

BRAZIL'S ELEVATED INTEREST RATES: A CASE OF IRRATIONAL PESSIMISM
OR GUARDED OPTIMISM?

By

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THERE was a child went forth every day;
And the first object he look'd upon, that object he became;
And that object became part of him for the day, or a certain
part of the day, or for many years, or stretching cycles of years.
Walt Whitman, Leaves of Grass (1900)

This work is the product of my interactions with a great number of people over the course of the last five years, and would not have been possible without their influence, which was oftentimes unbeknownst to them. My time as a research assistant at the Federal Reserve Board helped to me ground my undergraduate training in macroeconomics and my research with David Lebow and Jeremy Rudd trained me to see the truths apparent in large, obscure datasets. It was there that I was first exposed to Phillips Curves, Taylor Rules, and the theory of rational expectations, all of which are utilized throughout this paper.

While at Florida, Dr. Terry McCoy and Alex Sevilla have served as my advocates in my desire to combine my disparate disciplines, Latin American studies and finance, into a harmonious curriculum that has brought the two worlds much closer (at least for me). The faculty and staff of the Center for Latin American Studies and the Florida MBA Program have all greatly facilitated the process as well. Professionally, Eric Allred and Kathy Fitzpatrick at Johnson and Johnson in Jacksonville helped me to contextualize the Brazilian business environment better than any in-class or personal travel ever could have and my experience working with them has completely shaped my perspective in writing this paper.

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Abstract of Thesis Presented to the Graduate School
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This thesis examines interest rates in Brazil, with a focus on their historically volatile nature, the theoretical and practical reasons for their elevated levels, and the ways in which firms and individuals mitigate the negative effects of a high interest rate environment. Brazil's macroeconomic history has been extremely volatile, and the country experienced triple digit inflation rates as recently as 1993. The instability of prices, as well as the existence of what has been called a "weak macro regime," has necessitated interest rates which exceed those of peer nations. A cycle emerges, in which exogenous shocks are propagated into the country, making it a more risky environment for investments and raising the intrinsic risk associated with government debt, as default is seen as a more likely possibility. The nature of this cycle, as well as other determining factors of interest rates, is examined in this work.

In spite of these interest rates, Brazil has experienced some periods of very impressive economic growth. The buffers between the deleterious effects of high interest

rates and the rates of growth exhibited in the country are also examined in this work. Specifically, this thesis will answer how firms raise capital in this environment, and show the effects of firm size and nationality on the methods of financing used. The effects of high interest rates also trickle down to individuals, and decisions such as home finance and durable goods purchases, as well as more day-to-day financing of household consumption. This thesis also explores the network of informal, and oftentimes subsidized, credit that has emerged in the country.

In the light of the recent economic success of the country, investors from Brazil to New York are calling for a lowering of the reference interest rates in the country. This thesis blends previous theory, survey-based research, and anecdotal evidence from the most recent data to illustrate the causal mechanism that would allow that lowering to take place, and argues that interest rates should, in fact, be lower than they actually are.

CHAPTER 1 INTRODUCTION

For most, the word “Brazil” conjures up images of the Amazon, Samba, and *Carnaval*. The commotion and volatility that all of these images imply is not dissimilar to the thoughts of economists on the country: rampant inflation, sky-high interest rates, precarious commodity prices, and unpredictable economic growth. Brazil suffers greatly from these preconceptions. In a reciprocally causal relationship, interest rates are high because of the risk that doing business in the country implies; those high interest rates act as a continual impediment to growth and (more importantly) to economic equality in the region. Those impediments to equitable growth further fuel the level of risk that the market now assesses to investments in Brazil. Without access to credit, the middle class is stifled, inequality grows, and balanced growth is further out of reach. This paper will focus on the cost of credit in Brazil, with a specific focus on the history of volatility that has necessitated high interest rates, the theoretical and practical factors which influence their determination, and the mechanisms which have evolved to help the country function despite the inability to effectively utilize traditional debt finance.

There exists no market for long-term local debt, not even for the most securitized lending such as mortgages, and only the wealthy with access to overseas funding can effectively leverage their fixed assets. In addition, as interest rates remain high, a larger percentage of government revenues continue to service the national debt, in essence paying continually for the country’s dismal economic past, instead of funding initiatives aimed at preparing Brazil for the future. In fact, the government pays the greatest cost for

these high interest rates, as the government debt/GDP ratio remains very high, crowding out private investments. This diversion of funds cannot be stopped: any talks of a moratorium or of a restructuring of debt payments to allow for more social programs or productive investments sends shocks through financial and currency markets, raising the “Brazil risk” and making the debt grow instantaneously, in terms of *reais*,¹ as a large portion of the debt is denominated in dollars. This was evidenced most recently in October of 2002, in the run-up to now President Lula’s election: with talks of profligate public spending and disregard of Brazil’s obligations to the international financial community, the *Real* hit an all-time low against the dollar of 4.03 on October 12, 2002.

Since that time, the government of Lula has pursued orthodox economic policies not unlike those of his predecessor, Fernando Henrique Cardoso. The currency market has adjusted accordingly, with the *Real* experiencing a 15% appreciation in 2005 and a cumulative 51% appreciation since year-end 2002. Notwithstanding this impressive adjustment in currency values, the overnight bank lending rate (hereafter the SELIC rate) in Brazil remains at 18%, implying an ex-ante real interest rate of over 13%.² At such high levels of interest in the least risky of investments (overnight bank lending), it is easy to see why no local long-term debt market has matured. Adding factors for default, maturity, and liquidity risks, private lending rates quickly approach prohibitive levels. Despite solid growth prospects and performance, interest rates seem “sticky” and unbalanced growth continues, jeopardizing the future of the country.

¹ *Reais* is the Portuguese-language plural of the Brazilian currency, the Real.

² At year-end 2005 the expected change in the price level in the following twelve months was 4.76%, as measured by the Banco Central do Brasil and published on the Bank’s website. The real interest rate is simply the nominal rate less expected inflation.

This vicious cycle is extremely unfortunate, as the Brazilian economy has been performing very well in recent years. Growth in real GDP was 4.9% in 2004 and is expected to be 2.44% and 3.45% in 2005 and 2006, respectively (*Fundação Getúlio Vargas* and Latin-Focus magazine's consensus estimates). These rates of growth are all above the average growth of 2.0% for the twenty year period ending in 2003. Inflation has remained essentially in check since the institution of the *Real* in 1994 (more on this below) and productivity growth continues to accelerate as synergies resulting from investment in the real sector and international economic liberalization are being realized.³ In short, it appears that the “*país do futuro*” has finally arrived into its economic “promised land” and that the country is performing as the economic powerhouse that many have believed it could be for so many years.

In order for this transition to economic powerhouse to occur, many things must take place simultaneously. Unemployment must be low to foster economic opportunity. In Brazil the official statistics for unemployment hover around 10%, with levels of underemployment higher and the employment index for the informal economy mitigating the poverty effect from this official unemployment (according to data from various editions of the monthly employment survey from Brazil's national statistical agency, IBGE⁴). Wealth must be fairly distributed to kindle a middle class capable of entrepreneurship (the true engine of growth); in Brazil income inequality is worse than anywhere else in Latin America and on par with some countries in Africa (Bulmer-

³ Productivity is difficult to measure in Brazil, and is not officially published by the government. I rely on the work of Ferreira and Rossi (2003) for this generalization.

⁴ The survey is the Pesquisa Mensal do Emprego and the agency is the Instituto Brasileiro de Estatística e Geografia.

Thomas, 2003, p. 11). Macroeconomic fundamentals such as inflation must stay low and relatively nonvolatile in order to provide appropriate signals to markets. Another key component of economic growth is the interest rate that affects the decisions made by governments, banks, and non-financial firms.

Standard economic models would suggest that the interest rates would be declining over time in Brazil. In the market based approach to interest rates, this works through two channels. First, expectations of future inflation directly influence the nominal interest rate: $i_t \approx r_t + E(\pi_{t+1})$; that is the nominal rate today is approximately equal to today's real rate plus the expectation of inflation in the following period (more formally, the expected annual inflation over the term of the interest rate).⁵ Another channel through which good economic performance should lower interest rates is through the country risk premium. Stylistically this is the rate at which the market assesses a premium to transactions in a country (and in a country's currency) vis-à-vis a base country of reference.

These two mechanisms should be acting to lower interest rates in Brazil. Specifically, the expectations of future inflation should be diminishing as recent inflation performance has been below the historical average and much below the hyperinflationary levels which ended with the Real Plan in 1994. The government now operates in a new regime of inflation targeting. This regime has performed well, is transparent, politically independent, and operates with a legal mandate to control inflation (though it does not operate in an apolitical vacuum). As agents update their frameworks for evaluating inflationary expectations, the nominal interest rates should decline. Furthermore, solid

⁵ The same is true when monetary policy is viewed through the Taylor Rule, where expectations of future inflation are positively correlated with interest rate moves by the central bank.

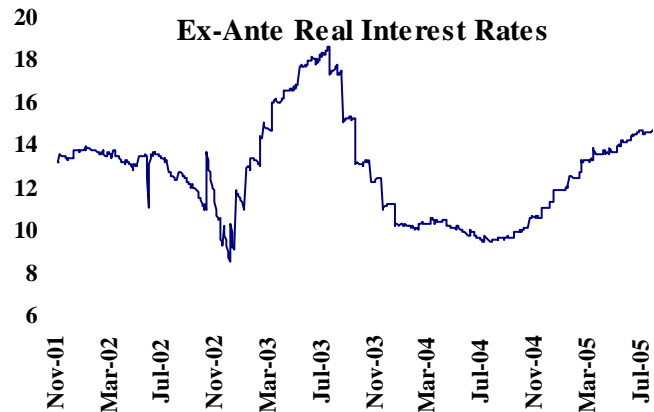
economic fundamentals will themselves drive non-inflationary growth. In Brazil, some decline in expectations has occurred and later in the paper the formation of expectations and “inflationary memory” will be discussed. Specifically the prospects of an asymmetric response function to inflationary news will be evaluated: does the market take longer to believe good news than it does to incorporate (and penalize) bad news? Most important, however, to the formation of inflationary expectations is the credibility given to the monetary policy of the government. Brazil now operates in a completely new regime from that of just a few years ago. Transparent inflation targeting in the confines of a politically independent central bank such as that done in Brazil is the “state of the art” in monetary policy, indeed more theoretically advanced than the regime of even the U.S. Fed, which cloaks its policy decisions in obfuscating language, and represents a clear break from the political nature of a loosely defined monetary policy in Brazil’s past. If this new regime is believed to be *the* regime going forward, expectations should not factor in the policy mistakes of previous regimes. Later this paper will address this concern as well.

The so-called country risk premium should also be falling. Brazil has returned to a peaceful democracy since the end of the military dictatorships, capital markets are fully developed and fairly liquid (compared to historical norms), and capital moves freely across the border. Even the leftist politicians of years ago are pursuing orthodox economic models and are allowing for increased autonomy of the nation’s central bank. In short, conditions are such that inflationary expectations should not be anchored in the hyperinflationary or even high-inflation period, and the country risk premium should be converging to a more reasonable level. Furthermore, the ex-post change in the currency

has implied a currency premium, and not a discount, for investing in *reais*. Despite the seemingly convincing case for lower real-interest rates, the precipitous decline has not occurred. As seen in the chart below, the real rate has been in a band between 10-18% since 2001, and is in the mid-point of that band now.⁶ This paper will examine reasons

for interest rate persistence, examine the path necessary to drive the rates lower, and to examine mechanisms which are already in place to mitigate the impact that interest rates currently have on consumers and firms.

Figure 1.1 Ex-Ante Real Interest Rates in Brazil



There exists a robust literature on the subject of Brazil's macroeconomic fundamentals, and much work has previously been performed on the question of the country's interest rates. Much of the work examines one component of the interest rate, focusing on inflationary expectations or on one of the drivers of the real interest rate. Several papers seek to justify Brazil's interest rate policy, and estimate Taylor rules for Brazil. Most notably, Muinhos and Nakane (2005) employ various techniques to show that Brazil's interest rates are higher than those of other economies, while Bogdanski et al. (2001) estimate monetary policy rules for Brazil consistent with the level of interest rates currently present in the country. In an important contribution to the literature, Favero and Giavazzi (2002) estimate a full Taylor rule for Brazil that shows that the

⁶ Defined as the SELIC rate less expected change in the IPC index over the subsequent twelve months (BCB data, author's calculation and graphic).

interest rate associated with non-accelerating inflation is around 17.5%. The implications of their methods and results are discussed fully in chapter three.

Building on the theoretical work of Keane and Runkle (1990, 1998), Carvalho (2004) builds a complete set of tests of the rationality of the forecasters that are surveyed by the Central Bank on the future movements of inflation. Her work largely rejects rationality in the data, and similar tests (with more recent data and slightly different specifications) are reproduced in the third chapter of this work. Carvalho stops short of identifying the driving forces of expectations, focusing on their rationality. A recent contribution from Cerisola and Gelos (2005) discusses how those expectations are formed, and suggests that the relative importance of the various determinants changes over time. This work is expanded upon in this paper, in light of the most recent economic data.

The question of real interest rates has also been addressed by several authors. Favero and Giavazzi (2001) point to term premia, currency aversion and the lack of independence of the central bank. The last point is also identified as a cause of inflation by Tullio and Ronci (1996), who estimate a Phillips curve with a proxy for the perceived independence of the bank. This estimation clearly shows a correlation between weak political independence and higher inflation. Palley (2004) and others have written on the weak fiscal situation of the federal government and how high interest rates are both a cause and an effect of that deficit financing. Their work is examined and critiqued in the second half of chapter three. Carneiro and Wu (2004) point to Brazil's insertion into the global economy as a proximate cause of its high interest rates, a point also examined by

Garcia and Didier (2000). Finally, Arida and Lara-Resende (2005) also point to the lack of local long-term debt as a reason for (and not an effect of) high interest rates.

Less work has been done on the effect of high interest rates in the country. Bonomo et al.(2003) empirically verifies credit constraints at the firm level, and Terra (2003) shows that the size and nationality of the firm is a determining factor of the severity of that constraint. This paper will examine the capital structure of firms, principally using published annual reports (in the case of large firms) and survey data (in the case of smaller firms) from the World Bank (2003). Some research has been done with respect to credit constraints at the individual level, and this paper will make use of a recent survey (Brusky and Fortuna, 2002) to discuss the unmet needs of the masses with respect to everyday access to credit and capital. Fagnani (1996) and Borba (2004) discuss the lack of mortgage finance and suggest ways in which that gap could be eliminated. Finally, Pinheiro and Cabral (1999) show the major aspects of Brazil's "gray" market for credit which allow it to flourish.

This paper will act as a compendium of all of this research, bringing the previous authors' disparate viewpoints together to tell, in one voice, the story of Brazil's interest rates. The most recent data will be considered as well, updating some results that were written several years ago, while conjecturing either that other results are no longer valid or that the credit markets have not yet responded to a shift in the fundamentals of the Brazilian economy. In doing so, the paper seeks to answer whether Brazil's credit markets are suffering from irrational pessimism, routed in the past may not repeat itself, or if they are subject to a guarded form of optimism that will require more economic austerity and good performance to result in lower interest rates.

CHAPTER 2
AN ABBREVIATED HISTORY OF INTEREST RATES, INFLATION, AND
MONETARY POLICY IN BRAZIL

Brazil's history of inflation, interest, and monetary policy will be extremely different for the reader solely familiar with the stable regime of the United States or the other more industrialized nations. It does not, however, differ drastically from other Latin American nations. The government's use of the inflationary taxes to finance the public deficit are not uncommon to the region, nor are rates of inflation that are meaningless in annual terms and are calculated and discussed in monthly rates, rates which, in turn, are factors of 10 above the average *annual* inflation rate of the most stable post-industrialized economies. To help the reader to better understand this process and its causes, this paper will review this history in order to gain insight into the causes of this interest rate dilemma. Indeed, one cannot study the history of interest rates *per se* in an economy such as Brazil's. The series is highly discontinuous, variable, and ill-defined (even by the Central Bank). This is due almost entirely to the unpredictable nature of inflation, along with the regime changes experienced in the country over the last fifty years.

The study and history of inflation is integral, then, to the study of interest rates in any country. Individual investors demand rates of return which exceed the increase in the price level; if those rates of return cannot be met, agents have strong incentives to

consume income as it is earned, thereby lowering the savings rate.¹ Empirical evidence shows that the Taylor rule also holds in emerging economies as well as industrialized economies; as expectations of future inflation become worrisome, central banks use their policy instruments, namely interest rates, to quell inflationary pressures.² It is because of these linkages that this study begins with an examination of the history of inflation in Brazil. Special attention will be paid to the role of government in seeking to tame inflation's course so as to steer the economy towards low-inflation economic growth and also to the various monetary policy regimes which have sought to control the rate of price acceleration.

In the post-war period, inflation began at a fairly stable pace, fluctuating in a range below 20% annually until late 1959 (Bulmer-Thomas, 1993).³ Even the low inflation of this period, however, was sparked by government policies and manipulation. By 1945 the Vargas administration had increased the tax share of GDP to 26.5%, an astonishing three-fold increase from the level just six years prior (ibid). A dual exchange rate regime also existed in this period which gave preference to exporters. This regime may have promoted export growth but had inflationary pass-through consequences because of the high exchange rate granted to importers. This sort of indirect taxing of consumer goods began a long standing tradition of government manipulation, albeit indirect, of the price level (ibid). However, beginning in the 1960s, inflation quickly got

¹ When given the choice to spend R\$1 today on an asset, or invest at 10% to purchase the asset in one year at R\$1.15, a rational actor would spend the R\$1 today (even if he/she were to hold the good and sell it in a year's time).

² See, for instance, John B. Taylor, "Using Monetary Policy Rules in Emerging Market Economies," a paper presented at the 75th Anniversary Conference of the Bank of Mexico, November 14 – 15, 2000 (available on-line at <http://www.banxico.gob.mx>).

³ As in the United States, reliable, official economic data does not exist for the pre-World War II period.

out of control and became rooted in the Brazilian psyche, having long-lasting implications for the conduct of economic policy.

In that decade, inflation exceeded 40% per year and grew to exceed 100% annually by 1980. By the introduction of the most recent stabilization plan, the Real Plan, inflation was running at unfathomable levels (table at right, author's calculations).

Table 2.1 Annual Inflation
**Average Annual
Inflation** (percent)

1960-69	44.6
1970-74	20.9
1975-79	46.5
1980-84	148.0
1985-89	707.4
1990-93	1,764.9

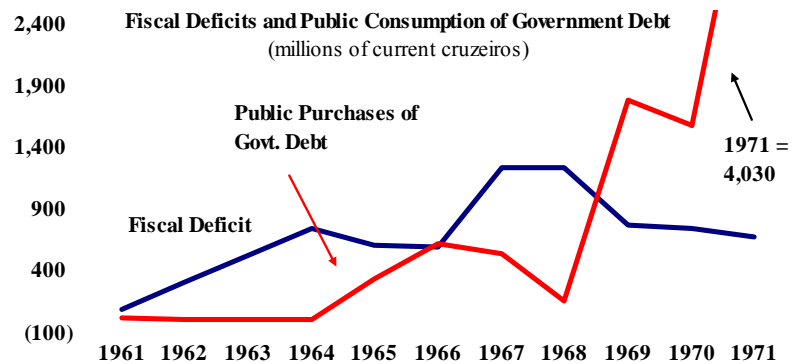
The acceleration of inflation in the period beginning in 1960 was caused in part by the lack of a market for government debt. In fact, outside of the *Banco Nacional de Desenvolvimento Econômico e Social* (BNDES), there were few resources available for long-term financing. Housing finance was not available (it remains largely inaccessible to this day) and any long-term credit was restricted to a few commercial banks and finance companies. At the time, Brazil was governed by a military government (more on this below), and its response was fairly orthodox: remove the pressures on the deficit that was causing the monetization of the deficit. Prices for public services were increased (though this has some pass-through to inflation in other sectors) and expenditures were cut (Coes, 1994, p. 87). Inflation fell to below 40% a year by the late 1960s, all things considered a great accomplishment but not low enough to engender the sort of long-term lending the country needed for development purposes.

To that end, the government instituted its second, much less orthodox, response: the *correção monetária*, literally “monetary correction” and now known as inflation indexation. The BNDES had long been indexing its long-term lending to offset the inflation-induced real erosion of loan repayment. Then Minister of the Economy Roberto

Campos was a former president of the BNDES and suggested that indexation be used in a broader sense in the economy.⁴ With the passage of the now-famous law 4.357 in 1964, financial contracts could be written to allow for ex-post revisions in their notional amounts to reflect inflation. The legislation also introduced a new type of government bond, the *Obrigação Reajustável de Tesouro Nacional (ORTN)*, which increased the government's ability to finance its deficit through selling new government bonds to the public, bonds which were indexed to a pre-determined index of the cost of living.⁵

According to Coes (1995), public absorption of this new debt was one of the key factors in bringing down inflation after 1964 (see graph).

Figure 2.1 Deficits and Public Consumption of Fiscal Debt



Indexation became a central feature of the economy, and following the ORTNs, the government began to track *Unidades Padrões de Capital*, or UPCs, which allowed for the indexation of all debt, private and public, to the government-set levels for inflation adjustment. In addition to the ORTNs, the government also began to issue *Letras de Tesouro Nacional*, or LTNs, which were offered at various maturities and at market-determined interest rates. All of these new assets helped to create a more liquid financial market and made the more narrow monetary aggregates less important, as Brazilian

⁴ BNDES, *50 Years of Development*. On the web at <http://www.bndes.gov.br/english/book50years.asp>

⁵ This was a relatively progressive concept. As a point of reference, the U.S. Treasury first introduced its inflation-protected securities, the TIPS series, in 1997.

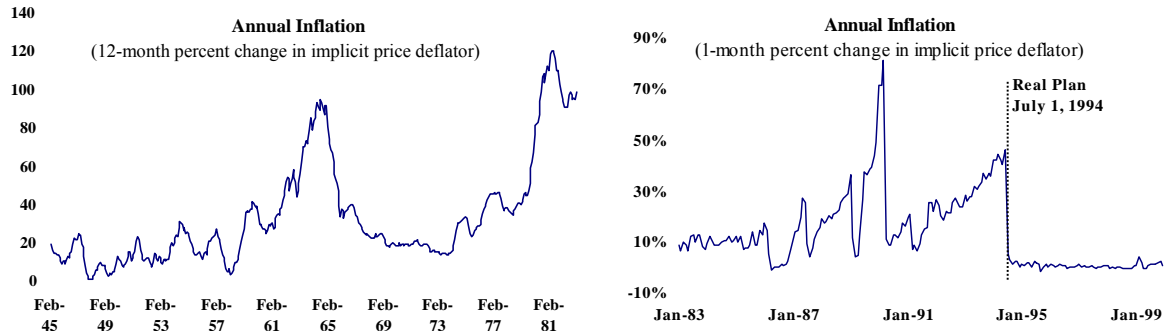
agents could move between inflation-adjusted and nominal currency with ease, thus blunting the monetary erosion to accumulated wealth from the inflation experienced in the period.

However, outside of the financial sector notional correction was much less advanced. Salary contracts were often negotiated on annual bases and even those contracts which were indexed were corrected at a staggered pace (every six or twelve months). The government itself contributed to this lag: it wasn't until 1979 (fifteen years after the beginning of indexation) that the minimum wage was moved from an annual to a semi-annual cost of living adjustment—with the variability that inflation exhibited in this period, even this semi-annual adjustment left much to be desired (Coes, 1995, p. 89)!

Throughout the history of indexation, the government continued to manipulate the economy through its policy choices. Take for instance the choice of price index used to correct for inflation: a mining company would like its workers' wages (or the price of any of its inputs, for that matter) to be corrected by the price change in the factory's output (say, iron ore), while workers would like their incomes to be adjusted vis-à-vis changes in the price of the basket of goods they consume. The government is essentially torn between these competing pressures and any choice of index merely manages the distortion in real prices that occurs without any indexation; it does not, however, completely solve the problem. When oil prices sky-rocketed in the 1970s, the government introduced a new price index that could be manually adjusted to control for exogenous shocks beyond the control of the national economy. The result of this

manipulation was a real erosion of all assets corrected by the ORTNs, and reduced purchasing power of the adjusted *cruzeiro*.⁶ Inflation continued to be high (despite

Figure 2.2 Inflation Rates, Before, During, and After Hyperinflation and the Real Plan



indexation) throughout the 1970s and 1980s and then accelerated to astronomical levels in the late 1980s and early 1990s. Only with the introduction of the Real Plan was it slowed to manageable levels. The charts above tell the story better than words possibly can (note the scales): inflation so high, volatile, and endemic that by the mid-1980s it no longer made sense to refer to inflation in the year-over-year or annualized sense, but rather by 1-month percent changes (author's exhibits from data collected from the BCB). Despite various stabilization plans (as discussed below), it wasn't until the introduction of the Real Plan in 1994 that the problem of inflation was finally tackled.

Theoretical Bases for Inflation

Before examining in more detail each of the relevant periods of recent Brazilian economic history, it is useful to examine the theory behind the inflation that has plagued the country and clouded the ability of policymakers to set a clear path for the future. Specifically, what does theory tell us about these rampant (and variable) accelerations in inflation? According to the classic model, the root cause of inflation all across Latin

⁶ Essentially the government would decide how much of the inflation was “exogenous” to the country and only allow the indexation to account for the remainder.

America during this period was the same: monetization of fiscal deficits. Despite the fact that external financing was important to Latin America's growth and economic planning in this period, these high rates of inflation also suggest that much of the debt was in fact monetized. The Central Bank prints money in order to finance the balance between its deficits and new debt issuance (external and internal) in order to pay the government's bills. The so-called inflation tax arises when the government prints too much money, its real value declines, and the new, devalued currency is used to pay nominal balances owed to the government's lenders. In this monetary model, increases in the money supply are essentially treated as exogenous, meaning they are predetermined and not affected by other variables such as the change in the price level. If this were true, growth in the money supply – the infamous printing of money that people oft blame for hyperinflation in Latin America – would lead to a devalued currency. The policy prescription for stopping inflation would be clear: turn off the printing presses!

Treating the money-printing policy decisions of the central bank as exogenous, however, does not entirely apply to the Brazilian case. If budget deficits cannot be fully financed through external funding, the bank has no choice but to increase the money supply. As Fisher and Easterly argue:

Milton Friedman's famous statement that inflation is always and everywhere a monetary phenomenon is correct. However, governments do not print money at a rapid rate out of the clear blue sky. They generally print money to cover their budget deficit. Rapid money growth is conceivable without an underlying fiscal imbalance, but it is unlikely. This rapid inflation is almost always a fiscal phenomenon. (Fischer and Easterly, 1993, pp. 138-39.)

The true variables of interest then, the ones driving inflation, would be the size of the budget deficit and the appetite of the investing community for government-issued debt. Furthermore, critics of the monetarist theory in Brazil note that inflation sometimes

spiked at times when there was no substantial increase in the monetary aggregate, and have pointed out instability in the estimates of monetary demand in Brazil. They cite these two facts as evidence that the monetarist model is not appropriate for the Brazilian case.⁷ Arguing for a structuralist approach to inflation in Brazil, opponents of monetarism say that the money supply is in fact endogenous, determined by other variables, not the least of which is the price level. According to this theory, supply constraints or excess demand causes inflation in specific prices. Seeing their purchasing power eroded, other agents in the economy also raise their prices. The central bank then is faced with a dilemma: restrict the monetary supply and foster deflation, or accommodate the price increases with increased money so as to not engender unemployment and/or recession. In short, structuralists argue money growth is the effect, and not the cause, of inflation.

Which of these theories is right? It is possible that there exists a feedback mechanism wherein initial price increases prompt monetary accommodation, which in turn brings about more inflation. Coes (1995) performs Granger causality tests⁸ on the general price index (IGP-DI) and various monetary aggregates (the monetary base, M1, M2, and M3). The results do not indicate that inflation causes increases in the broad monetary aggregates. For the more narrowly defined monetary aggregates, the tests are on the border line of significance (in probabilistic terms) and suggest some relationship may be present. In the case of the reverse relationship, the test results vary. For broader monetary aggregates (M2 and M3, which include highly liquid monetary substitutes), the

⁷ See, for instance, Cardoso (1983), Rossi (1989), and Cardoso and Fishlow (1990).

⁸ The test used is actually a variant of the Granger causality test which eliminates potential bias from serial correlation in the data.

tests indicate that changes in money do induce inflation. In short, for broadly defined monetary aggregates, the monetarists' argument appears to hold water. Coes asserts this distinction is due to the fact that during inflationary times (and especially after indexation began), the increasing liquidity of near-money assets implies that it is these measures which should be studied. Recent work (Feliz and Welch, 1992) indicates a neo-monetarist model is most appropriate for Brazil: prices respond to both contemporaneous and expected future changes in the money supply. Just the same, the failure to overwhelmingly reject the structuralist argument in the Brazilian data may indicate that there is some feedback mechanism which says that inflation may further fuel accommodative monetary policy.

Regardless of the causes or the exact transmission mechanism, inflation remained high through various administrations and economic plans. Without knowing the exact transmission mechanism, but knowing the correlation between money supply, inflation, and growth, one should by now be asking a very relevant question: how did so many governments fail to manage inflation and control the country's economic situation more effectively? Government policies had a direct impact on accelerating prices from the 1950s to the implementation of the Real Plan. Simultaneously, stabilization programs were put in place to mitigate the negative consequences of the government's aggressive (and oft unrealistic) development goals. Were those policies simply ineffective, ill-conceived, or were they subject to extraordinary exogeneities that rendered them futile?

Post-War Promises

Brazil emerged from World War II in a better position than many of the developed economies. War had generated a demand for the country's exports, and the United States had declared Brazil's coffee an importing priority during the war. As a

result, at the end of the war the national coffers were full: more than half a billion dollars lay in the national reserves, and a positive trade surplus contributed much to that boon. This good fortune quickly changed course, however, as that surplus was consumed by aggressive development plans by the new administrations. Promising “fifty years of progress in five,” Juscelino Kubitschek began massive development projects, including the initiative to develop Brazil’s interior and to create a new capital, Brasília. There were some success stories which arose from his development plans: during his administration real GDP grew at an average of almost 7 percent per year, leading to a per capital increase of about 4 percent (FGV and BCB). The decrepitude of these plans, however, was the government’s inability to finance them: while Vargas had increased the tax share to around 27% of GDP, this alone was insufficient to finance these aggressive plans. Furthermore, export revenues were stagnating, only partially offset by foreign capital flows (Coes, 1995). The government was left with almost no choice: they monetized a great portion of this deficit. Not surprisingly, inflation ensued, with the first bout spiking in 1959 and the annual inflation rate exceeding 30 percent. The successive administrations of Quadros and Goulart, from 1961 to 1964 imposed some conservatism, but it was too little, too late. Opponents of government manipulation favored greater reliance on market prices and feared Goulart’s seemingly dictatorial aspirations. Furthermore, inflation had taken root and the fiscal deficit proved harder to eradicate than one would have hoped; when the military ousted Goulart in 1964, the inflation accumulated in the twelve months prior exceeded 90 percent (as measured in the IGP; author’s calculations). This paper does not posit that the principal reason for Goulart’s removal was economic. His attempts at stabilization ranged from highly orthodox to

completely contrarian with respect to economic theory, embracing IMF lending originally, then rejecting it for a more “radical nationalist” strategy (Skidmore, p. 13). This move to a more nationalist strategy wasn’t just economic – it sought both a political and economic removal from the world scene, simultaneous with a move to the left of the political spectrum. Goulart asserted a causal relationship between the economy’s woes and its insertion in the global economy, as well as domestic policies. It was this turn to the left that alienated many factions within Brazilian society and prompted the formation of a shadow government consisting of various segments of society (Ibid., p. 14). The inability to control inflation, then, was symptomatic of serious division in the government and in society that was crippling with respect to any unified policy; its rampant nature helped to usher in a defining moment in Brazilian history: military rule that would last for two decades.

Military Rule and an (Overly) Managed Economy

The military imposed stringent measures to reign in inflation. Fiscal strategy included the raising of taxes, changes in the pricing strategy of public utilities and services, control of wages and credit, and announced targets for monetary expansion. The government’s profligate spending was not corrected, however, as government’s share of GDP remained at historical levels. The idea was simple: cover the existing spending with more tax and service revenue, but don’t decrease spending! Government spending as a share of GDP remained essentially constant throughout the period (at around 10%, according to statistics from IBGE, 1991). However, the revenue base of government did expand and covered a greater share of these expenditures, allowing inflation to cool in the late-1960s. However, excessive government management of the economy became a staple: policies allocated resources instead of prices, and those resources were allocated

based on the government's agenda. Indexation further complicated pricing, and sped the transmission of shocks between sectors of the economy (since the broadest inflation measure, the IGP, was used as the basis of indexation).

A new administration, headed by Costa e Silva, took the reins in 1968 and exacerbated these difficulties by allowing for more inflation, as it viewed inflation as a trade-off with real GDP growth (Coes, 1993, p. 15). Price level management was also institutionalized, in bureaucratic Brazilian fashion, with the creation of *the Conselho Interministerial de Preços* (CIP), and wage adjustment was changed to reflect actual inflation in an ex-post fashion. During this administration, real output grew at over 10 percent per annum, while inflation remained around 20 percent and the public deficit was brought to below 1% of GDP – for obvious reasons this period in Brazil's economic history is known as the *milagre*.

Economic sensation quickly turned into cessation with the first oil shock in 1973. At the time, Brazil was highly dependent on foreign oil (80% of the crude consumed was imported), and was especially impacted by the shock (Coes, 1995). The new government's management of the crisis was commendable, however: with Brazil's economic management institutions, only about one-half of the price increase was passed on to consumers, while subsidies covered the rest. Through both monetary and fiscal restraint, the inflationary threat posed by the oil price increases was quelled. The shock to consumers was mitigated, but the effects on government remained deleterious: some increased borrowing to cover the subsidies, a negative impact on the trade balance, and a reduction in Brazil's international reserves.

Brazil's government decided to launch a second national development plan in the period following the shock, and greatly encouraged importation of intermediate and capital goods to that end. This was prompted by the level of world interest rates: real rates on dollar-denominated loans were zero or negative throughout much of the 1970s (Coes, 1995, p. 19). Expansive monetary policy led to soaring inflation, however, and at the time the world economy was experiencing its first bout with stagflation (the phenomenon of simultaneously high inflation and low output growth), which limited the ability of Brazilians to export abroad. This led to a sharp increase in real interest rates over the period from 1977-1978 that aimed at cooling the overheating economy. By the time of the second oil crisis, inflation was still excessively high and the current account remained in significant deficit.

The response of the government to the second oil shock was typically bureaucratic: strict controls on nominal interest rates, coupled with subsidized credit for certain sectors of the economy. Promulgations abounded, from pre-announced devaluations, to targets for *correção monetária* and expansion of the monetary base. The intent was clear: stop the inertia in inflationary expectations. The policies lacked credibility however, and after a year of record-setting inflation (110% in 1980), the government switched its mechanism of management to that of demand control, including more aggressive management of the monetary base. The government at this time also began the sale of exchange-rate indexed bonds to the Brazilian public. Due to the inordinately high levels of expected devaluations, the availability of these bonds led to an increase in real interest rates: there was no longer a transactions cost for hedging

domestic currency exposure because the government would adjust returns vis-à-vis another currency.

With domestic interest rates so high, foreign borrowing skyrocketed and by 1982, interest payments accounted for over 70% of the current account deficit and 4.2% of GDP (IBGE). Public enterprises also took part in the foreign debt markets, borrowing abroad to finance the external debt of the central bank, thereby increasing reliance of the government on foreign funding. While an increase in borrowing abroad should force down the domestic interest rate, in Brazil that did not occur. The reason for this atheoretical result is that Brazil was backed into the constraint imposed by high foreign debt. With the stock of external

federal debt at the time in excess of fifteen percent of GDP (see graph), any marginal increases in the debt level further decreased the country's credit standing, increased the drain

Figure 2.3 Federal Debt/GDP Ratio



from debt servicing, and further exposed the country to the whims of international sentiment and exogeneities. These factors served to increase the country risk element of the real interest rate (as measured and detailed below) and counteracted any monetary expansion from the foreign borrowing.

As if the situation wasn't bad enough already, in late 1982 another exogenous shock rattled the now-fragile Brazilian economy, as financial contagion from the Mexican debt crisis affected the country's cost of capital and, for that matter, the availability of foreign lending. Though Baer and Coes (1990) argue that the lending

policies had begun to disfavor Latin America before this date, this crisis increased the perceived “country risk” even further. Political (election-related) pressures prevented the country from borrowing from the IMF (exacerbating its cost of capital).⁹ When lending finally came from the IMF (with the usual strings attached), its success, in economic terms, was so painful that the government lost much political support (per capita real income had fallen by more than 10 percent cumulatively in the years 1980-1983). This loss of support sped the transition to civilian rule and helped to usher in the government of Neves/Sarney.¹⁰

Civilian Rule and Attempted Stabilizations

Sarney’s attempts to stabilize the economy were various and categorically unsuccessful. His first plan, the Plano Cruzado, began in 1986 and included price and wage freezes, along with the prohibition of indexation and a new currency, the cruzado, worth 1,000 cruzeiros. The basic aim was to eliminate inertial inflationary expectations by ending the indexation and taking the cruzeiro out of public memory. The plan worked initially, but after a few months some allocational effects became obvious. The price freezes had caught some sectors off-guard, and relative prices became skewed, resulting in shortages and rationing. In an attempt to salvage the plan, the Plano Cruzado II was announced, adjusting the prices of a gamut of goods, including automobiles, government services and agricultural products. A floating peg of the cruzado was announced, as was a return to indexation (though this time the nominal anchor was to be the return of BCB notes). In the international community, the risk level associated with the country reached

⁹ Bacha (1983) estimated the effect of this decision at around 320 million dollars in extra interest to be paid.

¹⁰ Tancredo Neves was elected president but died before assuming office. Upon his death, his Vice-Presidential candidate, José Sarney, became President-elect.

new highs when the government announced it would temporarily suspend interest payments to foreign creditors in February, 1987. These measures eroded any and all confidence the government had gained; inflation returned to levels near 1,000 percent per year just eighteen months after the introduction of the plan (IBGE).

A new plan followed, named after the Economy Minister who devised it, Luis Bresser. Indexation remained, the currency was allowed to devalue, but wages and prices were frozen for a period of three months (only after allowing government and agricultural prices to “catch up”). Real interest rates were allowed to rise, and the government announced that its deficit would not exceed 3.5% of GDP. This particular part of the plan, however, was derailed when the President authorized large wage increases for public sector employees after the initial three-month freeze. After that initial three month period, the inflation rate again approached 15% *monthly* and Bresser resigned.

A new plan, *O Plano Verão*, or the Summer Plan, was announced on January 14, 1989. Real interest rates were elevated and cuts in public spending were announced. Prices were again frozen and the economy was de-indexed with a new currency unit, the *novo cruzado*, becoming the unit of measure (again, dropping three zeroes from the original cruzado). Two factors led to this plan's demise: a nominal peg of 1:1 with the dollar was announced and public spending also spiked ahead of the presidential election, wearing away the credibility in the plan's announced tenants. Inflation hit four and six percent in February and March (despite the price controls), and the exchange rate could not be maintained at 1:1. By the end of the election, which chose Collor de Mello as its leader, inflation surged to over 80% monthly (Coes, 1995).

The Collor Plan was immediately announced by the new administration, and was the most drastic plan yet. It included a sharp fiscal tightening and a sudden freeze in nearly 70% of the country's financial assets. However, there were exceptions to this freeze and those types of assets (principally short term bonds) allowed liquidity to again expand and inflation again ensued.¹¹ A new package, *Plano Collor II*, sought to re-administer the price level through a "reference interest rate" that served to re-index the economy and allow for more of the inertial inflation previously experienced. These plans were ultimately unsuccessful as well, as they failed to attack the principal causes of inflation: large federal deficits, deficits which were, in turn, fueled by rampant corruption which later forced Collor de Mello from office in 1992.

O Plano Real: Finally, a Plan that Works!

In the two year administration that followed, Franco appointed two politicians and an academic economist to the post of Finance Minister. Unsatisfied with their performance, he moved sociologist Fernando Henrique Cardoso to the Finance Ministry in May of 1993. Cardoso and three academic economists authored the stabilization plan that is still in place as of the date of this writing, *O Plano Real*. This plan incorporated the lessons learned from all the previous stabilization attempts and improved upon them. One of these authors described it as a three-pronged strategy to stabilize the economy: a fiscal strategy centered around a constitutional amendment, monetary reform taking place with the slow adoption of a new currency, and an opening of Brazil's economy, both in the form of continued privatization, a new foreign exchange policy, and a liberalization

¹¹ The quantity theory would suggest this result: it is the growth rate of the money supply, and not the stock, which matters for inflation. According to the theory, a sudden, one period drop in the stock of money, followed by growth would generate one-period deflation, followed by re-inflation of the economy.

of the capital account (Franco, 1995). The fiscal deficit was addressed immediately with the introduction of new taxes of financial transactions, cuts in federal government spending, and the creation of a new *Fundo de Estabilização Fiscal*. As a result, by mid-1994 there was a primary fiscal surplus of 2.6% of GDP. The currency adjustment and deindexation of the economy came in two pieces: first the creation of new *Unidade Real de Valor* (URV), which was a composite of several price indices and which emerged as the new index rate. However, with cuts in federal spending and a credible economic agenda, the URV found (as it was designed to do) a point at which the economy's prices stabilized. Once that stabilization had occurred, the Real was introduced as the new currency. In terms of the foreign exchange component to the plan, the value of the Real was allowed to fluctuate in what Cinquetti (1998) has called a "upper-bounded floating exchange rate regime"—the cost of the Real was to never exceed one dollar, but was allowed to fluctuate downward. The success of the plan has been credited to many things, including some exogeneities. However, it was the first of the plans to allow market mechanisms to settle within a new economic framework (no price/wage freezes) and slowly removed indexation instead of a sudden, incredible regime change. Moreover, it also addressed the fundamental structural issue, the federal deficit. With the government constrained to a balanced budget and new sources of revenue, the Central Bank was no longer forced to monetize the deficit, which would have had the usual effect of fueling inflation.

As mentioned above, the Real Plan continues in place today and has guided the Brazilian economy through a period of relative prosperity. It hasn't gone completely unchanged, though, and currently we are in a period which could be known as the "*Plano*

Real II' if one were to follow the semantics of previous stabilization attempts. In early 1999 Brazil adopted inflation targeting, after floating the currency completely and managing a 50% devaluation. This development changed one of the fundamentals of the Real Plan: the exchange rate was no longer the nominal anchor, but rather the economy was anchored by the inflation rate. This shift has an important implication for monetary policy: the Central Bank now has an explicit target to meet in order to keep its credibility and must unabashedly use its policy instrument (interest rates) to control inflation else risk the public's confidence in the Bank. This was evidenced during the crisis of 2002, when the Bank had to decide not *whether*, but *by how much* to raise interest rates (Giavazzi, et. al., 2005). This crisis was handled well, with inflation barely exceeding its (adjusted) target, and real GDP contracting very slightly (-0.2%) in 2003, a clear success when compared to what could have happened if the contagion from Argentina would have been more fierce.

The pages above convey the variability and volatility in Brazil's recent economic history. Under the guise of various monetary policy regimes, political organizations, and attempts at economic stabilization, Brazil has seen inflation so high that it cannot be shown on a chart, deep business cycles, and extreme ebbs and flows of international capital. Surely this economic rollercoaster is in the minds of economic actors as they evaluate their risk tolerance with respect to the country and is implicit in the relatively high spread vis-à-vis U.S. Treasuries from which the country suffers.

In the last ten years, however, the new monetary policy regime of the Real Plan has endured the stress test of an international liquidity crisis, capricious sentiments of what Thomas Friedman has called the "electronic herd" of international investors, and the

continuation of orthodox economic policies by one of Brazil's most left-leaning politicians, Lula da Silva. How deeply discounted must the recent performance of the economy be in light of the more distant past to justify the real interest rates experienced by the country? For how long must the regime of inflation targeting work in order to mend expectations and drive down the inflation premium in nominal interest rates? How much of a fiscal surplus must be maintained for investors to believe the debt is sustainable, in order to reduce the default risk premium? Will the past performance of the Real reduce investor aversion to the currency and eliminate the devaluationary bias implicit in the domestic interest rate? In short, what must Brazil do to lower both nominal and real interest rates, in order to achieve more balanced growth and productive investment? These are the questions that the next section of this paper will seek to answer.

CHAPTER 3 BRAZIL'S CURRENT INTEREST RATE DYNAMICS

Implicit in any monetary policy action or inaction is an expectation of how the future will unfold, that is, a forecast.

– Alan Greenspan

The macroeconomic history of Brazil has been anything but stable in recent history. Specifically, only the most recent decade has been a time of relative stability in terms of the usual macro-indicators. Despite this stability, however, interest rates remain at exceedingly high levels. The basic interest rate equation, as illustrated in the introduction, will now be examined to determine the sources of the persistent gap between the yields on U.S. Treasury bonds and similar debt instruments issued by the Brazilian national government.

The approximate Fischer equation, $i_t = r_t + E(\pi_{t+1})$, implies that there are at least two components to the nominal interest rate: the real interest rate and the premium demanded for investors to compensate for their expectations of future price inflation.¹ There are many factors which affect the real rate of interest, r : investors views of the currency, the possibility of sovereign default, the international economic environment, the equilibrium growth rate of the economy, the national financial situation, and the possible convertibility/liquidity risk for operating in a given currency (regardless of the notional exchange rate)—to name a few. Many factors also influence the expected future inflation: inflationary inertia, autonomy and credibility of the central bank (or lack

¹ The exact Fischer equation has an interaction term between the real rate and expected inflation. It is significant in high inflation countries such as Brazil but is ignored here because the equation is not estimated, but rather used as the basis for the organization of the paper.

thereof), state of fiscal balances, and sentiment vis-à-vis the international economic environment. Both parts of the model deal with markets' perceptions and forecasts of probabilistic scenarios and future events. All standard economic models presuppose that markets act efficiently and rationally, which means (among other things) that these expectations are based on all available information and are the true "best guess" of the outcome of these future events. In some cases, however, rationality may not hold. It is with that possibility that this section of the paper begins, later returning to more standard components of interest rates.

Testing for rationality in price forecasts

The so-called New-Keynesian Phillips Curve posits that it is the deviation between expected and actual inflation that causes the short-run trade-off between inflation and employment. Consequently, empirical models (such as those used by the Brazilian Central Bank) require the use of observable phenomena (lagged inflation, actual unemployment) as well as expectations of the future course of those phenomena. If a systematic bias were to exist in the markets' expectations of inflation, that bias would clearly have an effect on nominal interest rates. If, for instance, the market consistently predicted inflation of 5% higher than that which actually was to occur 12 months hence, the nominal interest rate would be 5% higher than it would be if the expectations did not have this bias. In Brazil, one hypothesis would be that though the Real Plan has stabilized inflation, the markets still "remember" the hyper-inflationary times of the early 1990s and do not believe that inflation will be as contained as it actually has been. An alternative hypothesis would be that markets impetuously believe the Central Bank's announced target and set their expectations accordingly, not foreseeing the danger that the Bank may not be able to manage the economy (down) to the target (this would

amount to accepting the target without considering evidence which may exist to the contrary of the announced policy rate of inflation).

The inflation-focused rational expectations literature, pioneered by John Muth, hypothesizes that expectations about future inflation are made in such a way that incorporate all available information to the forecaster, and that errors in forecasting are nonsystematic. This implies that agents use all available information to (on average) perfectly predict inflation. In its inflation targeting regime, the Brazilian Central Bank should then pay close attention to these private inflation forecasts, reacting quickly to changes therein as these indicators truly point towards future changes in inflation. If a systematic bias is suspected, the Bank should measure that systematic bias in order to make some inference about the true private beliefs and expectations about future inflation. Incentives exist for the Bank to make inferences about true future inflation from the public's expectations, as any marginal improvement in its ability to foresee (and control) future inflation will only further bolster its credibility.

There are two conditions for rationality. Unbiasedness means that the forecasts are on average centered on actual, observed inflation. Suppose π_{t+k} is the actual inflation observed in period $t+k$ and $E_t(\pi_{t+k})$ is the aggregate survey response to the future inflation at period $t+k$, using all information available up to period t . The literature then claims that if $\beta = (0,1)$ in the following regression, the aggregate forecast is unbiased:

$$\pi_{t+k} = \begin{pmatrix} 1 \\ E_t \pi_{t+k} \end{pmatrix} \beta + \varepsilon_{t+k}, \text{ or that the } k\text{-period ahead forecast of inflation is equal to}$$

inflation k -periods ahead plus an error, which (in the case of rationality) is centered on zero and distributed normally. Further performing a joint test for efficiency implies that no available information could have improved the forecast. Allowing Θ_t to be the vector

of information available at the time of the forecast, efficiency implies $\beta = (0 \ 1 \ 0 \ \dots \ 0)$ in

the regression:
$$\pi_{t+k} = \begin{pmatrix} 1 \\ E_t \pi_{t+k} \\ \Theta_t \end{pmatrix} \beta + \varepsilon_{t+k}.$$

Expected inflation is difficult to measure. In fact, in many cases empirical analysts assume an autoregressive process of actual inflation actually governs inflationary expectations.² In some other cases, actual expectations can be observed. For example, the term structure of interest rates can give some information about the market's expectations for future short term interest rates.

Also, expectations surveys exist in many countries for the most basic macroeconomic variables, among them prices. The difficulty with surveys is two-fold: it is difficult to know if they are truly the same expectations which affect policymakers decisions/markets' assessments and, depending on the source of the survey, it is not clear that the respondent has economic incentives to use all possible available information in making his/her forecast. Imagine a phone survey to 10,000 Brazilian homes, for instance. In many cases, the homeowners would simply answer the survey without doing the proper research and certainly without consulting their own macroeconomic models. The Brazilian Central Bank publishes the consensus forecast of professional forecasters for growth in GDP, fiscal performance, and inflation. This series mitigates the aforementioned downsides to survey-based measures. This particular measure of inflationary expectations is a part of the *Relatório do Mercado* that is utilized by the Bank (and made available to the public), and the series is the average of the responses of professional forecasters who have clear economic incentives (bonuses) riding on their

² The judgmental forecasts used in the Federal Reserve's classified *Greenbook* are no exception; the larger FRB/US model does have an explicit role for expectations, however. See Federal Reserve (1997).

accuracy. Moreover, at the Central Bank of Brazil, inflation models do in fact treat these survey based measures as rational expectations (Carvalho 2004). In fact, Fraga (2003) shows that the point estimate of these expectations in a monetary policy reaction function is over two, implying a one percent-point change in expectations translates to an over two percentage-point move in interest rates. It is obvious, then, that the question of rationality in this data should be examined.

Near the beginning of the inflation targeting regime, the Central Bank began to survey private forecasters on their views of inflation. Those forecasts were initially very unreliable, relying on faxes from respondents which were later compiled in Excel spreadsheets: they suffered from low reliability, high variability, unpredictable response rates and (worst of all for researchers) the data was never made available to the public (Carvalho, 2004). However, beginning in late 2001 the Bank began to utilize a web-based interface for the collection and dissemination of this information. The survey is conducted daily with the reporting institutions submissions and the means, standard deviations, and medians made available on a weekly basis.

A criticism of survey based measures is that when they are analyzed in the aggregate, it is not necessarily true that each forecaster is using the same information set, as it is possible some private information exists. In the case at hand, imagine an investment bank that conducted its own point-of-sale surveys during the month to aid in its forecasting. To alleviate this problem, this paper uses the methodology put forth by Carvalho (2004); one day is chosen of each month to be representative of the entire month and that day is chosen to minimize the chance of private information. Carvalho suggests using the last day of the prior month, indicating that there is little chance that private information such as a survey could help an institutional forecaster foresee price

changes in the following month. To make this point clear, consider this example: a forecaster reports his 12-month price forecast on 2/28/XX ; the aggregate survey response on this date will be treated as the March data point.

The data refute the null hypothesis (of rationality) in many cases. An interesting, explicable result holds true: forecasters can predict short term movements in prices much better than they can longer term movements. Specifically, tests were run on the means of foreseen monthly inflation for periods 1, 3, 6, and 12 months into the future and also for inflation accumulated in the next 1, 3, 6, and 12 months (the two 1 month regressions are identical). It was only for forecasts in the 1- and 3-month horizons for which the null hypothesis of rationality

cannot be rejected at the 90% confidence level; this holds for both foreseen one-month price changes, as well as cumulative inflation measures (see table). This rejection of rationality may be the

Table 3.1 Rationality Tests in Inflation Expectations
Rationality Tests for Expectations in INPC Prices
(standard errors in parentheses)

Dependent Variable	Constant	Slope Coefficient on Expected Inflation
One-month Inflation, t+1	-0.22 (0.15)	1.6 (0.25)
One-month Inflation, t+3	0.7 (0.26)	0.03 (0.47)
One-month Inflation, t+6	1.27 (0.25)	-1 (0.44)
One-month Inflation, t+12	1.08 (0.28)	-0.89 (0.56)
Accumulated Inflation, t+3	0.26 (0.72)	1.15 (0.42)
Accumulated Inflation, t+6	4.46 (1.57)	0 (0.46)
Accumulated Inflation, t+12	14.77 (2.34)	-0.79 (0.34)

result of a new monetary policy regime that is still building credibility and is also highly subject to the adverse inflation shocks that the country experienced, especially during late 2002.

Keane and Runkle (1990) argue that testing the rationality of survey data is not valid when conducted on survey means because each individual forecast that contributes to the mean “will differ because of differences in information sets” (p. 4). While this

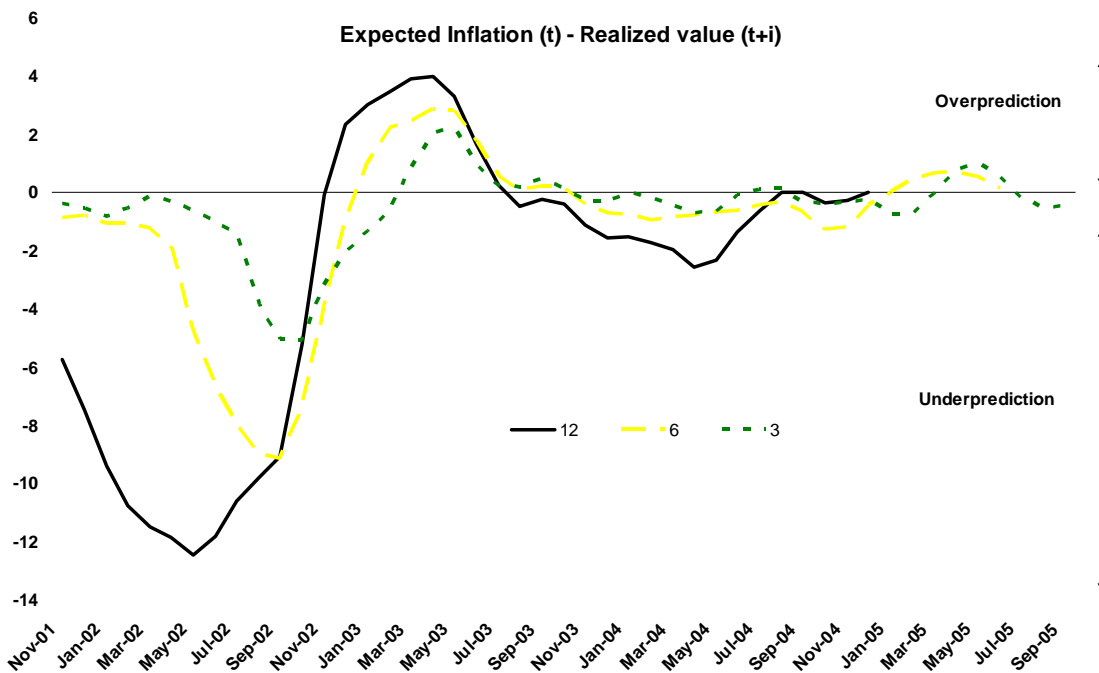
problem is partly alleviated by the method of selecting a representative day to reflect the months' observations, some aggregation bias may still exist, especially in times of (relatively more) uncertainty. Another way to compensate for the fact that this data comes from a survey is to utilize a weighted least squares estimates, employing the standard deviations of the forecast means to place less emphasis on data points about which there is less consensus. Doing so tightens the estimation of the one- and three-month ahead forecasts, making the case for rationality even more statistically sounds but does not allow for accepting the null of rationality in forecasts of a longer horizon, consistent with an OLS estimation. Because these estimations do not qualitatively alter the findings, they are not reported here. The main finding, using data through the end of 2005, remains unchanged: forecasts in the very short-term are rational and reasonable predictors of future inflation but forecasts for time horizons exceeding three months exhibit notable flaws.

This paper does not seek to be is an exhaustive model of inflationary expectations in Brazil. Recent work from Carvalho (2004) utilizes internal Bank data to build a panel data estimation, based on the submissions of the individual surveyors which make up the means and standard errors studies here. While theoretically superior, eliminating all of the biases exposed by Keane and Runkle (1990, 1998), the results do not drastically vary from those generated by the more simple estimations put forth in this paper. Most importantly, unbiasedness is refuted for the 12-month case even when the panel is estimated accounting for the non-spherical nature of forecast errors due to aggregate shocks which effectively correlate errors across all forecasters (events like September 11, 2001 and the ensuing run-up in oil prices and the election of Lula da Silva in October

2002 which caused a significant depreciation and inflation through the typical pass-through mechanism).

The implication for policy-makers is clear: account for the systematic bias in inflation expectations. The Fisher equation suggests that nominal rates should reflect the real rate (to be discussed below) plus a premium for future inflation. If expectations of inflation at time t for period $t+i$ are systematically lower than inflation's realized values at time $t+i$, and the Central Bank knows this bias exists, there should be an additional premium for the bias in inflationary expectations; more directly, interest rates should be even higher than the casual observer of inflationary expectations would think. Indeed, this seems to be the case in Brazil. Expectations for 12-month inflation were on average 96 basis points below realized values for the period September 2003 – December 2005 (standard error = 21; see chart below). Moreover, for the whole sample, 12-month-ahead

Figure 3.1 Inflation's Expected and Realized Values



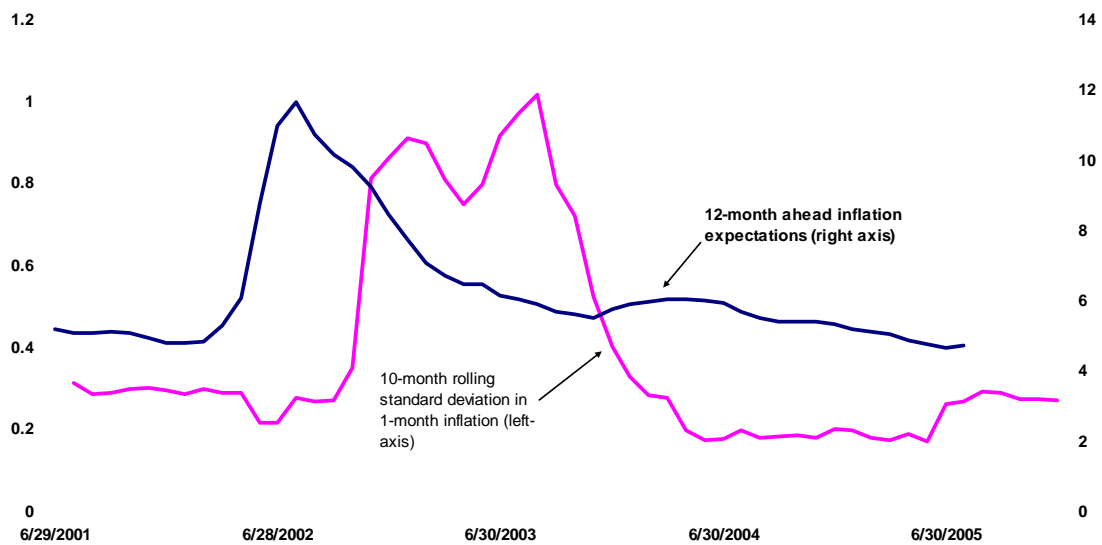
expectations were 289 basis points below the realized value (standard error = 82).

Assuming the Central Bank knows this bias exists, it has a strong case for increasing the

wedge between nominal and real interest rates by the amount of this bias, making up part of the difference which would appear irrational to the casual observer.

Recently it appears expectations have been tracking closer to inflation's realized values. Rolling regressions show point estimates in the rationality tests trending closer to one, implying rationality in the more recent forecasts, but with standard errors too large to make conclusive statistical remarks. While there is not enough evidence to make a statistical case for this argument, graphically one can see smaller errors that appear to be centered on zero in the most recent year for expectations made three and six months ahead. This may be due to the apparent success of the inflation targeting regime to control the variability of price movements. Since mid-2003 the variability in 1-month inflation has fallen precipitously, as measured by a rolling standard deviation measure in the graph below (though it has crept up in the most recent six months). At the same time, 12-month expectations of inflation have also fallen and have, on average, been closer

Figure 3.2 Year-over-year Inflation Rates and Rolling Volatility of Inflation



to realized values as discussed above. It is the expectation of 12-month inflation which should matter the most to the Bank, as the transmission between monetary policy and

inflation is estimate to have a lag of about three quarters in Brazil (Bogdanksi, et. al. 2001). If this trend continues, then, and expectations continue to accurately gauge future inflation, the Bank should clearly remove some of its wedge between actual expectations and the difference between the nominal and real rates.

This study of expectations of future inflation has been instructive. By illuminating the obvious problems with expectations in the past, an excuse can be made for the high level of nominal policy-set interest rates in Brazil: policymakers knew this bias existed and set nominal rates systematically higher than the casual observer would have deemed necessary. If, however, that bias has been eliminated, as the recent data analyzed in this paper seem to suggest, a clear case can be made for eliminating the wedge between the straight theory (the Fischer equation) and the nominal interest rate set by the Central Bank.

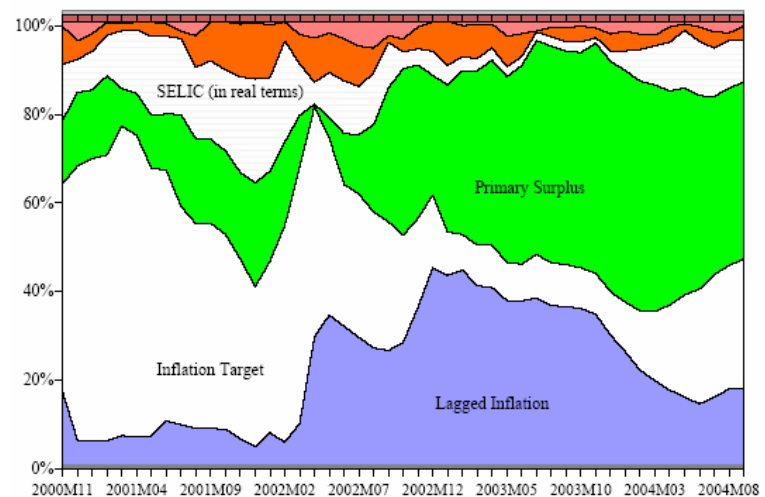
If these expectations are in fact trending down and becoming better indicators of future inflation, it is crucial for the Central Bank to understand what factors influence the expectations in order to begin to systematically lower inflation (and interest rates). Cerisola and Gelos (2005) estimate a model of inflationary expectations, estimating from mid-2000 through the third quarter of 2004. The model estimated is:

$\pi_t^e = \beta_o + \beta_1\pi_{t-1} + \beta_2\pi_t^T + \beta_3pb_{t-3} + \beta_4r_{t-3} + \beta_5reer_{t-3} + \beta_6wage_{t-3} + \varepsilon_t$, where the variables are (left to right) expected inflation, a constant term, lagged inflation, the target for inflation, the primary fiscal balance, the real SELIC rate, and deviations from trend of the real exchange and wage rates. The most important determinants of this model, after estimation, are the announced inflation target and the stance of fiscal policy, as proxied by the primary surplus, which serves to capture expectations of future monetization. The point estimate of the coefficient on fiscal policy, in fact, indicates that a one percentage

point increase in the primary surplus coincides with a one percentage point decrease in inflationary expectations. Consistent with expectations, a positive inflationary pass-through is found with a depreciated exchange rate (as prices of imported consumer goods and also intermediate goods rises); the wage variable also exhibits the expected sign (positive), also indicating an increase in inflationary expectations due to demand pressures (the lagged nature of the variable may also indicate a labor cost of goods to consumer price pass-through as well). An important finding, uncovered through recursive estimation, is that “since early 2003, and particularly during 2004, the demonstrated commitment to inflation targeting ...and monetary policy has begun to pay off, as expectations are [more anchored in the] target and less dependent on past inflation” (Cerisola and Gelos, p. 12). In fact, as shown in the graph below, which

shows the coefficients from a recursive estimation of the expectations equation, the inflation target and primary surplus now account for more than 60% of the variation in (explainable) expected inflation. This suggests

Figure 3.3 Contribution of Variables to Expected Inflation



Source: Cerisola and Gelos (2005), p. 15.

that, along with the SELIC rate itself, the government’s policies nearly completely shape inflationary expectations and that through diligent stewarding of these variables the government can lower the wedge between real and nominal interest rates.

This paper has now made one case for lowering interest rates: lower expectations of future inflation coupled with improved predictive power of those expectations vis-à-vis inflation's realized values. If this improvement is sustainable, the Bank should pay it credence, lowering rates in lockstep with the improved (predicted) inflation outlook. Indeed, as the epithet to this chapter suggests, a central bank's actions are influenced heavily by forecasts. As those forecasts project a more benign inflationary environment and as they become more reliable, the bank should feel comfortable taking a more accommodative stance in its monetary policy. This does not address the question of real interest rates, however. The remainder of this chapter will seek to a) discover whether real interest rates are high in Brazil when compared to comparable countries and b) decompose the real interest rate half of the Fischer equation into its relevant subparts, looking both at historical levels of these variables and their drivers, as well as expected future levels to estimate the effect of each going forward on the Bank's policy decisions.

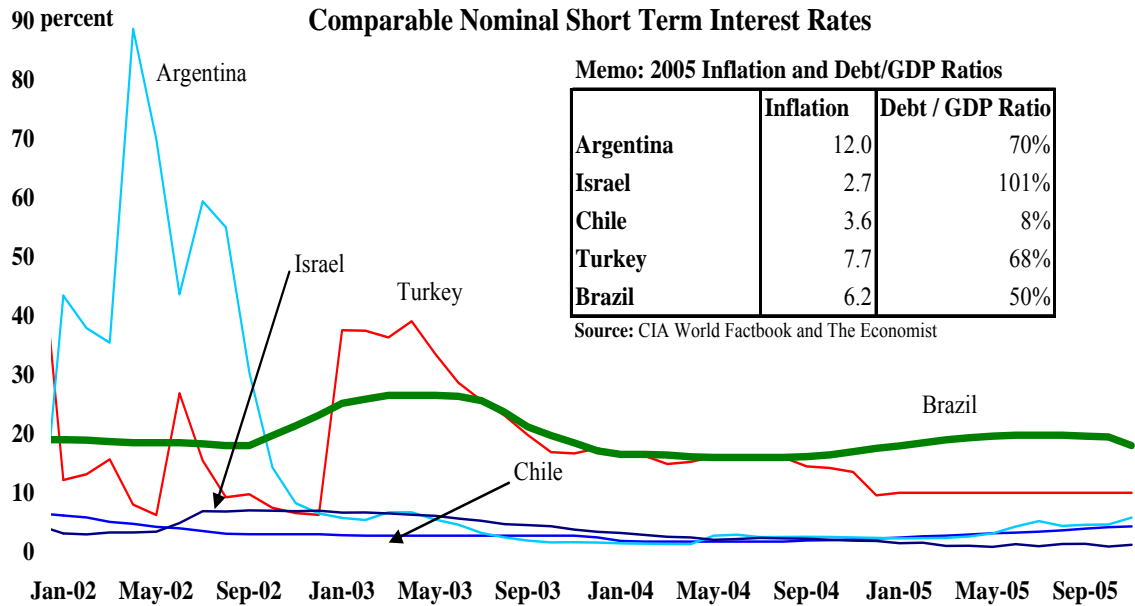
Real Interest Rates: Comparisons and Determinants

Interest rates in Brazil are high by any standard. Despite the country's recent economic success, rates exhibit stickiness with respect to historical levels. Comparing the country to economic comparables sheds some light on the subject. The graph below shows short term interest rates in five countries, including Brazil.³ In the case of Chile the rate presented in this exhibit is the policy rate set by the Central Bank of Chile (the TPM), while in the case of Argentina, Israel and Turkey the rates presented are the one-day BAIBOR rate (for Argentina) and the interest rate on deposits held within the Banks of Israel and Turkey, respectively. These countries are all good comparables for Brazil,

³ The countries in this analysis have not been selected at random. Others have compared this group due to their analogous episodes with hyperinflation and stabilization. See, for instance, Beckerman (1992).

and even if we were to aggregate the rates, the average interest rate lies nearly monotonically below that of Brazil in the post-Real Plan era.

Figure 3.4 Comparable Nominal Short Term Interest Rates



The persistence of Brazil's high interest rates is striking in this graph, especially when considered side by side with the hyperinflationary experience and economic crisis of 2002 in Argentina (the contagion from which didn't affect Brazil nearly as badly as the initial crisis affected Argentina), and the relatively recent conquest of hyperinflation in Israel and Turkey (early 1980s and 1999, respectively). The countries (even Turkey) have returned to nominal rates well below Brazil's and are relatively indistinguishable at present from industrialized economies (with the exception of Turkey). The experiences of these countries seems to have completely been forgiven by investors, as rates were high for a short-period of time and have since returned to the levels one would expect in the absence of dire financial crises: except in the Brazilian case, where one could look at

these relatively risk-free rates (*this is the overnight lending rate used between banks!*) and suspect that the country was in the midst of a financial meltdown. An oft-cited reason for Brazil's high interest rates is its level of public debt. In this peer group, Brazil fairs very well in that category, with a lower public debt / GDP ratio than all but Chile, and half of that of Israel (CIA World Factbook data). Indeed, this common explanation does not hold water when attempting to justify Brazil's high interest rates. Nor do differences in inflation explain the difference in these interest rates. Furthermore, while not theoretically correct, if one were to use past inflation as a rough proxy for expectations, it is easy to back-out a real rate for each of these countries (table below).

Without a doubt, the real rate in Brazil at year-end 2005 was exorbitant when compared to its peers, two of which exhibit negative real interest rates!

Table 3.1 Comparative Nominal and Real Rates

	Nominal Rate	Inflation	"Real" Rate
Argentina	5.8	12.0	-6.2
Israel	1.2	2.7	-1.5
Chile	4.3	3.6	0.7
Turkey	10.0	7.7	2.3
Brazil	18.0	6.2	11.8

Note: Inflation rates as reported in *The Economist*, December 24 2005, and are year-over-year changes to Nov. 2005 with the exception of Turkey (Dec.).

Muinhos and Nakane (2005) give some statistical footing to this assertion about the high level of real interest rates. They employ various measures, including (but not limited to) a HP-filter smoothing, and I/S curve extraction, and an extraction from estimating the marginal product of capital to find significant differences between Brazil's equilibrium real interest rate and that of other economies. Their work does not seek to explain the difference in rates, only to validate the assertion that the wedge does in fact exist statistically. In every specification of their models, the rate for Brazil is significantly higher than that of its peers.

Standard international economics textbooks posit that the real rate of interest is intertemporally equalized across countries.⁴ The evidence at hand suggests this is not the case, as the striking difference of Brazil's nominal interest rate in the graph above is not accounted for solely by differences in inflation. This point would be even more clear if the above chart were to include fully industrialized economies, which exhibit nominal rates categorically lower than the countries in the above panel.

All of these standard economic models make some simplifying assumptions which do not hold in the Brazilian case. Specifically, they assume that long-run purchasing power parity holds, meaning that inflation rates between nations either converge or are equalized through exchange rate movements. They assume that default risk is the same across countries, that perfect convertibility between currencies exists, and that there is no liquidity constraint on government securities. A sustainable fiscal position is assumed in standard models, and these models also assume perfect jurisdictional certainty, meaning that disputes over contract values will be adjudicated in a predictable fashion and that there is no relevant adjudication risk in the country; this hypothesis in particular builds on the "original sin" work developed by Hausman, et. al. (2003), which says that once countries begin to dollarize their financial liabilities it is difficult to de-dollarize them, in part because of the aversion of local currency denominated debt due to this jurisdictional risk. The relevant data on Brazil indicates that none of these simplifying assumptions has held in the past and that while some of them do in fact hold today, there is still a wedge between theory and practice due to what for Brazilian Central Bank head Arminio Fraga has called "...weak macro regimes ... and a long history of misbehavior" (Fraga, 2005, p. 297).

⁴ Most include a footnote or caveat to this statement, but it is seldom emphasized. See, for instance, Husted and Melvin (1998).

Apologists for Elevated Real Interest Rates

Three basic hypotheses explain the persistence of high real interest rates in Brazil: the “bad equilibrium,” insufficient fiscal adjustment,” and “sequence of negative shocks.” In the “bad equilibrium” argument, monetary policy is seen to have been necessarily conservative in the pegged exchange rate regime (1994-1998) in order to compensate for the high (and accurate) risk of devaluation. In this case the economy was using a foreign-exchange anchor that lacked credibility and perceived sustainability. However, the nominal target was changed to the inflation rate with the maxi-devaluation in 1999 and the move to inflation targeting. In the post-float, inflation-targeting regime (1999-present), the appropriate adjustment was not made in interest rates at the time of the float and now policy is not able to suddenly shift them down. The basic tenant is that very high real interest rates raise the level of risk on government debt, and so a lower real interest rate brings down the possibility of default and thereby justifies a lower country risk premium and a lower interest rate. This theory deserves some attention because if applied properly, it describes the Brazilian case fairly well. It is easiest to portray this multiple equilibrium model graphically (and not algebraically), so consider the graph below: the horizontal axis is the domestic interest rate, and vertical axis is the risk-adjusted return on foreign assets in local currency terms, $(1 + i^* + z)$. The non-linear function (that appears to be a sine wave) is the expected return on domestic financial instruments, including an adjustment for possible default. This function is non-linear because initially higher interest rates imply higher expected returns but if they raise too much, increased bankruptcy risks due to higher debt service burdens increase the bankruptcy risk. However, as the interest rate gets too high the possible default risk may go down, as the government acts to alter perceived default risk (through IFI lending or

through the creation of a budget surplus). At certain prohibitively high levels of interest, however, unstable debt dynamics dominate and the expected return plummets.

Regardless of where on the curve interest rates are, in equilibrium, this function must intersect the exogenously-set international rate of interest. In this model, point A is the stable, low interest rate equilibrium, B has a low interest rate but is unstable, C is the high interest rate equilibrium, and D is an unstable high interest rate locus. Imagine the economy was operating at point A when it was hit with an external interest rate shock, that temporarily moved the foreign interest rate relationship from the solid to the dotted line. Once this shock was removed, the economy would move to point C, not to point A. This is the argument of the bad equilibrium hypothesis, some of whom use the 1997

Asian Financial Crisis as

Figure 3.5 Stylized Depiction of a “Bad Equilibrium”

this exogenous shock

(Palley, 2003). The

challenge in their minds is

to move Brazil from point C

to point A.

This theory amounts to

a sort of chicken-and-egg

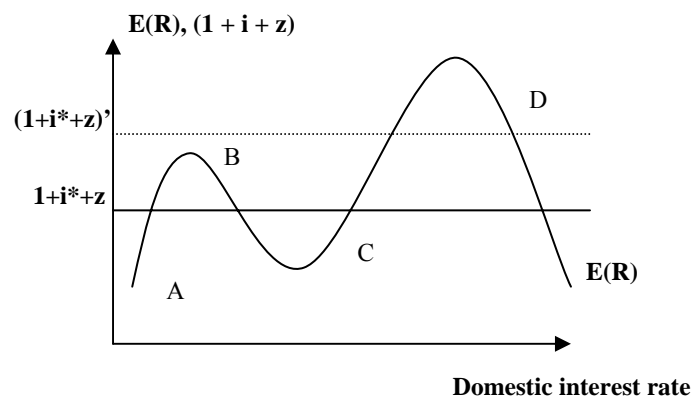
argument, and in their oft-cited work on Brazilian interest rates, Favero and Giavazzi

(2002) argue that Brazil “should not rely on a transition happening automatically” (p. 6).

Instead, Brazil should follow the example of other countries that have made a similar

transition: endure a large primary surplus for a protracted time in order to justify the

lowering of the SELIC rate.



This prescription follows logically into the second hypothesis, which says that fiscal adjustment is not yet complete. Despite a sizeable primary surplus, the debt/GDP ratio remains high enough to continue to crowd out private sector funding needs (as that debt is rolled over before it is retired), which raises the market interest rate. The policy prescription here is the same: continue to run a fiscal surplus in order to bring down rates by reducing the amount of government debt outstanding.

The “adverse shock” hypothesis claims that shocks to the economy such as the U.S. stock market, 9/11, Lula, and the Argentinean meltdown have forced the Central Bank to use interest rates to smooth volatility that otherwise would have crippled the economy (notwithstanding the crippling effect of the high interest rates). Proponents of this theory would then argue that in the absence of further shocks, interest rates will soon begin to move to lower levels. In essence, the argument is that ex post rates are high (because inflation has not picked up, nor did the risks to the economy really materialize), but ex ante they are in line with theory and the prevailing risk assessment at the beginning of the terms of the rates. While theoretically sound, the analysis of the data presented earlier reveals a *non-sequitur* in this argument: the economies that actually had the fall-outs have already seen their rates recover and Brazil’s rates (ex-ante *and* ex-post real rates as well as nominal rates) are persistently high (see introduction and this chapter, above). Apologists for the theory counter that Brazil’s case was peculiar: monetary policy had to be excessively tight to make sure credibility was maintained for the incipient inflation targeting regime, as well as to defect the exchange rate. Evidence to that point is that the real money stock from Sept 2000 – Mar 2001 fell by 3.8%, though it had increased 8.6% the previous year (Vieira de Faria, 2003). Furthermore, an exchange rate-based response to these crisis may not have worked because of the dollarized nature

of the country's public and private liabilities: the effect of a depreciation is indeterminate as exports are increased but net financial liabilities increase as well. Because of these points, "Central Bank autonomy in the process of setting its key interest rate is more theoretical than real" (Vieira de Faria, 2003, p. 46). Even if Brazil's interest rates should have recovered from these shocks three years hence, a dedollarization of financial liabilities would help the countercyclical nature of exchange rate adjustments become more effective in the future, thereby putting less pressure on monetary authorities to alter the basic cost of capital.

Historical Factors and Current Realities of High Real Interest Rates

The challenge, then, is to identify what measurable factors are influencing the real interest rate and to suggest policies which will influence those mechanisms in order to justify a lower real interest rate. This section of the paper lends heavily on the vast literature, pioneered by Favero and Giavazzi (2001) and mentioned in the introduction which seeks to explain various components of the real interest rate. The goal will be to act as a compendium of that research and to look at the current performance of the Brazilian economy and how it fits into the models estimated by these economists.

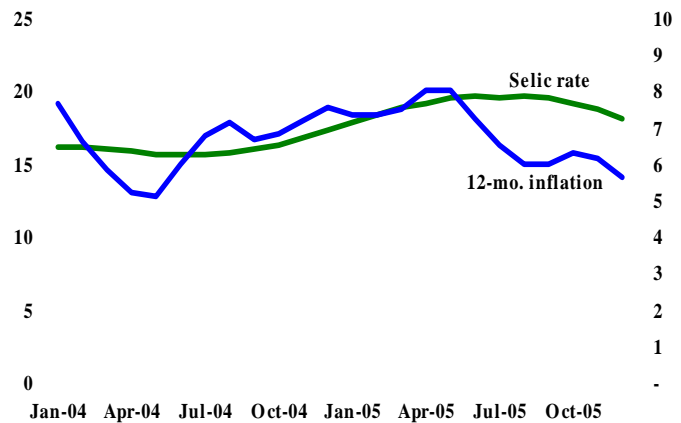
In their work, Favero and Giavazzi find that there are two major factors which influence the country's interest rates: monetary policy and term premia. They estimate a Taylor rule for Brazil, noting this simple rule explains the actions of the bank very well. Furthermore, they estimate that the equilibrium policy rate (the rate consistent with zero accelerating inflation) is around 17.6 percent. This rate, called the "neutral rate" by some economists is extremely high (for reference, the Federal Reserve estimates the neutral rate in the United States to be between three and five percent⁵). A first read of this paper

⁵ While not an official estimate, numerous Fed Governors and staff have put the estimate in this range. See, for instance, money.cnn's interview with St. Louis Fed President William Poole (11/10/2004).

may leave the impression that this is an open-and-close case: interest rates are high out of necessity to stabilize inflation. Indeed, the average SELIC rate in 2004-2005 was 17.7% and inflation has essentially been stabilized in those two years, as indicated in the chart at right (through Dec. 05). What this ex- post modeling misses, however, is why the rates have to be so high in the first place. Indeed, the oscillations in the SELIC rate in the last two years, indeed in the six years of inflation targeting, have accurately shaped expectations of future inflation

and have helped to control inflation during this time. Could the same oscillations not occur in a range of 8-10%, or 5-7%? Why must the level of interest rates be so high if it is the change in rates that controls inflation by marginally curtailing or encouraging activity?

Figure 3.6 Recent Trends in SELIC and Inflation



Favero and Giavazzi argue that one important factor pushing up the high neutral rate is fact that the BCB enjoys none of the institutional guarantees that other central banks have in their mandates; “we know of no other central bank that successfully operates an inflation targeting regime and is not formally independent” (p. 5). This point cannot be stressed enough; in their work on Brazilian inflation in the pre-Real Plan era, Tullio and Ronci (1996) estimate that a Phillips Curve that includes a proxy for the lack of political independence of the Central Bank⁶ that shows that it is strongly correlated

⁶ Their proxy is determined by the turnover in Central Bank governors and chairmen.

with inflation and accounts for a portion of the rampant inflation this period.⁷ This lack of independence, then, directly influences the real rate, as argued by Favero and Giavazzi, as well as pushes up the nominal rate through increased inflationary expectations. The importance of independence has a long history in the economics literature and its conclusions are summed up very well by Alan Blinder, who writes:

Monetary policy requires long time horizons because the lags through which interest rate changes affect output and inflation are typically long. If monetary policy decisions were left to politicians, on a day-by-day basis, the temptation to reach for short term gains at the expense of the future (that is, to inflate too much) would be hard to resist, especially in the run-up to an election. Knowing this, many governments wisely try to depoliticize monetary policy by, e.g., putting it in the hands of unelected technocrats with long terms of office and insulation from the hurly-burly of politics. (Blinder, 1998, pp.56-57.)

As discussed, Brazil does not belong to this “wise” group of nations with depoliticized central banks. Recent changes and stirrings in Brasilia towards increased Central Bank independence should be applauded, then, and will be discussed in more detail in the conclusion of this work.

In terms of longer policy rates, they employ a system of equations to simulate future SELIC rates in order to give estimates of theoretical rates of longer maturities that are based solely on monetary policy rates.⁸ Their conclusion is that almost all (95%) of the spread between observable long-term rates and this theoretical rate is explained by term premia and not by uncertainty about monetary policy. Their conclusion is valid based on their assumptions, but incorporating the work of Cerisola and Gelos (2005, discussed above) on inflationary expectations shows that those same fundamentals and

⁷ One could make the reverse argument: high inflation causes turnover (i.e. the firing) of Central Bank officials. Tullio and Ronic report Granger causality tests which refute this alternative interpretation.

⁸ Their dynamic simulation is based on a simple Taylor rule and is closed by an equally uncomplicated model of inflationary expectations, which is based solely on the target rate of inflation and its recent performance. Their model is overly simple and ignores the factors which affect expectations, as discussed in the previous part of this chapter. However, this simple specification does fulfill their goal, which is a simulation of *ceteris paribus* future policy rates.

debt dynamics are also an important part of agents' expectations of inflation and should not be ignored when analyzing short-term interest rates. Because of that important transmission channel, Favero and Giavazzi's findings on long term rates can be extended to considerations of the Selic rate as well.

Since these term premia are not affected by devaluation expectations, Favero and Giavazzi conclude that the spread is caused by macroeconomic fundamentals and debt dynamics. Specifically they point to the level of government debt and the volatility of international financial markets as influencing the perceived risk of government default. When internal financing rates are widely determined by international markets, and the government debt is large, the default risk is highly affected by the correlation of the growth rate of output (which in turn affects the level of the primary surplus) with financial spreads. This additional consideration in the Brazilian case implies that a larger-than-otherwise necessary surplus is required to make the debt sustainable and to bring down the cost of capital. Favero and Giavazzi point to the experience of Italy in the mid-1990s when a one-year primary surplus in excess of 6% of GDP was interpreted as a commitment to a more responsible fiscal policy and which began a virtuous cycle that helped move the country towards a permanently lower cost of debt.

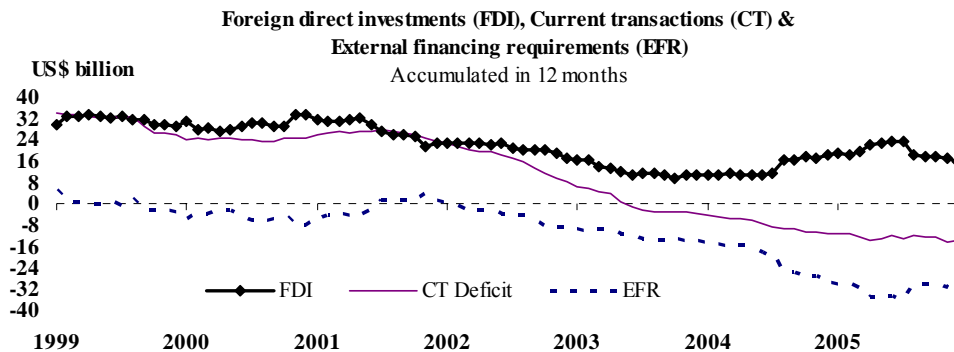
The driving forces identified thus far are a large and unmanageable (not to mention dollar-denominated) national debt and the lack of institutional independence granted to the Central Bank. While the work of Favero and Giavazzi and others in this area is accurate, this particular policy mix alone will not bring about the panacea of lower real interest rates that the country so desperately needs. More recent work points to other factors which need to be considered as well in order to bring about the level shift in the country's cost of capital.

In fact, some of this work refutes the analysis of Favero and Giavazzi to a limited extent. Writing in 2003, Thomas Palley notes Brazil's current debt situation implies dynamics that cannot avoid default – at existing real interest rates, the surplus needed to stabilize the debt would need to be 5.1% of GDP in order to stabilize the debt, alternatively noting that in the growth of national debt as a percentage of GDP is given by the following equation: $g_{D/Y} = i + \left[\frac{d}{Y} \right] \left[\frac{Y}{d} \right] - g_y$. At the time of his writing, the domestic interest rate, $i=18\%$, the deficit/GDP ratio, $d/Y = -3.75\%$, the GDP/Debt ratio $Y/D = 1.67\%$ and GDP growth $g(Y) = 3.5\%$, implying that interest rates, i , needed to fall to 9.75% just to stabilize the debt ratio (Palley, 2003). At the time of this writing, the relevant indicators were $i=17.25\%$, the deficit/GDP ratio, $d/Y = -5.6\%$, the GDP/Debt ratio $Y/D = 2.59$ and GDP growth $g(Y) = 2.5\%$, implying that interest rates needed to fall to around 12% to make the debt sustainable. While this is slightly more palatable than the estimate above, it is still clear that the current 17.25% interest rate prohibits debt sustainability. This same doomsday scenario was put forth in a 2002 critique of new IMF lending from the Washington-based Center for Economic and Policy Research, which argues that “[assuming the most optimistic of scenarios] .. stabilizing the debt-to-GDP ratio through primary surpluses would not be potentially achievable” (Weisbrot and Baker, 2002, p. 3). These scenarios have not, as of yet, played out because of the aggressive debt management policies of Lula, which will be considered in the conclusion of this work.

Fiscal concerns are not the only ones that affect the real interest rate, however. Arguing for a broader “Monetary Conditions Index,” Carneiro and Wu point out that small countries in the global economy often times have a peculiar combination: high real interest rates and deficits in the current account. Using panel data, they show that (on

average) “every 1% increase in the current account deficit (as a percentage of GDP) is associated with an increase in real interest rates of 20 to 30 basis points” (2004, p. 304).⁹ Furthermore, they report a strong statistical relationship between the size of the current account deficit and the real interest rate (measured *ex post*). The theory here is relatively straightforward: increases in the current account deficit create an external funding need which can only be satisfied in the risk-adjusted rates of return for new (marginal) borrowing are sufficient. To the extent that Brazil ran significant trade in the period through 2003, this explanation is valid. However, the argument loses validity when considering the persistent trade surpluses generated by the country since mid-2003 (see chart below). To their credit, Carneiro and Wu only consider data through 2000 (though

Figure 3.7 Brazilian Balance of Payments



their work was published in 2004). Is this the break-down of a previously persistent statistical (and theoretically sound) relationship, or did the work suffer from misspecification? It seems unlikely that this misspecification would hold true across a panel of 20 countries, as Carneiro and Wu estimate. More likely than not, as Nobel prize winning economist Joseph Stiglitz writes, “Brazil’s financial markets today are probably a good example of excessive pessimism” (Esterl, 2002). As argued in the inflation

⁹ My translation of the original text, written in Portuguese.

expectations section, it is the position of this paper that the markets are persistently slow to adapt to the evolving insertion of the Brazilian economy into the global marketplace.

This basic idea is supported further by the decomposition of what are called “the cousin risks,” the country risk and the currency risk, so-called because of their highly cointegrated nature (Garcia and Didier, 2001). This work has shown that one of the components of Brazil risk, that of convertibility risk, was very important through the time of the international financial crisis of the late-1990s but no longer has statistical significance. In fact, this decomposition has shown that in the post-inflation targeting period, the currency risk can be estimated at above 5% per year, while the explicit Brazil risk is less than 3% (Garcia and Dider, 2001, p. 32).¹⁰ The irrationality hypothesis, then, is supported in light of the 18-month rally of the Real vis-à-vis the dollar though December 2005, along with the strongly export-driven current account surplus, juxtaposed with the persistence of high real interest rates. If the market had foreseen this performance, interest rates would have dropped significantly, but they didn’t.

Another persistent aspect of the Brazilian economy which contributes to high interest rates is the so-called jurisdictional uncertainty. No long-term market for credit exists in the country, and the only long-term credit available outside of the country is that which is denominated in dollars. Arida et. al. (2005) argue that this inability has produced an important new risk element in the country, that of uncertainty over the adjudication of contracts, as well as enhanced currency risk in light of the dollarization of financial liabilities. The authors argue that a policy aimed at correcting this uncertainty would lower interest rates through an increase in convertibility (or liquidity) of the

¹⁰ Admittedly, this estimate came before the explosion in the country risk premium associated with the Lula election, but as levels have returned to “normal” since that time, the author feels the statement is still valid.

currency, as well as a reduction in the effort costs of the Central Bank to artificially lengthen the maturity of that portion of the national debt that is denominated in local currency. The perception of the riskiness of Brazil's currency and the inability of agents to enter into long-term financial contracts in their home jurisdiction adds to the interest rate dilemma, then, by increasing demand for short-term credit and making the future even less easy to predict.

Existence and Causes of High Interest Rates

In short, interest rates are high in Brazil because of perceptions and expectations. Inflationary expectations are the major driver of interest rates, and Brazil's volatile past with respect to inflation rates have left a permanent scar on economic agents' ability to foresee the future. Furthermore, it may be in light of this inability that monetary policy has been excessively punitive, in order to curb inflation in a worse-case scenario sense (i.e. when realized inflation is even greater than the prevailing expectation). Real interest rates are also high. When compared to other countries that have similar macroeconomic fundamentals and problems and have weathered, (or even caused) some of the shocks that flustered the Brazilian economy, the prevailing interest rate in Brazil is persistently higher. The economy's debt position, including its level, its indexation to the dollar, and its growth, all contribute to the inherent risk of lending in the country. A net importing position has also added to those external financing requirements, further altering perceptions of the sustainability of the economic model the country is pursuing and raising the cost of capital. It is the assessment of markets that necessitate these high interest rates and no sudden change in the rate would be accepted – instead it would cause capital flight and currency depreciation, as the country would be deemed even more risky. But expectations take time to evolve. The conclusion of this paper will examine the most

recent Brazilian economic data and argue that a fundamental change has occurred, one that is still awaiting the approbation of the international financial community.

CHAPTER 4
O JEITO JURÍDICO BRASILEIRO: COPING WITH THE PROBLEMS RESULTING
FROM HIGHLY ELEVATED INTEREST RATES

Interest rates have been extremely high in Brazil even given the highly unpredictable economic environment and to attempt to control inflation, which has rocked the country's stability since the late 1950s. As argued by da Cunha and Ferreira (2004), the cost to individuals of this punitive monetary policy is equally extremely detrimental to individuals who do not have access to long-term credit. These same costs are experienced by firms, which must forecast their performance (and that of the overall macroeconomy) when deciding their optimal capital structure and in making financing decisions. The consistently high interest rates (from which ex post real rates are difficult to accurately forecast) implies a business environment that inhibits balanced growth. However, during that time Brazil has had impressive periods of growth and has seen industrialization and wealth creation for many of its citizens. The mechanisms that have allowed this growth to occur despite crippling high real interest rates are the subject of this chapter. First this paper will examine the peculiarities of Brazilian finance at the firm level, later turning to peculiarities more personal in nature.

Firm-Level Financing Decisions

The large overhang of government debt (a true *hang-over* from times of large budget deficits) has a deleterious impact on Brazilian firms. Government issuance of debt needs to be purchased by investors: this pushes out the demand curve for capital and, in doing so, increases the equilibrium interest rate in the economy (as discussed in

the previous chapter). The result is known as “crowding out,” in which government debt, by definition less risky than debt of Brazilian national firms without access to international funding, takes available, investable savings “out of the system.” The result is a credit crunch for Brazilian firms, that is to say a scarcity of capital and the *de facto* imposition of capital constraints for firms. These capital constraints have been verified empirically by many scholars, most recently Bonomo et al.(2003) and Terra (2003). Both papers examine sales accelerator investment models of investment. In this model, if all the factors that influence investment are accounted for, cash flow should not affect investment decisions. Stylistically, if a firm has no credit constraints and subsequently a project exhibits an expected return above the marginal cost of capital, it should be pursued regardless of the firm’s cash flow position at that time. However, if the cash flow variable explains some part of investment decisions, then there is evidence that the firm faces a credit constraint and can only make those decisions in economic “good times” of high cash flow. In both papers, significant levels of credit constraint are shown for all Brazilian firms.

Terra (2003) bifurcates the analysis by using panel data and aggregating the regression results by firm type and also by the level of dependency each firm shows with respect to external financing. The tested hypothesis is that firms that are more international in nature will exhibit less credit constraint. A second hypothesis is that firms that are more dependent on external finance will invest more when capital inflows are high (and consequently firms’ access to credit is less constrained). A perhaps obvious result follows: firms that are multinational and/or larger in nature show less credit

constraint than more domestic/smaller firms, particularly in periods of high capital inflows.

The implication of this result is made obvious when comparing the composition of private, corporate sector debt: firms that are large and multinational comprise more than half of private sector debt and that share increases in times of rising or elevated inflation (Tullio and Ronci, 1996). Large firms, generally less risky, are more able to handle the disclosure costs of debt finance, and can marginally raise debt finance at less of an impact to the cost of equity.¹ Moreover, these firms can more easily tap international debt markets, sometimes borrowing at rates that are preferential to those that the government receives (more of this below).

Impacts on Large Firms

Size is also an interesting component to the equity financing of these firms:² in the post-Real Plan era, over 70 Brazilian firms have directly listed their stocks on the New York Stock Exchange through the American Depository Receipt program, or ADRs (State Department, 2005). ADRs allow the firms to sell their equity on U.S. markets in shares that are denominated in dollars, both improving liquidity and removing investor-level uncertainty over foreign exchange effects. This cross-listing has made their stocks more liquid and has forced upon them US GAAP reporting standards, both measures presumably serving to lower the cost of capital of these firms by increasing the desirability of their equity issues. This increase in ADRs coincides with the opposite phenomenon in the São Paulo stock exchange, the BOVESPA, as the number of firms

¹ Consider a firm with R\$ 1 million in equity and a firm with R\$ 100 million in equity. A R\$1 million debt issuance makes the equity in the first case much more risky, all else equal.

² This is, of course, inextricably linked to the interest rates through the CAPM relationship.

listed on the BOVESPA fell 15% from 2001 to 2003 (BOVESPA data). In bypassing the Brazilian equity markets and raising money abroad, this subset of Brazilian corporations hopes to be able to raise money at rates that are effectively lower than the risk-free rate in Brazil. Raising this money in foreign markets should lower the aversion of the typical international investor, as ADRs are, by their very nature, free of foreign exchange rate risk. This hope has not materialized, however. The cost of capital for firms that list as ADRs does not materially differ from those that only list in São Paulo (Hail and Luez, 2005), 20.0% vs. 21.4%. However, this result does not hold across companies from all countries (the panel is of over 30 countries), but is largely consistent for all countries in Latin America.³ This result implies, then, that the cost of increasing a firm's dollar based equity (though revenues are principally in *reais*) is not always justified by a lower cost of capital. However, these firms do exhibit common characteristics which explain their propensity to cross-list on the NYSE. De Medeiros and Tiberio (2005) employ a logit model which proves that the propensity to cross-list is governed by some important principles. Firms that are larger, as noted, tend to cross list, as do firms that are highly active issues on the BOVESPA. Firms with a high market-to-book ratio also experience an increased propensity to cross-list, perhaps because the benefit to doing so is greater (because their stocks are worth more). Also, firms with better corporate governance standards exhibit greater probabilities of being cross-listed. All of these relationships are as expected, and may relieve some of the credit constraints of these firms, but do not remove the fundamental result of Hail and Luez (2005), which is that these firms do not enjoy significantly lower cost of capital, despite their ability to raise equity abroad.

³ Indeed, WACC estimates for Brazil vary by more than the other Latin America nations, which exhibit the same similarities in sample means (Hail and Luez, 2004).

Indeed, something systematic (and, as noted, outside of currency considerations) is raising the cost of capital for these firms; they seem to suffer greatly from the same *Brazil risk* that haunts the government's key interest rates.

These ADRs are just one piece of a complex financing strategy that helps large firms try to evade the problems associated with costs of constrained capital. Firms often employ multi-tiered financing strategies. In addition to listing both on the NYSE and the BOVESPA, paper-marker Aracruz diversifies its debt structure across many interest rate mechanisms and currency denominations (chart at right, below).⁴ The firm has interest

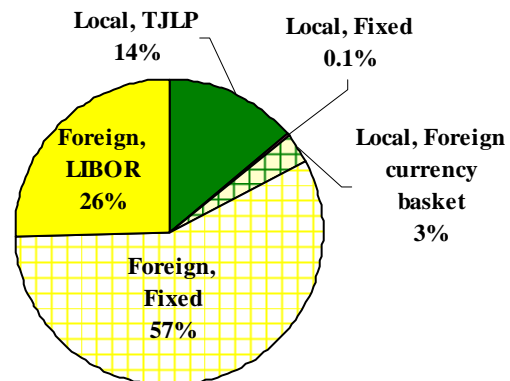
rates that are tied not only to the SELIC rate (those contracts which are indexed to the *Taxa de Juros de Longo Prazo*, Brazil's government-set long term interest rate), but also to the LIBOR rate and to the movements of a basket of currencies.

Importantly for the firm as well is the fact that it issues debt in both *reais* and dollars, creating a natural hedge for its dollar-denominated revenues.⁵

One impressive facet of this debt finance is the low interest rates associated with the various tranches of the firm's long term debt. The local currency denominated tranches are financed mainly through bonds linked to the TJLP and the spread over the TJLP that Aracruz pays implies yields on these bonds of less than 10%, markedly better

Figure 4.1 Aracruz's Debt Structure

Foreign Currency Denomination and Interest Rate Determination of Aracruz's Debt Structure



Source: 2005 SEC Filings, EDGAR database

⁴ This section relies solely on the author's analysis of the firm's 2005 20-F Filing with the SEC, available on-line from the SEC EDGAR database.

⁵ In 2005 the firm reported that 98% of its revenues were denominated in dollars (company form 20-F).

than the overnight Selic rate discussed above. Even more impressive, though, is that the yield on the foreign currency denominated bonds is less than 6%, similar to average risk North American firms. How does Aracruz borrow at rates preferential to those of the Brazilian national government? One answer to this question is that a large portion of these loans come from the National Economic and Social Development Bank (the BNDES) and is effectively subsidized: the Brazilian government lends the money at rates that are below its own cost of capital. This subsidy is somewhat recovered by the Bank through the large equity stake that the BNDES holds in Aracruz. The firm also benefits from below market-rate debt financing from the World Bank and the International Finance Corporation, both at rates below 6%. Thirdly, the scope and dominance of Aracruz in its sector may imply that indeed its operations justify a smaller risk premium than that assessed to the national government.

Aracruz is not alone with respect to Brazilian firms that seek to lower their cost of capital through international debt issuance and other financing activities. An analysis of other Brazilian mega-firms will reveal similar patterns: financing subsidized by the BNDES (who is often a large equity holder in the firms), ADRs that serve to increase equity liquidity, and loans from multi-lateral financial institutions that offer loans at highly preferential rates. State oil firm Petrobrás issues long term debt at much better rates than the federal government, with coupon rates on its bond ranging from 3.7 - 9.7%⁶ In the notes to its financial statements, the firm remarks that its long term borrowings “consist primarily of the issuance of securities in the international markets, debentures in the domestic capital markets, financing from the BNDES, and ... facilities guaranteed by

⁶ As of this writing, the bonds were trading at values immaterially different from their book values, so this comparison is valid.

other multilateral agencies” (Petrobrás Form 20-F, 2005, p. 105). It adds that short term credit is “derived mainly from commercial banks including trade lines of credit and commercial paper,” and that interest rates on its short term instruments range from 2.86-6.01% (Ibid., p. F-20). This firm, then, shows no capital constraint and can easily tap into international markets, perhaps even more easily than the Brazilian government itself. The interest rates that it pays are comparatively low (though the reader should be reminded that they are essentially free of foreign exchange risk, since they are denominated in dollars).

These two mega-firms can effectively bypass the problems associated with high domestic interest rates by raising capital internationally (though the question remains to be answered with respect to the overall cost of capital, implying highly irregular equity risk premiums – this question is beyond the scope of this work, though).⁷ The cases of Aracruz and Petrobrás are not unique, however. An examination of any of the Brazilian megafirms will reveal similar characteristics (low interest rates, liability dollarization) and perplexities (why does the government subsidize so much of these firms’ capital?).

Impacts on Smaller Firms

A more interesting question, however, is the manner in which firms that are smaller can raise capital for their operations. Terra (2003) and others have shown that firms that do not fall into this category show significant credit constraint and oftentimes cannot undertake profitable projects because of the scarcity of capital. Yet these firms

⁷ The cost of capital for a firm is determined by: $w_e * k_e + w_d * k_d$ or the sum of the products of the portions of capital and equity in the firm’s capital structure with their respective after-tax costs. This analysis is mainly concerned with the term k_d , while the observation made here refers to a high cost of equity, k_e .

continue to exist and, in many cases, to grow. What is the source of their financial constraint, and how do they finance themselves in order to grow?

In 2003 the World Bank and the International Finance Corporation charted the World Business Environment Survey. Its mission is to assess the business environment of member nations with respect to opportunities and limitations for growth, government intervention, corruption, financing decisions, and expectations for the future. The dataset is rich, stratiating firms across countries and by size.⁸ The table on the next page was generated from this survey and speaks to two important questions: what is the source of financial constraint and how are firms financed? It reveals differences across firms' sizes that may, by now, seem obvious to the reader. A striking difference is the problems posed by high interest rates. 90% of small firms identify interest rates as a problem, while only 73% of large firms do so (which admittedly is still a high proportion). This difference does not even fully capture the impact of these rates, however, since a firm of 500 employees counts equally as a "large" firm as does a firm of 15,000 employees. Within the large firms there is a negative correlation between the value of a firm's fixed assets (as a proxy for size within the group) and the extent to which high interest rates are an inhibitor.

Interestingly enough, high interest rates are not the only variable for which there is a significantly different effect across firm size. For small firms, paperwork related to financing is a problem for over 55% of firms, while only 30% of large firms feel this constraint. This may, in turn, be related to the higher reported lack of non-bank equity, foreign bank lending, and export and lease financing available to smaller firms. If a

⁸ This dimension is a categorical variable: "small" is 1-49 employees, "medium" is 50-499 employees, while "large" is 500 or more employees.

Table 4.1 Source of Financing Constraints and Firm Capital

Financial Constraints Imposed by (a lack of):

	# of Firms	Collateral	Paperwork	Interest Rates	Special Connections	Money	Foreign Banks	Non-Bank Equity	Export Finance	Lease Finance	Credit
Small	30	43.3%	56.7%	90.0%	26.7%	16.7%	10.0%	23.3%	10.0%	6.7%	10.0%
Medium	141	44.0%	41.8%	83.7%	27.0%	9.2%	9.2%	14.9%	9.2%	3.5%	10.6%
Large	30	43.3%	30.0%	73.3%	30.0%	13.3%	6.7%	10.0%	6.7%	3.3%	10.0%

Source of Firm Capital

	# of Firms	Retained Earnings	Equity	Local Bank	Development Bank	Foreign Banks	Family Members	Money Lenders	Supplier Credit (A/P)	Leasing	Public Sector	Other
Small	25	58.4%	0.0%	11.6%	0.0%	0.4%	14.4%	4.0%	6.2%	1.0%	0.0%	4.0%
Medium	123	38.1%	6.8%	23.0%	2.1%	3.5%	3.9%	0.3%	12.2%	6.1%	2.1%	1.9%
Large	24	37.9%	4.3%	21.8%	1.3%	14.0%	0.8%	0.0%	7.2%	8.3%	2.1%	2.4%

Note: Not all firms answered questions regarding the source of firm capital

Source: Author's Calculations from World Business Environment Survey, from the World Bank

copious amount of compliance and disclosure is required, in addition to the bureaucratic costs for loan processing, it is easy to understand why smaller firms are not more externally financed. The same is true of subsidized credit from the BNDES, which would be included here as non-bank equity or as credit, depending on the arrangement. The lesson, then, would be to reduce the bureaucracy as much as possible in order to open up these preferential sources of capital to smaller and more medium sized firms. It is these smaller firms that truly need capital, but if the costs are too high and only a large firm can bear them (due to economies of scale), development initiatives are thwarted and credit is not optimally distributed. The survey also illuminates some differences in the source of firm capital, all of which naturally follow from the implications of the sources of financial constraint. A notable gap is in the financing which occurs through retained earnings. This internal financing implies a firm can only grow once it “gets going,” financing projects through profits. Nearly 60% of the capital of small firms is generated through retained earnings, while only 37.9% of the capital of large firms comes from this internal source. Local banks are also notably less important to small firms, accounting for twice as much of the capital of larger firms. There is a reversal between the categories of foreign banks and family members, with the former disproportionately financing large firms, and the latter being important nearly exclusively in the case of small firms.

This capital structure has important implications. In the case of large firms, they can expand through external financing, even when they are not growing organically. This option is not as available to smaller firms, who must wait for positive cash flows (and net income) to finance themselves through profits. Financing through family

members is an option, but it comes with an important theoretical concern: markets are not allocating these resources to the firms, rather it is familial allegiances that act as guarantors of the borrowed assets. While this arrangement commonly provides capital to firms, there is no mechanism to filter out bad investment ideas: presumably the funds are granted in a less stringent fashion than, say, a loan officer or private equity investor would undertake. A more competitive marketplace for smaller firms to bid for capital, then, would lower the cost of that capital for profitable projects and assess (and account for) the risk implicit in other, not as lucrative, endeavors. With more financing available in a competitive marketplace, entrepreneurs without the access to the “special connections” that makes financing easier for some will also be able to finance their ideas. Access to capital is one of the most important facets of successful new business development and a more market-oriented allocation would help Brazil to more efficiently allocate its relatively scarce capital. It is in this direction that the evolution of capital markets in Brazil should move.

Implications of Interest Rates for Individuals

If small firms are ill-prepared to pay high interest rates to finance their endeavors, individuals are even more poorly equipped to bear the cost of financing. The lack of long term markets denominated in *reais* discussed by Arida et. al. (2005) not only affects the level of interest rates through the jurisdictional uncertainty argument, but also affects the day-to-day financing decisions of Brazilian individuals. The implication is that finance is not available for things that citizens of other countries take for granted: mortgages have not achieved the penetration of economies with lower interest rates, automobiles and other consumer durables are largely purchased “*à vista*” (or for cash), and purchases on

crediário,¹ or in stores financed in “*até 6x sem juros*,” or in equally divided monthly installments (usually up to six months) to credit cards without any difference in the purchase price. All of these alternatives to traditional credit have evolved to fill a gap created by the unattractive nature of typical interest-laden installment contracts.

Mortgage Finance

In the case of mortgage finance, there are two systems which have evolved to help allocate capital to potential homeowners. An official government entity known as the *Sistema Financeira da Habitação*, the Housing Finance System or SFH, is the main system in the mortgage market. This system sets strict limits on the value of houses available for finance, and on the value and conditions of the loans. The financing for this system comes largely from the *Fundo de Garantia*, a compulsory savings account akin to Social Security in the United States. The original idea for this system was to offer below-market level interest rates for housing finance for lower income Brazilians. The reality, as documented by Fagnani (1996), is that a regressive allocation of housing finance resulted, with upper-middle class and upper class Brazilians receiving most of the subsidies.

The fund also experienced cash-flow cyclicalities: with contributions for fresh capital stemming from the worker’s fund and performance of loans linked to the unemployment rate, during the volatile periods of the 1980s and 1990s the fund was not able to provide necessary financing for homes (Borba, 2004). Because capital in the system became more scarce, interest rates remained high, despite an explicit government guarantee of the fund, and are now set at the reference rate plus twelve percent, which

¹ To the best knowledge of the author, this arrangement does not exist in the English-speaking world; accordingly, the Portuguese word will be used throughout the text when discussing this form of borrowing.

currently amounts to over thirty percent annually (Pinheiro and Cabral, 1999, and current BNDES data).

The joint effects of the cronyism with which funds were distributed and the cyclical nature of fund availability has left an unmet demand equivalent to 15% of the existing housing capacity, 84% of which comes from families which earn less than three minimum salaries a month and 81% of which consists of urban households, who seek funding to no avail (Borba, 2004). In short, the reality of this system has been to crowd out and/or raise the cost of home financing even more for that segment of society least able to bear its costs.

The second system, known as the *Carteira Hipotecária*, or Mortgage Portfolio, allows Brazilian banks to set the conditions of loans. The costs are even higher for these mortgages, as they are funded through popular savings accounts in the commercial banks that issue them and mortgage rates have historically averaged 14 to 16 percent above the reference rate, with the difference in rates between the *Carteira Hipotecária* and the SFH stemming from typical commercial banking spreads and the absence of the effective government subsidy in the administration of the loans (Pinheiro and Cabral, 1999). The problems with the *Carteira Hipotecária* are even more pronounced with respect to availability, as one must first have an account with a bank to receive a mortgage. In Brazil commercial banking penetration is below 50% and more than 1/3rd of individuals who would like a bank account do not have one (World Bank, 2003).

In response to these difficulties, the state of São Paulo has initiated its own program. Financed through a 1% supplementary tax, the Sao Paulo Housing and Urban Development Corporation has a statutory obligation to provide housing programs and

finance to families that earn between one and three minimum salaries per month, with preference to those earning three or fewer. In the years following the implementation of the policy, new production of houses in São Paulo state approached 300,000 units, with 75% of that production benefiting the lowest tier of income earners (Borba, 2004). This subsidized finance was subject to manipulation however, driving applicants to report lower household incomes in order to receive more subsidies (Borba, 2004). While the government is actively seeking to correct these distortions at the time of this writing, programs such as this should be replicated and improved upon in the rest of Brazil to mitigate the effects of high interest rates on the housing sector.

Everyday Financing for Individuals

In addition to the impact seen in mortgage finance, high interest rates and credit inaccessibility have impacts on the more day-to-day financing activities of individuals. To better understand these effects, the BNDES charted a survey in late 2001 in the cities of São Paulo and Recife to capture the demand for financing instruments and the methods people in the lower classes use to satisfy those demands (Brusky and Fortuna, 2002). This section leans heavily on their work, and extends it by looking at more recent data sources. They find that the credit most used by individuals can be categorized along the lines of formal, semi-formal, and informal, with a second difference existing between monetary credit and “parceled” credit, or credit that is extended for the explicit purchase of an asset.

The most formal credit offerings include loans from banks, personal lines of bank credit, cash advances on credit cards, and loans from microfinance organizations (in the case of monetary credit), and credit card, post-dated checks, and *crediário* (equally spaced charges to a credit card for a fraction of the purchase price) in stores. These

formal lines of credit are governed (as one would expect) by the rules of the Brazilian financing system, and to some extent, by the same rules as corporate lending. Individuals must be registered with the federal government, show proof of residency, show proof of income in the formal sector, and have good credit standing (as measured by the credit protection services *SPC* and *Usecheque*) (ibid., p. 17). Loans from this formal mechanism vary in duration from 1 to 36 months, with interest rates varying between 0 and 11.5% per month. Because of their more stringent conditions, and high interest rates, this method of financing is the least used by the lower classes of society.²

The semi-formal sector is much more utilized, especially in the case of parceled credit. Very few documents are required, and a clean credit history is not required, as the credit agencies are rarely consulted. What is much more important in this type of arrangement is the personal relationship between lender and borrower, with the types of instruments including loans from employers, *adiotas* (or loan sharks), loans from employee funds, supplier credit (in the case of small firms), and also *crediário* in *lojinhas*, or company stores. The terms are generally shorter (one to four months in duration), with interest rates running from 0 to 45% per month. While the rates are at times higher, this form of credit is more utilized because of the less stringent conditions under which it is granted.

The most commonly used method of financing for the masses is that of informal credit, as classified by Brusky and Fortuna. These instruments include loans from parents and friends, as well as take-now, pay-later schemes (*fiado*, or on faith, in

² An important exception is the case of *crediário*, which the authors note is “so important that even those who do not meet the conditions of use still manage to utilize it, often purchasing products in the names of the friends or parents.” (My translation, ibid., p. 21).

Portuguese), the use of the *crediário* of others, and the use of *sorteio*, or group savings plans in which members pool their funds for a determined amount of time, then take turns spending the accumulated funds. A reader less familiar with the Brazilian economy may ask why these funds are administered by groups, instead of being deposited in personal savings accounts that can be managed by each of the individuals. The reason is that these funds exist predominantly in the subsection of society that cannot legally have accounts at financial institutions. The terms of all of these arrangements are favorable, with interest rates between 0 and 5% per month, for one month, and no required documentation. The downside is that the limits of borrowing are generally lower, with notional amounts rarely exceeding R\$200. Despite these small amounts, it is much more common for individuals to borrow in this form than in more formalized mechanisms.

Despite the high level of interest rates in Brazil, the Brazilian economy has largely overcome the crippling nature of high interest rates with respect to the credit offerings. There exist instruments to mitigate this effect and to spread its cost around the economy (in the case of *crediário*, for instance, the real value of the purchase is eroded by interest-free installments). Pinheiro and Cabral (1999) identify three main institutions that allow these irregular credit offerings to flourish: a well-developed informational infrastructure (which essentially allows for the use of *crediário* and post-dated checks), the presence of public banks (which subsidize the cost of capital), and the use of group mechanisms to ensure repayment (which lower risk of lending to unsecured individuals). These mechanisms should continue to be utilized, as their existence will allow for even lower levels of interest rates once the central bank begins to inject more monetary stimulus into the economy. And until interest rates do decline, it should be the priority of all parties to

ensure that these mechanisms only become stronger to ensure some form of credit is available to those excluded from the formal sector.

The Disparate Effects of High Interest Rates

Brazil's high interest rates have effects on all segments of society and on all sectors of the economy. Multinational firms must be much more creative in their financing decisions in order to lower their cost of debt, issuing securities in multiple currencies. These liabilities create a mismatch in revenues and expenses (unless natural hedges exist) that must either be insured or factored in to the cost of debt. Because of their scope and size, however, these firms are best equipped to deal with the challenges of prohibitive domestic credit markets.

Small firms do not enjoy the same fortune. Oftentimes their lending is constrained, and expansions are limited to those which can be undertaken out of the firm's retained earnings or from additional paid-in capital from principal investors (most notably family members). Access to foreign banks is limited for this group, and family members and other allegiance-based arrangements oftentimes fill the financing gap in a less-than-efficient fashion.

High interest rates also have a strong impact on individuals. The mortgage market is largely unfinanced (due to the risk-laden nature of fixed-rate, long-term contracts) and undesirable (mortgages exceeding 25% annually need incredible land appreciation rates to be justifiable!). Even the purchases of domestic appliances and clothing are affected by these high interest rates, which (through the reference rate of the economy) affect the APRs on credit cards and other consumer debt instruments. Due to this otherwise activity-stopping effect, the economy has evolved with respect to consumers. Certain debt instruments rely on family or personal allegiance to lower the

perceived risk for the creditor, while other arrangements use group collateral or savings plans to spread the risk across individuals. Out of the necessity to sell their merchandise, department stores also become financing organizations, selling merchandise on *crediário*, allowing consumers to pay in installments, while transferring possession to (though not title of) the merchandise on the day of the sale. The burgeoning nature of these arrangements should be supported and will help to foster an even more diverse financing environment once interest rates move to more tolerable levels.³

The Brazilian economy has learned to cope with the reality of high interest rates. Without a doubt, however, these rates still have significantly negative effects on the economy. It is a testament to the spirit of the Brazilian people that economic growth has occurred in spite of the high cost of capital. One can only imagine what the ingenious Brazilian spirit could do in a more fertile economic environment.

³ Some of these instruments will likely disappear, as well, as there will be little or no need for certain of these instruments at lower levels of interest.

CHAPTER 5 CONCLUSIONS, RECENT OBSERVATIONS, AND FINAL REMARKS

This paper has shown that Brazil's economic history and structure have historically demanded the persistence of high nominal and real interest rates. Those rates have principally been necessary to combat inflation, though in periods of fiscal expansion they have, at times, fallen pro-cyclically, with expansions in the money supply merely accommodating the aggressive fiscal stance of government. The economy has been rocked by major shocks, not the least of which were the oil crises of the 1970s and 80s and, more recently, turmoil in emerging markets that all threatened contagion. These shocks have propagated through the real sector of the economy, as well as adding inflationary pressures.

The political economy has been a veritable laboratory for economic theory and practice. Incredible attempts at expansion and development led to overheating because of lack of external financing. The internal financing necessitated by this otherwise unfinanced policy resulted in hyper-inflation that was combated both with orthodox (austerity) and heterodox (manipulative) measures. Various attempts at stabilization failed by not addressing the most endemic problems of the economy, which could all be traced to theoretically apparent relationships: budget deficits, lack of regime credibility, self-fulfilling expectations and inflationary inertia. The plan under which the economy operates at the time of this writing has succeeded in stabilizing the economy in the last eleven years, bringing low-inflation growth, coupled with productivity advancements.

A review of the causes of high interest rates

Interest rates have not fallen from their historical levels. This paper has shown that the rates, whether measured in nominal or real terms, exhibit stickiness with respect to economic fundamentals and when measured vis-à-vis other economies with similar economic histories. In fact, countries whose crises have influenced the level of interest rates in Brazil seem to recover to neutral policy rates following those crises more quickly than does Brazil (which is only affected through contagion). When measured in nominal terms, they highly reflect the public's expectations of future inflation. Those expectations have historically been overly optimistic, though recently there is evidence that they are more centered on inflation's true, *ex-post* realized values. These expectations are driven by past inflation (the inflationary inertia effect) and by other observable economic phenomena. More recently, however, they have been dominantly determined by government policies such as the fiscal stance, the announced inflation target, and the government's inter-bank reference rate, *a taxa Selic*. This suggests that the factors determining inflation are well within the government's control, which in turn suggests that the level of nominal interest rates could be lowered following the proper macroeconomic recipe at the very least by lowering the public's expectation of inflation.

Several factors influence the real interest rate as well. Some have argued that monetary policy needs to be highly contractionary in order to quell inflation. These theorists point to an equilibrium, non-accelerating inflation rate of interest of nearly 18%. These statements are derived from an *ex-post* analysis of the data, and do not give us any insights into why interest rates have to be so high in the first place. Along the same lines, some have argued that the weak constitutional independence of the Brazilian Central Bank requires that interest rates be maintained at levels higher than those which would be

otherwise required, in order to send clear signals to the market of the Bank's commitment to the often politically unpopular fight against inflation. This effect has been quantified both on its influence on interest rates and indirectly on its influence on inflation. Brasília would be wise, then, to grant the bank constitutional independence, giving governors and the President of the Bank irrevocable terms of service that do not coincide with the political cycle.

More analysts of this question have pointed to the fiscal stance of government and the debt dynamics of the nation when seeking to explain high interest rates. Because public indebtedness is high, a high default probability is assessed, pushing up the endemic country risk. Furthermore, as a large portion of that debt is denominated in dollars, and the *real* has not been stable, the implied revenue/liability mismatch further adds to perceived risk. There is no doubt that the level of government debt is high in the country, and the government should continue to maintain primary surpluses in order to pay down that debt.

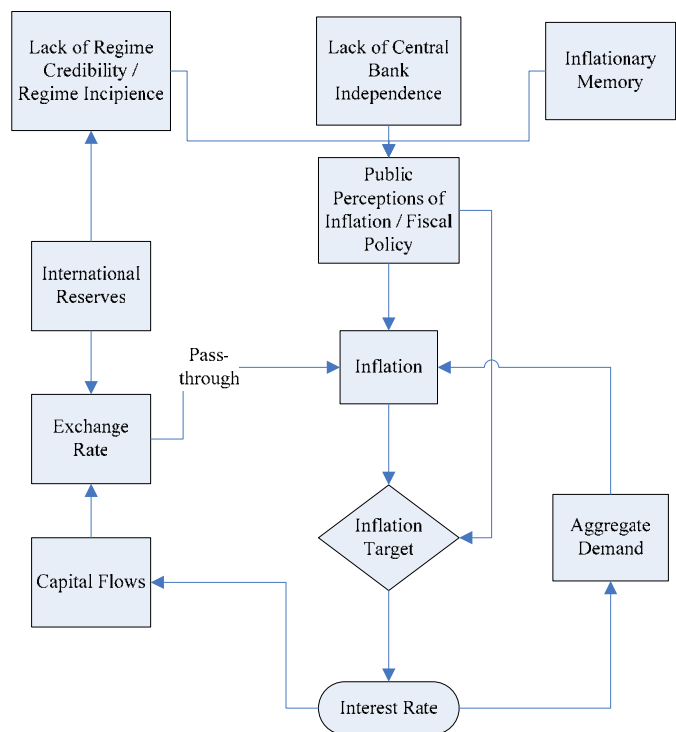
The insertion of the Brazilian economy into the global economic scene has long been cited as a cause of high interest rates. Maintaining a current account deficit puts significant downward pressure on the exchange rate, endangering price stability through exchange rate pass-through and adding to the equilibrium level of external financing requirements of the economy. The low-liquidity of Brazilian currency internationally has also been cited historically as a cause of high interest rates, but work using more recent data has rejected that assertion.

Finally, there is significant evidence from Brazil and other emerging economies that there is an "original sin" from issuing government debt denominated in dollars.

Once that dollar debt is available, aversion to local currency issuance lowers the liquidity of the existing debt, and raises the market-clearing interest rate for that debt as well. In the Brazilian case, it is argued that this effect has been so strong as to eliminate the possibility of long-term, local currency-denominated debt. Existing debt, moreover, is deemed so unattractive as to raise the risk associated with adjudication and valuation, a risk known in the literature as jurisdictional uncertainty. In Brazil, the institutions that would eliminate that adjudication risk are weak and should be strengthened in order to set the stage for a robust local, long-term market for credit.

All of the relevant determinants of interest rates are brought together in the flowchart at right. The model is an extremely interconnected one, and steps to delink these causal mechanisms will take time. Building regime credibility, for instance, will only lead to lower interest rates once the public factors that credibility into its expectations, and once those new expectations lead to lower inflation, which will in allow the Central Bank to lower interest rates.

Figure 5.1 Flowchart of Interest Rate Determinants



The Show Must Go On: Evolutions of Very “Brazilian” Credit Mechanisms

The marketplace has evolved in Brazil to mitigate the effects of these high interest rates. Large firms effectively bypass the problem by raising money abroad. Those with access to these loans often times make acquisitions abroad just to diversify their asset base and to be able collateralize new obligations in dollars. These same firms often qualify for sub-market rate loans from development banks and organizations, most notably the Brazilian state-run national development bank, the BNDES. These mechanisms allow these firms to lower their cost of debt and continue to finance their activities.

Smaller firms are somewhat more constrained. Expansion in these firms is somewhat limited by profitable activities; investment activities in these firms are disproportionately financed from retained earnings. Furthermore, relationship finance (family members, friends, etc) is extremely important to these firms. The implication of this finance is clear, however: there is no market mechanism or due diligence to filter out bad investment ideas and the resulting allocation of credit is often times highly inefficient.

For individuals, access to credit is varied. Bank penetration is low, and is often times limited to those individuals in the formal sector of the economy. Mortgage credit is often subsidized but ironically limited to the wealthy, or those with special connections because of the bureaucratic nature in which the credit is issued. There is evidence, however, that this is improving, as mortgage funding increased 55% in 2005 from the previous year, though still not enough to cover the housing deficit (PREI, 2006). Lending has increased an average of 40% annually since 2003, when the Central Bank began to put the pressure on commercial banks to provide funding (Inter-American

Dialogue, February 2006). This growth cannot continue *ad infinitum*, however, especially if interest rates do not fall further.

Smaller financing decisions by individuals are also affected by these interest rates. Low bank penetration has obviated the use of extensive use of credit cards, though those that have bank accounts often times finance through post-dated checks, credit cards, and lines of credit. Those that do not make use of store finance options, use collective arrangements, or use the credit of family and friends. While all of these options have enabled the economy to continue to function, lower interest rates coupled with increased personal banking would allow the economy to perform much more efficiently and would lead to more equality of economic opportunity.

Epilogue: Recent Data and Trends¹

In the most recent economic data, there is reason to believe that the forces are in play to enable a measured lowering of the key interest rate in Brazil. Inflation has been low, well within the range of the Central Bank's targets since early 2004, with consensus estimates for inflation in 2006 in the mid-point of the Bank's range. Year-over-year real GDP growth continues to be strong, with the most recent reading of 3.1% in third quarter of 2005 almost 75% driven by internal demand. Unemployment was categorically lower in all of 2005 than in the previous four years, with the December reading of 8.3% the lowest Brazil has seen in that entire period; formal job creation exceeded 1.5 million in the 12-months to December 2005, while an expansion of investment created expanded industrial output without inflation-building pressures on capacity, which saw utilization of 81% in the most recent data. The announced targets for inflation are 4.5 for the next

¹ This section presents data that is public and widely available, most readily from the website of the Brazilian Central Bank (www.bcb.gov.br).

two years, and the Bank seems to have achieved credibility, as consensus IPCA data is for inflation of 4.7 and 4.5% in 2006 and 2007, respectively; expectations have exhibited a nearly monotonic decline since 2004 and are now approaching levels of more advanced economies. The strengthening in the *real* has continued, with an additional 10% appreciation since the beginning of 2006. This has not affected the exportability of the Brazilian economy, however, as export prices have nearly doubled since the beginning of 2003 and export growth has accelerated markedly, creating a current account surplus for the first time in recent history in 2003; that surplus has been sustained since 2003 and hit a record of 45.4 billion dollars in 2005.

Public debt management is also improving. 2005 saw a primary surplus of 4.8% of GDP, and the average for this surplus was 4.5% in the period 2004-2006. The debt/GDP ratio closed the year at 51.6%, down from a ten-year high of over 60% in 2002. Market expectations are for a further improvement, with forecasts of around 45% by 2009. The portion of the debt that is linked to foreign currencies is declining, and is quickly approaching zero: reductions of 9.4, 25.7, and 25.3 billion dollars in the most recent three years have brought the level of foreign currency denominated debt to less than 5%, down from over 40% in 2002. This has not entirely taken place through the retirement of the debt, as part of this reduction has been achieved through the roll-over of that debt into local-currency denominated bonds, the first one being issued in September of 2004. This is a significant achievement for Brazil, which previously suffered from the “original sin” of dollar-denominated debt (Hausman et al., 2003). This change has greatly improved Brazil’s resilience to exchange rate shocks: the Central Bank now estimates that a 1%

change in the exchange rate would have less than a 5 basis point impact of the debt/GDP ratio, down from a high of 35% in 2002 (Bevilaqua, 2006).

There is some evidence that interest rates have begun to fall. The market-measured “Brazil risk” is now half of what it was in early 2004 and the real interest rate (as measured by 360-day swaps) is near 11%, down from an average of 15.2% for the same measure in 2000-2003. The January 2006 meeting of the monetary council lowered the Selic rate from 18% to 17.25%, followed by another cut in March 2006 to 16.5%, with indications that further rate cuts may follow. Time will tell if these rate cuts materialize and make rates in the country more comparable to that of its peers. Brazil’s commitment to sound policies may be rewarded in the long-run, then, and may soon be a textbook example of slow adjustment rather than one of irrational pessimism and undue punishment.

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BIOGRAPHICAL SKETCH

Ed Johnson will graduate in May, 2006 from the University of Florida with a Master of Business Administration, with concentrations in finance and competitive strategy, and with a Master of Arts in Latin American studies, with a concentration in the Latin American business environment. His passion is Latin America; he has made several trips to the region and speaks Spanish and Portuguese. Before graduate school, he was a research assistant for the Federal Reserve Board of Governors in Washington, DC, working on macroeconomic forecasting and analysis for the Federal Open Market Committee. While at Florida he has worked for ExxonMobil Corporation and Johnson and Johnson, principally on inventory and supply chain initiatives. Upon graduation he will join Deloitte Consulting's Atlanta-based Strategy and Operations practice as a Senior Strategy Consultant. He holds a B.A. in economics and Spanish from the College of William and Mary in Williamsburg, VA. A native Virginian, Ed currently resides in Gainesville, FL.