INDOSUEZ W.I. CARR SECURITIES

Latin America Economics Research

# Oedipus and the Sphinx

November 9 1999

## Why currencies overshoot

**The performance of the BRL indicates that the currency is probably much weaker than its long-term sustainable level. It seems to us that the BRL is following a classic overshooting process, as required by the arbitrage conditions between onshore and offshore risk-adjusted interest rates.**

**We estimate that the long-term sustainable level for the BRL is close to the BRL1.70-BRL1.85 per USD, already accounting for the inflationary process that follows the devaluation. If these calculations are correct the BRL is 4% to 13% undervalued, which – coupled to an 1-year interest rates on the vicinity of 22% per annum – makes the currency quite attractive.**

**Under this perspective we se further room for lower interest rates. Under the current conditions we believe that lower rates would have little, if any, impacts on exchange rates. Eventually, however, as the currency gets closer to the long-term level lower interest rates should increase the volatility of the BRL, just as the overshooting model would predict.**

**The Central Bank now has additional ammunition to cope with the volatility problem. Yet, the Central Bank must not give in to the temptation of containing normal volatility resulting from the usual operation of the floating rates market: this is the result of the normal arbitrage between onshore and offshore rates. Intervention should be used only to cope with temporary imbalances in currency flows.**

**Alexandre Schwartsman (55-11) 3038 1999**
aschwart@br.indocarrsec.com

# Introduction

**The BRL looks quite cheap**

What is the "equilibrium" level of the BRL? We do not really know (if we knew we would probably not be writing economics research, but enjoying life in a luxurious tropical island[1]), but there are some consistent indication that it is not between the current BRL 1.90-2.00 per USD[2]. We believe it is probably closer to BRL 1.70-1.85 per USD, even accounting for the inflation that followed the devaluation. But then, why is the BRL so cheap?

Thinking about the subject we came to believe that the "overshooting" of the BRL can be explained in terms of the traditional models that stress the arbitrage between local and offshore interest rates as the driving force behind changes in interest rates. The essential story is more or less as follows.

Under perfect capital mobility, a wedge between onshore and offshore interest rates (adjusted for risk) would have implications on reserves (if a country adopts a fixed exchange rate regime) or on the exchange rate (if a country adopts a floating rate regime). If local rates were lower than offshore rates, then reserves would drop in a fixed rate regime, leading to higher domestic interest rates and eventually restoring the equilibrium[3].

**Under a floating regime the nominal exchange rate usually overshoots relative to the long-term level**

Under a floating rate regime, however, the mechanism would have to be completely different. By definition, under this regime, reserves are constant. This means that the money supply is fixed, and therefore – assuming that local rates are lower than the offshore counterpart – it is the nominal exchange rate that must bear the burden of the adjustment. In order to assure the arbitrage between local and offshore interest rates the nominal exchange rate must be expected to ***appreciate*** in the future. Thus, at the ***initial*** moment it must devalue well beyond the long-term "equilibrium" level, so that it can be expected to appreciate as it moves back to this long-term equilibrium. Along this path the (risk-adjusted) difference between onshore and offshore interest rates is exactly matched by the expected currency appreciation.

In other words, exchange rates have to depreciate more than the required by long-term equilibrium consideration (i.e., overshoot the long-term level) to assure that dollar adjusted returns on local and offshore securities become the same.

With that in mind we can not only understand the overshooting movements of the BRL observed since January 1999, but also predict that volatility should be the trade mark along the remainder of 1999 and (more strongly so) during the first half of 2000. We do believe that the inflation targets are consistent with lower interest rates, and therefore that the Brazilian Central Bank will move to reduce the current overnight rates. But then, if our reasoning is correct, this should eventually create a wedge between local and offshore rates, sparkling a new round of nominal adjustments in the exchange rate. True, the Central Bank now

[1] Doing economics research of course, but just for the sake of it.

[2] We will show the evidence ahead.

[3] Unless the Central Bank engages itself in sterilized intervention.

has further ammunition to reduce exchange rate volatility, there is no perfect capital mobility in Brazil, and there nothing prevents changes in risk perception that offset the impact of lower interest rates. Still, we believe one must understand this process, and this is the objective of the present paper.

## Overshooting models

If Rudi Dornbusch is eventually awarded the Nobel Prize there will be little doubt about the reason: he was the first to understand and explain the mechanism through which the currency overshooting works[4]. His approach essentially mix a long-term view of the exchange rate based on the purchasing power parity (PPP) doctrine with the observation that in the short-term sticky prices[5] prevent the fast adjustment of exchange rates to the PPP level, and therefore that real exchange rates are more volatile than PPP would suggest.

**Non-arbitrage requires equality between onshore and offshore interest rates**

In addition to that his approach stresses the asset price nature of the exchange rate. On this issue, the non-arbitrage condition under perfect capital mobility requires that the interest rate differential between onshore and offshore rates to be equal to the expected depreciation of the currency plus a certain risk premium (which we assume constant)[6].

$$i = i^* + E_t(e_{t+1} - e_t) + \rho \qquad (1)$$

PPP, on the other hand, implies that domestic prices, P, are given by international prices, P*, multiplied by the nominal exchange rate (P = EP*), or using logs:

$$p = e + p^* \qquad (2)$$

Absolute PPP, as expressed above, implies that domestic inflation must be equal to international inflation plus the depreciation of the currency.

$$\pi_{t+1} = (e_{t+1} - e_t) + \pi^*_{t+1} \qquad (3)$$

Deducting expected inflation from both sides in equation (1), we arrive at the non-arbitrage condition for real interest rates, r, expressed as:

$$r_t = r^*_t + E_t(s_{t+1} - s_t) + \rho \qquad (4)$$

where s is the real exchange rate defined as s = e + p* - p. If PPP were valid instantaneously, the very definition of the real exchange rate s would imply that it must be constant. Assuming however that prices are sticky we can see

[4] Dornbusch, R. "Expectations and Exchange Rate Dynamics", ***Journal of Political Economy*** (1976) 1161-1174. The description of the model above follows Caves, R.E., Frankel, J.A. and Jones, R.W. ***World Trade and Payments 6th edition*** (1993), 579-591.

[5] In the sense that goods prices adjust slower than asset prices.

[6] In equation (1) i stands for the log of 1 plus the nominal domestic interest rate, i* for the log of 1 plus the nominal offshore rate, e for the log of the nominal exchange rate and ρ for the log of 1 plus the risk premium.

deviations of the real exchange rate from the constant level implied by PPP, even though in the long-term we can expect prices to eventually converge.

**Convergence to PPP implies regressive expectations**

As a result we can also expect the real exchange rate to revert to the long-term PPP level, denoted by $s_L$. If this is true then expectations of the real exchange rate should be ***regressive***: if the real exchange rate were weaker than its long-term PPP then we would expect the real exchange rate to appreciate. Conversely, if the real exchange rate were stronger than its long-term PPP level we would expect it to depreciate over time. Mathematically:

$$E_t(s_{t+1} - s_t) = -\theta(s_t - s_L) \qquad (5)$$

Therefore the path of real exchange rates would be given by:

$$s_t - s_L = -1/\theta\,(r - \rho - r^*) \qquad (6)$$

**When domestic interest rate declines the currency must weaken to make up the difference**

What this tells us is that whenever a country presents (risk-adjusted) domestic interest rates lower than offshore rates, it is necessary that the current real exchange moves above its long-term PPP level (overshoots). Then the future expected appreciation makes up for the difference between the (risk-adjusted) domestic and offshore interest rates.

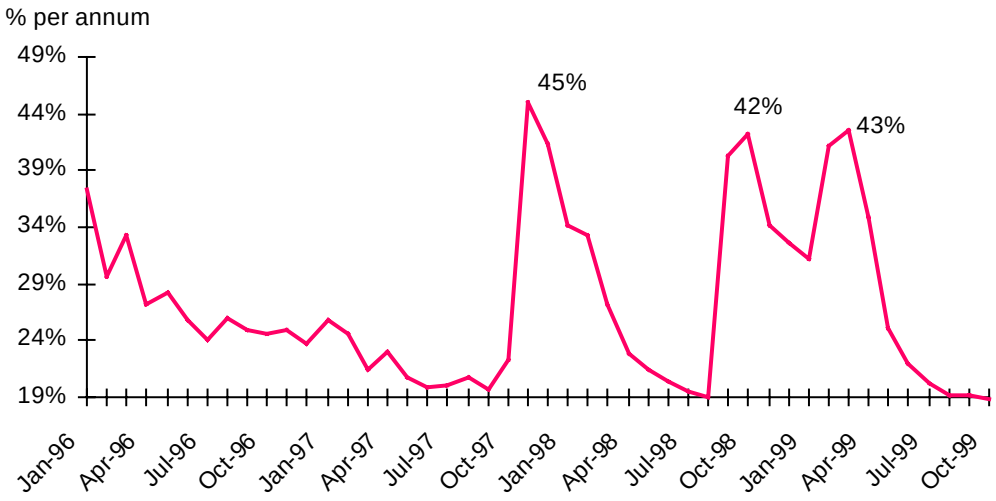
Thus, if a country expands its money supply by, say, 10%, we would expect prices to go up by 10% in the long-term and the nominal exchange rate to follow suit, so as to converge back to the original real exchange rate level. Yet, in the meantime the expansion of the money supply drives down interest rates, pushing the currency well above the long-term PPP level. That is, changes in the money supply tend to produce proportionally larger changes in exchange rates, meaning that volatility is in the very nature of the floating exchange rate regime.

We believe the analysis above is very helpful to understand the likely path of exchange rates in Brazil from now on (we should see how as we move along[7]), once the country is currently in a floating rate regime, and the current account is already moving to a sustainable path. Yet, it seems that there is something missing. After all, in the immediate aftermath of the adoption of the floating rate regime interest rates practiced in Brazil were extremely high, with overnight interest rates reaching more than 40% per annum. How could an overshooting be associated with such interest rates[8]?

[7] Actually this is the main purpose of the present paper.

[8] Notice that real interest rates were quite high as well, reaching some 25% in March 1999.

**Nominal overnight interest rates in Brazil - % per annum**




Source: Economatica

Paul Krugman[9] made an interesting addition to this approach, introducing the issue of the current account slow adjustment to the currency depreciation (the J-curve) in the overshooting model. The essential features of the Dornbusch approach were maintained, in particular the non-arbitrage condition (1) and regressive expectations (5).

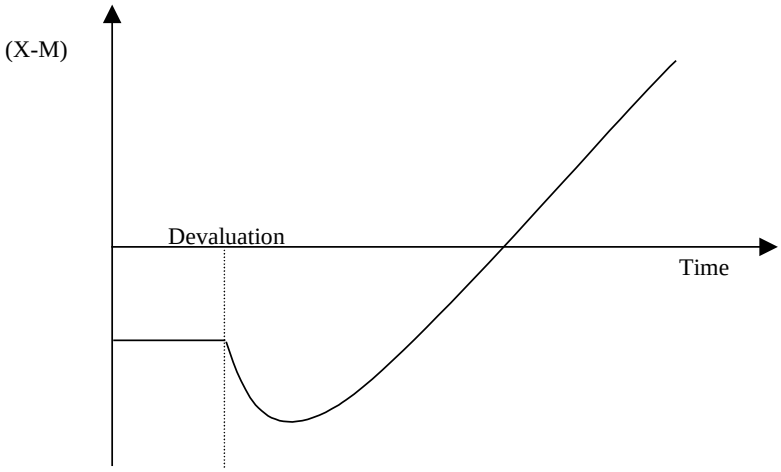
He added, however, a link between real interest rates and real exchange rates, via the current account deficit. From the national accounts identity we know that the current account deficit (imports M minus exports X) are identical to the excess of investment I over savings S.

$$M - X = I - S \qquad (7)$$

An increase in interest rates should reduce the gap between investment and savings (investments decline and savings increase), whereas a real devaluation of the currency should, after a while, reduce the current account deficit. Yet, in the short-term the effects of the devaluation are not large, and it is conceivable that in the immediate aftermath export prices actually decline, so that the first effect of the devaluation is to increase the current account deficit. Eventually, however, the positive effects prevail and the current account deficit declines, following the J-curve pattern.

[9] Krugman, P. "The J-Curve, the Fire Sale and the Hard Landing", ***AEA Papers and Proceedings*** (1989) 31-35

**The J-Curve**




Suppose then that the risk perception of a country increases substantially, so that the risk-adjusted interest rate differential becomes strongly negative. The currency then depreciates in response to the risk-adjusted interest rate differential, but the current account does not react immediately, because of the J-curve dynamics. The rate of capital inflow, therefore, cannot be reduced. The currency depreciates more to assure the current account financing than would be required to reduce the current account deficit. As the current account reacts and external financing needs decrease, the overshooting gradually subsides: the exchange rate appreciates and real interest rates decline.

This approach captures, we believe, a crucial element of the Brazilian economy: the existence of a large current account deficit (at the moment of the devaluation USD 33.6 bn), and a slow response of the trade balance to the devaluation. It helps make sense of the initial overshooting of the currency back in January and February.

Yet, that said, it still to be proven that the currency has indeed overshot, and that the analysis above is of any relevance to Brazil. To see that we should now proceed to estimate the likely value of the long-term exchange rate in Brazil. If indeed we conclude that the currency is substantially above the long-term level, we would have proved the case for the overshooting[10]. Furthermore, there are implications for monetary policy that need to be addressed carefully as well. These are the topics of the next 2 sections.

[10] Or, at least, made it more likely.

## The long-term equilibrium exchange rate

**PPP is the usual methodology to assess long-term exchange rates**

The usual approach to determine the long-term real exchange rate level is to use the PPP theory. As we said above, the overshooting models actually use PPP as the basis for the long-term real exchange rate, anchoring the long-term level of the currency.

At first sight PPP seems a straightforward technique. From the PPP definition of the previous section (P = EP*), all it takes is to deflate the nominal exchange rate by some domestic price index and inflate it by some international price index to find the series of real exchange rates. Then we choose a base period during which the currency seemed to be in equilibrium, and bingo: it is now only a matter of comparing the current real exchange rate to the equilibrium level. End of story.

**There are, however, conceptual difficulties**

Unfortunately, there is more than meets the eye in the application of this seemingly simple technique. First, what is the correct definition of the nominal exchange rate: measured against the USD or against a basket of currencies representative of the trade partners? Then, what is the relevant price index to use: the CPI or the WPI? Finally, what is the foreign price level measure: US PPI or a basket of PPIs (or even the CPI)? Finally, how do we define a period of long-term equilibrium to choose as the basis for the PPP calculations?

### Do it yourself: perform your own PPP calculations

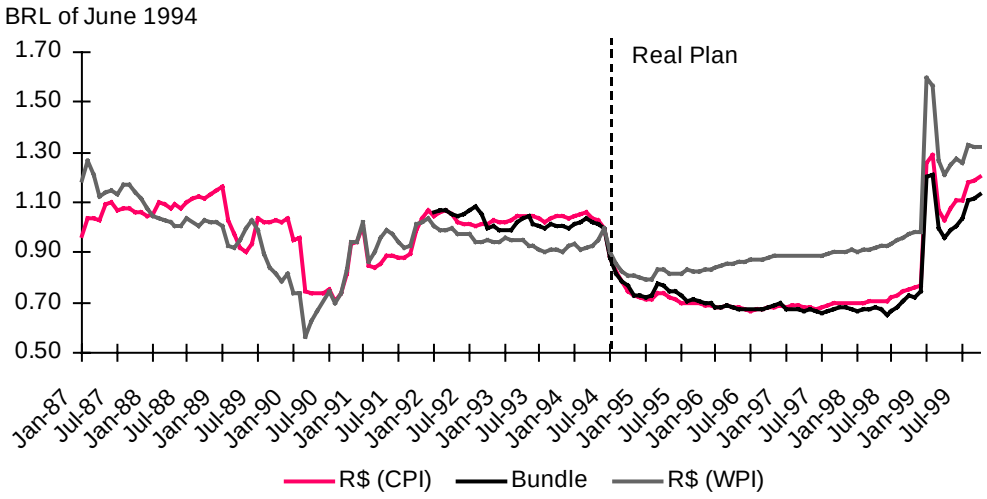
| *Nominal exchange rate* | *Domestic price index* | *Foreign price index* |
|---|---|---|
| Against the USD | CPI | PPI-US |
| Against the currency basket | WPI | PPI-currency basket |

Source: IWICS

We do believe that the correct price index to deflate the nominal exchange rate is the CPI. As we wrote last month[11], we understand the real exchange rate as the ratio of traded to non-traded goods. As the CPI displays a larger measure of non-traded goods it allows a better measure of the real exchange rate. Yet, there are many other analysts who use the PPI to perform the same calculations and – as the chart below shows – there are large differences in the performance of the real exchange rate series depending on the choice of the domestic price index.

[11] Please refer to our previous Oedipus and the Sphinx "Why there is no repressed inflation", October 7, 1999, specially pages 3 and 4.

**Real Exchange Rate**

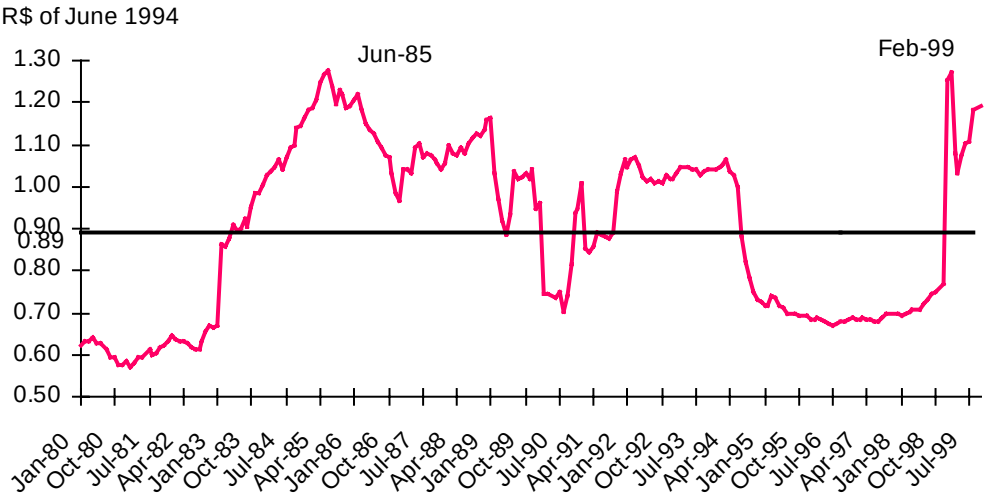



Source: IWICS

In particular, the difference between the real exchange rate calculated according to the CPI and PPI in December 1998 reached some 28%[12] and – with figures like that – it is no wonder the disagreement among the analysts about the correct level of the real exchange rate.

Let's, however, assume these problems away, and consider that the relevant measure for the real exchange rate is the nominal exchange rate against the USD, deflated by the domestic CPI and inflated by the US PPI (we present the series below). When was the currency in equilibrium during the last 20 years?

**Real Exchange Rate (measured against the CPI)**




Source: IWICS

[12] The real exchange rate measured by the PPI was 28% weaker than the CPI measure. This difference reduced to 10% in October 1999.

**PPP would require a 16.5% devaluation in December 1998**

There is no answer for that, but, if the story about the real exchange rate reverting to its mean is correct, we can treat the average real exchange rate in the period as an estimate of the PPP level. ***This measure would imply that the BRL at the eve of the devaluation required a 16.5% correction to reach the long-term equilibrium level***.

**An alternative methodology puts the required devaluation in December 1998 at 25%**

We developed an alternative measure of the required devaluation of the Brazilian currency[13] based on the notion that past equilibrium exchange rates are of little use as guide to current equilibrium exchange rates. Typically countries that allow their currencies to appreciate experience current account deficits and a correspondent increase in their net foreign liabilities (debt, for short). In order to pay for the accumulated debt this country would have to generate (after the appreciation episode) higher trade surpluses than the required prior to the appreciation. The real exchange rate consistent with those higher surpluses is the equilibrium exchange rate. Following this methodology we found that the required devaluation of the BRL in December 1998 was around 25%.

Finding the "equilibrium" real exchange rate and the required devaluation of the currency, however, is still only part of the story. We still have to find what is the nominal exchange rate consistent with such real exchange rate. That is, we need to account for the fact that a fraction of the devaluation dissipates as domestic inflation (pass-through), and does not translate into an effective change in relative prices. Let the required devaluation be denoted as $\sigma$, the nominal devaluation as $\varepsilon$, inflation as $\pi$ and the pass-through coefficient as $\alpha$. Considering that the real devaluation is given by:

$$1+\sigma = (1+\varepsilon)/(1+\pi)$$

and that inflation is $\pi=\alpha\varepsilon$, the nominal devaluation consistent with the required real devaluation can be expressed as:

$$\varepsilon = \sigma/(1-\alpha-\alpha\sigma) \qquad (8)$$

Thus, if indeed the required devaluation is 25% and the pass-through coefficient is 30% the nominal devaluation must be 40% [0.25/(1-0.3-0.3*0.25) = 0.40]. Considering that the nominal exchange rate was at BRL 1.22 per USD just before the devaluation, the "equilibrium" nominal exchange rate would be around BRL 1.71 per USD (1.22*1.40). The table below displays the estimated values for the nominal exchange rates for different values of the required devaluation (from 15% to 30%) and different values of the pass-through coefficient (from 10% to 40%).

[13] This was originally presented in our Food for Though of October 15 1998, "What is the required devaluation of the Real?" and more recently extended under the form of a working paper ("Real Exchange Rates and Current Account Sustainability") available at request.

**"Equilibrium" Nominal Exchange Rate**

| *Required real devaluation* | *Pass-through 10%* | *20%* | *30%* | *40%* |
|---|---|---|---|---|
| 15% | 1.43 | 1.46 | 1.50 | 1.56 |
| 20% | 1.50 | 1.54 | 1.60 | 1.69 |
| 25% | 1.57 | 1.63 | 1.71 | 1.83 |
| 30% | 1.64 | 1.71 | 1.82 | 1.98 |

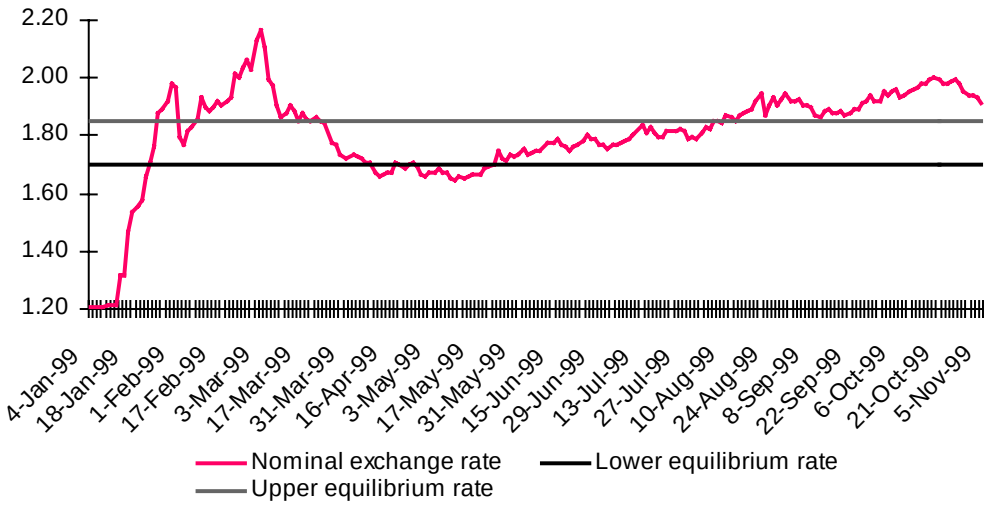
Source: IWICS

If one believes in the PPP calculations (which we do not) and a pass-through between 30% and 40% the "equilibrium" nominal exchange rate would have to be between BRL 1.50 to BRL 1.55 per USD. Following the alternative approach, in our preferred cases the "equilibrium" nominal exchange rate would be between BRL 1.70 to BRL 1.85 per USD.

**PPP requires the exchange rate at 1.50-1.55 and the alternative approach at 1.70-1.85**

If the calculations above are correct, then at the moment of this writing the currency is between 4% and 13% above its long-term level. At the worst moment (at the beginning of March) the overshooting reached between 17% and 27% relative to our estimated long-term level. At any rate the currency seems cheap, especially in light of the current interest rates in the country.

**Overshooting**




Sources: IWICS and Economatica

## Implications for monetary policy

What is the return of a fixed income investment in Brazil for one year, if one is willing to remain unhedged? To answer this we must explicitly include taxation, which we have neglected so far, but the inclusion is straightforward. We deduct from the amount invested the IOF tax (0.5%) and the CPMF tax (0.38%). This last one enters twice, as one pays the CPMF to get in and out. We also deduct the retained income tax on the gross yield of the domestic instrument (more on that below). Finally, to get the return in foreign currency we deduct the expected currency depreciation during the period ($E_t/E_{t+1}$). These calculations are summarized in the formula below.

$$1 + return = (1 - IOF)(1 - CPMF)[1 + r(1 - IR)](E_t / E_{t+1})(1 - CPMF) \qquad (9)$$

Thus, given taxation the return (measured in dollars) depends essentially from the expected path of the currency and the gross interest rate. We have already examined the former, so we can now have a look at the latter.

When we think of the relevant offshore interest rate for Brazil we are referring to the Brazilian bonds yield to maturity, usually the Bradies. Under that approach it is clear that the relevant domestic interest rate is not the overnight rate, but the yield of some instrument whose duration is, to some degree, similar to the Brazilian bonds. Thus, we have chosen, for the purposes of the present paper, to focus on the 360-day prefixed swap[14].

At the current level of the prefixed swap (21.8% per annum), deducting taxes and assuming that in one year the nominal exchange rate would converge back to a level between BRL 1.70 to BRL 1.85 per USD (from the current level of BRL 1.924 per USD) the yield of such investment would be between 22% and 32% per annum. The first column in the table below summarizes these calculations.

**Return in USD of a 12-month prefixed investment in Brazil - % per annum**

| ***USD*** | | ***Exchange risk premium*** | | | |
|---|---|---|---|---|---|
| ***Long term*** | ***0%*** | ***3%*** | ***6%*** | ***9%*** | ***12%*** |
| **1.70** | 32% | **29%** | **25%** | **22%** | 18% |
| **1.75** | 29% | **25%** | **21%** | **18%** | 15% |
| **1.80** | 25% | **21%** | **18%** | **15%** | 12% |
| **1.85** | 22% | **18%** | **15%** | **12%** | 9% |
| **1.90** | 19% | 15% | 12% | 9% | 6% |
| **1.95** | 16% | 12% | 9% | 6% | 3% |
| **2.00** | 13% | 9% | 6% | 3% | 1% |

Source: IWICS

[14] There is a complication here. The IDU yield-to-maturity is around 9% per annum, but the duration is now much lower than one year (the duration of the one-year swap), while the EI duration is much higher, and its yield hovers around 12% per annum. Anyway the returns we found outperform these rates.

Of course, so far our analysis has not included the currency risk. The table above shows the same calculations for required exchange risk premia between 3% and 12% per annum. For the set of most reasonable assumptions on the risk premium the yield runs from 12% to 28% per annum[15] (the bold figures in the table above). This outperforms the yield on the Brazilian sovereign assets offshore, revealing that – if our analysis is correct – the BRL is really cheap.

**The return on domestic assets would outperform the Bradies…**

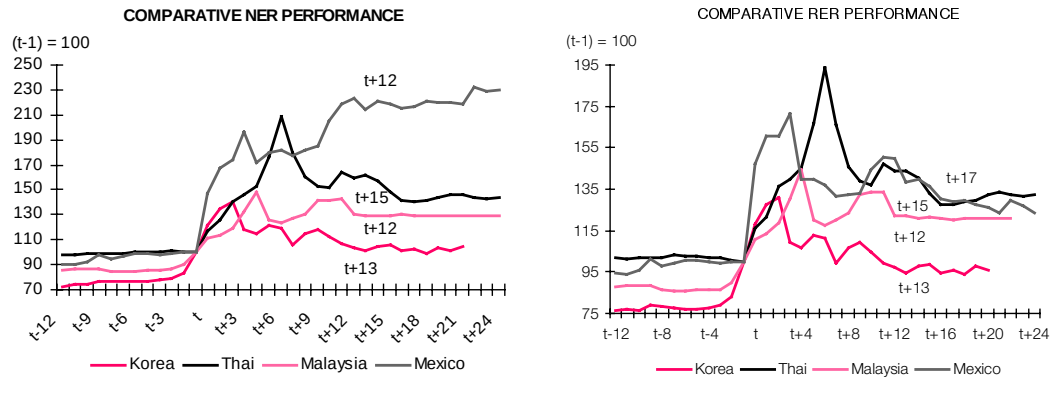
Then, the most important implication is that there is room for further interest rate cuts. Assuming that the cuts in overnight rates is reflected in similar changes in the one-year interest rate we can see that such decline would still leave onshore rates (corrected for the exchange rate risk) above the offshore rates.

**…meaning that eventually domestic rates can be reduced**

Of course, as the wedge between these rates narrows later on, further cuts in interest rates would most likely cause the same process as we described above: some overshooting, so as to equate onshore and offshore returns. It is in this sense that we said above that volatility is inherent to the floating rate regime, and there is no reason why this should be different in Brazil.

Thus, as interest rates decline during the first half of 2000, when the currency is presumably closer to its long-term level, volatility is likely to increase again. Yet, the long-term trend should reflect the convergence to the "equilibrium" level.

[15] Please note that this depends crucially on: (1) the convergence of the exchange rate to the long term; (2) that it converges in up to one year from now. While one can even make the case for convergence (we made it, didn't we?), it requires a leap of faith to expect convergence in one year. Yet, as we show in the charts below, from the experience of other countries it takes between 1 and 1 ½ years for nominal (NER) and real (RER) exchange rates to stabilize. Notice, again, that in the Mexican case it took more time and the NER convergence happened at a much higher level, because of higher inflation.




Source: IWICS

More detailed statistical studies, however, indicate a speed of about 3% per month, i.e., 3% of the gap between the current real exchange rate and its long-term equilibrium disappears in a month. In one year, therefore, only some 31% of the difference is eliminated ($97^{12} = 0.69$). To eliminate half of the gap one needs 22 months and more than 6 years to eliminate 90% of the gap. That is, this issue is far from solved.

## Conclusion

We believe that the BRL is substantially weaker than its long-term equilibrium level, either calculated according to PPP, or calculated according to our alternative current account sustainability approach. This does not necessarily means that the BRL is out of an equilibrium path. As we have shown in the first section of the present paper, a weakening of the currency beyond the long-term equilibrium is a natural result of the floating rate regime as long as asset markets adjust faster than the goods market, a reasonable assumption. The arbitrage between (risk -adjusted) local and offshore interest rates requires such overshooting.

There are reasons to believe that the long-term level of the BRL lies probably in the BRL 1.70 – BRL 1.85 per USD range. Even accounting for some inflation the real exchange rate that results from these range of nominal exchange rates seems able to generate a trade surplus whose present value matches the current value of Brazilian net foreign liabilities (debt and foreign capital invested in the country). Considering current domestic interest rates and a convergence towards this long-term level we see that fixed income investment total return in Brazil (measured in foreign currency) outperforms offshore interest rates (one can always invoke risk premia to close the gap).

This indicates that – with the currency at this level – a decline in interest rates would not cause too much pressure on exchange rates. Furthermore, as we believe that current interest rates are high from the perspective of inflation targeting, we also believe that domestic objectives are no obstacle for interest rate reduction. True, at some point, further reduction in interest rates should have an impact on the currency, much in line with the overshooting models described above, but this requires the currency to be much closer to its long-term "equilibrium" level than it is right now.

**Lower rates at this point would not put pressure on the currency. Later these pressures may reappear**

**Central Bank Potential Intervention – USD mn**

| | ***November*** | ***December*** | ***January*** | ***February*** | ***March*** |
|---|---|---|---|---|---|
| ***Sources (government) (A)*** | ***2,521*** | ***166*** | ***166*** | ***826*** | ***166*** |
| BID | 1,100 | | | 660 | |
| Interest | 166 | 166 | 166 | 166 | 166 |
| Issue | 735 | | | | |
| Guarantees | 520 | | | | |
| **Uses (government needs) (B)** | **484** | **1,807** | **46** | **276** | **611** |
| **Net flow (C = A - B)** | **2,037** | **-1,641** | **120** | **550** | **-445** |
| Reserves (Reserves(-1)+Net flow) | 25,283 | 23,642 | 23,762 | 24,312 | 23,867 |
| Floor | 20,990 | 20,300 | 18,950 | 19,750 | 21,350 |
| **Potential intervention** | **4,293** | **3,342** | **4,812** | **4,562** | **2,517** |

Source: Central Bank

The additional ammunition that the Central Bank has been able to amass – thanks to the change in the agreement with the IMF – should prove important to smooth out this additional volatility as we make it into the first quarter (first half?) of 2000. With a volume of resources ranging from USD 2.5 bn to as much as USD 4.8 bn the Central Bank will be able to at least preclude the most obvious distortions.

Notice that the reasoning we developed earlier warns against using it to avoid the normal market movement. If domestic interest rates are lower than offshore rates and the Central Bank intervenes to contain the currency then the intervention only postpones the adjustment at the cost of declining reserves. Intervention is a useful weapon, but must be used wisely and rarely.

**The Central Bank can intervene, but must do it wisely**

INDOSUEZ W.I. CARR SECURITIES

# Latin America Economics Research

# Oedipus and the Sphinx

November 9 1999

**To discuss this report contact our economists:**


**Alexandre Schwartsman**
(55-11) 3038 1999
aschwart@br.indocarrsec.com

**Alexandre Bassoli**
(55-11) 3038 1916
abassoli@br.indocarrsec.com


## OUR OFFICES


**Bangkok**
Telephone: (66-2) 256 7888

**Colombo**
Telephone: (94-1) 423 903

**Jakarta**
Telephone: (62-21) 252 1984

**Karachi**
Telephone: (92-21) 240 1021

**Kuala Lumpur**
Telephone: (60-3) 241 7411

**London**
Telephone: (44-171) 303 1133

**Manila**
Telephone: (63-2) 848 0881

**Mumbai**
Telephone: (91-22) 282 6861

**New York**
Telephone: (1-212) 451 2600

**São Paulo**
Telephone: (55-11) 3038 1900

**Seoul**
Telephone: (82-2) 3700 1400

**Shanghai**
Telephone: (86-21) 5879 5559

**Singapore**
Telephone: (65) 533 4988

**Taipei**
Telephone: (886-2) 2727 1005

**Tokyo**
Telephone: (81-3) 3261 8297

**Hong Kong**
Telephone: (852) 2820 7373
geninfo@hk.indocarrsec.com