
THE BRAZILIAN INFLATION TARGETING EXPERIENCE

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On behalf of Central Bank of Brazil, I would like to thank Central Bank of Turkey for this invitation and say that I am very pleased to be here in this beautiful country. We are going to see the Brazilian inflation targeting experience, which is very recent but can provide useful lessons to Turkey.

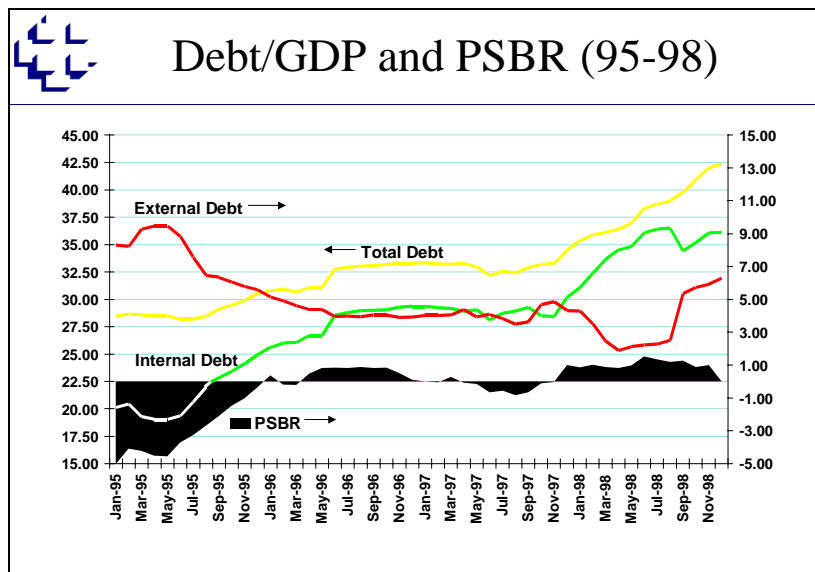
Before that, let's take a brief look at the macroeconomic background beginning in mid 1994, when the Real Plan was implemented. The Real Plan was an exchange rate based stabilization plan and it was very successful in bringing inflation down in Brazil.



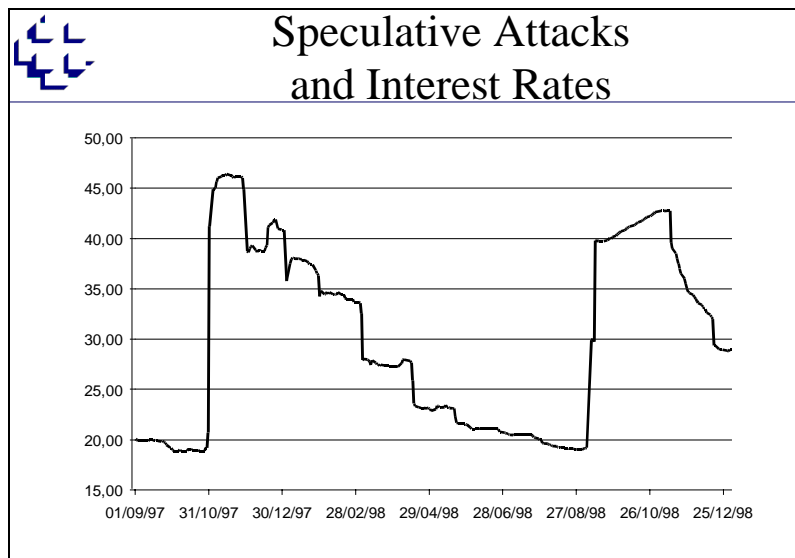
Macroeconomic Background (1)

- Real Plan (1st July-1994)
 - Exchange-rate based stabilization plan.
 - Successful in bringing inflation down: 1,65% in 1998 from 916% in 1994.
- Loose fiscal policy and an overvalued currency led to speculative attacks: Oct.1997 (Asian), Sep.1998 (Russia).

Inflation came to 1.65% in 1998 from 916% in 1994. Despite the huge success concerning inflation the government didn't cope with the fiscal side. In fact, since its beginning fiscal policy was loose. Additionally, the currency became overvalued very fast after the pegging. Both factors ultimately led to speculative attacks. The first speculative attack was in October 1997 during the Asian crisis, and the second one was in September 1998, after the Russian default.



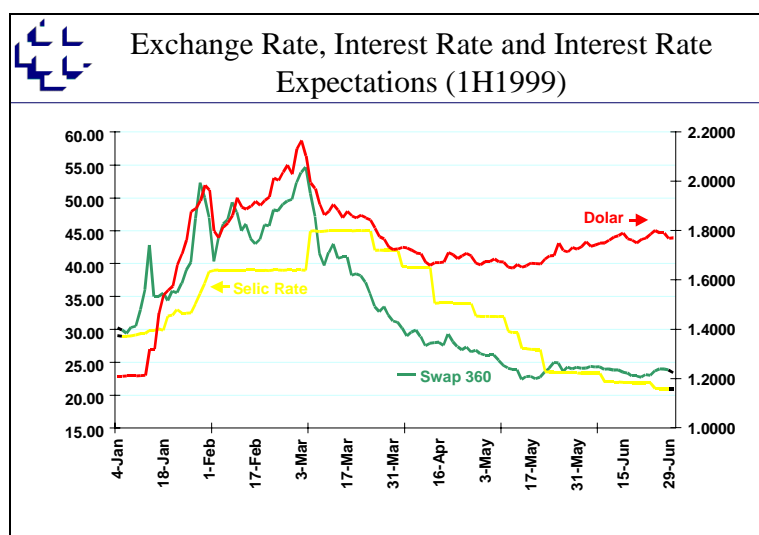
This graph shows two key indicators regarding fiscal policy in Brazil, debt to GDP ratio and public sector borrowing requirements, from the beginning of president Fernando Henrique Cardoso first term in January 1995 until the end of 1998, just before the collapse of the fixed exchange rate regime. As shows both the yellow and green lines, during this period debt to GDP ratio raised steadily, mainly due to two factors. The first one was the PSBR reversal. We can see that, in the beginning of 1995 Brazil had a 5% surplus, note that a negative number means a surplus, and just one year after PSBR was zero, or around zero. That meant a big and rapid reversal in fiscal situation. Second, the high interest rate that has prevailed during this period, mainly due to the need to attract capital inflows to finance the current account deficit. Besides that, after the first speculative attack the situation got worse because the government had to increase the interest rate even more to defend the parity, as we are going to see in the following graph. As a consequence, Brazil experienced a great increase in total debt.



Here we have the behavior of interest rates during the period in which have occurred two speculative attacks in Brazil. In the first one, in the end of October 1997, Central Bank was obliged to increase interest rate from 19% to 46%. In the second speculative attack it raised again interest rates from 19% to above 40%. It was interesting because at that time some economists began to say that there was a curse about the 19% level in the Brazilian economy. The harmful effects of the increase in interest rates were very clear, as we saw in the previous graph. In addition to the increase in public debt, GDP growth declined to minus 0.12% in 1998 from an increase of 3.6% in 1997. Accordingly, unemployment rose by almost 2 percentage points from 5.7% to 7.6%. In the end of 1998, trying to overcome these difficulties, Brazil signed an agreement with the IMF, but due to lack of credibility this was not enough to stop exchange rate pressures and capital outflows. So, in the middle of January 1999 the fixed exchange rate regime collapsed.

Now, let's take a look at the macroeconomic forecasts as of January 1999. There really was a chaos scenario in Brazil. Devaluation reached almost 78% in the following 45 days following the devaluation. Private sector's forecasts were terrible showing that GDP would fall between 4% and 6%, and inflation would reach between 40% and 50% in 1999. Some inflation forecasts reached 80%. Furthermore, credibility was very low as a consequence of the poor fiscal performance of the previous years. As we have just seen, debt to GDP ratio increased almost 15% in just 4 years, reaching 42% in December 1998 from 28% in January 1995. If we consider internal debt only, the increase was even bigger. Clearly, the outlook for Brazil was a not good one.

The developments for the first semester of 1999, just after the devaluation, were the following. New board took office in March 1999 and Governor's first measure was to raise interest rates once more to 45%, from 39%. Additionally, the mechanism of interest rate bias was implemented. It was welcome by because it gave flexibility to Central Bank and provided more information about Central Bank's assessments concerning monetary policy. After an initial overshooting, expectations reversed very quickly and exchange rate fell sharply. Inflation did not get out of control. A tight fiscal policy was put in place just after the devaluation. I would like to make some comments on this. After the first speculative attack in October 1997, the government announced a very hard set of fiscal measures to deal with the harmful effects of the increase in interest rates on public debt. Nonetheless, it didn't work and credibility was undermined. Once more government announced his intentions to put in place a tight fiscal policy but, at that time, credibility was undermined. Finally, as Brazil doesn't have Alan Greenspan as a nominal anchor, the government announced his plans to implement an inflation targeting framework.



This graph shows exchange rate and interest rate expectations developments in the first semester of 1999, before the formal implementation of inflation targeting, and after the devaluation. As we can see, just after the increase in interest rates in March, interest rate expectations fell sharply and came below the short term interest rates. Additionally, exchange rate overshooting was reversed.

Now, we are more able to understand Brazil's initial conditions for inflation targeting. The Inflation Targeting Decree established monetary policy operational independence. But, although there was a clearly improvement

concerning this issue, the situation is still very fragile. Government issued this decree but it can issue another decree breaking it. Moreover, Board's members don't have fixed terms, so we are still vulnerable to political instability. We had flexible exchange rate, that is, no other nominal target was set, a crucial precondition for inflation targeting. Government was committed to fiscal goal. This point also deserves further comments. As we saw, government's credibility was severely undermined when the fiscal measures announced after the first speculative attack did not work out. However, by the time inflation target was implemented in the mid-1999, although in a still low credibility environment, government had already posted some positive results concerning fiscal policy for the initial months of the year, and inflation was controlled. That was very important to recover some credibility.

Another important issue is that devaluation caused a change in relative prices, but there was no inflationary process in course. At this point I would like to make some digression. I refer to the frequently misunderstood relationship between exchange rate and inflation in countries like Brazil, Mexico and I think also Turkey. The experience of several decades of high chronic inflation with continuous depreciating currency may cause the wrong impression that exchange rates cause inflation. When the inflation rate keeps rising *pari passu* with the exchange rate, it is a symptom of bad fiscal and monetary policies and not a relation of cause and effect. Because of this misunderstanding, 99 out of 100 Brazilian economists were afraid that if exchange rate floated, inflation would come back. Therefore, Brazil postponed for a long time any changes in the exchange rate regime, with bad effects on the real side of the economy. I think this is a very important lesson from Brazil.

This is the Brazilian inflation targeting legal framework. The Inflation Targeting Decree says that IT should be based on a widely known CPI index. Many years of high inflation were not innocuous. One of the consequences was the creation and the widespread usage of several indexes of inflation. In our framework the Finance Minister chooses the index and set the targets and the tolerance intervals. He decided to choose a broad CPI index. Note that it is important that the Finance Minister chooses the targets in order to create a commitment between the fiscal authority and the Central Bank. Additionally, the targets should be set with 2 year and a half in advance. Central bank is responsible for implementing the inflation targeting framework, that is, it has instrumental independence but not target independence. The targets are met when observed inflation for the whole year falls within the tolerance intervals.

Accountability is a key ingredient. If targets are breached, or not attained, the President of the Central Bank is obliged to issue an open letter to the Finance Minister, explaining the reasons why this has happened and the necessary measures that will bring inflation back to the target, with the necessary time span for that. A crucial component of inflation targeting regime is transparency. As I said we didn't

have credibility. In this situation, it is even more important to show effectively that Central Bank is committed with transparency. Accordingly, we have to issue a quarterly inflation report, containing assessment of economic conditions, Central Bank's inflation forecasts and the underlying assumptions.

Officially, inflation targeting was implemented in July 1st 1999 in Brazil. At this point I would like to make some optimistic advices to the Central Bank of Turkey. We have implemented inflation targeting in a very short period of time. We took less than 6 months to build the models and to run the system, so it is also possible to Turkey to do the same. Another important lesson is the size of the models. Begin using small models, because they are simpler and can do a very good job.


We had some difficulties choosing the appropriated kind of inflation index to be used. Since in the past the government used to manipulate official inflation indexes, there were two doubts related to it. First, we should use the core or the headline concept? Second, the index should be calculated by the private sector or by the government? In order to gain credibility we have chosen the headline concept, eventhough calculated by the government. My personal beliefs, and I do not speak for the central bank, is that the headline index should be the official one. This fact not prevents central bank to calculate its own core inflation and use it for the monetary police.

We have chosen not to have any escape clauses, in order to gain credibility. Of course these two features, a headline index and the absence of escape clauses, put a lot of stress on central bank regarding the attainment of targets. As a counterpart, larger tolerance bands were adopted because, in the short run, central bank cannot control inflation precisely. The economy is exposed to shocks, such as oil shocks, weather shocks, so we thought this was the ideal arrangement. Note that our main objective is to attain the middle of the band. In the beginning we set the targets for 1999, 2001 and 2001 at 8%, 6% 4% levels. Last month, we set 3,5% as the target for 2002. Communication efforts are also very important. Minutes of the monetary policy committee meetings are released with 8 days lag only. If I am not wrong, this is the shortest time span in the world.

These are the main technical challenges that Brazil have faced and is facing, during the implementation of the inflation targeting framework. The first challenge is how to model exchange rates. As we know, there are several theories about the determination of exchange rate such as UIP, random walk, PPP and other approaches. Unfortunately, none of them work well, but we have to deal with it. Another challenge is how to measure the exchange rate pass through. As I mentioned before, Brazil, Mexico and Turkey, share some similar problems concerning the relationship between inflation and exchange rate. The fact is that we can't use the past pass-through which has been observed in an inflationary fiscal and monetary regime to forecast the future pass-through when the regime has changed. By the time the inflation targeting framework was implemented, in mid-

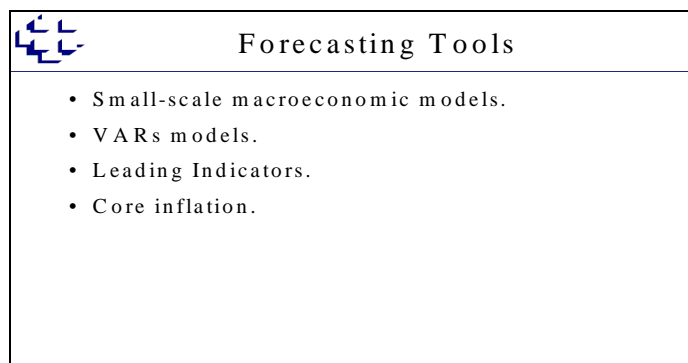
1999, we had already 6 months experience after the devaluation to verify that the pass-through was smaller than most people were expecting. We have several approaches. We can model it as a constant pass-through, choose a quadratic approach or make it dependent on the level of exchange rates. There are several options to the monetary policy committee and they choose the preferred one depending on the circumstances.

A key issue is the estimation of potential output. There is a lot of uncertainty regarding it, mainly because potential output is non-observable variable. How to model inflation expectations is another important issue. We can expect that as long as inflation targeting framework go on and central bank gains credibility, the forward looking component on the Philips curve should increase, but we also have some flexibility here. We have basically 3 approaches: a backward-looking specification for the Philips curve, a forward-looking specification, or a mixture of both approaches. How to deal with government managed prices is another important issue. The last technical challenge is how to input board's assumptions not covered by the model. This is an interesting challenge, because as was said yesterday one important advice is to keep your model simple, but we have to take into account variables that are not included in your models.

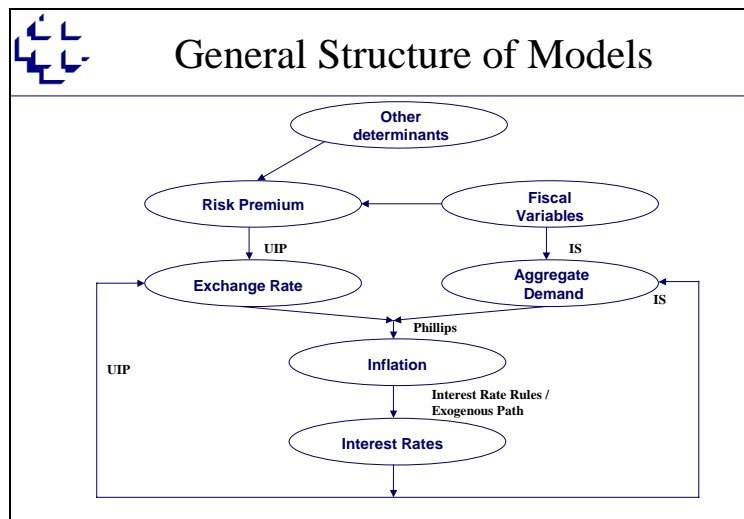
	<h3>Monetary Policy Decision Process</h3>
<ul style="list-style-type: none">• Use the broadest information set as possible.• Judgmental analysis is very important.• Use macro models to discipline and make discussion more rigorous.• Use several models to check consistency, but choose the main one.	

Let's take a look at the monetary policy decision process. Here we have some useful lessons. First, use the broadest information set as possible. You have to take everything into account when you decide about the future path of inflation. Forecasting is an art, no econometric model is perfect. We have to know how to combine strong and solid technical skills with judgmental ability. Second, use macro models to discipline and make discussion more rigorous. That is a very important advice. We can't discuss like we were in a bar. It is imperative to build a

framework and discuss the model and the underlying assumptions. Third, do not trust in a particular model, that is, use several models to check consistency, but choose the main one.



Central Bank of Brazil has several forecasting tools, such as: a) small-scale macroeconomic models, which are the best way to begin with; b) VAR models, which do a good job regarding short run forecasts; c) we have several leading indicators and we calculate the core inflation for the IPCA, the official inflation targeting price index. All these tools are used together because they complement each other.



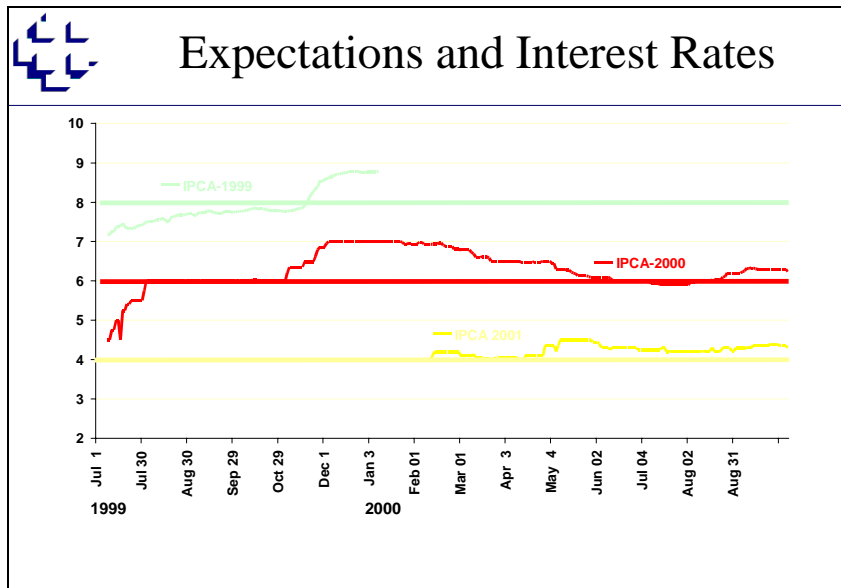
This chart shows the general structure of the models. Note that the models are always improving, and this scheme is useful only as a reference. A difficult task is how to model the exchange rate. We use an UIP approach with the risk premium

determined by fundamentals, such as fiscal variables, current account deficit and other determinants. As my colleague from Bank of Mexico has just said, the risk premium is a crucial part of the exchange rates behavior. But, as I mentioned before, we have some flexibility and other approaches can also be used. Besides the UIP, basically the model is completed by an IS curve and a Phillips curve. Some interesting results are that in Brazil changes in interest rate affects aggregate demand with a lag of one to two quarters, and changes in aggregate demand affects inflation with a lag of one quarter. In other words, the lag between changes in interest rates and inflation varies between 2 to 3 quarters. It is a short lag compared to other economies.

After seen the initial conditions, let's take a look at the macroeconomic developments in 1999, which has been a very hard year for Brazil. As I said, we faced a nominal depreciation over 50% and, besides the exchange rate shock, international oil prices raised more than 100%. Another negative shock was the sharp increases in government managed prices. These increases caught central bank and private sector by surprise, because we weren't aware of the clauses in the privatization contracts. These contracts rule that automatic realignments of public prices will be allowed once a year, according to the variation of the dollar. Therefore, electricity fees, telephone fees and other utility fees experienced a great increase in their prices.

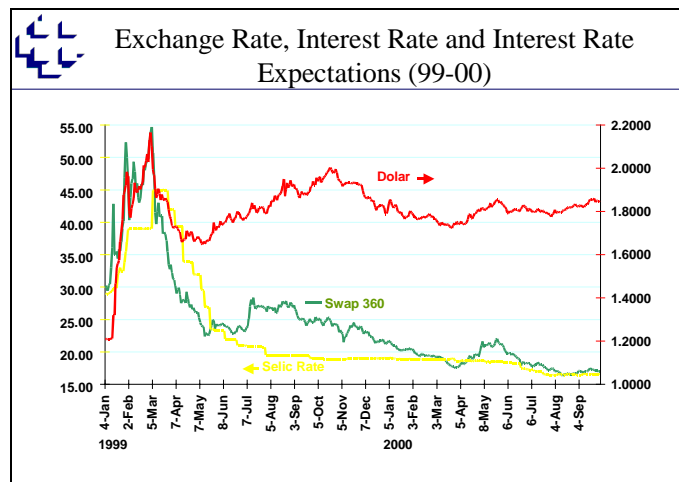
Despite all adverse shocks, the performance of the Brazilian economy was very good, contrary to the initial expectations. IPCA inflation was only a little bit above the central target, 8,94%. GDP grew by 0.75% and Brazil had a sound fiscal performance. Government posted a 3.1% primary surplus compared to equilibrium in the previous year. Trade balance performance is still below expectations, although it has improved a lot. Anyway there was a reduction of almost 5 billions in trade balance last year. Interest rates ended the year at 19%.

In the year 2000 the economic performance is even better. GDP grew 3.6% in the first semester. IPCA inflation is below 5% and the 6% target should be met without any problems. Fiscal policy continues to show a sound stance. Government posted more than 3% primary surplus so far. And, finally, interest rate finally fell below the 19% level. The monetary policy committee had a meeting last Wednesday, but I don't know the decision yet. So, the last information that I have when I left Brazil is 16.5% for the interest rate.

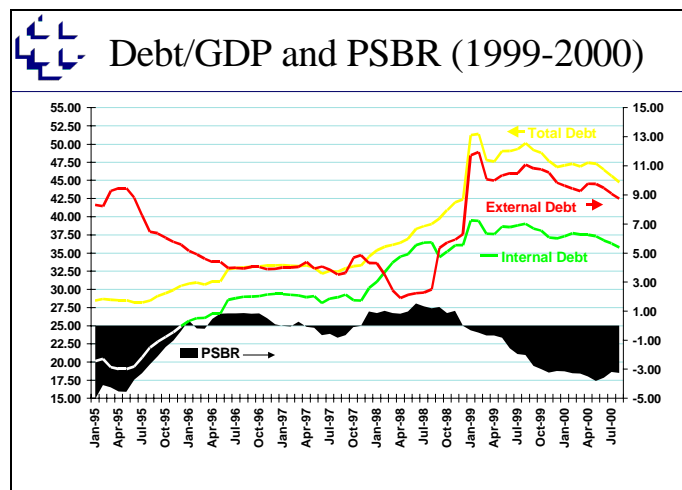


This graph shows how inflation expectations have evolved since the implementation of inflation targeting. The green line shows how inflation expectations behaved last year, while the green thick line is the central target for that year, 8%. Note that the upswing, by the end of the year, was due to the surprise caused by government managed prices. And as we can see, it had also contaminated expectations for 2000. But, as both the red and yellow lines show, representing 2000 and 2001 respectively, they are almost in line with both targets currently.

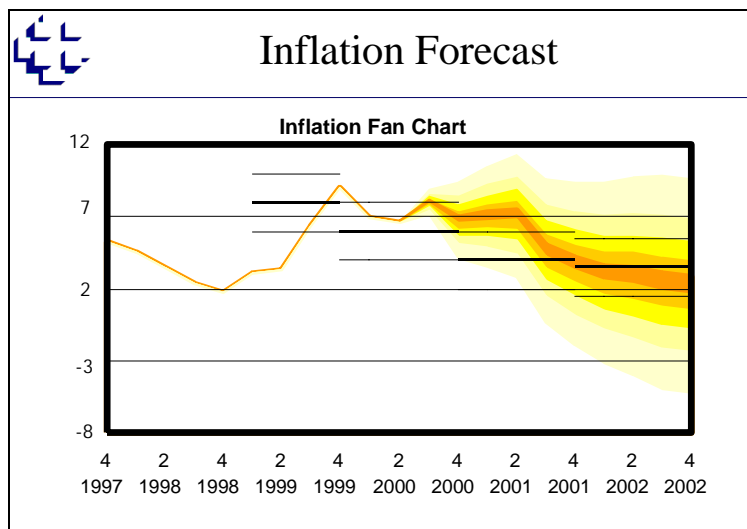
I should make one comment on this. These expectations are gathered through a Central Bank's survey with several financial institutions and enterprises, hence we have to be careful about them because people don't put their money on. Unfortunately, we can't extract inflation expectations from market instruments. Anyway we can see that the outlook is promising.



This graph is the same that we have seen before, but for a larger period. As we can see, after the initial overshooting expectations fell sharply and expectations improved so much that in May 1999 Central Bank had to intervene in the market buying dollars. Later in 1999, with the uncertainties regarding the American economy, exchange rate reversed the downward path and began to depreciate. Eventhough, it is noteworthy the small volatility of the exchange rate during this period. The same kind of behavior occurred with interest rate expectations. When exchange rates began to rise a lot of analysts ask central bank to intervene in the markets, as we did in the past. But Central Bank didn't do it. What I mean is that it took a while for markets to understand what is inflation targeting about. Currently, interest rate expectations are in line with the short term interest rates.



This graph has already been shown also. The only difference is the larger period covered. It is clear-cut the great improvement in the fiscal situation. As I said before, after the increase in interest rate debt to GDP began to rise very fast. Similarly, after the devaluation it soared. In both cases this was due to the fact that a great part of the public debt is indexed to interest rate and exchange rate. Eventhough, a constructionist fiscal policy succeeded in reverting the debt to GDP path.



This is the inflation fan chart published in the last inflation report. As you can see the inflation forecast for this year is a little bit above the 6% central target. But, currently, our forecast is a little bit lower. For the years 2001 and 2002 the forecasts are below the central target.



Forecast: IPCA

IPCA inflation with fixed interest rate at 16.5% p.y.

Year	Q	Confidence Intervals					Central Projection	
		50%	30%	10%	50%	30%		
2000	3	7.6	7.8	7.9	8.0	8.2	8.3	7.9
2000	4	5.6	6.1	6.5	6.9	7.3	7.8	6.7
2001	1	5.6	6.2	6.7	7.2	7.8	8.4	7.0
2001	2	5.3	6.1	6.7	7.4	8.0	8.8	7.0
2001	3	2.5	3.4	4.2	5.0	5.7	6.6	4.6
2001	4	1.4	2.4	3.3	4.1	5.0	6.0	3.7
2002	1	0.5	1.6	2.6	3.6	4.5	5.6	3.0
2002	2	0.0	1.2	2.3	3.4	4.4	5.6	2.8
2002	3	-0.6	0.7	1.8	3.0	4.1	5.4	2.4
2002	4	-0.8	0.5	1.6	2.8	3.9	5.2	2.2

Note: Accumulated inflation in 12 month, in % p.y. The values correspond to the ones shown in inflation fan chart.

Finally, we also publish the table with the figures contained in the fan chart. As we can see, at that time, the central projection for this year was 6.7%, 3.7% for 2001 and 2.2% for 2002. Note that these forecasts are conditional on the assumption that interest rate will be kept at 16.5%.

Thank you.