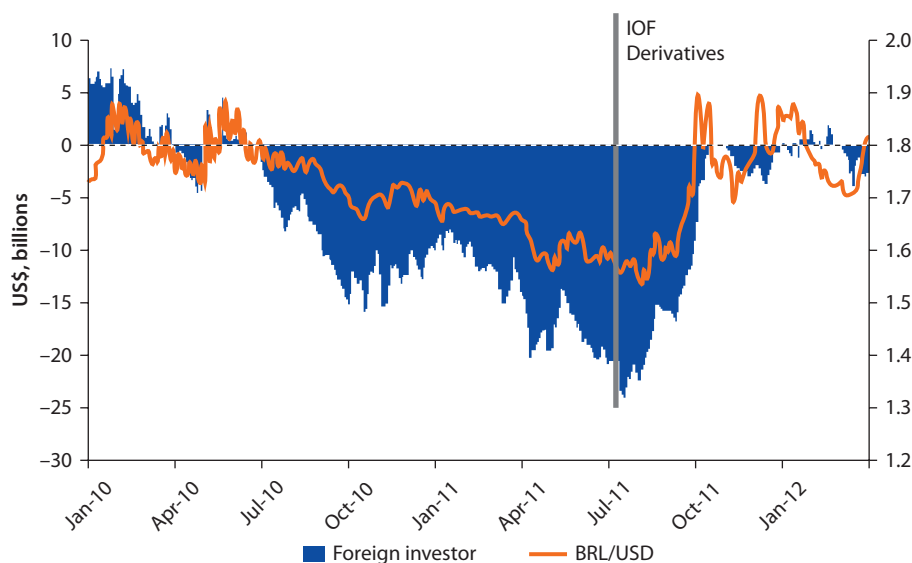
It also established that to be valid, all derivatives contracts must be registered with duly authorized entities, that is, clearing houses or data repositories that have been accredited by the central bank or by the Brazilian Securities and Exchange Commission (Comissão de Valores Mobiliários; CVM) to operate with clearing, settlement, and registry.

The second measure was a decree,³⁹ also dated July 26, 2011, which amends the IOF regulation approved by a December 14, 2007 decree.⁴⁰ The new decree repeats many of the terms defined in the 2011 provisional measure described earlier, then states that the current applicable IOF rate to derivatives contracts is 1 percent 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 an 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 percent rate will apply.

The decree created a level playing field between the underlying cash market and the derivative market for nonresidents' carry trades. As mentioned earlier, initially the authorities adopted a 1 percent⁴¹ tax rate that, although deemed insufficient to apply a burden equivalent to the 6 percent tax on fixed income instruments, apparently was enough to discourage short positions, as shown in figure 6.11.

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

Figure 6.11 FX Derivatives Exposure and Exchange Rate

Source: Central Bank of Brazil.

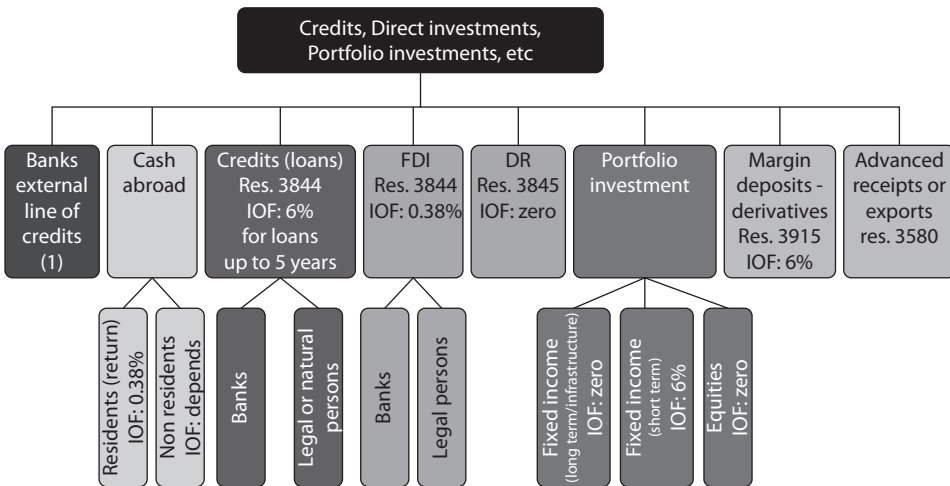
the latitude given to the CMN to adopt further measures on derivatives market for monetary and exchange policy purposes, and also the establishment of the maximum IOF rate at 25 percent, had an important psychological impact on investors' mindset that resulted on dismantling excessive positions in the derivatives market.

All these measures were taken without losing sight of the fact that there were important trade offs in taxing foreign exchange markets. First, the cost of hedging might increase for the real economy.⁴² 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 amended the rules applicable to export financing transactions involving the advancement of payment to the Brazilian exporter, commonly known as "advanced payment" (Pagamento Antecipado; PA).⁴³ This trade-financing modality is specifically designed to finance production by Brazilian exporters and for that reason it enjoys favorable tax treatment (0 percent rates for IOF and for income tax on interest payments).

Pursuant to the new regulation, qualifying advanced payments can be carried out only by the importer (the foreign buyer of the Brazilian goods or services) for a limited period of 360 days.⁴⁴ Before this amendment, the advanced payment could be made by any legal entity, such as the importer or a foreign financial institution, and without any time limitation.

Figure 6.12 Foreign Inflows' Channels and Main Government Measures

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

Source: Based on data from the Central Bank of Brazil.

The amended central bank rules state that for values sent to Brazil as PA, one of the following situations shall occur within up to 360 days: (1) the shipment of goods or the provision of the service; (2) the conversion by the Brazilian exporter, with the prior written consent of the foreign payer, into direct investment (paying the corresponding 0.38 percent IOF tax) or external credit⁴⁵ (paying 6 percent IOF tax for operations with average maturity below 1,800 days); or (3) the return of the values sent to Brazil as PA, observing the tax regulations applicable to resources not destined to exports (paying 6 percent IOF tax on external credit and 10–25 percent 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 inasmuch as it prevented regulatory arbitrage and closed a loophole that could otherwise be used to circumvent the 6 percent 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 percent as compared with the same period in 2011, while exports did not advance at a comparable pace.

Figure 6.12 summarizes the main channels for foreign inflows to Brazil and government actions to curb its excesses and improve its composition.

The Complex Conjunction of the Second Half of 2011 and Early 2012

The results of the tightening cycle of 2010 and the first half of 2011 were positive. The policy settings were adjusted in a timely manner and were instrumental in cooling overheating pressures and gradually bringing inflation—after it reached a peak of 7.3 percent YOY in September 2011—down toward 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.

Macroeconomic Policies with Global Volatility and Rapid Changes in Risk Perceptions

Policy makers 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 (the United States in particular) was taking hold, especially after the initial boost to market sentiment brought on by the new battery of unconventional monetary easing measures, which visibly permeated through 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 United States. Nevertheless, in Brazil, local experience with debt crises suggested that the ensuing recoveries were taking longer than usual, and could be marked by volatility. Brazilian policy makers were concerned that many structural characteristics of advanced economies had not been fully appreciated: the new levels of debt on 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.

That was the case in the Euro zone, 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 in the pace of rate hikes toward 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 25 bps each).

Toward the end of July 2011, things deteriorated rapidly. A succession of idiosyncratic policy stalemates (notably, the debt ceiling in the United States) together with a worsening in market sentiment, triggered by the Greek situation but reaching more systemic economies of the Euro zone (Spain and Italy) as well, revealed that the prevailing combination of political economy factors in the United States and in the Euro zone was pushing the balance of risks to the downside. The data coming from U.S. activity in 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 U.S. housing market, still-high levels of household debt, high gas prices reflecting buoyant commodities markets, and the downgrade of U.S. 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. At the end of August 2011, it started to reduce the base policy rate. In the seven monetary policy committee meetings held since then, the SELIC (overnight) rate was cut by 400 bps (including two cuts of

75 bps 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 percent 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 who were focused on the still-high inflation headline YOY in the last quarter of 2011, despite its declining trend initiated in September.

However, by the end of 2011, domestic economic activity in Brazil was showing signs of deceleration. Eventually, growth figures surprised analysts on the downside. Vindicating the chosen policy strategy, not only did activity slow as had been expected by policy makers, 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 making the slowdown more pronounced than originally expected, including the cyclical 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 was 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 did expand in the last quarter of 2012 at a faster pace but still below what was initially expected.

Inflation has been falling, but expectations—albeit decreasing marginally—remain that it will rise above the 4.5 percent target for the end of 2012, and continue to rise in 2013. After its 7.3 percent 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. Conversely, wholesale price inflation picked up in April, reflecting pass-through—albeit moderate—from the exchange-rate depreciation observed since March.

The year 2012 saw a volatile, risk-off, risk-on environment for policy makers. After the European Central Bank's (ECB's) inauguration of long-term refinancing operations (LTROs) at the end of 2011, the new year began (as 2011 had) in a positive mood. But the implementation difficulties of the Greek program,

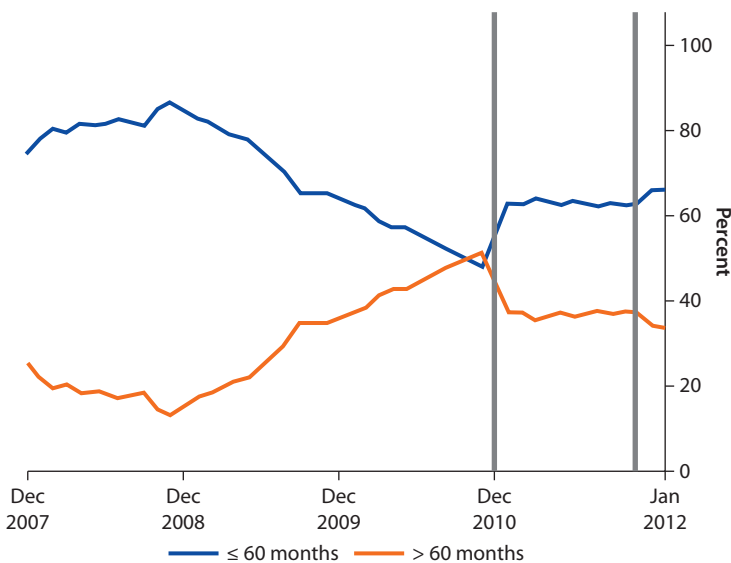
the political economy debates about the pace of fiscal consolidation in many Euro zone countries and the missing of fiscal targets by Spain at the end of February 2012 threw markets in a downward spiral again. This negative external environment, notably the intensifying crisis in Europe, presents the 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.

Fine-Tuning Macro Prudential Instruments

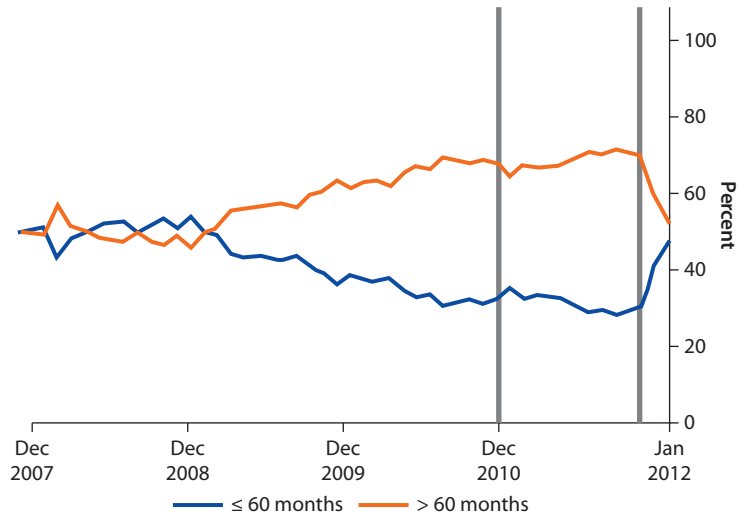
With these negative macroeconomic developments, by the end of 2012, the credit market was growing at a more suitable rate and the average maturities for vehicle financing had declined. The average delinquency rate for vehicle financing in the first half of 2011 also declined 27.6 percent compared with the same period in 2010. In November 2011, the central bank decided to adjust the macro prudential 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. It reduced from 150 percent back to the earlier 75 percent, the risk-weight factor (RWF) used for capital requirement calculation on all collateralized car loans with maturities below 60 months, regardless of loan-to-value ratios.⁴⁶ However, for car loans with maturities above 60 months, deemed to be riskiest, the RWF was kept at 150 percent. The impact of these changes is shown in figure 6.13.

For the payroll-guaranteed consumer loans market, the diagnosis was that the measure implemented in December 2010 to increase to 150 percent 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

Figure 6.13 Percent of New Vehicle Financing Loans, by Maturity Date



Source: Central Bank of Brazil.

Figure 6.14 Percent of New Payroll-Guaranteed Loans, by Maturity Date

Source: Central Bank of Brazil.

figure 6.14, 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 they soon resumed the upward trend.

As a consequence, the central bank decided to increase the RWF for payroll guaranteed loans above 60 months from 150 to 300 percent,⁴⁷ and reduce it to 75 percent for the other contracts. To avoid any regulatory arbitrage or distortion in the personal consumer credit market, it also increased to 300 percent 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, the of the IOF legislation was amended⁴⁸ with respect to consumer credit transactions, reducing the rate to 0.0068 percent⁴⁹ per day (previously 0.0082 percent) for loans to individuals.

Policy Going Forward

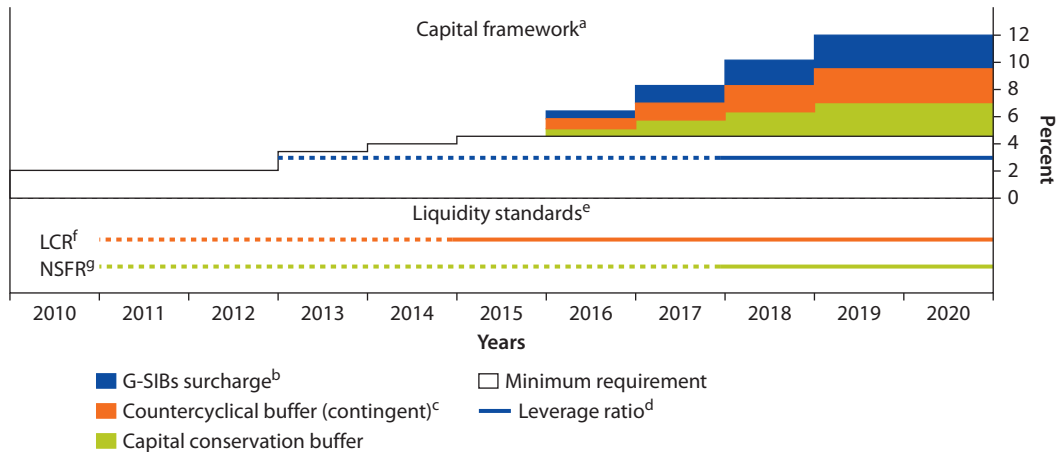
Brazil will continue expanding its macro prudential toolbox on a precautionary basis, to increase its capacity to deal, whenever necessary, with exceptional foreign exchange volatility, destabilizing capital inflows, credit booms, and asset price bubbles. However, calibrating existing or new measures has proven to be difficult because of the economics profession's incomplete understanding of how risks to the financial system develop and how macro prudential instruments act on those risks (see Agénor, Alper, and Pereira da Silva 2009 and Agénor and Pereira da Silva 2010). Sometimes, as a result, decisions cannot be as firmly grounded in theory as one might desire; instead, Brazilian policy makers have been required to make policy judgments, drawing on analysis, market intelligence, and modeling to adopt a tentative, step-by-step approach, taking the

necessary precautions and weighing the trade offs inherent to those measures to avoid excessive distortions and undesirable side effects.

Most of the macro prudential 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 cyclical nature of the financial system. However, experience gained from the 2008 crisis has illustrated that, as the financial system becomes more complex and sophisticated, risks can arise not only in a single sector but also as an interlinked, systemwide 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 percent 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 to distill the findings from various analytical strands into a consistent macro prudential 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 of Brazil⁵⁰ to access relevant information should be expanded to adequately fulfill its macro prudential supervisory role. 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 G-20 fora (see figure 6.15). 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 nonrisk-based measure of leverage, given by the ratio between total assets and equity, stands at low levels. The leverage ratios of Brazilian banks are particularly conservative considering the fact that our accounting rules are restrictive compared with international standards when it comes to netting of short and long positions. In addition, off-balance sheet exposures are not significant. Most banks should have no trouble meeting the new Basel III requirements on leverage; therefore no deleveraging process is expected in the near future.

Some refinements will need more work. On the countercyclical capital buffer requirements,⁵¹ 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.⁵² In line with this, the Basel Committee on Banking Supervision (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.

Figure 6.15 Implementation of the Basel III Capital and Liquidity Rules

Source: Basel Committee on Banking Supervision; BIS calculations.

^a Common equity capital requirements as a percentage of risk-weighted assets.

^b Maximum of the countercyclical buffers to be met with common equity or other fully loss-absorbing capital, implemented according to national circumstances.

^c 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.

^d Capital surcharge applicable to the top bucket of systemic importance.

^e Liquidity ratios to be monitored during the transition period.

^f Liquidity coverage ratio.

^g Net stable funding ratio.

Concluding Remarks: Complementing Monetary Policy with Macro Prudential 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 IMF 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 macro prudential measures to contain financial risks in specific market segments. The Central Bank of Brazil has made clear that macro prudential measures are not a replacement for monetary policy action and are primarily geared at addressing financial stability risks.

Brazil's large macro financial linkages grew *pari passu* with improvements in the strength of the system. Brazil's FSAP stress tests show that the banking system can withstand severe shocks. 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 well manage shocks to liquidity and market conditions. Over 20 percent of assets in required liquid reserves are held as buffers at the central bank, and liquidity and market stress tests run by the FSAP find the system is well positioned to manage strains, including those that could arise from tail risks such as in the Lehman Brothers episode or a new bout of severe stress in the Euro zone. It is true that credit has grown quickly in the last decade (Brazil's credit-to-GDP ratio rose from 26 percent in 2004 to 49 percent in 2011) 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 the credit increase in Brazil reflects financial deepening, helped by institutional and legal reforms 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 the boundaries of Tinbergen's separation principle (see table 6.7): on the one hand, we saw strong and established results that monetary policy is effective in addressing the transmission of excess demand into inflation; on the other hand, we knew that macro prudential instruments are effective in addressing the build-up of excessive financial risk. The less-explored areas were the effects of monetary policy (respectively, macro prudential policies) on financial risk (respectively, inflation and activity), and the interaction between these policies on both inflation control and financial stability. In the present stage of the global financial crisis, under the separation principle, Brazil employed two instruments (the central bank's base rate and a set of macro prudential tools) to address two objectives (the inflation target and a composite set of financial stability indicators). On the macro prudential 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 procyclicality.

Table 6.7 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)

Other related issues are under discussion. Financial stability remains in the mandate of many central banks but should it be conducted by a unified agency (the central bank itself) or by two separate agencies? Finally, communicating this new separation clearly to agents is important for an adequate anchoring of expectations.

Brazil had to address these issues with pragmatism, since it was painfully aware of the destabilizing effects of excessive levels of global liquidity, particularly 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 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, to what financial indicators monetary policy should respond? And what new set of instruments should 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 analysis explores the roles of macro prudential regulation and monetary policy in mitigating procyclicality 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 countercyclical (Basel-type) rules. There are some promising results suggesting that when both macroeconomic stability and financial stability are properly defined by quantitative benchmarks (for example, 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 learned about the implementation and performance of the new macro prudential 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. Nevertheless, monetary policy is not a replacement for macro prudential regulation 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” (that is, stemming excessively rapid growth in credit) can be done through a combination of monetary and macro prudential 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 macro

prudential policies to act in a complementary fashion to ensure both macroeconomic and financial stability.

Brazil's recent experience with monetary and macro prudential 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 whether this policy direction can be generalized and replicated with success. The present context of the global economy is challenging but it has also triggered new thinking among regulators and central bankers to be ahead of the curve for the ongoing and the next episodes of financial stress.

Annex 6A: Categorizing Brazil's Macro Prudential Instruments

Tools	Risk dimensions	
	Time dimension	Cross-sectoral dimension
Category 1. Instruments developed specifically to mitigate systemic risk		
	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • 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		
	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • 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)

Annex 6B: 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

	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
FINANCIAL AND CAPITAL MARKETS											
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 ^a	-	-	-	-	1.5%	-	-	-	-	-	-

^a This is not IOF on foreign exchange operation, but IOF on securities.

Annex 6B: IOF Tax Measures on Foreign Exchange Transactions *(continued)*

	Dec. 6.306	Dec. 6.339	Dec. 7.456	Dec. 7.457	Dec. 7.683	Dec. 7.698	Dec. 7.751	Dec. 7.853
EXTERNAL LOANS	14.12.2007	03.01.2008	28.03.2011	06.04.2011	01.03.2012	09.03.2012	13.06.2012	04.12.2012
Tax rate	5%	5.38%	6%	6%	6%	6%	6%	6%
Taxable maturity	90 days	90 days	360 days	720 days	1,080 days	1,800 days	720 days	360 days

	Dec. 7.412	Dec. 7.454
CREDIT CARD	30.12.2010	25.03.2011
Credit card company obligation for client's purchase abroad	2.38%	6.38%

	Law 12,543 ^b	Dec. 7.536	Dec. 7.563	Dec. 7.699
DERIVATIVE CONTRACTS^a	08.12.2011	26.07.2011	15.09.2011	15.03.2012
Exposure:	Max IOF	1% ^c	1% ^d	1% ^e
long exposure reductions/ short exposure increases	25%			

^a This is not IOF on foreign exchange operation, but IOF on FX derivatives.

^b Law converted from Provisional Measure 539, de 26.07.2011.

^c 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.

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

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

	Dec. 6.306	Dec. 6.339	Dec. 7.412
FOREIGN DIRECT INVESTMENT^a	14.12.2007	03.01.2008	30.12.2010
FDI	zero	0.38%	0.38%

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

Notes

1. Mostly from the Bank for International Settlements and not surprisingly from the Bank of Japan but also Blanchard (2000); Borio and Lowe (2002b); Cecchetti et al. (2000) and Goodhart (2000).
2. Mostly from the Anglo-Saxon academic community, for example, Bean (2003); Bernanke and Gertler (1999; 2001), Greenspan (2002); Kohn (2005), and Miskhin (2008).
3. The warning was made by Alan Greenspan 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?" (Greenspan 1996). But questions were raised by others (see Bernanke 2001, 2002; Borio and Lowe 2002a).
4. See Miskhin (2008).
5. CIEPR (2011).
6. See Stark (2010), Svensson (2010, 2011) and Trichet (2010).
7. The Turner Review (see Financial Services Authority 2009), Brunnermeier et al. (2009), and BCBS (2010).
8. See the financial regulatory agenda of the G-20 and Financial Stability Board (FSB), Committee on the Global Financial System (2010), Galati and Moessner (2011) and IMF (2011b, 2011c). The debate on post-crisis macro financial policies was broader and can be found for example in Blanchard et al. (2010, 2012); Blinder (2010), and Borio (2011).
9. See Lim et al. (2011).
10. Mesquita and Torós (2010).
11. See BIS (2009), IMF (2011a), and Terrier and others (2011).
12. See Central Bank of Brazil (2011a) for complete description of the macroeconomic scenario.
13. See Central Bank of Brazil (2011b).
14. For the purpose of this chapter, the amounts of capital flows comes from data on foreign exchange contracts, the same criteria used for IOF (Brazil's tax on financial operations) charges. Because of these methodological criteria, the figures may differ from balance-of-payments' data.
15. The reversal of the monetary policy tightening stance in August 2011 is discussed later in more detail.
16. See Montoro and Moreno (2011), and Moreno (2011).
17. Central Bank of Brazil, Circular 3427/2008.
18. Central Bank of Brazil, Circular 3513/2010.
19. Central Bank of Brazil, Circular 3514/2010.
20. Central Bank of Brazil, Circular 3513/2010.
21. Government of Brazil, Decree 7458. http://www.planalto.gov.br/ccivil_03/_Ato2011-2014/2011/Decreto/D7458.htm.
22. Central Bank of Brazil, Circular 3515, December 3, 2010.

23. 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.
24. The IOF on nonresident inflows for portfolio investments was used to limit excessive inflows before the crisis, from March to October 2008, with a 1.5 percent tax rate, both for fixed income and equities. In October 2009, it was introduced again with a 2 percent tax rate.
25. In Brazil, about 90 percent 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.
26. A synthetic carry trade can be performed in the derivatives market by acquiring long positions on a high-yield currency (that is, the Brazilian real) and short position on a funding currency (that is, dollars, yens, and so on).
27. Otherwise, nonresidents would be able to enter the market with a first investment in equity, taxed at the 2 percent IOF, and, later on, transfer funds to a fixed income investment, avoiding the payment of a higher 6 percent IOF rate.
28. 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.
29. Calculated as: $t = \log(1 - \text{IOF}) / \log[(1 + e) / (1 + i)]$, where e = external interest rate and i = domestic interest rate
30. A five-day moving average methodology was also adopted for the calculation of the short position.
31. In December 2012, BCB released Circular 3619 withdrawing this limit back to US\$3 billion as the likelihood of excessive short-term capital inflows was not high anymore and in order to inject further liquidity into the spot market.
32. This happens because local banks usually perform an arbitrage transaction in which 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 (that is, 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.
33. Law 4131/62 requires that the total amount borrowed abroad by a resident to be fully internalized in the country.
34. To provide more effectiveness to the measure, it was imposed on the performance of simultaneous foreign exchange operations for renewal, renegotiation, and assumption of obligation of external loan (including securities) under registration requirement with the central bank.
35. The authorities further extended the taxable average tenor from 720 days to 1,080 days on March 1, 2012 and to 1,800 days in March 9, 2012. On July 13, 2012, it returned to 720 days and on December 4, 2012 it withdrew back to 360 days.

36. External credit flow rules are established by Resolution 3,844/2010.
37. Foreign exchange transactions related to direct investment in Brazilian companies remains subject to a rate of 0.38 percent on the inflow.
38. Provisional Measure 539/2011, later approved by the Brazilian Congress and converted in the Law 12543 of December 8, 2011.
39. Decree 7536.
40. Decree 6306.
41. The Law 12543/2011 allows the IOF tax rate on derivatives up to 25 percent.
42. On March 15, 2012, the government exempted certain exporters from the 1 percent financial operations tax levied on FX 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.
43. Central Bank of Brazil Circular 3580.
44. By means of Circular 3604, of December 4, 2012, this period was extended from 1 to 5 years.
45. Registered with the Central Bank of Brazil pursuant to Law 4131, of September 3, 1962, as amended by Law 4390, of August 29, 1964, and relevant regulation.
46. Circular 3563/2011.
47. In March 4, 2013, this RWF was reduced back to 150 percent.
48. Decree 7632/2011.
49. In May 21, 2012, Decree 7726 further diminished it to 0.0041 percent.
50. The Central Bank of Brazil's mission is defined as "to ensure the stability of the purchasing power of the currency and the soundness and efficiency of the financial system."
51. The size of the countercyclical capital buffer varies over time and can amount from 0 to 2.5 percent of the bank's risk-weighted assets.
52. 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.
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 with a credit rule is stronger than that of alternative rules following a classical Taylor-rule specification even when augmented by a set of macro prudential 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.

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