



BRAZIL'S DOMESTIC DEBT MANAGEMENT DILEMMA:

*Can financial indexation dry the ice ?**

This article analyzes the main factors of Brazil's rapid buildup of domestic debt and the effectiveness of its debt management strategy. Fiscal problems have been aggravated by high financial indexation and unsustainable real interest rates, which also undermine effective financial intermediation. Banks and funds have become used to high profits from indexed government bonds and refuse to share more risk or to expand into real sector lending. Experience from Israel and Italy reveals that fiscal adjustment, strong governance, market development, and innovative instruments are critical ingredients for effective debt management. It is also proposed to enhance liquidity in money markets and to separate issuance into nominal bonds and derivative supplements.

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* Financial indexation refers to short-term indexation to interest or exchange rates which has been used to calm the markets by reducing their risk exposure, which in a Brazilian saying is called "drying the ice".

BRAZIL'S DOMESTIC DEBT MANAGEMENT DILEMMA:

Executive Summary

Brazil has gone through many debt cycles and currently struggles to rebuild market confidence to **sustain its public debt**. Official statistics show net domestic public debt of 56% of GDP in July 2002, which has accumulated rapidly due to fiscal problems (primary deficits until 1998 and large contingent liabilities of states) and market shocks (devaluation of the Real and continuous high real interest rates). Brazil's domestic public debt has increased by 6.6% of GDP over the past 18 months, mainly because of rapid exchange rate depreciation and high real interest rates. Assuming that market confidence can be restored after the elections, it is argued that continued fiscal adjustment is necessary but not sufficient to develop a sustainable debt management strategy.

The key structural challenge is to enable an **effective sharing of risks** with the markets. Currently, financial indexation covers over 80% of Brazil's domestic debt, which is indexed either to overnight interest rates or to the exchange rate. As a result, liquidity is shifted to derivative markets and yield curves cannot develop. The central bank relies on high reserve requirements and focuses on overnight repurchase operations, which undermines the interbank market and the development of longer-term repo markets. Despite the minimum risk accepted by markets, real interest rates are among the highest in the world and remain well above 10%. In an highly concentrated market, banks and funds have realized impressive returns, at the expense of underdeveloped corporate bond markets and weak private credit which is officially subsidized.

There is ample **international experience** in developing domestic securities markets but few examples with such extreme starting conditions. Italy and Israel have both managed to break with indexation, with Italy shifting out of floating-rate debt and Israel shifting partially out of monthly inflation-indexed debt into nominal instruments. Their experience suggests that such a gradual process could be based on four pillars in Brazil:

First, a credible **macro-economic framework** with strong fiscal adjustment, falling real interest rates, and positive external shocks (for instance a regional free-trade agreement). Second, a strong **institutional basis** for inflation targeting and for debt management with an independent central bank and a legal mandate for operational independence of debt management, which would further support the ongoing capacity building at the Treasury. This could be supported by clear competition policies and anti-trust rules to further liberalize markets and by privatizing remaining federal banks. Third, an emphasis on **debt market development** with support for nominal instruments that create liquidity in cash markets, and supportive market infrastructure that also helps to develop interbank and money markets with medium-term benchmarks instead of CDI. Finally, a **debt management strategy** that eliminates any indexation in the short-term segment and establishes 12-month nominal LTN benchmarks at an additional premium. Indexed instruments are transformed into medium-term floaters or longer-term inflation-indexed bonds. These measures shall avoid the return to zero-duration instruments during the next crisis and shall establish a foundation for sustainable debt management. **“Drying the ice” with financial indexation cannot be a sustainable medium-term strategy.**

BRAZIL'S DOMESTIC DEBT MANAGEMENT DILEMMA:

Can financial indexation dry the ice ?

1. INTRODUCTION

Brazil has a rich history of debt cycles, starting from the debt crisis in 1825 and subsequent crises in 1898, 1914 and 1931. Following three decades of financial repression, public debt markets re-emerged during the 1960s. After two decades of high inflation and indexation, Brazil joined the Latin American debt crisis in 1984. Subsequently, several failed stabilization programs included the domestic default under the Collor Plan in 1990. The Real Plan in July 1994 led to disindexation of the real economy and an extraordinary growth of Brazil's domestic debt, which continued at a more modest pace under the inflation targeting regime since 1999.

Since 1994, Brazil's net federal debt has increased from R60 bn (12% of GDP) to R674 bn (56% of GDP) at annual real growth rates above 20% as real interest rates averaged 16%. Over half of this increase can be attributed to the effect of real interest rates (among the highest in the world), despite an average 2% primary fiscal surplus during that period. One third of the increase can be attributed to recognition of liabilities (skeletons) and the remainder to the depreciation of the exchange rate. By July 2002, over 81% of Brazil's public debt was indexed to the overnight interest rate or exchange rate. Under such massive indexation, sustainability can only be achieved in scenarios of rapid stabilization of the exchange rate and significant reduction of real interest rates.

Collaboration between federal debt managers and a highly concentrated group of banks in Brazil has enabled the financing of large public deficits at very high risk-adjusted costs. While the government has ensured full debt financing, it has offered very high real interest rates and has also occasionally bailed out the markets in stress situations. Banks and funds have been insisting to minimize their risk by holding a large share of indexed debt with zero duration, and have generated healthy profits with increasing leverage (public debt assets exceed three times bank equity). Brazil's domestic debt accounts for over 70% of total debt (LAC average is 41%) while real interest rates and risk profile of its debt are among the highest in the world. Moreover, financial intermediation is inefficient, banks seek financial rather than real sector profits, corporate debt markets have been suppressed and private sector credit (34% of GDP) remains largely subsidized.

This paper makes the strong assumption that macro-economic stability and market confidence in debt sustainability can be restored after the elections in October 2002. The question then is how the portfolio structure can be improved to avoid recurrence of such large vulnerabilities. It is argued that short-term goals to "*dry the ice*" need to be balanced with medium-term objectives for true risk sharing with the markets. Such a strategy will require at least four necessary policy ingredients: primary fiscal surpluses need to be maintained; governance of debt management needs to be enhanced ; market liquidity needs to be extended from derivative to money markets ; and both financial indexation and real interest rates need to be substantially reduced. The structure is as follows: the next section provides an assessment of sustainability parameters and risk profile of Brazil's domestic debt ; the following part reveals lessons from disindexation experience and market development initiatives ; and the final part draws specific policy conclusions in the four areas mentioned above.

2. ASSESSMENT OF DEBT DYNAMICS

2.1 Evolution of Debt Profile

Brazil's federal debt more than quadrupled during the past eight years, which is well illustrated by Garcia (2002).¹ Initially, the main problem was loose fiscal policy until 1998 as well as recognition of liabilities by states and public enterprises (so-called skeletons), which accounts for nearly one third of the increase in federal debt since 1994 (chart 3). The floating of the Real in 1999 and its substantial depreciation have further increased public debt (share of about 20%). This share has of course increased with the rapid depreciation of the Real in 2002.² However, the main factor has been the extremely high **real interest rate**, which averaged 16% during this period. Despite the significant fiscal adjustment since 1999, about half of the increase in public debt can be attributed to the effect of real interest rates (net of fiscal surpluses). Chart 1 reveals that Brazil's debt stock continues to grow rapidly even as real interest rates have declined because nominal fiscal deficits remain substantial. As originally pointed out by Kaminsky and Leiderman (1996), a certain lack of credibility is revealed by the comparison of real interest rates across emerging markets (chart 2), because those of Brazil (2001) remain above 10% as compared to a sample average of around 5% despite the successful targeting of inflation.

In July 2002, **Brazil's net domestic public debt** reached R 674 bn (56% of GDP) whereas estimates for gross public debt (incl. contingent liabilities and net debt of public non-financial firms) are around 80% of GDP (Williamson, 2002; IIF, 2001). Taking account of the problematic liquidity of certain assets (arrears, social security, state and municipal debt) Favero and Giavazzi (2002) suggest an alternative measure of net public debt which is around 65% of GDP at the end of 2001. As the level of Brazil's public debt is getting into a danger zone, its speed and structure are aggravating market concerns. It is estimated that Brazil's new government would need to maintain a substantial primary surplus (cf. table 2 and chart 6) to stabilize the level of net public debt.³

Indexation has been a complex phenomenon that evolved during high inflation in the 1980s and that was supposed to stay behind when the Real plan was introduced in 1994. While other countries have developed inflation-indexed instruments⁴, this simple form of indexation remains relatively small in Brazil (9% share of public debt). Instead, Brazilian markets introduced a perfectly indexed bond (LBC, now called LFT) in 1985 which has continued to be the most widely used bond in domestic public debt and which has helped to limit currency substitution (Garcia, 1996) but its zero duration has rendered useless the wealth effect of monetary policy.⁵ In July 2002, 53% of public debt has been issued in form of overnight-indexed LFT instruments. Moreover, the government has

¹ Garcia (2002) compares data on net federal debt to illustrate the recognition of state debts during the past decade, which would not be visible in the official statistics on net public sector debt.

² Guardia (2002) estimates that the cumulative impact of the devaluation in 1999 and the continued slide of the Real during 2001/2002 have added about 14% of GDP to net public sector debt.

³ However, important differences exist between definitions of net and gross public debt: while assets of some 15% of GDP reflect state debt yielding real interest income of 6%, the average real interest on domestic liabilities exceeds 10% ; moreover, reserves of over US\$ 30 bn generate little income but real interest rates on external debt exceed 11%. Therefore, an additional surplus of approximately 1% of GDP is required for sustainability if calculations are based on a concept of net public debt (cf. table 2).

⁴ Inflation indexed instruments have accounted for shares between 4% to 19% of government debt in Australia, Canada, France, New Zealand, Sweden, United Kingdom, and United States during the 1990s.

⁵ LFT bonds are indexed to overnight interest rates (Selic) and sold at a discount with the face value corrected daily by variations of interest rates ; this zero-duration instrument is close to perfect indexation.

introduced a dollar-linked bond with daily adjustments to exchange rate variations in order to support its exchange rate policy, which now accounts for 29% of public debt.⁶ Markets use these instruments as protection against very short-term market fluctuations rather than against medium-term risks of inflation. In return for lower funding costs and rollover risk, the government assumes both interest and exchange rate risks. Although these instruments barely trade, their derivative components (interest rate swaps and coupon cambial) are actively traded in Brazilian derivative markets. We therefore define these short-term interest- and exchange-linked instruments as **financial indexation**.

Financial indexation reflects the ultimate form of risk aversion, just short of dollarization or capital flight. It represents an insurance written by the government to the markets against any short-term fluctuation in interest or exchange rates. It keeps duration to a minimum and also limits liquidity, but on the other hand helps to extend average maturity and to reduce refinancing risk. Over time, the degree of **risk aversion** has varied widely in Brazil: In 1994, only 37% of Brazil's domestic debt was indexed, as compared to 50% in 1997 and to 81% in 2001 (charts 10 and 11). Although two-year fixed-rate notes were issued in 1997 and 2000, the share of nominal debt has been cut in half over the past two years. As a result, average duration of the portfolio has only increased modestly from six months in 1998 to twelve months in 2001. Moreover, the share of dollar-linked domestic debt has risen to 29% in 2001 (twice the share of 1998) despite the significant real depreciation of the Real. It appears that the highest financial indexation occurs in periods of crises when pressure rises on exchange and interest rates, with an adverse impact on growth and fiscal positions (table 1 and chart 9). This reveals a distinctly pro-cyclical impact of financial indexation (cf. also Hausmann, 2002). Finally, banks are using the fully indexed asset positions to immunize similar indexation on their liability side, which perpetuates such financial indexation across the system to investors and intermediaries.

2.2 Institutional Framework

Brazil's institutional framework for debt management has evolved over the past decade. Significant progress has been made in building capacity at the Treasury, which has unique responsibility for issuing domestic debt, with a new risk management function and explicit monitoring of contingent liabilities. Domestic debt management is implemented by the **Treasury (STN)**, in cooperation with the **Central Bank (BCB)** which is acting as government agent in primary markets. BCB has no separate money market instruments but remains active in open market operations through repo markets as well as in recently introduced FX swap instruments. However, debt management of the overall portfolio is still segmented as external debt (international capital markets) is outsourced to BCB and the coordination on debt strategy remains very limited. The decision to consolidate debt management at the STN has been delayed by one year with continued inefficiencies of such segmentation. The lack of independence of the BCB has also prevented a clear separation between debt management objectives and monetary/FX policy objectives. For example, the single instrument of dollar-linked debt has been used for both debt management and FX policy objectives. While BCB has responsibilities to support the stability of the financial system and to manage the exchange rate. On the other hand, STN has fiscal responsibilities and aims to minimize costs on the budget. Policy makers may not always be able to achieve both objectives and engage in trade-offs that may be more short-term oriented than desirable from a debt management objective.

⁶ The share of FX-linked debt, including swaps, has increased to 41% by September 2002.

An Annual Borrowing Plan establishes the overall debt management strategy for the domestic portfolio since 2001, but implementation varies according to market conditions. **Short-term budgetary concerns** appear to be most important in the choice of debt instruments, and no medium-term strategy or portfolio benchmarks have been developed. Accounting rules (cash basis) and indexed market benchmarks (CDI) have led to an institutional preference for indexed instruments. Questions have arisen on whether a more effective institutional arrangement could be established (integrated agency or improved intra-agency coordination), whether operational independence could be established, whether a consistent medium-term framework needs to be developed, and whether the current choice of instruments (especially in FX and money markets) is efficient. Chart 7 illustrates issues related to the coordination of debt management.

The overall objective stated in the Annual Borrowing Plan is to **minimize long-term funding costs of the government under prudent risk limits**. This objective is broken down into conceptual targets (mostly related to ensure solvency) as well as operational targets (mostly related to ensure liquidity), as revealed in chart 8. The *conceptual targets* are all interrelated, as they aim to minimize real interest rates, to reduce indexation, and to promote market development. The *operational targets* aim to establish prudent risk limits for the government and focus on refinancing risk, market risk, FX event risk, and concentration risk. They are slightly different than risk considerations of market participants, which mostly focus on credit, liquidity, market, and counterparty risks, although both issuer and market perspectives have an impact on debt structure and costs.

However, debt management objectives have not been supported by a clear **legal mandate** from the policy level starting with the mandate provided by Congress to the Minister of Finance. The objectives of risk management of the debt portfolio and the importance of market development implemented by the National Treasury, but not formally mentioned in the legal framework which weakens governance of the debt manager. Moreover, the current legal framework is primarily focused on short-term considerations to raise funds and to reduce costs. Ideally, the government would operate under an effective institutional framework where the cost- and risk-objectives are clearly defined in a legal document, which would enable the debt manager to construct an **objective function** whereby risk-adjusted funding costs are dynamically minimized (cf. Hausmann, 2002), although this task may be complicated by varying relative preferences and problematic risk aggregation. Practical implementation of clear mandates, institutional independence, and separate instruments appears to be a lengthy process, as there are several interrelations between debt management and other macro-economic objectives that need to be considered. However, as a first step, Brazilian debt managers are currently establishing a risk management framework (cash flow and budget at risk models) that shall allow them to monitor specific targets and to identify main vulnerabilities as well as trade-offs.

An **alternative perspective** to help validate the formal framework would be to look at the objective function of market participants, which aim to maximize risk-adjusted returns on capital by investing in government debt, which in this respect is the opposite of the issuer's objective. Banks have been extremely profitable by using most of their capital to invest in government debt (as compared to real sector lending) and by assuming minimum risk through short duration and high indexation of government debt. Another perspective to aggregate market perceptions of sovereign credit risk is revealed in external debt markets (stripped Brady bond spreads) or implied spreads of domestic

credit default swaps. Arbitrage opportunities might arise as the covered interest parity does not hold and country premiums fluctuate widely (Garcia and Didier, 2001). In external debt markets, premiums currently exceed 1,600 bp above UST and indicate a substantial lack of confidence. In the following, progress on both conceptual and operational targets is analyzed and their effectiveness is assessed.

2.3 Domestic Debt Sustainability

Real interest rates: Solvency of the government requires a medium-term framework whereby primary surpluses can finance interest costs under given growth, inflation, and exchange rates. Current real interest rates of 12% would require future growth rates above 6% (*ceteris paribus*) or a future primary surplus of about 5.8% of GDP (*ceteris paribus*) in order to stabilize the government debt stock (table 2). Even under optimistic macro-economic projections, solvency is hard to achieve if long-term real interest rates remain above 8%. Although Brazil has made significant progress in terms of institutional reforms, by adopting a flexible exchange rate and inflation targeting regime, and by strengthening its fiscal policy over the past four years, real interest rates remain among the highest in the world and appear to be unsustainable. Moreover, despite inflation targeting, their volatility remains high⁷ and does not reflect the improvements of the institutional framework. An interesting comparison is South Africa (Kahn and Farrell, 2002) where real interest rates averaged below 5% during the past decade, which help to contrast Brazil's experience (chart 1) with an international perspective (chart 2). Both macro-economic factors (growth, fiscal position, current account deficit), institutional factors (inflation targeting, market structure), and debt management strategy (choice of instruments, market liquidity) have an impact on real interest rates (table 5).

Disindexation: Brazil has a long history of high inflation and extensive indexation of its real and financial sectors. Since the introduction of the Real Plan in 1994, inflation has been contained and indexation of the real economy has been gradually reversed. However, financial indexation of government debt to interest and/or exchange rates has increased from 50% in 1997 to 81% in 2001 (chart 11). Although indexed public debt appears to be a cheaper short-term funding vehicle, it prevents effective risk sharing with markets, and may feed into inflation, erode credibility, and raise long-term real interest rates. Financial indexation carries both direct costs (FX and interest rate liability) as well as indirect costs (hampering bond market development and effective monetary policy) as illustrated in chart 9. After introducing a floating exchange regime in 1999, the government stated a policy priority to reverse the financial indexation of government debt.⁸ However, the share of nominal debt declined by one half to 7.8% at end-2001, mainly due to the effort to limit refinancing risk. The target range for nominal debt in the Annual Borrowing Plan for 2002 remains in the low range between 7% to 10% due to the remaining high real interest rates. It appears that the institutional structure and track record are inconsistent with the stated objective of reducing the level of financial indexation, although any adjustment under current market conditions is indeed difficult.

⁷ Fischer (2002) points to the extreme volatility of real interest rates in Brazil, which is about 530% of US, 250% of Korea, 130% of Mexico.

⁸ The Public Debt Annual Borrowing Plan for 2001 stated the objective to increase the share of nominal debt from 15% at end-2000 to at least 22% by the end of 2001. However, there have been no incentives for market participants to acquire more risk and strong fiscal disincentives to issue nominal debt.

Market development: Brazil's government has emphasized the need to facilitate market development in order to enable access for corporate borrowers. It has partially succeeded in extending the yield curve, in improving the term structure, and in enhancing liquidity and transparency. The strengthening of STN operations, the annual borrowing plans, improved auctions, significant improvements in market infrastructure, reopening of issues, introduction of limited repo markets, and consultations with the markets have been key success factors. However, corporate issuance remains marginal as the high degree of financial indexation remains a key obstacle. Moreover, liquidity in cash markets remains poor, mainly due to the high degree of indexed debt that rarely trades. The development of sophisticated derivatives markets (DI futures) has also shifted liquidity away from secondary markets due to lower transaction costs and a higher leverage impact⁹. Other factors limiting liquidity are the problematic benchmark (overnight interest CDI) used for bank liabilities which limits the demand for actively traded nominal debt instruments as well very high reserve requirements, the CPMF transaction taxes, and the limited responsibility of market makers and absence of specialists. The concentrated market structure¹⁰ is also reflected by the small participation of foreign banks and fund managers and the narrow institutional investor base (chart 5).

2.4 Risk Profile

Refinancing risk: External shocks as well as domestic political events have led to highly volatile debt markets in Brazil. In 1998, the very short average maturity of the portfolio was a major source of financial vulnerability. In order to address the key liquidity risk of the issuer, the government decided to significantly reduce the share of domestic debt falling due within 12 months from 53% at end-1999 to 26% at end-2001, although this share has risen to 41% in September 2002. This important reduction of refinancing risk has also resulted in an increasing average term to maturity, which has been raised from 27 to 35 months, and slightly larger average duration, which has increased from 9 to 12 months during the same period.¹¹ These are significant achievements in terms of debt management over the past four years. However, this objective has been achieved by near full financial indexation of new debt, and it will be difficult to make further progress as the average maturity of auctioned debt has declined to 11 months. By any comparison, average duration remains very short and reveals a strong risk aversion of the markets. Unless more efforts are devoted to market development (esp. liquid and deep money markets), and to expanding the investor base (i.e. more diverse risk preferences by de-linking benchmarks from CDI and by eliminating distortions arising by the CPMF tax) there will remain significant vulnerabilities with respect to refinancing risk.

Market risk: Sovereign issuers could take credit risk as exogenous in the short-term¹² and focus on managing interest rate risk and volatility. Under the current inflation targeting framework, policy makers have been relatively successful in reducing inflation expectations, in setting interest rates transparently (apparently guided by a Taylor-rule),

⁹ Analytical research on why and how derivative markets substitute for cash markets still needs to be completed, but preliminary work indicates that financial indexation appears to be the driving factor.

¹⁰ Bevilaqua and Garcia (1999) illustrate "home bias" and "captive demand" for public debt in Brazil, where "the Central Bank has bailed out the market" and banks are "partners in rolling over the debt" (p. 8)

¹¹ Bullet payments have to some extent also helped to extend durations, but may increase "bunching".

¹² Credit risk has been considered as lower magnitude and lower priority for the debt manager, but that does not mean that it cannot be successfully managed.

and in limiting nominal interest-rate volatility (through very frequent intervention). The latter objective has been facilitated by highly liquid derivative markets and improvements of primary and secondary market infrastructure. However, volatility of real interest rates and exchange rates remains substantially higher than in other emerging markets (Fischer, 2002). Moreover, concerns remain regarding the independence of the Central Bank, which could significantly enhance credibility of the policy framework and help to further mitigate market risk. Moreover, the recent transfer of all debt issuance to the Treasury (STN) may leave a vacuum at the Central Bank (BCB) and may create new uncertainties, especially on instruments linked to exchange-rate policy. In addition, the implementation of mark-to-market rules appears to have increased market volatility and has added market risk in the short-term although that may be mitigated through better risk management.

FX event risk: Brazil's Central Bank has long aimed to centralize foreign exchange risk and to minimize involvement of state-owned banks and state-owned corporations in foreign exchange markets. Moreover, it has maintained some controls on capital account transactions in order to limit avenues for short selling of the Real. However, volatility of the Real during the past two years has been very high¹³ and in part reflects a learning experience of market participants under a floating FX regime. Chart 4 also reveals that larger expected devaluation leads to a higher degree of indexation. The main instrument of the Central Bank in 2001 has been net issuance of dollar-linked debt (some R 65 bn) and more recently of Dollar/Real swaps. Such intervention of a central bank in FX forward markets is highly unusual and normally limited to short transition periods. Given the external shocks (Argentina) and domestic political uncertainties (elections), it is important to avoid a large overshooting of the real exchange rate, given the recent pass-through of about 20% to inflation. However, the current stock of US dollar-linked debt (R 190 bn) and its short average maturity (two years) have created a significant liability and it is critical to announce a medium-term strategy to reduce such exposure, where the experience of South Africa may again be helpful (Reserve Bank, 1998). Moreover, these objectives can only be achieved with effective incentives, complementary instruments, and enhanced intra-agency coordination.

Concentration risk: Brazil has traditionally been a very tightly connected financial market, and foreign holdings of domestic debt remain small. The ten largest holders (3 banks and 7 mutual funds) hold well over 50% of the government debt stock and their portfolios are over 80% concentrated in government debt. Moreover, five large banks control many large mutual funds, pension funds, and insurance companies, so that the domestic debt market is in fact a highly concentrated market where price discovery is limited and systemic risk appears to be substantial.¹⁴ Moreover, the government appears to have implicit guarantees for the largest market participants, which may become a critical impediment once these institutions will be forced to shift activities from financial investments to real sector lending. Enhanced competition and privatization of federal banks appear to be the main obstacles to start reducing the high concentration risk. Moreover, a stronger interbank market (beyond the largest banks, and beyond overnight segments) may help to facilitate the transfer of risk to market participants.

¹³ Market data show Brazil's FX volatility around 215% of the US dollar, 200% of the Polish zloty, 180% of the Philippine peso, and 160% of the Mexican peso.

¹⁴ Very limited trading of government debt in secondary markets further aggravates concentration risk. Gragnani (2002) shows that trading ratios are about one tenth of the size observed in the US or Canada.

3. International Experience

3.1 OECD experience with financial indexation

There is ample international experience with various indexed financial instruments and their impact on debt market development, but there are few examples with such extreme starting conditions and such massive financial indexation as in Brazil today. Economists have argued on whether **indexation**¹⁵ is desirable and whether it has an impact on real interest rates. These arguments at the conceptual level should apply both to inflation indexation, also called partial indexation due to time lags, as well as to overnight interest indexation, which is closest to perfect indexation as the duration is getting close to zero.

Many distinguished economists, including Jevons (1875), Marshall (1925), Keynes (1927), and Fisher (1934) advocated that governments issue indexed bonds, and one of the first indexed debt issues occurred in 1780 by the State of Massachusetts. The main arguments **in favor** of indexation are savings of the inflation premium, protection of savings' purchasing power, and reduction of future inflation taxes. Moreover, it is argued that indexed bonds help with high financing needs, solve the monetary time inconsistency problem, and they extend the universe of investment opportunities, thereby helping risk management (table 4). Moreover, Barro (1998) makes a case for indexed debt based on tax-smoothing objectives. However, economists are far from agreement, and many arguments have been presented **against** indexed bonds, most importantly, it weakens the constituency to fight inflation, it increases the probability of default and hence risk premia, and it has no significant welfare gains. Moreover, indexation distorts credit allocation, may lead to real indexation, balkanizes markets by eroding liquidity, and as a result, the private sector strongly dislikes to issue indexed securities. Indexation, in the context of liability dollarization can exacerbate risk-adjusted levels of debt (Hausmann, 2001 and 2002) and make inflation targeting more difficult (Eichengreen, 2002).

Today, only a few countries have significant outstanding indexed debt instruments: Brazil (\$ 160 bn, 80% share), United States (\$ 140 bn, 4% share), United Kingdom (\$ 100 bn, 19% share), Israel (\$ 57 bn, 70% share), Chile (\$51 bn, 63% share) and Sweden (\$11 bn, 8% share), although a few other Latin American countries had significant indexation in earlier periods. The track record has been positive only on those cases where small parts of public debt are inflation-indexed, such as in the US, UK, and Sweden, mainly because of portfolio diversification effects. In most cases, indexation of bonds is linked to inflation, carries lags (i.e. eight months in the United Kingdom), and caters to demands from long-term institutional investors. The savings from inflation premia on nominal and indexed bonds have been about 400 bp (Foresi, Penati, and Pennacchi, 1997) but they have been much lower (about 130 bp) in periods where inflation expectations pointed to a significant increase in long-term inflation and in developed economies (Campbell and Shiller, 1996).

However, a slightly different perspective emerges from a government debt manager, who attaches a greater weight to short-term risk management than to longer-term variables such as real interest rates and market development. From that point of view, the issuance of long-term inflation-indexed debt is far more favorable than short-term debt that is perfectly indexed to overnight interest or exchange rates, simply because rollover risk is

¹⁵ Most of the literature on indexation refers to price indexation.

much lower, volatility may be lower, and the asset-liability mismatch may be reduced. Moreover, long-term inflation indexed instruments rarely trade and are often not marked to market, which may reduce volatility, and they are often the only long-term instruments accepted by the market. On the other hand, it may not be favorable to lock-in very high real interest rates for long durations, as that may undermine debt sustainability. However, more analytical and empirical work is needed to establish the tradeoff between these instruments in order to find more definite recommendations for the case of Brazil.

The case of **Chile** may be relevant because of complete financial indexation to the consumer price index through the UF (unidad de fomento) (cf. Walker, 1998). However, real interest rates have remained relatively high, and few policy makers would recommend complete financial indexation, especially when it is an extreme case of zero duration (as in Brazil) where the effectiveness of monetary policy is compromised. The **experience of Israel and Italy** during the 1990s reveals some helpful insights on the process and benefits of disindexation. **Israel** had a majority of indexed government debt indexed to a monthly CPI (53% of public financial assets in 1992) and reduced that share to 37% by 2001 as illustrated in box 1. The inflation premium has declined very quickly to currently less than 2% and real interest rates were on average around 4% during the past decade. Market development efforts and incentives to promote nominal instruments were critical to advance the gradual process of disindexation, which has been slowed by remaining political shocks, institutional uncertainty, and an uneven market structure. The gradual extension of a nominal yield curve (box 1) also demonstrates the ability of high-debt countries to overcome the “original sin” (inability to issue long-term nominal debt), especially when it is combined with a more active exchange-rate policy (which is consistent with the model by Hausmann 2001 and 2002).

In the case of **Italy**, a majority of government debt was initially short-term or floating rate debt (62% of public debt in 1993) but that share was reduced to 19% by April 2002. The most common floating rate instrument (CCT) is indexed to six-month treasury bills and has a maturity of seven years, which is obviously far away from zero-duration. As illustrated in box 2, many structural measures have underpinned that impressive performance, especially the development of market infrastructure with a private, screen-based, wholesale trading system (MTS) and a select group of market specialists and the widening of the institutional investor base, including foreign investors. Moreover, the debt management strategy limited the issuance of floating rate debt to the medium- and long-term market segments, while T-bills and fixed-rate bonds were introduced in the short-term market segment as a basis for building a nominal yield curve. In both Italy and Israel, fiscal adjustment was very important in this process, while external factors were quite different (EMU convergence in Italy ; Middle-East tensions in Israel). However, it should be noted that Italy’s success was not entirely due to the European Monetary Union, but that micro-market reforms had established the foundation of the success by 1996 (majority of fixed-rate debt, market infrastructure, substantial decline of average yield, increased average life, cf. charts in box 2) when there were still market uncertainties on whether Italy would qualify for initial EMU membership.

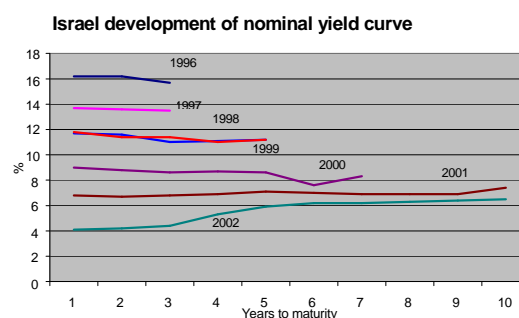
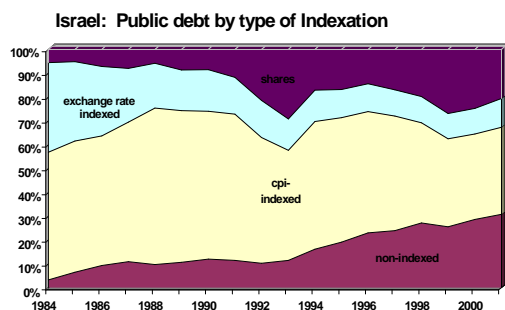
Box 1: Israel – how to reduce risk and real interest rates

Israel's experience with macro-economic stabilization and disindexation during the past 15 years reveals some useful insights and parallels to the case of Brazil. Although the nature of indexation is slightly different, the extreme coverage and persistence provides some common ground for Brazil. Despite many shocks and uncertainties, Israel has managed to reduce its debt burden from 180% of GDP in 1986 to 96% of GDP in 2001. This was achieved through strong growth and low real interest rates (between 2% to 8%) while inflation has been contained under an inflation-targeting regime. During the past two years, **48% of new government bond issues were nominal bonds** with maturities of up to ten years with a small inflation premium (declined from 9% to 2%). Although many weaknesses remain and some policies were less successful, the overall results are impressive. **Four factors** have been critical in this process: strong economic growth (average 4.5% over past decade); substantial fiscal adjustment (primary surplus exceeded 2% of GDP over the past decade); credible monetary and exchange rate policies (inflation declined below 6% for past five years); and institutional changes that improved debt management and facilitated the growth of institutional investors. However, due to differences in perspective between Central Bank and Treasury, a step-by-step approach evolved with a focus to minimize short-term funding costs, rather than a coherent longer-term strategy. In this approach, following measures have proven successful:

Real interest rates were brought down rather quickly, very high reserve requirements were reduced from over 60% to 3%, and bank activity has moved from the financial to the real sector (currently 60% of bank profits from lending, only 3% from securities). Although indexation in the real economy persisted for many years, three incentives were especially helpful to promote nominal debt instruments: accounting rules were adjusted to reflect only real interest costs on the budget (irrespective of the instruments); mark-to-market rules were introduced for tradable debt which forced investors to value liquidity (which is higher in nominal instruments); and tax differentials (35% on interest from indexed bonds) helped to offset the higher risk of holding nominal debt.

Market development has played a critical role to facilitate the disindexation process: Among others, early efforts to develop money markets led to strong institutional demand from money-market mutual funds. Gradual development of a yield curve for nominal bonds was achieved at low cost, with the help of larger benchmark issues, re-openings, improved debt management techniques, and upgrades of market infrastructure. At the same time, risk management was prudent: rollover risk has been small (between 8% to 14% of debt maturing within 12 months), market risk has been limited (due to very tight monetary policy) as volatilities have declined by one-half, exchange rate exposure has been minimal (widening of bands and no intervention in FX markets), and concentration risk has been reduced as the institutional investor base has expanded to 80% of GDP.

However, government debt levels remain high and require continuous efforts, and indexation of total debt remains around 70%, which is mostly linked to a monthly consumer price index. Markets for corporate debt, mortgages, asset-backed securities, as well as repo- and interest derivative markets remain small and require further structural improvements. The **market structure** also remains uneven as provident and pension fund assets exceed those of mutual funds by four times which also reveals the need for better liquidity management.



Source: Kahn (2002) "Public Debt Management: the case of Israel"

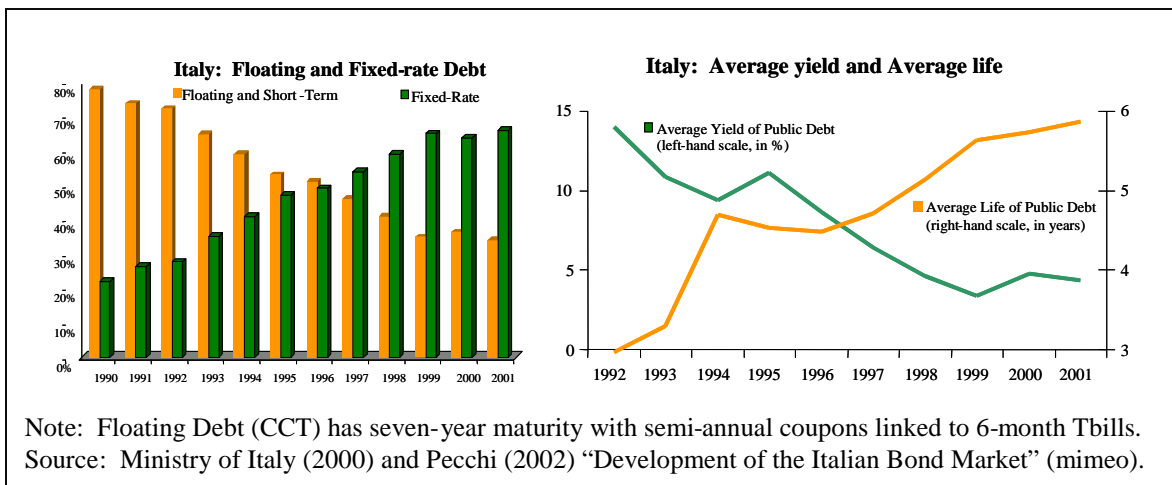
Box 2: Italy – how to broaden markets and the investor base

The structure of Italian domestic government debt in the mid-1980s had some similarities to Brazil's structure today: large domestic debt volumes, mainly short-term maturities, and a larger number of floating rate securities. However, there are two important differences that need to be noted: First, over 80% of the outstanding Italian debt was held by households, as compared to mostly institutions in Brazil. This provided the government with a stable but also very risk-averse demand, which required either short-term or floating rate securities. Second, the EMU convergence has been a powerful externality in Italy in building market confidence and government commitment. Notwithstanding, there are important lessons for Brazil on Italy's debt management strategy which was used to extend duration and develop a liquid government securities market. This strategy was based on **five pillars**: a market-oriented approach with a selected group of specialists, the development of a screen-based wholesale trading system, an active portfolio management approach (enhancing liquidity and extending duration), the widening of the investor base including foreign investors, and fiscal adjustment.

In the mid 1980s, the Italian government adopted a market-oriented approach in the **primary market** by shifting from syndication to an open auction system. The government started to conduct regular auctions independently from any view on interest rates, and to enhance the transparency of procedures. Eventually, the government committed to a pre-announced yearly auction calendar, which made issuance more stable and predictable. The next step was to encourage the market to buy longer-term securities. The strategy was to ensure a certain level of demand at each auction, and this was facilitated through a selected group of primary dealers, called specialists. The **specialists** had a number of obligations including the subscription of a specified share of securities at each auction. The role of primary dealers and a set of tax incentives attracted also **foreign investors** to the Italian market. The objective to move towards fixed-rate securities required to **issue long-term floating rate notes** to alleviate refinancing risk and to gradually introduce T-bills, fixed-rate and zero coupon bonds while reducing issuance of floating rate notes. Floating rate notes (CCTs) typically had a 7-year maturity, and their coupon was linked to an average of the cut-off rates of four one-year T-Bill auctions plus a specified spread. The government decided to use primary market rates because secondary markets were never very active. The decision to use the average of four auction stop-out rates aimed to prevent manipulation and excessive volatility.

Moreover, a **screen-based trading system (MTS)** was launched in order to create a supportive environment for the ongoing changes in the primary market, and to achieve greater liquidity through a transparent, inexpensive and electronic network. The Italian government decided that the best way to ensure liquidity was to organize a wholesale market and to insist in the definition of a category of market makers. The MTS was organized in three layers: the dealers, the primary dealers and the specialists in government bonds. The dealers could trade on the basis of the bid/offer prices placed by the primary dealers and specialists in the system. The primary dealers were committed to quote two-way prices in selected securities. The specialists were selected among the primary dealers and had stricter requirements, but also enjoyed a number of privileges. The system improved secondary market trading by bringing anonymity, liquidity and depth, improving transparency and efficiency in the trades. It benefited the issuer by widening market distribution and reducing the cost of funding, the securities dealers by lower transaction costs and reduced trading expenses, and even final investors, who indirectly enjoyed tighter spreads. This process lasted for more than a decade until it started to rely on medium- and long-term fixed-rate bonds. The active portfolio management approach also contributed to increase liquidity and extend duration of the portfolio. After issuing 3, 5 and 10 year bonds, the first 30-year bond was introduced in 1993, which was mostly purchased by international investment funds. Pricing was difficult and initially required a risk premium. However, the Treasury prioritized its objective of building long-term, liquid issues and re-opened issues even during a full year in order to acquire a liquid critical mass. **By March 2002, Italy's government debt market had become the largest, most liquid, and most competitive market in the Euro area.**

Italy initially had issued a high proportion of floating and short-term notes (over 62% in 1993) but managed to reduce that share to 36% of total debt in 1999. **By April 2002, 58% of Italy's domestic debt was long-term, fixed-rate debt, whereas floating rate notes had been reduced to 19%.** In its attempt to lengthen the average maturity of debt, the Italian Treasury tried to diversify the investor base, searching for a different kind of investor who would be more risk-prone than the domestic retail base. Tax incentives and issuance of foreign debt also attracted foreign investors to the market. Finally, fiscal adjustment was substantial as the primary surplus was increased to an average 5% of GDP during 1995-2000 while interest costs fell from 11% to 6% of GDP. ..



In the case of **Brazil**, indexation has long been a dominant feature of real and financial sectors. After a period of financial repression with laws prohibiting contracts in foreign currencies (1933) and limiting nominal interest rates to 12% (Lei de Ususra), the institutionalization of indexation started in 1964 (cf. Goldfajn, 1998). Government securities (ORTN) were indexed far past inflation plus interest rates of 6%, mortgage rates were adjusted to quarterly variations of ORTN, and eventually indexation spread to almost all areas of the economy. All attempts to reduce inflation through traditional policy instruments failed until the Real Plan was introduced in 1994. However, the level of real interest rates remained moderate until the debt crises of the 1980s, and then jumped to a much higher level during the 1990s (Garcia and Didier, 2001). Meanwhile, **financial indexation** has become more extreme, as banks established the overnight interest rate (CDI) as benchmark for deposits and matched their liability structure with perfect indexation on the asset side as the government agreed to issue **zero-duration** bonds (LFT) which adjust daily to changes in interest rates. Any market pressure from domestic or external events then quickly translates into extreme risk aversion of market participants and has resulted in over 80% financial indexation in Brazil today.

Empirical evidence is mixed regarding the impact of indexation on **real interest rates**. However, it appears that the relationship is non-linear and more complex, depending on the form and extent of indexation as well as on other macro- and institutional factors. Cross-country regressions reveal that fiscal variables are most important in determining real interest rates, both the stock of debt as well as annual financing needs (chart 2). Moreover, institutional factors (modeled by Caselli, Giovannini, Lane, 1999) are also highly significant, especially as they relate to financial liberalization, structure of public debt, market infrastructure, and taxation and regulatory regimes. These effects appear to be much more pronounced for highly-indebted countries, which on average can benefit by a 30 bp reduction in real interest rates for each 10% reduction of public debt. Comparing these factors across countries, it appears that real interest rates in Brazil are extremely high and key weaknesses are in the level and structure of public debt, as well as in the expected devaluation and country risk premia (table 5).

3.2 Derivative instruments and money markets

The extreme degree of financial indexation in Brazil has given rise to very active derivative markets which have become a partial substitute for absent liquid secondary markets.¹⁶ Brazil and Korea are among the five largest global derivative markets with annual growth rates exceeding 20%. Globally, over-the-counter (OTC) derivatives markets are mostly unregulated and in notional volume have grown to over \$ 127 trillion in June 2002, as compared to about \$ 70 trillion in global bonds and equities. 81% of derivatives represent interest rate contracts, 16% foreign exchange contracts, 2% equity contracts, and less than 1% commodity contracts (BIS, 2002). Alan Greenspan once referred to the development of financial derivatives as “by far the most important event in finance during the past decade”. Derivatives markets are essential to the functioning of global financial markets and have improved pricing and allocation of financial risks significantly. This section addresses four broader concerns which appear to be relevant for Brazilian policymakers: rising leverage ; shifting liquidity ; mismatch of maturities ; and accounting practices.

Derivative markets can give rise to **systemic risks** in institutions, markets, and the financial system through the dynamic nature of gross credit exposures, information asymmetries, impact on aggregate credit and counterparty risk, high concentration risk in major institutions, and global interrelations (IMF, 2000). Regulators have often focused on modern risk management infrastructure as well as margin requirements to limit risks.¹⁷ In the case of Brazil, daily trading of BM&F instruments is about \$ 20 bn and open interest is exceeding \$ 300 bn which requires careful risk management and prudential supervision, especially as the market is highly concentrated among five banking groups.

Imbalances between derivative and underlying **cash markets** can have an adverse impact on **liquidity**.¹⁸ Supply of benchmark instruments, active market making, development of money and repurchase markets, and a well functioning interbank market are typical complements to counterbalance the rapid growth of fixed-income derivative markets. In the case of Brazil, annual turnover of BM&F interest instruments exceeds \$ 3 trillion, which is more than five times of outstanding bonds (global average is two times). It appears that liquidity has largely migrated to derivative markets and price discovery in cash markets may be inefficient. Whereas the choice of indexed instruments appears to be one of the main reason for illiquidity of cash markets, tax and regulatory policies (i.e. differential taxation, transaction costs, margin requirements) may be contributing factors.

¹⁶ Further research in this area is ongoing and it is still an open question whether the growth of Brazil's derivative markets may have increased the degree of volatility in cash markets. In the case of Korea, such an “anti-derivative” effect has been found as volatility in equity markets has surged since 1997 (cf. Fratzscher and Oh, 2002).

¹⁷ The NYSE Katzenbach Report (1987, pp.16-24) states that “margin rules provide the Federal Reserve with an effective tool for controlling the amount of leverage that may be used in securities transactions and, ultimately, the ease with which speculation may occur ...The trivial cost and tremendous leverage available make index futures and options an ideal instrument for speculation in short-term market movements.”

¹⁸ Recently there were a number of well publicized “squeezes” in the German bund market due to scarcity of physical instruments: “The disproportion of futures and cash markets, if not properly counteracted from the supply side, could leave the euro area government bond market less liquid.” (BIS, 2002, p. 84).

Secondary markets are further constrained by the absence of well functioning **money markets**. Due to the frequent intervention of the Central Bank to keep nominal interest rates stable, banks have little incentives to trade among themselves in term segments and place most liquid assets in overnight repurchase operations with the Central Bank. Longer-term repo markets are largely absent, and volumes in the interbank market have declined as the Central Bank does not support such market development. Lack of incentives for dealers and the absence of market makers further constrain liquidity in secondary markets, and trading is heavily concentrated in nominal instruments.¹⁹ As a result, main trading in interest rate instruments has shifted to BM&F derivative markets (DI futures) which offer higher liquidity, higher leverage, and lower transaction costs.

The **mismatch of maturities** between cash and derivative instruments appears to be widespread, which reflects the growing share of speculative transactions (high leverage, short maturities) and the declining share of real sector hedging. Liquidity in derivative markets is typically highly concentrated in the short-term (up to two years), whereas cash market liquidity may extend to long-duration instruments. As a result, corporate hedging can often only be obtained through illiquid OTC swaps or by rolling short-term futures which may increase the hedging efficiency due to rollover risk.²⁰ In the case of Brazil, maturities of government bonds extend to 5 years (LFT) although the main derivative instruments (DI futures) are illiquid beyond two years (90% liquidity in 12m segment). Banks often split dollar-linked debt instruments into underlying real instruments and illiquid FX swaps to provide a synthetic hedge to corporate clients, although it may be more efficient for corporate clients to seek rolling hedges at BM&F.

The **role of governments** in derivative market operations has been widely debated. Although facilitating the development of derivative markets is usually positive in view of improving liquidity and risk management, it may create regulatory problems if misused to circumvent capital controls or to destabilize currencies (Garber, 1998). Moreover, the active participation of governments in derivative markets may reduce funding costs but can create potential liabilities (i.e. FX forward book in South Africa, cf. Reserve Bank, 1998) which may not always be fully disclosed.²¹ In the case of Brazil, BCB is active in FX swaps and STN is active in indexed instruments that create potential liabilities. Both institutions have objectives that are highly inter-dependent. Therefore, it is important to establish best-practice **accounting procedures** and to fully disclose potential liabilities when they are incurred, and not only when they come due.

¹⁹ Nominal LTN bonds account for 35% of turnover but only 7% of outstanding instruments.

²⁰ Studies of commodity markets (Neuberger, 1999) suggest that hedging strategies of rolling short-term futures (i.e. 8 months) can remove 85% of the risk of long-term cash commitments (i.e. 6 year oil supplies).

²¹ Piga (2001) states that “swaps are used both to increase the liquidity of government bonds and for speculation. However, some sovereign borrowers have also used derivatives to ‘window dress’ their public accounts for the purpose of disguising budget deficits.”

4. POLICY SUGGESTIONS

The analysis of Brazil's debt profile has revealed why markets fear that once more "Brazil is on the edge" (Deutsche Bank, May 2002 ; Goldman Sachs, June 2002). Authorities have identified a range of short-term indexed instruments and structural measures to "*dry the ice*"²² but also need to establish a medium-term strategy to address market concerns on debt sustainability. Such a strategy may be implemented by the new administration once market turbulence has passed. Select international experience has demonstrated that there are innovative ways that could be helpful for Brazil in the years ahead to develop a medium-term strategy. There clearly is no silver bullet, but a number of reforms are necessary to create a critical mass. At the core is the need to establish a mechanism to enhance risk sharing with the markets and to support confidence through stronger institutions. In this effort, four challenges appear to be predominant:

First, a sustainable macro-framework requires continuing fiscal adjustment and reduction of liabilities from indexation, especially in FX markets. Macro-stability is necessary but not sufficient, as strong credibility of macro-economic adjustment may open a window for debt managers to implement structural reforms. Second, governance could be supported by a stronger legal framework for debt management and clear delineation of responsibilities between STN and BCB, while new market entry and anti-trust rules may reduce the high concentration in financial markets. Third, market development could focus on establishing fixed-rate benchmarks and a better balance between money and derivative markets. Finally, portfolio management could be enhanced by innovative operations that help to break the excessive financial indexation and enhance liquidity. The emphasis on reducing rollover risk needs to be balanced with the need to increase the duration of the portfolio, which better reflects the amount of risk carried by the markets. Moreover, strong institutions need to ensure that rules are respected and market participants do not expect further bailouts.

4.1 Macro-framework

Debt dynamics always come back to a simple rule: only higher domestic savings can reverse the rapid accumulation of public debt. They are the key to support fiscal adjustment and to strengthen the current account. However, high real interest rates have proven unsuccessful in raising national savings in Brazil. To the contrary, rising real interest rates led to declining national savings (16% of GDP) and widening current account deficits (nearly 5% of GDP)²³. The external deficit has remained around \$ 20 bn, which is entirely accounted for by interest payments and remittances, and so far was fully financed by FDI inflows and privatization receipts. In future, moderating FDI inflows need to be compensated by higher export volumes and lower external borrowing.

Brazil's future adjustment clearly needs to focus on the risk of fiscal dominance. Under optimistic assumptions (growth of 4% and real interest rates of 8%) the domestic debt path could stabilize with the current primary surplus of at least 3.75% of GDP, but that would require very strict control of new debt recognition and new skeletons, including contingent liabilities from federal banks, public companies, states, and from federal debt management. Experience from Italy and Israel has shown that strong political capital will

²² Literal connotation: mopping up the water from an even-thinner layer of ice after many heat-shocks.

²³ IMF Country Report Brazil 01/10 (p. 201) shows that gross national savings declined from 21.8% to 15.7% during the period 1994-1999, and IMF Brazil PIN 02/08 shows that current account deficits have widened to 4.6% of GDP in 2001.

be required to maintain the fiscal balance across such a complicated system as in Brazil. While debt sustainability will remain the key concern, liquidity risks cannot be underestimated as 40% of Brazil's domestic debt will need to be rolled within 12 months with a heavy concentration in the first quarter of 2003.

4.2 Institutions and Governance

While macro-economic adjustment can open a window of opportunity, structural reforms are essential to build a more sustainable framework. Such a framework needs to be grounded on a strong legal basis that enhances governance of debt management. Congress, STN and BCB all have honorable objectives to strengthen Brazil's debt management, but incentive structures are not entirely consistent as debt managers still receive their mandates from politicians with a short-term perspective and the primary objective to minimize short-term costs. Problems of risk profile, long-term dynamics, market risks and concentration are shifted to the next generation. Therefore, it is important to commit the political level to the need of risk management and to see debt dynamics with a longer term perspective. Equally important is the need of greater transparency in setting the debt management objectives and in public monitoring of its implementation. This could be supported through legal mandates and stronger operational independence for debt management, as well as by incentives to minimize long-term risk-adjusted funding costs and strong disclosure and auditing requirements. The institutional framework would ideally build on a law that establishes objectives for debt management and appoints the Minister of Finance to establish specific policy guidelines and portfolio benchmarks for STN.

Two possible organizational structures could be considered: an independent debt management office (i.e. England, Sweden, Hungary, Ireland, Portugal) or alternatively an agency structure within the Treasury (i.e. France, Belgium) where more administrative flexibility is provided but close links to other financial and fiscal operations of the state are maintained. Any of these institutional frameworks would also need to be supported by continued investment in human capital and operational capacity.

Furthermore, independence of the Central Bank would allow the full separation between monetary and exchange rate policy from debt management. Accordingly, there should be separate instruments for each objective. Building on the improved capacity at STN, debt management could be further strengthened by structural reforms that enhance governance and enhance risk management systems for potential liabilities from indexation. The partial outsourcing of the external debt operation should finally be reverted to consolidate debt management at the STN, which has strengthened its operational capacity to ensure a professional management of the entire portfolio. Most importantly, clear accountability needs to be established in managing the large foreign-exchange exposure in FX swap markets and dollar-linked instruments. Transparency may be improved by fully disclosing potential liabilities, by adopting best-practice accounting standards (incurred basis), and by stress testing of different exchange rate paths. Moreover, highly concentrated market structures may need to be liberalized in order to reduce dependency on five large banks and funds which hold over 50% of public debt. Among others, this may require privatization of federal banks and implementation of strict anti-trust rules.²⁴

²⁴ A detailed analysis of market structures, concentration, contestability, and foreign participation has not yet been completed, but preliminary results show the need for further liberalization (cf. Gragnani, 2002)

4.3 Market development

Brazil currently has one of the largest illiquid domestic debt markets and one of the largest and highly leveraged derivative markets in the world. Shifting liquidity into the cash markets would help to reduce volatility, increase efficiency, reduce funding costs, and contain systemic risks. The better balancing between financial derivative markets and money markets would also facilitate more efficient financial intermediation on the real side of the economy. Efforts to develop interbank and money markets should be guided by BCB and might require three important policy decisions:

First, a review of reserve requirements in order to reduce barriers to real sector lending combined with a review of transaction costs and margin requirements in derivative markets in order to contain leverage and to strengthen risk management practices. Second, an establishment of new medium-term interest-rate benchmarks as alternatives to the overnight CDI measure, in order to break one anchor of indexation, which may require tax and regulatory incentives. They could include interbank rates (LIBOR equivalents) and regular nominal Treasury bill rates. Experience of Israel and Italy has shown that initial incentives for nominal instruments are critical to facilitate market development on a case-by-case basis. Third, a redoubling of efforts to build market infrastructure, based on the experience in Italy, revealing that liquidity can be enhanced by introducing market makers, by creating repo- and short-selling instruments, by supporting active interbank and money markets, by introducing modern trading platforms, and by facilitating new instruments such as ABS or MBS. Open market operations may be less frequent as the role of interbank markets is growing. Finally, it is important to establish clear responsibilities for the supervision of government bond markets. Currently CVM is excluded from this market as the government bonds are not considered “securities” in the Brazilian legal framework. Although BCB has been acting as supervisor, it has not focused on market integrity which clearly needs to be enhanced.

4.4 Portfolio management

The main problem of Brazil’s current system is the inability of the government to share risks with the powerful club of banks and funds. Normally, in markets with steep upward yield curves, investors would be indifferent between nominal short-term debt and floating medium-term debt, as duration risk would be offset by term and liquidity premia. In fact, Italy established two competing market segments, one expanding in short-term nominal instruments, and one contracting in medium-term floating instruments, whereby rollover risk is reduced while duration is gradually extended. Such a strategy could be mirrored in Brazil in four stages (table 6):

Initially, benchmark nominal instruments are established in the short-term segment (LTN with 3m to 12m maturities) while indexed instruments are offered in the medium-term segment (LFT with 36m+ maturities). This would require an initial inflation premium for issuing nominal instruments, which could be in the range of 400bp to 500bp. This may be complemented by a lengthening of maturities and design of floating-rate instruments and by some more aggressive marketing of longer-term bonds linked to inflation although historical connotations, inflationary impact, and high costs may need to be considered.

In the second stage, proper incentives could be considered in order to promote nominal instruments. They would include accounting rules requiring to disclosed all potential liabilities as they are incurred (level playing field), differential tax incentives (cf. Israel, box 1) , as well as regulatory measures (cf. Italy, box 2) to facilitate a broadening of Brazil's investor base.

In the third stage, maturities of nominal instruments are gradually extended according to market conditions, which may require only small premia (as experienced in Israel). Simultaneously, new forms of indexed-instruments are introduced to extend duration (i.e. price-indexed bonds, LFT with first year fixed coupons, floating rate notes, etc.) and to share more risks with the markets for a premium. Subsequently, remaining zero-duration bonds (LFT) may be decomposed into benchmark nominal bonds (LTN) plus derivative supplements (swap, DI future) which would allow differential maturities (i.e. 36m LTN plus 12m DI future), lower intermediation costs, and help in gradually phasing-out derivative supplements, while nominal bonds would be strengthened.

Further analytical work in the area of market structures and competition, as well as related to the rapid growth of derivative markets could be very helpful to identify further structural measures that would support a sustainable debt management strategy.

In sum, Brazil has weathered many storms but has also gone through many debt cycles. Policy makers have been successful “to dry the ice” with effective short-term measures but have not yet established a strategy to avoid “breaking the ice”. Key challenges ahead are to decisively reduce financial indexation, to continue macro-economic adjustment, to improve governance and accountability, and further efforts on market development and innovative portfolio management in order to establish a sustainable medium-term strategy.

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6. APPENDICES

Chart 1: Brazil – Fiscal Variables and Real Interest Rates (1994-2001)

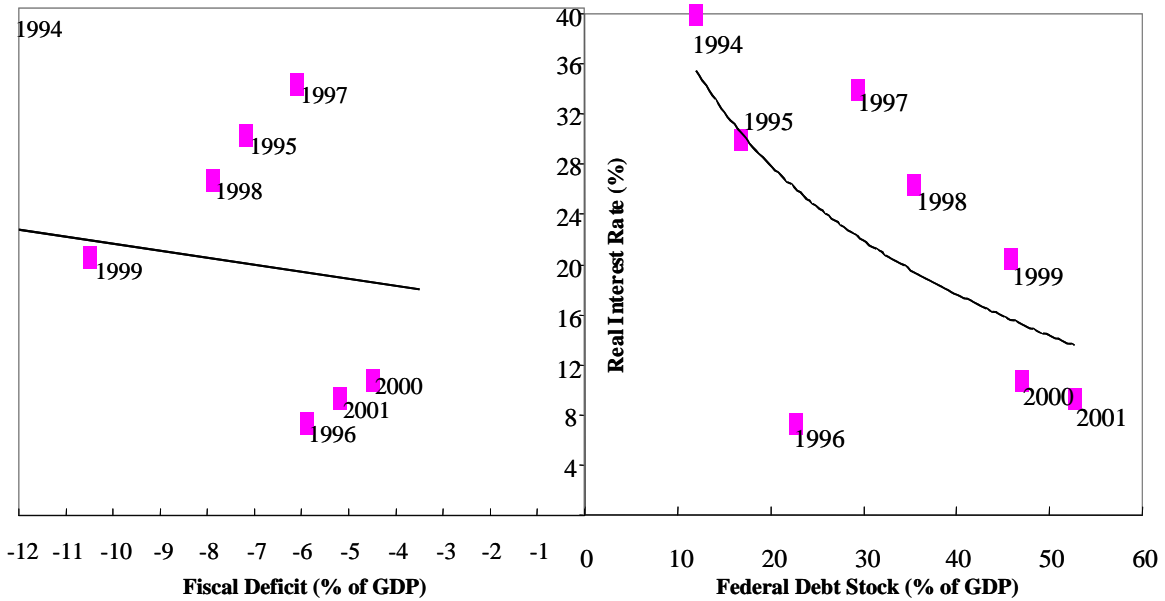
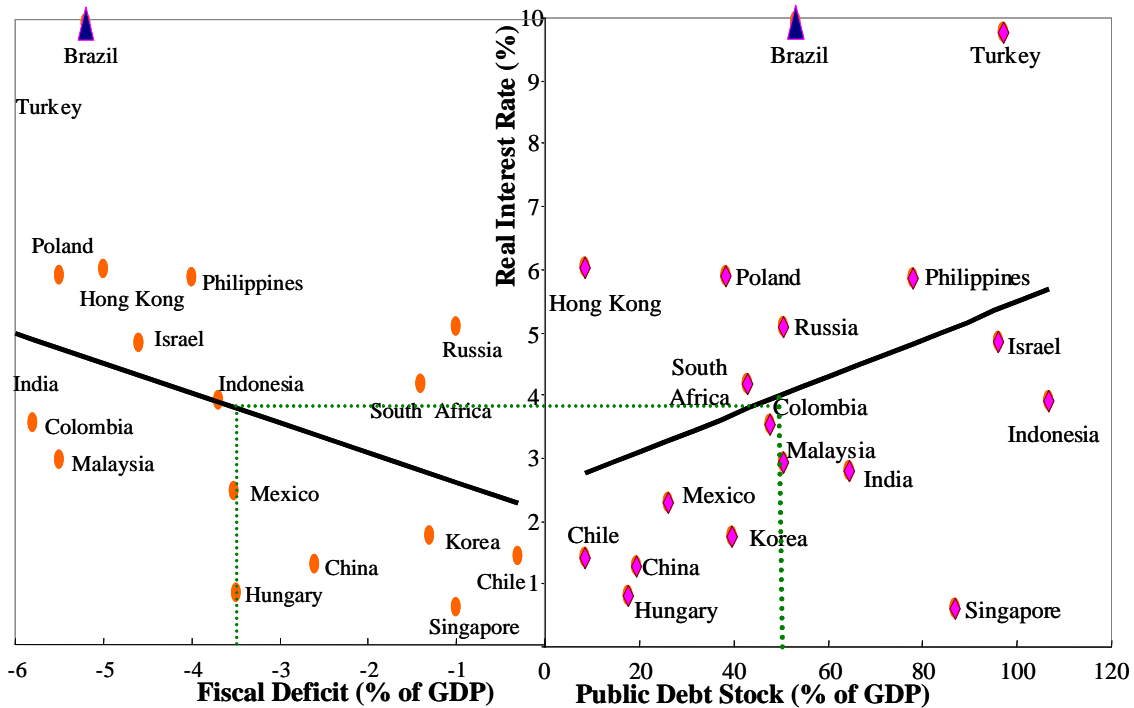


Chart 2: International Sample – Fiscal Variables and Real Interest Rates (2001)



Notes: real-interest rate defined as short-term policy rate minus CPI
 fiscal deficit calculated as PSBR where available (often narrowed in Asia)
Source: IMF, BCB, Deutsche Bank (2002).

Chart 3: Brazil – Decomposition of Federal Debt Increase (1994-2001)

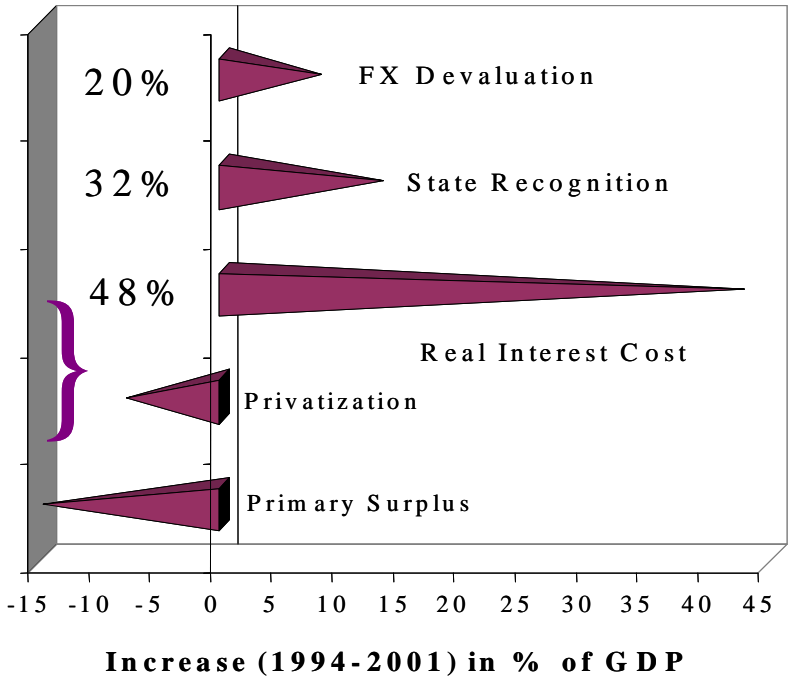
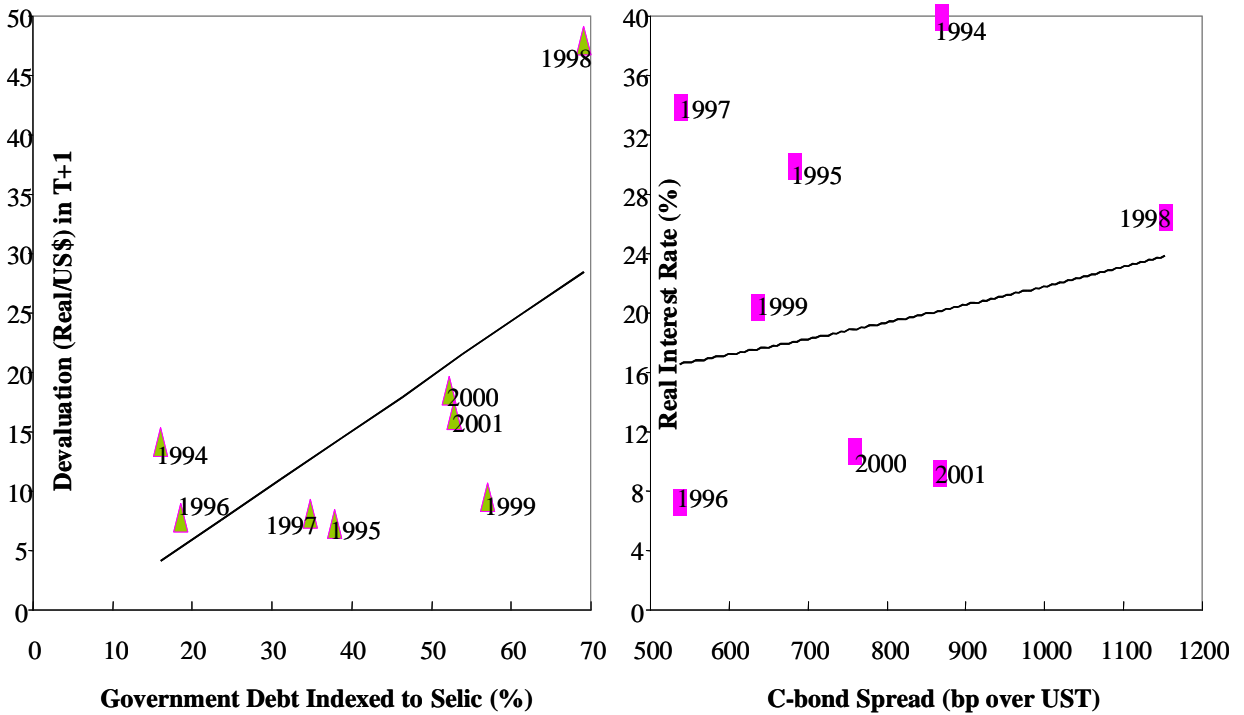
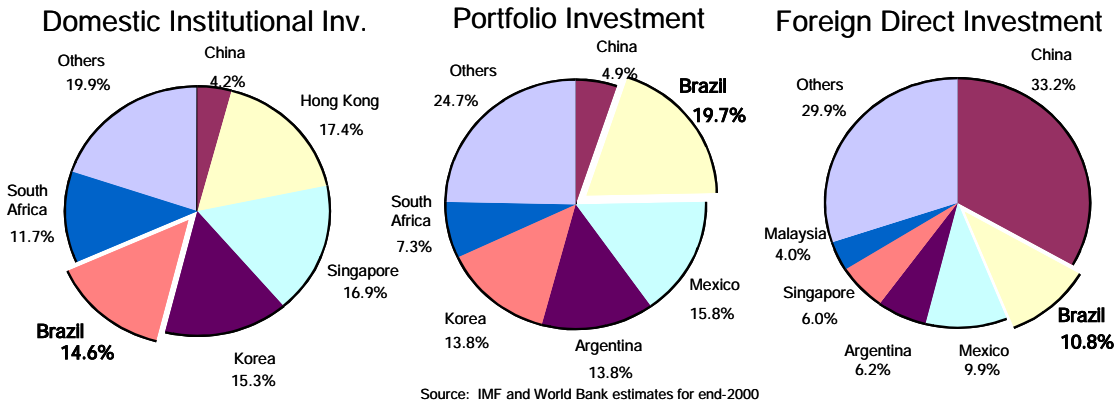


Chart 4: Brazil – external factors affect indexation and real interest rate



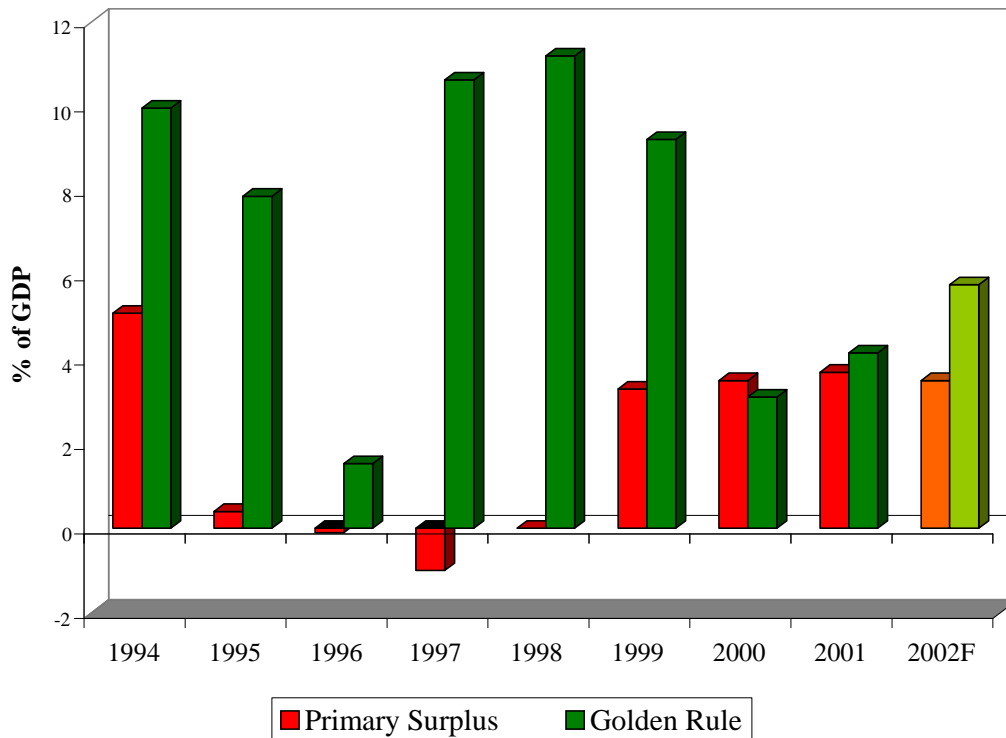
Note: real-interest rate defined as short-term policy rate minus CPI
Source: IMF, BCB, Bloomberg, Garcia (2002).

Chart 5: Brazil – Institutional Investor Base (end-2000)



% of GDP	Brazil	Chile	Hong Kong	Singapore	Australia	Korea	South Africa	Average(7)
Deposits	27.4	42.1	269.7	102.8	68.2	81.0	41.3	83.8
Bonds	60.9	18.3	38.7	60.2	51.0	91.0	31.5	63.0
Equity	37.0	91.7	312.5	218.9	104.4	46.8	129.6	99.3
Mutual	25.2	7.3	113.1	167.8	85.2	32.5	13.7	54.3
Contractual (Insurance + pension)	19.7	71.9	18.5	85.1	92.9	41.3	91.3	51.1
Institutional	44.8	79.1	131.6	253.0	178.1	73.7	105.0	105.4

Chart 6: Brazil - Primary Surplus and Golden Rule Surplus (1994-2001)



Sources: BCB, World Bank estimates.

Chart 7: Brazil - Coordination of Debt Management

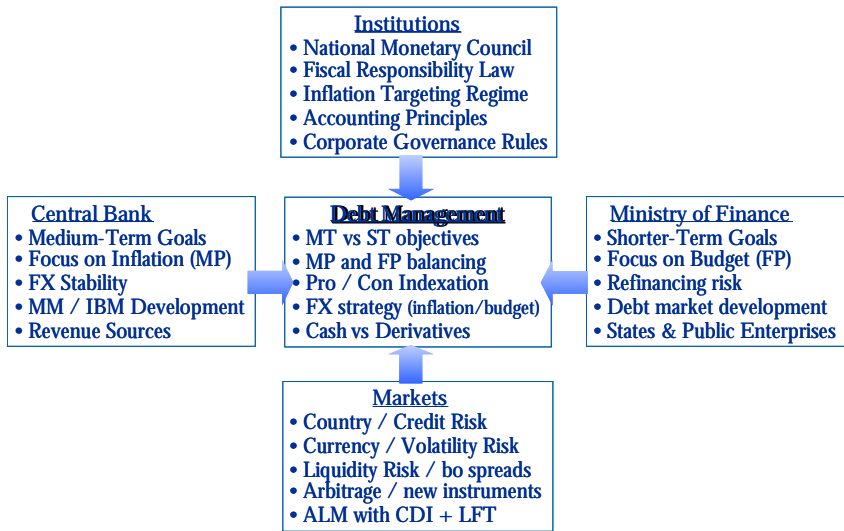


Chart 8: Brazil - Debt Management Objectives

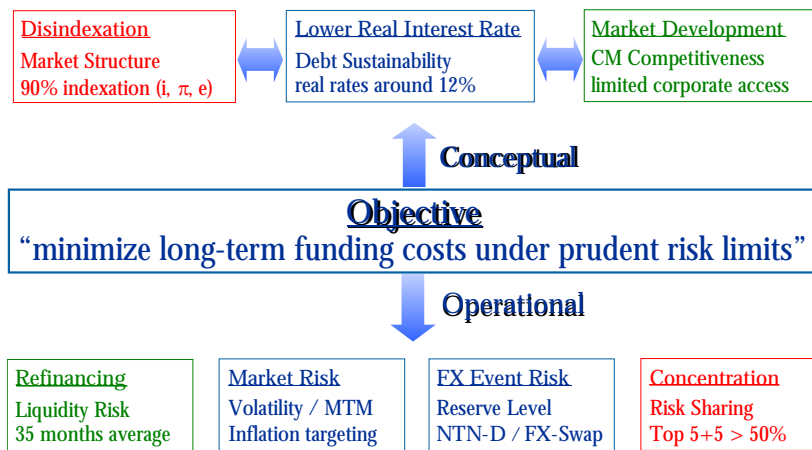
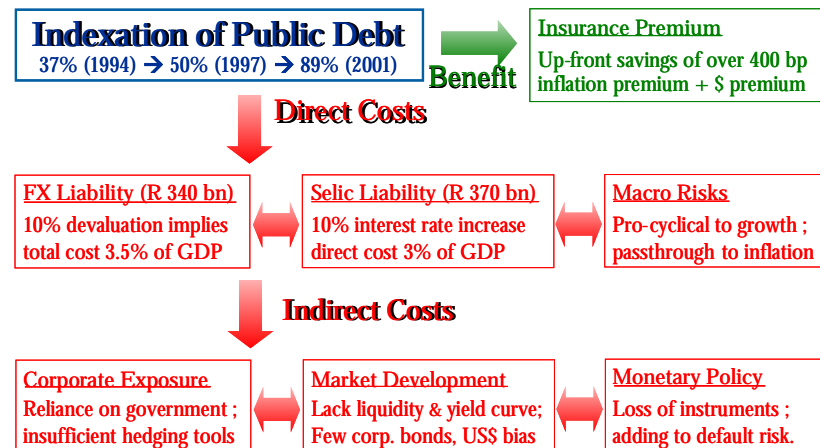
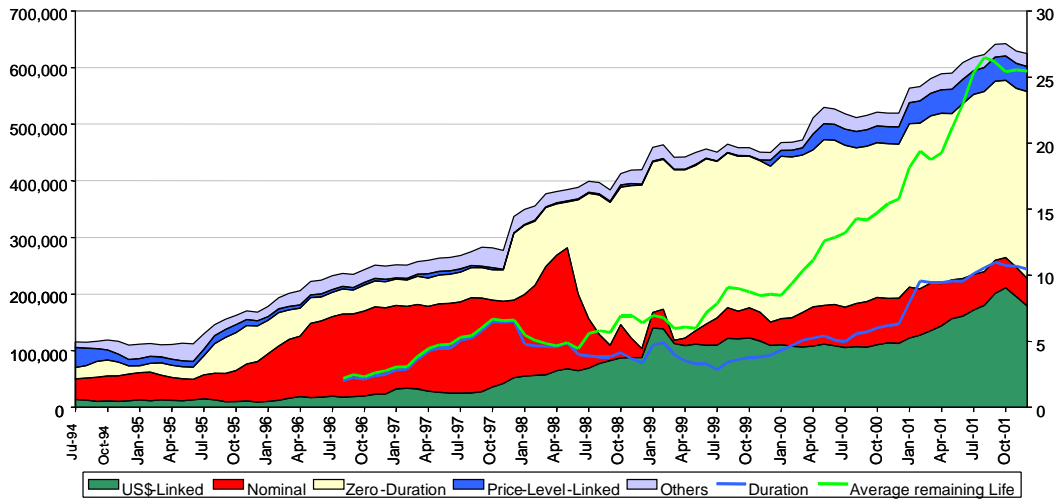


Chart 9: Financial Indexation in Brazil – Costs and Benefits



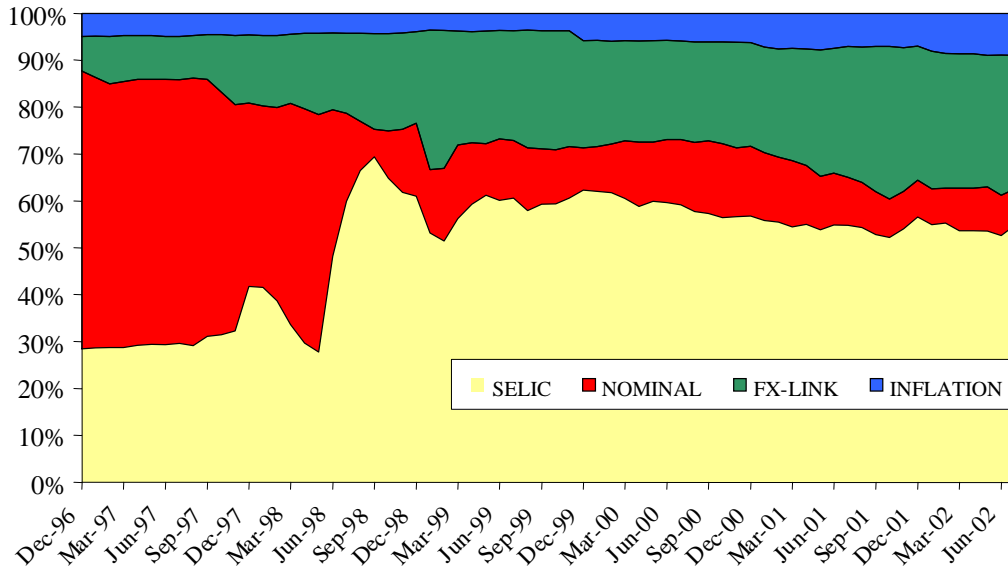
Note: analytical models are currently developed by BCB and STN with assistance of the World Bank Group

Chart 10: Evolution of Brazil's Federal Domestic Debt (absolute levels, 1994-2001)



Note: expressed in constant R\$ million as of Dec 2001.
Sources: STN and Garcia (2002).

Chart 11: Evolution of Brazil's Federal Domestic Debt (composition, in %)



Note: expressed as percentage of total domestic federal debt
 excludes FX swaps in calculating share of FX-linked debt
Sources: STN and Guardia (2002).

Table 1: Public Debt Dynamics and Parameters for Sustainability

	$\delta / \delta \text{ pf}$	$\delta / \delta \text{ g}$	$\delta / \delta \text{ r}$	$\delta / \delta \text{ e}$
Fiscal Deficit	+ 1.00	–	+	+
Growth	– 0.60	...	–	+
Real Interest	+ 0.31	–	...	+
E (US\$/Real)	+ 0.35	+	+	...

Note: with indexation: $\delta e / \delta \text{ pf} = 0.35 = 0.11 + 0.25 * 0.60 + 0.30 * 0.31$
without indexation: $\delta e / \delta \text{ pf} = 0.14 = 0.11 + 0.00 * 0.60 + 0.20 * 0.15$
Indexation adds 2% of GDP for each 10% real devaluation

Source: World Bank estimates.

Table 2: Primary fiscal surplus required for debt sustainability in 2003 (scenarios)

GDP growth / Real Interest	0.5 %	2.0 %	3.5 %	5.0 %
6.0 %	4.7%	3.7%	2.7%	1.7%
8.0 %	5.4%	4.4%	3.4%	2.4%
10.0 %	6.1%	5.1%	4.1%	3.1%
12.0 %	6.8%	5.8%	4.8%	3.8%
14.0 %	7.5%	6.5%	5.5%	4.5%

Note: primary fiscal surplus \geq debt stock * (real growth – real interest rate) + special
special = { real devaluation ; debt recognition ; contingencies ; volatility ; seignorage }
differential interest rates on gross debt add about 1% of GDP to required surplus

Assumptions: E(\$/Real) = 3.50 and net debt stock of 65% of GDP at end of 2002 ;
during 2003: real exchange rate remains constant ; zero special factors.

Table 3: Lessons from Italy and Israel

ISRAEL:	ITALY:
1. Country risk critical to keep real interest rates low	1. Big fiscal adjustment is “sine-qua-non”
2. Focus on domestic debt reduces vulnerability	2. Buybacks from privatization receipts help pricing
3. Effective FX regimes support monetary policy	3. Foreign share of 54% helps to reduce real rates
4. Low reserve requirements help real lending	4. Market makers and specialists key for liquidity
5. Markets willing to share inflation risk at 370 bp	5. MTS infrastructure highly efficient, lower BA spreads
6. Early MM development facilitates growth of II	6. Investor base key to shift 35% to 65% LT debt
7. Monetary policy plus liquidity reduce volatility	7. Portfolio strategy includes ST nominals plus LT floaters
8. Incentives work: accounting, MTM, tax differentials	8. Tax incentives facilitate placement of new nominals
9. Persistent indexation prevents corporate/ ABS markets	9. FX pressures are main factor of high market volatility
10. Rivalry compromises strategy, speed, & consistency.	10. Federalism explains long consolidation process.

Table 4: Literature review on indexation

FOR INDEXATION	AGAINST INDEXATION
savings of inflation premium up to 400 bp (Musgrave 1941, Foresi 1997)	weakens constituency against inflation (Pecchi and Piga 1997, Summers 1989)
protects purchasing power of savings (Tobin 1971)	increases default probability / LT rates (Drudi and Prati 1997)
reduces need of future inflation taxes (Friedman 1974)	mostly negative international experience (Stockman 1993)
solves time inconsistency, helps monetary policy (Calvo 1988)	has no significant welfare gains (Fischer 1983, Viard 1993)
helps to refinance high debt levels (Drudi and Giordano, 2000)	distorts credit allocation, causes real indexation (Price 1997, Faria 1997)
extends range of investment opportunities (Barone and Masera 1997)	balkanizes markets with lower liquidity (Campbell and Shiller 1996)

Table 5: Contributing factors for real interest rates

	<i>Real interest rates – contributing factors</i>	<i>BRAZIL</i>	<i>ISRAEL</i>	<i>ITALY</i>	<i>TURKEY</i>
	<i>current real interest rate (and 5-year average)</i>	12% (16%)	3% (5%)	0.5% (1%)	16% (2%)
1.	country risk premium (external debt spreads)	-		+	-
2.	expected devaluation (covered interest parity)			+	
3.	convertibility risk (capital account restrictions)				
4.	inflation record and regime (credibility)	+	+		-
5.	liquidity and rollover risk (domestic triggers)			+	
6.	fiscal deficit and projections (sustainability)	-	-		
7.	current account deficit (net FDI, savings level)				+
8.	Institutional framework (central bank, federal)	-			
9.	Market structure (concentration, foreign share)			+	
10.	Degree of indexation (volatility, risk sharing)	-	-		

Note: based on Caselli et al (1999) ; positive (+) and negative (-) drivers of real interest rates.

Table 6: Proposed portfolio strategy

<p><u>1. Establish two zones for nominal and indexed instruments</u> Short-end (3m...12m) nominal debt ; benchmark LTN12m ; pay inflation premium (400 bp) Medium-term (3yr...5 yr) indexed debt ; benchmark LFT36m ; keep rollover manageable</p>
<p><u>2. Provide incentives to promote nominal instruments</u> Accounting rules on level playing field: “account all contingencies when incurred” Tax incentives for funds and retail with differential rates for indexed debt Regulatory incentives to broaden investor base, and to attract foreign investment</p>
<p><u>3. Extend maturities by establishing longer-term benchmarks</u> Nominal debt extending up to 3yr, active repo markets, reopening issues Indexed debt with new features: first-year fixed, put option, inflation indexed, floaters</p>
<p><u>4. Decompose indexed debt by using short-term derivative hedges</u> LFT36m = LTN36m + DI12m ; rolling futures will cover most risk ; enhancing liquidity Gradually reduce DI maturities to 3m ; gradually reduce coverage ratios.</p>

Table 7: Policy dimensions

<p>Macro-framework: * Fiscal sine-qua-non > monetary policy * C/A net FDI adds additional weakness * Indexation aggravates devaluation risk</p>	<p>Governance: * Operational independence of STN * Accounting principles incl. contingencies * Liberalize markets with privatization</p>
<p>Market Development: * Real credit helped by lower reserve requ * Replace CDI by longer-term benchmark * Liquidity built by money and IB market</p>	<p>Portfolio Management: * Two-pronged strategy: LTN_{12m} + LFT_{36m} * Pay for inflation and term premia * Decompose LFT_{36m} = LTN_{36m} + DI_{12m}</p>