

This Chapter of the *Inflation Report* presents the assessment made by the Monetary Policy Committee (Copom) about the behavior of the Brazilian economy and of the international scenario since the release of the last *Report*, in December 2007, as well as the analysis of inflation prospects up to the first quarter of 2010 and GDP growth up to the end of 2008. One should highlight that, from *Inflation Report* on, Copom starts release inflation forecasts for a period of two years systematically, starting to count in the very next month following the *Report* release, a procedure similar to the one adopted only in case of *Reports* released in each December. Thus, *Reports* published in March, June and September, which used to consider inflation forecasts for current and next year will, henceforth, contain forecasts for a two-year period, respectively, starting from April, July and October. The inflation forecasts are presented in two main scenarios. The first, named benchmark scenario, supposes a fix Selic rate during the forecasting horizon – at 11.25% p.a., value decided by Copom in its last meeting, on March 4 and 5 – and that the foreign exchange rate will remain at R\$1,70/US\$ along the same period. The second, named market scenario uses the trajectories for Selic rate and for the foreign exchange rate based on the survey carried out by Brazilian Central Bank's Gerin with private sector analysts, until the cutoff date of March 14, 2008. One should highlight that these scenarios serve only as an input to the monetary policy decisions, and its hypotheses do not consist of, and should not be seen as, Copom forecasts about future behavior of interest and foreign exchange rates.

The forecasts for inflation and for GDP growth contained in this *Report* are not point estimates; they explicitly present probability intervals, which highlights the uncertain degree present at the moment the decision on basic interest rate was taken. The inflation forecasts do not depend only on the hypothesis about interest rate and foreign exchange, but also on a set of assumptions about the behavior of exogenous variables. The set of hypothesis considered more likely by Copom is used to construct the scenarios to which the

Committee attaches greater importance in decision making about interest rates. By presenting them, the Committee seeks to give greater transparency to monetary policy decisions, contributing to its effectiveness in controlling inflation, which is its main target.

6.1 Inflation determinants

Inflation, measured by IPCA, ended the year of 2007 at 4.46%, 1.32 p.p. higher than the rate verified in 2006, and close to the 4.50% mid-point of the inflation target. The consumer inflation increase, in 2007, was due, in part, to shocks – observed in global scales – in the prices of agricultural commodities, meat and milk and derivatives, and others. Behind these increases there are structural factors which tend to be persistent, as the larger demand by the major Asian economies – China and India – and the displacement of production of some crops, as maize, in favor of biofuel production. Besides, transitory factors, such as weather conditions, also put pressure on food prices in world markets. Therefore, there was a change in the scenario observed in 2006, when inflation had benefits from the sharp cutback of food prices. Another important change in inflationary dynamics came up with the behavior of administered prices, which, since the inception of the Inflation Targeting System, in 1999, for the first time registered variation in the year (1.65%) lower to the free prices (5.73%). On the other hand, the behavior of prices of nontradable products showed that the demand pressures also had a relevant impact on the inflationary dynamics. In fact, within the set of free prices, nontradable goods increased 6.65% (3.99% in 2006), while the price variation of tradable goods, despite the observed exchange rate appreciation in 2007, also was above the center of the target (4.75%, against 1.31% in 2006). At the beginning of the year, while free prices continued showing some acceleration, monitored prices were contained, following a deceleration trajectory. In aggregated values, the IPCA also registers a slight acceleration.

GDP grew 5.5% in 2007, against 3.8% in 2006. On the margin, the increase rate has been accelerating and reached 6.2% in the last quarter, against 5.6% in the previous quarter. From the supply viewpoint, the increase in 2007 was homogeneous: farming had a 5.3% expansion; industries, 4.9%; and services, 4.7%. As to demand, the highlights were on the gross formation of fixed capital (growth of 13.4%) and household consumption (expansion of 6.5%). Copom assesses that, even with the weakening of global economy the dynamics of domestic aggregated demand should continue over the coming quarters, which

should be favored by several incentive factors impacting economic activity, as credit expansion and employment, the lingering effects of monetary easing and fiscal incentives. Taking into account, also, the narrowing of the input market observed in 2007, the Committee deems that demand expansion tends to gain increasing importance in the balance of risks to inflation dynamics.

At a moment in which the confidence about the pace of world economy expansion decreased, the dynamics of household consumption contributes in an important way to support the domestic demand, and thereby to maintain a positive prospect for economic activity in Brazil. On the margin, the increase of household consumption, accelerated in the fourth quarter of the year, showing a 3.7% growth against the previous quarter. The robust performance of national accounts with reference to consumption has been anticipated by the monthly data on retail business, registering increase of 9.6% in 2007. One should highlight the increase in the furniture and appliances sales (15.4%), encouraged by the continued growth of wages and better credit conditions, as well as in textiles, clothing and footwear (10.7%). Meanwhile, sales of vehicles, motorcycles, parts and spares, included in the broad sales index sharply increased 22.6% in 2007.

The accelerated pace of activity in 2007 produced positive effects on the labor market. The average real income rose 3.2%, which, associated to the expansion of 3.0% in employment, determined increase of 6.6% in payroll in 2007. The level of employment in the manufacturing industry, on the other hand, presented growth of 3.7% last year, according to CNI data. Regarding formal employment, data released by MTE indicates that the expansion of 2006 was intensified with the creation of 1.6 million job positions in 2007, the greatest balance registered in Caged's historic series. In percentage terms, the expansion of formal employment was led by construction (8.3%) and trade (6.11%); however, in absolute terms, it was the services sector which created the biggest number of jobs (587 thousand). The favorable developments in the labor market strengthen the perception, voiced by Copom in previous *Reports* that payroll will continue to be one of the pillars of aggregated demand. Additionally, the positive performance of the labor market has contributed to maintain consumer confidence indices at high levels, signaling willingness to increase spending.

The availability of credit to households, favored by macroeconomic stability, by institutional advances and by the downward trend in interest rates to the final borrowers,

despite the increase verified in the beginning of this year, has been another important element of consumer stimulus. In 2007, the financial system credit (with non earmarked resources) to individuals increased 33.5%, especially the expansion of leasing operations (117.2%). Moreover, one should highlight that credit expansion has been accompanied by the lengthening in average maturities and stability of delinquency. Regarding the prospective scenario, market analysts' and bank sector representatives' expectations are that the growth rate of credit to individuals, albeit with some moderation compared to the pace of 2007, should continue robust in 2008, with strong acceleration in some segments, such as real state credit. This valuation gains support, for example, in the increase of labor market formalization, increase of population's bankarization, improvement of the institutional environment and of the consolidation of macroeconomic stability, which should continue sustaining personal credit expansion during 2008.

Investment has been shown as one of the most dynamic components of domestic demand. In 2007, the expansion of the GFCF moved to 13.4% against 10% in 2006. With a share of GDP, the GFCF increased from 16.5% in 2006 to 17.5% in 2007. The dynamics of investment reflects the buoyancy of the activity in an environment of economic stability and expansion of companies' profitability (supported by the exuberant performance of the Brazilian stock market), which has led the increase of the business community's confidence. Incidentally, FGV's February Situation Survey indicates an 11% forecast of expansion of the manufacturing industry capacity in 2008 (the highest percentage in the last 5 years) and of 22% to the triennium 2008/2010.

There are signs that the credit expansion would help to sustain the investment expansion. In fact, credit with non earmarked resources to companies grew 32.2% in 2007, and 33.2% in the first two months of 2008, against the same periods in the previous year. However, disbursements of credit and financing resources from the BNDES system increased 26.5% in 2007, and 25% in the first two months of 2008, against the same periods in the previous year. However, in the capital market, the volume of public stock supply (virtually stagnant so far in 2008, but with growth of 133% in 2007), as well as the placement of debentures (R\$13.4 billion in 2007, excluding issuances done by leasing companies), helped to finance investments in almost all sectors. For its part, the strengthening of the currency has also significantly benefited investment growth, as it reduced the cost of imported capital goods. On the other hand, the strengthening of the PAC implementation process should

expand public investment in infrastructure. In summary, despite the uncertainty about the behavior of global economy and the volatility of the recurrent financial markets, the combination of high profitability and confidence, associated to favorable financing conditions, should contribute to the continuity of favorable investment performance.

According to IBGE, the government consumption increased 3.1% in 2007 and 2.2% in the last quarter in relation to the same period of 2006. This development was followed by a strong increase in government revenues – Central Government revenues increased 13.9% in 2007 and the collection of ICMS, the main state tax, grew 9.1%. Confronted with the framework of existing budget linkages in the country and guidelines of public policies, it is expected that the pace of government consumption growth continues in the coming quarters. On the other hand, the interruption of the CPMF as of 2008 added some uncertainty to prospects of federal revenue increase.

With reference to the external sector, exports show expansion of 6.6% in 2007, according to national accounts compiled by IBGE, with process of growth initiated in 1996. Imports, for their part, grew 20.7%. Therefore, net exports contribution to the total aggregated demand was negative by 1.4 p.p. in 2007 (-1.4 p.p. also in 2006). As occurred in 2006, the external demand contribution for the dynamics of economic activity in 2007 was higher than the agents had anticipated at the beginning of the year. The expansion of net exports reflected the effects of acceleration in domestic economic activity vis-à-vis the situation in our trading partners, as well as the strengthening of Brazilian assets prices, including foreign exchange rate. Despite its relevance to mitigate inflationary pressures, evidence indicated that net exports would become a less effective instrument for stability of prices.

Still referring to external trade, despite the fact that the imported quantum had increased faster than the exported quantum in the last quarters, to a large extent the external purchases increase (32% in 2007, accelerating on the margin to 36.5% in the accumulated twelve months up to February) is due to a significant expansion in purchasing of capital goods (32.7% in 2007, strongly accelerated on the margin to 38.4% in the twelve months accumulated up to February). In 2007 the exported quantum increased 5.5% (4.8% in twelve months through February) while prices increased 10.5% in the same period (12.5% in twelve months through February). In this context, even anticipating, to 2008, lower trade balances than the ones observed in the last biennium, Copom sees no reversal in the trade balance. On the other

hand, the Committee recognizes that with regard to current transactions – with a US\$4.9 billion deficit in twelve months through February, equivalent to 0.4% of GDP – the most plausible scenario is the possible occurrence of a deficit in the accumulated of 2008.

The prospective trajectory of external accounts and net external demand depends not only on domestic economy developments, but also, importantly, on the global economic context. In view of this, one should highlight that relevant changes took place since the release of the previous *Report*, in the external scenario. In fact, the December *Inflation Report* indicates that problems related to international financial markets, especially regarding the bonds market and in that of loan-backed liabilities, had lasting impacts and, in this sense, added some caution to a foreign scenario which, until mid-2007, in general lines, pointed to robust global economic growth, despite the expected slowdown in U.S. economy. However, since that time, concerns about financial stability in mature economies have intensified and brought about an aggressive response from monetary authorities by injecting massive liquidity in their economies.

Under these circumstances, since then a consensus was built that the world economy would grow less in 2008, as compared to previous years. Besides, persistent uncertainties about expansion and allocation of losses originated in the subprime market in the USA, which led to disruptions in interbank term liquidity markets and to credit supply restrictions to businesses and households, showed that the slowdown might be more intensive and longer than expected. A pronounced slowdown in the USA, with potential consequences on economic activity in Europe and Japan, would test the thesis that the robust growth in major emerging economies, particularly in Asia, would have acquired autonomous dynamics; in other words, the growth of these economies would be less dependent on the demand originating in mature economies and, instead, more dependent on internally generated demand and/or in other emerging economies. In short, since the release of the last *Inflation Report*, the prospective central scenario for the world economy suffered deterioration, and now it faces greater uncertainties, with a basic negative bias.

These developments have determined changes to monetary policies in mature economies, usually in the sense of limiting, due to more pronounced growing risks of economic slowdown and of potential systemic stability problems, the scope for tightening policy actions. In particular, the need for mitigating the potential impact of the financial turbulence

on the economic activity led the Fed to reduce the interest rate by 200 b.p in its two meetings, held in January (one of them, extraordinary) and the other in March. Such actions, which certainly took into consideration the economic falloff in the fourth quarter of 2007, as well as the fragility of coincident or antecedent indicators released in the past few months, suggest the increased possibility that the effects of subprime crisis would create a stronger slowdown in economy, leading to recession in the first half of this year. Besides dealing with potential macroeconomic impact of the financial system difficulties, central banks like the Fed, the European Central Bank and the Bank of England had to act vigorously to ensure the functioning of interbank markets. The liquidity needs of banks as consequence of the crisis in the real state market have been potentialized by the release of negative results for financial institutions, and in the view of some agents, constitute additional factor of pressure on short-term interest rates in these economies. It is clear that, despite the timely response of central banks to the increase of financial volatility, the external scenario continues uncertain, and changes of sentiment and the increased risk perception in financial markets should be closely monitored.

In this context, prospects for the behavior of prices of the principal Brazilian exports – especially commodities – pose greater uncertain. In cases such as iron ore, which recently suffered significant increase of prices – prevailing in the next twelve months, starting in April – may repeat, determining important changes to the balance of trade for this year. In short, however, the prices of commodities still remain at historic high levels, but may suffer correction as consequence of possible decreases in world demand, especially in the USA and Europe, even considering that the demand from important emerging economies may contribute to slow down this movement. On the other hand, so far the upward tendency of commodities' prices has contributed so that the Consumer Price Indices, in economies like the United States, China and Euro Area show signs of pressure.

There is also the reading that an expansionist change of monetary policies by the central banks of major economies could have inflationary impacts and that it would be as strong as the economic activity in emerging economies from Asia can resist the slowdown of mature economies. In fact, considering the intensification of associated, observed and expected, inflationary pressures, besides the increases in commodities prices, and given the intensive use of productive factors in many regions, many central banks, especially in economies notably more open to world trade than the Brazilian, have implemented contractive actions

since mid-2007, despite the deteriorating expectations of growth in mature economies. In particular, since early 2008, the central banks of Australia, Chile, China, Colombia, Peru, Poland, Czech Republic, Russia and Sweden increased the respective basic interest rates, in order to ensure price stability.

With reference to the aggregated supply, the three sectors showed a positive performance in 2007, and low dispersal of growth rate indicates strength in the growth process. The industry had a strong acceleration, with a rate of increase (4.9%) markedly higher than the one of 2006 (2.9%). In fact, industrial output expanded 4.9% in the year, against the same period in the previous year, the highest since the second half of 2004. The services sector also showed a positive performance, with the increase of 4.7% (3.8% in 2006). On the other hand, the farm sector had the most vigorous performance growth, 5.3% (against 4.2% in 2006).

The broad industrial output increased 6% in 2006, the highest rate in the past three years, and the second highest since 2001. The manufacturing industry expanded 6% during 2007, the highest increase in the past three years, and the second highest since 1995, while the mineral extractive industry increased 5.9% (7.4% in 2006). Although the difference had been marginal, one should highlight that, since 2004, the manufacturing industry had not grown more than the mineral extractive (and, before this year only in 1994). In early 2008, the manufactured activity remains increasing, while the mineral extractive industry is settling. Anyhow, the industrial output expansion cycle is expected to continue in 2008, which will continue favored by several incentive factors impacting economic activity, such as the credit and employment expansion, the lingering effects of monetary easing, the fiscal incentives, and reduced stock levels, in some segments.

Despite the major reduction of inventories occurred in the fourth quarter of the previous year, information about the national accounts suggest a slight increase in 2007. The GDP, from the supply viewpoint, increased 5.4% last year, against 5.3% in the components of demand – excluding variation in inventories. From the narrower viewpoint of industry, FGV's February Conjuncture Survey showed that after remaining four months higher than 100 – level above which the number of firms evaluating that inventories are insufficient surpasses the ones assessing they as excessive – the inventories indicator returned to 100 in February, suggesting decrease of mismatch between the planned and

actual inventories. According to CNI, at the end of 2007, the inventories of final goods remained at levels lower than the ones in corresponding periods of 2005 and 2006. Besides, for the first time in three years, the difference between the planned and actual inventories was lower than 50, showing that the effective demand is greater than that forecasted. Therefore, it is possible that adjustments in inventories levels occur at the beginning of 2008, which would cool off buoyant demand, considering that this time of year is usually characterized by oversupply.

The Nuci average in the manufacturing industry remained at 82.4% in 2007, according to CNI data, 1.6 and 1.7 p.p. above the ones registered in 2005 and 2006, respectively, and the highest value in the historic series, initiated in 1991. On the other hand, Nuci average measured by FGV reached 85.1% in 2007, 1.6 and 1.7 p.p. above the ones registered in 2005 and 2006, respectively. Although, in this last case, the average is not the highest of the series, it is also the highest since 1991. However, in the case of FGV series, the peak observed in 2007 is closer to the values observed in the past two years than in the case of CNI. With special regard to the industry of São Paulo, data compiled by the Federation of Industries of the State of São Paulo (Fiesp) indicated that Nuci reached about 82.2% in 2007, 1.7 p.p. and 1.1 p.p. higher than the values registered in 2006 and 2005, respectively.

Generally, the decrease of idle capacity mirrors the acceleration of the economic activity and it is expressed in several sectors, despite the substantial increase in investment volume. Incidentally, the FGV's Conjuncture Survey with the manufacturing industry indicates that, in this segment, 31% of the companies consider the possibility of not attending to orders due to the possible exhaustion of their production capacity. Regarding the expansion capacity, the absorption of capital goods showed strong growth of 20.3% in 2007, mirroring the sharp growth of imports (32.1% in volume), as well as of capital goods production (19.5%). One should also highlight that the production of inputs for civil construction increased 5.1% in 2007. It must be recognized that the capital absorption has strongly accelerated in recent years, considering that the expansion observed in 2006 (13.8%) had already been higher than the one verified in 2005 (5.2%). On the other hand, in view of the recent behavior of capacity utilization rates, the timely maturation of investment projects is a key factor to avoid the deepening unbalance verified between the supply increase and the aggregated demand during the last quarters, which may raise the risk of inflationary acceleration.

Despite the civil construction input production has increased in the last quarters, an expansion in production costs associated to this sector is observed, as indicated by the increase of the National Construction Cost Index – Internal availability (INCC-DI), with an accumulated increase of 6.26% in twelve months through February. One should highlight that the INCC-DI variation accumulated in twelve months has been standing above 5% since August 2006, particularly surpassing 6% in the last three months. This increase has raised worries about possible supply restrictions in this sector, which, given its productive structure, would hardly be mitigated by the import of inputs. To some extent, these worries are increased by prospects of demand expansion in an environment of favorable financing conditions.

Upon overcoming the impulse effect, typical of initial stages of expansion cycles, the Overall Labor Force (PEA) growth has slowed down. This development, associated to the increase in the pace of the economic activity and employment expansion, entailed a decrease in unemployment rates. In fact, in 2007, the average rate of unemployment decreased to 9.3% against 10% in 2006 and 9.8% in 2005. One should highlight, however, that in 2007 changes in the labor market were concentrated in the second half of the year. In fact, the average rate of unemployment in this period reached 8.7%, against 9.8% verified in the same period of 2006. This phenomenon may also be observed when one compares the evolution of the average quarterly unemployment rate during those two years. The size of the decrease in unemployment rates during the four quarters of the year were, respectively, of 0.1, 0.4, 1.1, and 1.1 p.p. At the same time, recent statistics suggest that the unemployment rate, taking into account the seasonality pattern, continues to decrease in the beginning of the year. With the strong momentum of demand for labor, if PEA tendencies are maintained, the unemployment rate should maintain its declining trajectory during the next quarters, which might give rise to pressures for more significant wage increases.

On the other hand, oil prices – a systematic source of uncertainty stemming from the international scenario – increased further since the last *Report*, reaching historical records, showing strong volatility, reflecting not only structural changes in the energy world market, but also of recurring episodes of geopolitical uncertainties. Notwithstanding inherent forecast uncertainty about the trajectory of oil prices, one should highlight that, if the actual levels of international prices of oil persists, the central working scenario adopted by Copom, which forecasts stable

domestic prices of gasoline in 2008, may become less plausible. One should highlight, additionally, that the impact of international prices of oil on domestic inflation is not transmitted exclusively through prices of fuels, but also, for example, through the productive chain of the petrochemical sector and through consumers' and entrepreneurs' expectations. One may not disregard, also, that the volatility of the prices of other important commodities, continues at a high level, as consequence of the uncertainties about the prospects of world demand growth, as well as of greater turbulence in global financial markets.

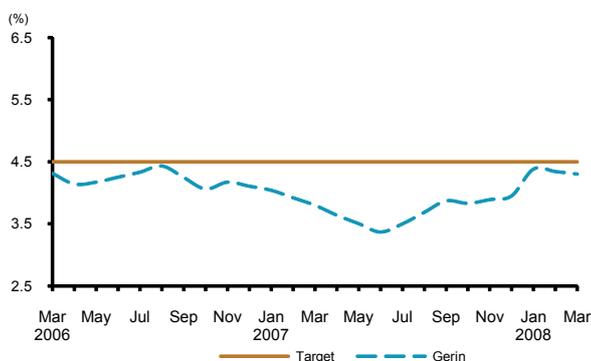
Broad inflation – measured by the IGP-DI – showed significant increase in 2007 (7.90%), almost twice as much as the rate registered in 2006 (3.79%). The index's strong acceleration mirrored, essentially, the behavior of the IPA-DI, which increased 9.44% against 4.29% in 2006. One should highlight that the IGP-DI increase occurred in a scenario of marked exchange rate appreciation (10.51%, considering the average rate). The industrial IPA increased 4.42% in 2007 (3.46% in 2006), while the agricultural IPA accumulated variation of 24.82%, more than three times higher than the rate registered in the previous year (6.92%). The acceleration of farming prices in the wholesale market has had significant effects on food prices which form the IPCA and it is associated to upward trends in the international markets of commodities, such as, for instance, soy beans. However, the dynamics of prices in the wholesale market seems to reflect the conflicting impacts of foreign rate appreciation and increase in the prices of inputs. The IGP-DI increase in 2007 also reflected, though with lower intensity, the IPC-Br and the INCC behavior. While the latter increased 6.15% in 2007 (5.04% in 2006), the former increased 4.60% (2.05% in 2006). At the same time, one should highlight that, on the margin, the three major IGP-DI components showed acceleration in the beginning of 2008, although the Agricultural IPA shows some slowdown.

The remarkably benign scenario of the consumer prices, which, in 2006, was materialized with intensity, decreased in 2007. These developments, in part, do not constitute a surprise, as noted in previous *Reports*, which anticipated that inflation accumulated in twelve months would accelerate this year. After reaching the highest level of the year, by that time, in August (0.47%), monthly inflation measured by IPCA decreased in September, but accelerated in the last quarter so that the accumulated in twelve months ended 2007 at 4.46%, 1.32 p.p. above the rate of 2006. Contrary to the occurred in the past years, in 2007 free prices, increased more than the contract administered prices and monitored ones, with

the last ones decisively mitigating the IPCA acceleration. In fact, while free prices increased 5.73% in 2007, the administered prices increased only 1.65%. In the set of free prices, those of nontradable goods increased 6.65% (3.99% in 2006), and the variation in the prices of tradable goods, although with exchange rate appreciation, was also above the central target (4.75%, against 1.32% in 2006). In the beginning of this year, while free prices continued showing some acceleration monitored prices remained contained, following a slowdown trajectory.

The three core inflation measures calculated by the Central Bank registered, in 2007, variation below the central target, with one of them standing below the level observed in 2006. In fact, in 2006, the core by exclusion of monitored prices and household food stood at 4.11% (3.56% in 2006), the trimmed mean core with smoothing of pre-established items showed greater inertia, and registered 4.04% (4.63% in 2006) and the trimmed mean core without trimming presented a lower variation (3.62% against 2.76% in 2006). One should highlight, also, that at the beginning of the year, both measures registered margin acceleration, and the second one, showed stability.

Figure 6.1 – Inflation target path and market expectations for twelve-month ahead inflation



Inflation expectations for 2008, which had increased in the third quarter – from 4.1% to 4.2% – continued to increase and now stands at 4.4%. For 2009, expectations to accelerate even more, moved from 4.0% in December, where it stood for a long time, to 4.3%. For 2010, expectations remain at 4.0%. In the Committee’s assessment, these increases, as well as the very increase of inflation in 2007 and at the beginning of this year, indicates that inflation convergence to the trajectory of the targets require a vigilant posture by the monetary authority.

6.2 Main scenario: associated risks and monetary policy implementation

The forecasts with which Copom works are based on a set of hypotheses about the behavior of the principal macroeconomic variables. This set of assumptions, as well as the risks associated with it, constitute the main scenario based on which the Committee makes decisions. In general terms, this scenario, embodied in the forecasts that will be shown, considers moderate decreases in the expansion pace of the world economy, on the external side, accompanied with the maintenance of the expansion cycle of the Brazilian

economy, on the domestic side, with increasing inflationary risks, both domestically and externally.

From the viewpoint of external risks, the principal is associated with the possibility that the deceleration of world economy becomes more intense than the one considered in the main scenario. This latter, in turn, already incorporates the consolidation of the economic slowdown in the U.S. economy, which in part has already taken place since the release of the last *Report*. However, the uncertainties about the intensity and the duration of the slowdown, as well as its repercussion on other countries are very large. One should highlight that, besides the impact that, by itself, a more intense economic decrease in the USA would cause in the global economy, one should consider also the potential negative effects on the mature economies of Europe and Asia, and on emerging economies. On the other hand, since the release of the last *Report*, there has been an expansion in the concerns about inflation, in plenty of regions, to some extent reflecting the direct and secondary effects (by the increased expectation of inflation) of increases in energy and food prices. In this sense, some central banks may well be faced with a framework that combines economic slowdown with significant inflationary pressures (“stagflation”).

Copom reaffirms its assessment that, for the Brazilian inflation, an alternative scenario of a more intense and generalized worldwide slowdown would present a risk factor of ambiguous sign. On the one hand, as it would reduce net exports, it would work as a factor of contention of the aggregate demand. Besides that, the potential decrease of some important commodity prices could contribute to a lower domestic inflation. On the other hand, the above-mentioned alternative scenario would act unfavorably to inflation expectation by means of two mechanisms. In the case of slowdown of mature economies which form the center of the global financial market, the risk aversion would possibly rise, reducing the demand for Brazilian assets and leading to a decrease of their respective prices. In addition, in the medium term, a possible decrease in net exports would possibly have a similar effect on the sustainability of some Brazilian asset prices, with potential repercussions on the inflationary dynamics. In this context, despite the fact that the Brazilian economy has been giving repeated signs of developing greater resistance to changes of the sentiment in the international financial markets, the capacity of the external sector to mitigate inflationary risks may be jeopardized.

Another risk originating in the external sector, which at the moment takes on a negative nature in regard to the trajectory

of inflation, refers to the behavior of international prices of petroleum. The increase in the barrel of petroleum prices is a risk factor that, on the one hand, is associated with the domestic prices of fuels, and, on the other, with the potential impact on domestic prices of others by-products, in particular of those used along the productive chain of the petrochemical sector. One may not disregard, also, that the excessive volatility of petroleum prices generates more uncertainty, which may negatively contribute to the expectations of economic agents in general, especially of the price setters.

The prices of other commodities, especially of grain, have also been shown important high trend until recently, notwithstanding the greater pessimism about expectations of world economy growth and the turbulence in international financial markets. Also, there are signs that international investors would have set up positions in commodities, especially farm product, as a means of protection against the inflation increase risk.

The expansion process of the Brazilian economy, which continues to be relatively little exposed to the international trade, and, therefore, with an economic cycle not so much synchronized with the ones from mature economies, is driven by vigorous domestic demand expansion. However, the external sector has, in the latest years, played an important role in maintaining inflation on a trajectory consistent with the targets established by the CMN. This occurs, especially, by the discipline imposed on prices of tradable goods and through investment expansion in an environment of strong demand. However, the gradual and consistent increase in inflation that occurred in the recent past, as well as in the inflation expectations, suggest that the behavior of domestic factors, especially demand growth, would be overlapping the contribution of the external sector, making it less effective.

Despite the context of uncertainty surrounding the global economy, the main inflationary risk stems from domestic factors. In fact, the robustness of domestic demand has exercised pressure on the supply capacity in practically all sectors of economy, especially in the case of those not exposed to foreign competition. This assessment gains even more defined contours when data related to economic activity is analyzed, for instance, the increased level of capacity utilization and the increased sales in the retail market. At the same time, one should recognize that the fiscal impulses for 2008 are expected as an additional incentive to domestic demand, which has already been growing vigorously. In this context, in line with the

assessments by Copom in previous *Reports*, increasing uncertainties come up about the future dynamics of consumer inflation, an assessment that finds support, among other factors, in the deterioration of expectations, the downturn of idle capacity and pressures on prices in the wholesale market.

Copom notes the important contribution of the investment to expand productive capacity. This factor, associated with the support from the external sector, has acted to mitigate inflationary pressures. However, the Committee assesses that the accelerated pace of domestic demand, which should continue to be sustained, among other factors, by fiscal impulses and by the remaining impulse derived from the relaxation of monetary policy implemented until September 2007, will continue to present risks that are not negligible for the inflationary dynamics.

It is also important to consider the risks derived from prices movements in the wholesale market and their possible repercussions on the consumer price index. The recent decrease of agricultural prices, after strong increase in 2007, may contribute to mitigate strong inflationary pressures arising from this group. Thus, it is plausible to assume that the pressures on prices of food to consumers, verified in the last year, would decrease in 2008. However, this hypothesis should be analyzed from the perspective of global expansion of demand for food and the relative scarcity, especially in mature economies, of resources to its production. The industrial prices in the wholesale market, on the other hand, have been accelerating since the second half of 2007, reflecting both external inflationary pressures (in part associated with the upturn of energy prices) and the heating of economic activity in Brazil.

There is evidence that, in Brazil, the pass-through of prices in the wholesale market to the consumer prices occurs with great intensity and in the short term. However, the Committee understands that the impact of price changes in the wholesale market on the consumer prices will depend especially on the prospective conditions of supply and demand and, critically, on expectations of price setters with regard to future inflation. In any case, in comparison to the scenario of December, there is increased probability that inflationary pressures, initially localized, should present risks to the domestic inflation trajectory, since the heating of demand and of the factor market, as well as the possibility of the emergence of sectoral supply restrictions, may increase the pass-through of pressure over prices in the wholesale market to the consumer prices.

By decomposing the IPCA into market prices and administered prices, it is observed, in the short term, that negative risks outlining the dynamics of market prices contrast with a benign condition for the administered prices, despite the recent rise in the general price index. In fact, as verified in 2007, though in lower magnitude, in 2008 the latter may continue contributing to the mitigation of pressures over the headline index. Especially with regard to energy, the specialists assess that the rates should again have a benign behavior in 2008, despite the existing worries in some segments about prospects of supply expansion in the long term. As a result, it is not assessed that there are substantial immediate negative risks arising from administered prices. The important exception, however, refers especially to the price of gasoline, as previously highlighted. In the long term, however, the most plausible scenario considers the hypothesis that the change in administered prices will converge to the average change in consumer prices and, as a result, this group stops contributing to the mitigation of pressures on the headline inflation index.

Notwithstanding the inflation increase observed at the end of 2007, the growth of the usual average real income, in inter-annual comparison, has remained robust. At the same time, employment expansion, partly rooted in macroeconomic stability, has sustained the wage growth at a healthy pace, and tends to continue. In fact, the decrease of the PEA growth, associated with continued employment expansion, will result in decreased unemployment, which may cause increase in wage gains, with potential impact both over the domestic demand and over costs in various sectors. In these circumstances, the behavior of wages *vis-à-vis* labor productivity growth should be carefully monitored.

Credit increase has been another important factor supporting the aggregated demand expansion. In principle, the increase in the interest rates of credit operations verified in the beginning of the year should serve to decrease credit growth. However, the significant increase of income and employment, and the prospects of continuity of this process, in an environment where banks seek to preserve their market shares, work as an important booster of credit expansion. At the same time, it may not be disregarded that the introduction of institutional changes aimed at encouraging the competition in the credit market may maintain the gratings at a strong pace or even determining its increase, which would stimulate domestic demand even more. Considering the dynamics shown by the credit market at the beginning of the year, apparently expansionist forces have prevailed over contractive factors. Even if the difficulties emanated from the international

financial turbulence add uncertainty to the scenario, significant changes cannot be foreseen concerning the context of vigorous credit expansion during the next few quarters. In another perspective, one should also emphasize that the market increase of interest rates, insofar as it predominantly reflects the deterioration of investors' inflation expectations, by itself would not have any relevant effects on the pace of expansion of aggregate demand.

The possibility that changes in inflation dynamics, which in a preliminary assessment seem to be transient, may have effects over agents' expectations about the inflation trajectory in the medium and long terms constitutes a perennial risk for the implementation of monetary policy. Taking into account the inflation behavior in the recent past, Copom considers relevant the probability that inflationary pressures, initially localized, may present risks to the domestic inflation trajectory. In the Committee's assessment, this risk tends to become deeper at the current moment, when the domestic demand is heated and exposed to new expansionist impulses and the factor market is under pressure. The evidence also teaches that inflation increase episodes are not evenly distributed among the different components of price indices. In view of this, to some extent, the behavior of IPCA cores and diffusion indices and of services and wholesale industrial prices in the last months corroborates the view that initially localized inflationary pressures might spread. It is up to the monetary policy, however, to remain especially vigilant to avoid the materialization of this scenario. This posture is justified, among other reasons, because the international experience suggests that increases in prices of items with high visibility, for example, energy and food, tend to have higher effects over the formation of inflation expectations than their weight in prices index.

In this way, even if they remain generally consistent with the trajectory of targets, inflation expectations are now surrounded by greater uncertainty, when compared to those registered in the last *Report*. Additionally, the risk of materialization of a less benign inflation scenario in the medium term has increased since then. In view of the continued economic heating, as confirmed by the National Accounts in relation to the last quarter of 2007, and of rising inflation expectations, the risks that favorable results now observed cannot be sustained on longer horizons are relevant. In fact, inflation expectations for 2008 have increased, and a similar movement has been observed, with even higher intensity, in the case of expectations for 2009. This behavior is an important sign that factors underlying the recent inflation increase may possibly not be transitory. One should

highlight that, although the expectations are still marginally below the target, for them to remain at levels compatible with the target trajectory, in view of the risks faced by the prospective scenario, it is up to the monetary authority to be ready to act in a preventive way.

In summary, the Committee assesses that, since the release of the last *Report*, the balance of risks for the expected inflation trajectory has become less favorable, from the viewpoint of both external factors and, specially, domestic ones. Externally, the developments of the latest months suggest that the contribution of imports to the maintenance of a benign inflationary scenario may have become less effective. On the domestic side, the increased pace of the demand expansion gains more relevance as a source of risks to the inflation dynamics, against signs that, despite robust investment behavior, restrictions to supply expansion might emerge. This assessment is supported, for instance, by the decreased level of inventories in important sectors of economy. In this context, Copom states that a consistent decrease of the mismatch between the pace of expansion in supply of goods and services and that of demand has become even more relevant in the assessment of different possibilities presented to the monetary policy.

The maintenance of inflation rates consistent with the trajectory of the targets and consequent consolidation of an enduring environment of macroeconomic stability will contribute to the continuity of the progressive decrease of macroeconomic risk perception which has occurred in the previous years. In order for this tendency to manifest in concrete results, however, it is necessary for the inflation prospective indicators, especially the trajectory of demand and aggregated supply, to expand in a harmonious way. Copom assesses that the persistence of cautious and timely actions by the monetary policy has been fundamental to increase the probability that inflation will continue to evolve in line with the target trajectory.

Copom understands that the monetary policy stance adopted during the latest years has contributed importantly for the consolidation of a favorable macroeconomic environment, extensive to long terms, through the construction of a benign scenario for the inflation behavior. In light of this reality, the main challenge of the monetary policy consists in ensuring the maintenance of the favorable developments observed in recent years.

Copom considers fundamental to highlight, one more time, that there are important gaps between the monetary policy

implementation and its effects on activity and inflation levels. There is some remaining effect from cutbacks in interests implemented in 2007, which still have not reflected on the activity levels, just as effects of activity on inflation have not had enough time to be completely materialized. In this way, the assessments of monetary policy's alternative decisions must concentrate on the analysis of the prospective inflation scenario, rather than privilege the current values observed for this variable.

In light of this, during the next quarters, expansion of overall wages and credit will continue to stimulate the aggregate demand. Besides these factors, the effects, possibly extended, of the current government spending growth and of government transfers, as well as other fiscal incentives, on the demand expansion, must be added. To this scenario, amidst the information set considered by the Committee, are put together the remaining effects on the aggregate demand of the above referred cuts in the interest rate, the signs that the aggregate demand is already heated, and the fact that the monetary policy decisions will have impacts concentrated on the second half of 2008 and later on.

In the light of these considerations, Copom decided to maintain the Selic rate stable at 11.25% p.y. in its meetings in January and March. In order to consolidate an environment of stability and predictability, Copom adopts a strategy that seeks to avoid a volatile inflation trajectory. Such strategy takes into account the lags of the transmission mechanism and has proven the most indicated to deal with uncertainties inherent to the process of formulation and implementation of the monetary policy. Thence, the importance attributed to inflation forecasts, to the balance of risks associated with the prospective scenario, and, fundamentally, to the preventive action in the Committee's decision process. Prudence starts to have an even more important role, in this process, on occasions as the current one, in which deterioration of the balance of inflationary risks reduces significantly the margin of the monetary policy security. In this environment, it is up to the monetary policy to keep especially vigilant to prevent that greater uncertainties detected in the short term propagate to long term ones. In light of this, in the March meeting, even considering that, at that moment, maintenance of the basic interest rate was the most appropriate decision, the Committee discussed the option of an adjustment to the basic interest rate. In Copom's assessment, an adjustment to the basic interest rate would contribute to the reinforcement of expectations anchorage, not only for 2008, but also in the medium term, and to the reduction in the mismatch between the trajectories of aggregate supply and demand.

In this context, the Committee reiterates that it is ready to adopt a different posture in monetary policy, in the case of consolidating a scenario of divergence between forecasted inflation and target trajectories, and it will continue to carefully monitor the macroeconomic scenario to decide on the other steps of its monetary policy strategy.

6.3 Inflation forecasts

In this *Inflation Report*, Copom starts to systematically release inflation projections for a period of two years, starting from the very next month after the *Report* release, a procedure similar to the one adopted only in case of *Reports* released in each December. Thus, *Reports* published in March, June and September, which used to consider inflation projections for the current year and the next one, henceforth the *Inflation Report* will bring projections for a two-year horizon, respectively, starting from April, July and October. This initiative aims to increase the transparency of monetary policy, following the line which has characterized the actions by the Central Bank, particularly since the adoption of the inflation targeting system.

It is worth mentioning that the projections presented in this *Report* incorporate information available until March 14, 2008 (the cutoff date).

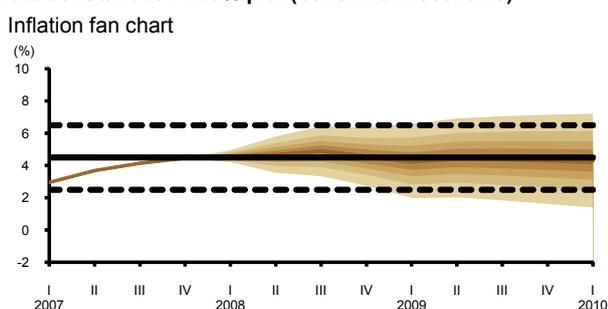
According to the traditionally adopted procedures, the benchmark scenario assumes the exchange rate constant over the forecasting horizon, at R\$1.70/US\$, and the target for the Selic rate at 11.25% – set on the Copom meeting of March – against R\$1.80/US\$ and 11.25% considered in the *Inflation Report* of last December. The projection for the variation, in 2008, of the set of regulated and administered prices, changed to 4.0% against 4.5% considered in the *Inflation Report* of December 2007. This projection is based on the hypotheses of nil variation in gasoline and bottled gas prices, for the accumulated of 2008, of 1.1%, in prices of electricity; and of 3.5% in the fixed telephones prices. The items for which more information is available price changes were estimated individually. For the others, the projections are based on models of endogenous determination of administered prices, which considers seasonal components, exchange variations, market prices inflation and General Price Index (IGP) inflation. According to these models, the readjustment projection of the items regulated and administered prices for 2009 changed to 4.5%, 0.3 p.p. higher than the level used in the December *Report*, and for 2010 it stands at 4.5%.

The market scenario, on the other hand, is based on data from the survey carried out by Gerin with a representative group of institutions up to the cutoff date. In this scenario, the evolution of exchange rate expectations decreased in comparison with the values released in the December *Inflation Report*. For the last quarter of 2008, these expectations moved from R\$1.80 to R\$1.74, and for the last quarter of 2009, from R\$1.89 to R\$1.84. For the first quarter of 2010, survey expectations project an exchange rate of R\$1.86. The consensus among analysts shows, however, a devaluation of the real against the American dollar in the forecasting horizon. The average expectation about the Selic rate evolution increased compared to the value registered in the last *Report*. For the last quarter of 2008, it moved from 10.50% to 11.25%, while for the last quarter of 2009 it went from 10.05% to 10.61%. For the first quarter of 2010, the projection for the average Selic rate is 10.42%. This trajectory is consistent with spreads for the pre-DI swap of six months of 50 b.p., 24 b.p. and 1 b.p., considering the current Selic rate, in the last quarter of 2008 and 2009, and in the first quarter of 2010, respectively. Additionally, reflecting, especially the effects of the expected depreciation of the nominal exchange rate, the market scenario assumes variation of 4.1% to the group of regulated and administered prices in 2008, and of 4.9% to this same group of prices, in 2009 and 2010.

With regard to the fiscal policy the projections presented in this *Report* are based on the working hypothesis of one primary surplus of 3.8% of GDP in 2008, 2009 and 2010, adjusted by the possible reduction of 0.45 p.p., as result of the implementation of the Pilot Investment Program.

Based on above assumptions and using the information set until the cutoff date, projections were constructed for four quarters of the accumulated IPCA inflation, given the benchmark and market scenarios interests and exchange rates trajectories.

Figure 6.2 – Forecasted IPCA-inflation with interest rate constant at 11.25% p.a. (benchmark scenario)



Note: accumulated inflation in 12 months (% p.a.).

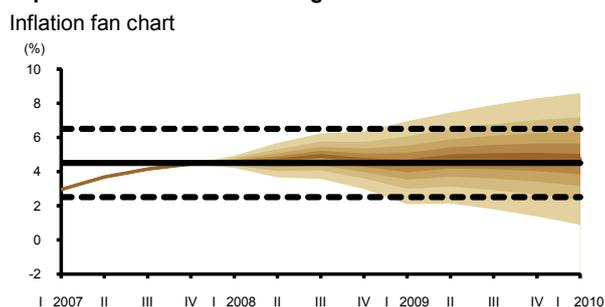
The central projection associated with the benchmark scenario indicates inflation of 4.6% in 2008, increase of 0.3 p.p. regarding the projection presented in the December *Report*, and higher than the central value of 4.5% to the target established by CMN. As illustrated on Figure 6.2, the convergence trend of inflation toward the central value of the inflation target continues present throughout the forecast horizon, which reflects, fundamentally, the increase of inflation expectations, both to 2008 and for 2009. Twelve-month accumulated inflation moves from 4.6% in the first quarter of 2008, reaches the highest value of 4.9% in the

Table 6.1 – IPCA-inflation with interest rate constant at 11.25% p.a. (Benchmark scenario)

Year	Q	Confidence interval					Central projection	
		50%						
		30%		10%				
2008	1	4.4	4.5	4.6	4.6	4.7	4.7	4.6
2008	2	4.2	4.4	4.6	4.8	4.9	5.1	4.7
2008	3	4.3	4.5	4.8	5.0	5.3	5.5	4.9
2008	4	3.8	4.1	4.4	4.7	5.0	5.3	4.6
2009	1	3.3	3.7	4.1	4.5	4.8	5.2	4.3
2009	2	3.5	3.9	4.3	4.7	5.0	5.5	4.5
2009	3	3.4	3.8	4.2	4.6	5.1	5.5	4.4
2009	4	3.2	3.7	4.2	4.6	5.0	5.5	4.4
2010	1	3.1	3.6	4.1	4.5	5.0	5.5	4.3

Note: accumulated inflation in 12 months (% p.a.).

Figure 6.3 – Forecasted IPCA-inflation with market expected interest and exchange rates



Note: Accumulated inflation in 12 months (% p.a.).

Table 6.2 – IPCA-inflation with market expected interest and exchange rates ¹

Year	Q	Confidence interval					Central projection	
		50%						
		30%		10%				
2008	1	4.4	4.5	4.6	4.6	4.7	4.7	4.6
2008	2	4.3	4.4	4.6	4.8	4.9	5.1	4.7
2008	3	4.4	4.6	4.8	5.0	5.2	5.5	4.9
2008	4	4.0	4.3	4.5	4.8	5.1	5.4	4.7
2009	1	3.5	4.0	4.3	4.7	5.1	5.5	4.5
2009	2	3.7	4.2	4.6	5.0	5.4	5.9	4.8
2009	3	3.6	4.1	4.6	5.1	5.6	6.1	4.9
2009	4	3.4	4.0	4.6	5.1	5.7	6.3	4.8
2010	1	3.2	3.8	4.5	5.0	5.6	6.3	4.7

Note: accumulated inflation in 12 months (% p.a.).

^{1/} According to Gerin.

third one, slows down and reaches the initial level in the fourth quarter. For 2009, the accumulated inflation projected in twelve months moves from 4.3% in the first quarter and ends the year at 4.4%. In this scenario, the initial projection for the first quarter of 2010 reaches 4.3%. One should highlight that the decline of inflation projection, both in the last quarter of 2009 and in the first quarter of 2010, in the benchmark scenario, reflects that inflation expectations for 2010 still remains at 4%.

Data on the Table 6.1 indicates, for 2008, an increase of 0.1 p.p. in the inflation accumulated in twelve months in the second quarter, regarding to the first; and of 0.2 p.p. in the third one, when compared to the second. In the first case, the movement reflects a projection of inflation of administered prices, on the second quarter of 2008, higher than the inflation observed, of these prices, in the same period of 2007. In the second case, the increase also reflects greater inflation projection of administered prices, in the third quarter of 2008, when compared to the same period of 2007. On the other hand, in the last quarter of 2008, Table 6.1 indicates decrease of 0.3 p.p. in the inflation accumulated in twelve months, as result of a lower projection of market prices inflation according to the inflation observed in the same quarter of 2007, offsetting the increase in the inflation projection of administered prices, against the same period in the previous year. According to the confidence interval illustrated on Table 6.1, the estimated probability of the inflation surpassing the upper limit (6.5%) of the target in 2008 stands at about 4%, according to the benchmark scenario.

In the market scenario, inflation projection of 2008 (4.7%) is 0.1 p.p. higher than that associated to the benchmark scenario, and 0.4 p.p. higher than that registered in the last *Report*. As can be seen on Figure 6.3 and Table 6.2, the projections indicate an increase in the inflation accumulated in twelve months on the second and third quarters of 2008, with some decrease occurring in the last quarter, but still ending the year at 4.7%, 0.4 p.p., higher than the value projected in December, and higher than the central value of 4.5% of the target. Against the benchmark scenario, the increase of the inflation projection for 2008 is explained, basically, by the analysts' expectations that there will be an appreciation of the real against the American dollar. Still according to the market scenario the projection of the accumulated inflation in twelve months presents, generally, a slight increase during 2009 and ends the year at 4.8%, higher, however, than the central value of the target established by CMN. In the first quarter of 2010, the projection for the accumulated inflation in twelve months is 4.7%, still higher

than the central value of the target. One should highlight that, alike the benchmark scenario, inflation projections, both in the last quarter of 2009 and in the first quarter of 2010, take into account the fact that inflation expectations to 2010, still remains at 4%.

Table 6.3 – December 2007 Inflation Report forecasts

Period	Benchmark scenario	Market scenario
2007 IV	4.3	4.3
2008 I	4.0	4.0
2008 II	4.3	4.2
2008 III	4.5	4.4
2008 IV	4.3	4.3
2009 I	4.3	4.5
2009 II	4.3	4.6
2009 III	4.3	4.7
2009 IV	4.2	4.7

Comparing the trajectories presented in this *Report* with the ones shown in the previous *Report*, which projections are presented on Table 6.3, indicates that there was increase of the projections, in both scenarios, for 2008. The benchmark scenario projections inflation, of 4.6%, is 0.3 p.p. higher than the value registered in the last *Report*, while the market scenario points to an inflation of 4.7%, 0.4 p.p. higher than the value released in December. One should highlight that these increases occurred in spite of the projections revision of the variation of administered prices figures in 2008 (from 4.5% to 4.0%). Besides the incorporation of recent months inflation rates higher than the expectations prevailing at the time the last *Report* was released, these revisions reflect the narrowing of the output gap, as well as the increase of inflation expectations for 2008 and 2009. For 2009, in comparison to the ones presented in the previous *Report*, it is noted the increase in the projection in both scenarios: 0.2 p.p. in the benchmark scenario of 0.1 p.p. in the market scenario.

Figure 6.4 – Forecasts and target path for twelve-month cumulative inflation

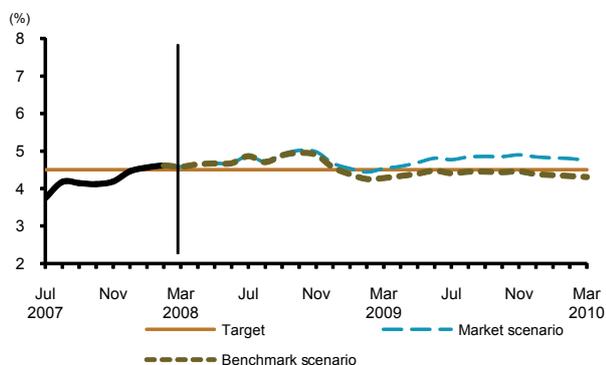


Figure 6.4 illustrates the evolution of inflation accumulated in twelve months, according to the benchmark and market scenarios, together with the target trajectory, up to the fourth quarter of 2009. By February 2008, the values are related to inflation occurred in twelve months and, after March, the trajectories consider the projections of the respective scenarios to compute the accumulated values. The projections for the benchmark scenario reach higher values than the established for the central target (4.5%) by the end of 2008, with later decrease and stay lower than this central value along the forecasting horizon. The market scenario presents similar trajectory until the first quarter of 2009, when the projections increase again and remain higher than the central target of 4.5% until the first quarter of 2010.

Figure 6.5 – GDP growth with interest rate constant at 11.25% p.a.

Benchmark scenario

Output fan chart

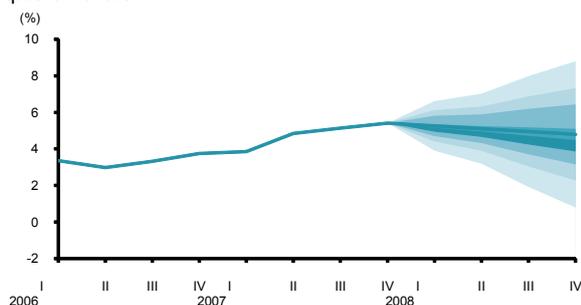


Figure 6.5 illustrates the output growth fan chart built on the hypothesis of the benchmark scenario. Taking into account that the model which generates GDP growth projections uses two variables that are not directly observable, potential output and output gap, the forecast errors associated to these projections are considerably higher than the errors registered in inflation projections. According to this scenario, the GDP growth projected for 2008 is 4.8%, 0.3 p.p. higher than that the one projected in December 2007 *Inflation Report*. This reflects, on one hand, an economic activity in the last

quarter of 2007, more intensive than projected; and on the other hand, the fact that the available indicators do not show decrease in the beginning of the year.

Autoregressive Vector Models

Autoregressive vectors (VAR) models consist of systems of simultaneous equations which seek to capture the existence of interdependence between the variables and which allow to evaluate the impact of random shocks in one of these variables in particular. Despite limitations such as the possible absence of economic and structural relations or the relative increased number of parameters to be estimated, the VAR models constitute a major tool for analysis and forecasts, especially for the short and medium term.

Since the implementation of the inflation targeting system, in June 1999, the Central Bank of Brazil, as well as the great majority of its international counterparts, use VAR models as an analysis tool and, mainly, for inflation forecasting. The information given by the VAR models, along with those generated by other econometric tools, constitute important input for decision-making by Copom. Thus, considering that the economic system is dynamic, the models used in inflation forecasts are constantly submitted to improvements.

The box “Autoregressive Vectors”, registered in the June 2004 *Inflation Report*, showed the VAR models used at that time. This box aims to provide information on the set of VAR models currently in use. Incidentally, one should highlight that, on the one hand, the purpose of most recent reviews of VAR models was to obtain a greater set of forecast models; on the other, to follow the literature (Diebold and Lopez, 1996, Hendry and Clements, 2004 and Adolfson *et al.*, 2005) and define the combination of individual forecasts (of each model) providing more accurate inflation forecasts. This process led to the choice of two subsets of VAR models: estimated with monthly data (the highest frequency) and estimated with quarterly data (the

smallest frequency), each frequency with seven specifications.¹

According to the literature (Bell and Hillmer, 1989), one of the advantages of using models with lower frequency data would be the reduction of sampling error, more strongly present in high frequency data. Recently with the increased sample (the fourth quarter in 1994 until the fourth in 2007) and without strong structural breaks, it was possible to consistently estimate VAR models with quarterly data. In the selection process several configurations for both, monthly frequency and quarterly frequency, were analyzed. As selection criteria, in and out of sample forecasting errors were analyzed, as well as the model's ability to incorporate different transmission mechanisms.

Table 1 shows the specifications for models estimated at monthly frequency. Excluding the variables shown in the Error Correction Vector Model (VECM), endogenous variables are in first difference. The models include the presence of a dummy trend for the period immediately after the Real Plan and constant. The nominal interests are given by the monthly Selic rate, real interests, by the Selic rate discounted by the variation of IGP-DI and currency by M1 at the end of the period.

Table 1 – VAR models specifications summary (monthly frequency)

Denomination	Endogenous variables	Seasonal adjustment	Lags
VAR I	free prices, administered prices, exchange rate and real interest rate	yes	2
VAR II	free prices, administered prices, exchange rate, nominal interest rate, industrial production and money	yes	6
VAR III	preços livres, juros nominais, câmbio e produção industrial	no	1
BVAR I	free prices, administered prices, exchange rate, nominal interest rate, industrial production and money	no	6
BVAR II	free prices, administered prices, exchange rate, nominal interest rate, industrial production and money	yes	6
BVAR III	free prices, administered prices, exchange rate and real interest rate	yes	2
VECM	free prices, nominal interest rate, exchange rate, industrial production and error correction	no	1

* VAR denomination refers to classical estimations whereas BVAR refers to estimations by the Bayesian method with Minnesota priori, and VECM refers to estimations with error correction.

1/ The models implemented in 1999 were all monthly ones. It was since December 2007 that quarterly models were presented to Copom.

Table 2, on the other hand, represents specifications for models estimated at quarterly frequency. All the models include constants and in most cases, the endogenous variables are considered in difference. Just as occurs with the monthly models, a dummy trend for the after Real Plan period is also included. The nominal interest is given by the quarterly Selic rate and real interest by the quarterly Selic rate discounted by IGP-DI variations. Currency is given by the M1 stock at the end of term and risk premium by the Embi-BR. The number of lags was defined based on an intersection of Akaike (AIC), Schwarz (SC) and Hannan-Quinn (HQ) information criteria.

Table 2 – VAR models specifications summary (quarterly frequency)

Denomination	Endogenous variables	Seasonal adjustment	Lags
VART I	free prices, administered prices, exchange rate and real interest rate	yes	2
VART II	free prices, administered prices, exchange rate, nominal interest rate, industrial production and money	yes	1
VART III	free prices, administered prices, real interest rate, industrial production and risk premium	yes	1
BVART I	free prices, administered prices, real interest rate and exchange rate	yes	1
BVART II	free prices, administered prices, exchange rate, nominal interest rate, industrial production and money	yes	2
BVART III	free prices, administered prices, exchange rate and real interest rate	yes	1
VECMT	free prices, nominal interest rate, exchange rate, industrial production and error correction	no	2

* The 'T' letter in the denomination indicates that the model was estimated in quarterly frequency.

Figure 1 – Inflation forecast: VAR Models



Note: accumulated inflation in 12 months (% p.a.). Average forecast generated by the VAR models.

Finally, one should highlight that a real-time analysis of forecast errors made indicate that the VAR models have their best performance in the short and medium term (forecast horizon up to one year), and it frequently surpass the structural models' performance. One should emphasize that the good performance of the VAR models in predicting inflation in the short and medium term is not a peculiarity of the Brazilian economy, considering that similar results have been identified in countries, as can be seen, for example, in Altig *et al.* (1995) and Sims (2002) on the U.S case and Adolfson *et al* (2005) on the Swedish case.

Figure 1 shows the average inflation forecast, for monthly and quarterly VAR models, accumulated in 12 months for the next two years.

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The Natural Rate of Unemployment in Brazil

Among the variables closely followed by central banks, those aimed at measuring the degree of slackness of the economy are, in principle, valuable leading inflation indicators. In the set of such indicators, the natural rate of unemployment or, more precisely, the unemployment gap – which seeks to measure how tight the labor market is – is a very important one. It should be noted that, besides its intrinsic relevance, the natural rate of unemployment is a key factor in the estimation of the potential output of the economy.

In spite of its great theoretical and practical importance, there are considerable difficulties in estimating the natural rate of unemployment. On the one hand, because it is an unobservable variable, it is usually estimated with great imprecision (see Staiger *et al.*, 1996).¹ On the other hand, there is no consensus among economists about its meaning and, therefore, about the best estimation strategy. Despite those obstacles, this box, largely based on da Silva Filho (2008a, b), discusses estimation methods of the natural rate of unemployment, as well as presents some results for the Brazilian economy.

The natural rate of unemployment concept was concomitantly developed by Friedman (1968) and Phelps (1968).² Despite the fact that the inflation rate had not been explicitly mentioned in the definition of the natural rate of unemployment proposed by Friedman – which highlights its structural

1/ In order to have an idea of the degree of uncertainty involved in the natural rate of unemployment estimates, it is worth mentioning the confidence intervals found by Staiger *et al.* (1996) for the U.S. They estimated that the 95% confidence interval for the Nairu, in 1994, reached almost four percentage points (3.9%–7.6%). Moreover, the intervals found in the literature (including Staiger *et al.*'s) are based on parameter uncertainty only. Should model uncertainty also be taken into consideration they would be much larger.

2/ Phelps (1968) named it the steady state unemployment equilibrium rate.

determinants – it could be inferred from it that when real wages (adjusted by productivity) are changing the labor market cannot be in equilibrium. In fact, the link between the (natural) rate of unemployment and the inflation rate were emphasized by Friedman while arguing that, in the long run, the Phillips curve is vertical, although there is a trade-off between inflation and unemployment in the short run. In this way, while the Philips Curve emphasizes the role of nominal wage rigidity and inflation expectations, the above definition highlights the structural – essentially microeconomic – determinants of the natural rate of unemployment. According to the economic theory, among the factors that affect the natural rate of unemployment, demographic and legal variables stand out. For example, as the labor force composition changes, it is likely that the natural rate of unemployment will also change, since the groups that comprise it are not homogeneous. The natural rate may also reflect changes in labor legislation, for example, in laws regulating the cost of hiring and firing, unemployment insurance and minimum wage.

A variety of methods have been used to estimate the natural rate of unemployment, and they can be divided into three groups: structural methods, which seeks to model explicitly the determinants of demand and supply of labor; reduced form methods, which model directly – in one equation (in general the Philips Curve) – the link between inflation and unemployment; univariate methods, which only uses the information contained in the unemployment rate to determine its natural rate. Among them the so-called univariate filters stand out, especially the Hodrick-Prescott (HP) filter.

The most used multivariate method to estimate the natural rate of unemployment is the Philips Curve (PC), which relates directly inflation to the unemployment gap.³ This framework, besides representing a very interesting alternative between a-theoretical methods – such as the univariate methods – and structural methods, is quite flexible.

3/ Some economists argue that this method does not estimate the natural rate of unemployment (e.g. Tobin, 1998), but rather the Nairu (non accelerating inflation rate of unemployment). However, given that several economists consider both terms as being synonyms, here they are used interchangeably. For more details on this debate, see da Silva Filho (2008b).

In fact, in its general specification, the Philips Curve can be defined as:

$$(1) \quad \Delta\pi_t = \alpha(L)\Delta\pi_{t-1} + \beta(L)(u_t - u_t^n) + \gamma(L)\mathbf{x}_t + \varepsilon_t, \quad \varepsilon_t \sim \text{NID}(0, \sigma_\varepsilon^2)$$

Where $\alpha(L)$, $\beta(L)$ and $\gamma(L)$ are lag polynomials, $\pi_t = \Delta \ln IPCA_t$ is the inflation rate, u_t is the (seasonally adjusted) unemployment rate, u_t^n is the natural rate of unemployment (unobservable, and possibly time-varying) and \mathbf{x}_t is the vector of other inflation determinants, among which supply shocks are an essential part.

Note that equation (1) implicitly assumes a vertical Philips Curve in the long-run and random-walk expectations (i.e. $\pi_t^e = \pi_{t-1}$). A particular case of interest is that when the natural rate is assumed to be constant along the sample, so that equation (1) can be rewritten as:

$$(2) \quad \Delta\pi_t = c + \hat{a}(L)\Delta\pi_{t-1} + \hat{a}(L)u_t + \tilde{a}(L)\mathbf{x}_t + \varepsilon_t$$

In equation (2) the natural rate can be estimated by ordinary least squares (OLS) and equals the ratio between the constant and the sum of coefficients attached to the unemployment lags.

$$(3) \quad \bar{u} = -c/\beta(1)$$

As mentioned above, an attractive feature of the Philips Curve framework is its flexibility. Indeed, it can be used, for example, along with the unobservable components (UC) method, when one wants to allow for the possibility of a time-varying natural rate. In this case, instead of carrying out a non-linear estimation in (1), one can express the model in the space-state format and estimate it by maximum likelihood, using the Kalman Filter. An advantage of this framework is that it allows for the possibility of a time-varying natural rate without the need of specifying what is behind such changes (i.e. its determinants). Nevertheless, one needs to specify a statistical model for the natural rate.

A widely used assumption is that the natural rate behaves like a random walk, according to which the best prediction for period $t+1$ is the rate observed in period t . Equations (4) and (5) illustrate this approach using the random walk hypothesis. It should be noted

that $\text{var}(\xi_t) = 0$, so that model (4)–(5) reduces to the model (2)–(3).

$$(4) \quad \Delta\pi_t = \alpha(L)\Delta\pi_{t-1} + \beta(L)(u_t - u_t^n) + \gamma(L)\mathbf{x}_t + \varepsilon_t \quad \varepsilon_t \sim \text{NID}(0, \sigma_\varepsilon^2)$$

$$(5) \quad u_t^n = u_{t-1}^n + \xi_t \quad \xi_t \sim \text{NID}(0, \sigma_\xi^2), \quad E(\varepsilon_t, \xi_t) = 0$$

Figure 1 – Quarterly unemployment rates

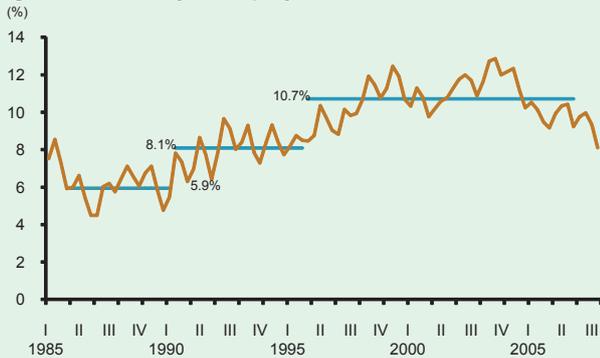


Figure 2 – Annual IPCA changes and lagged Unemployment

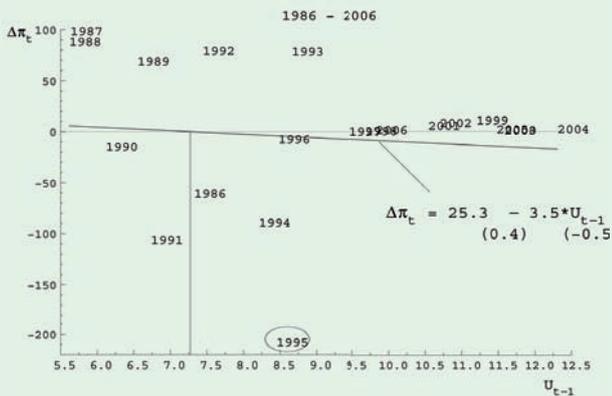


Figure 1 shows how the quarterly unemployment rate evolved in Brazil in the 1985.1-2007.4 period.⁴ The sharp rise in unemployment during that period is noteworthy, as well as the fact that it stood at high levels since the second half of 1990. However, note that the long upward trend was broken at some point between 2006 and 2007 and, since then, the unemployment rate has been showing a downward trend. It is essential, therefore, to have some estimate of where the natural rate of unemployment in Brazil stands now.

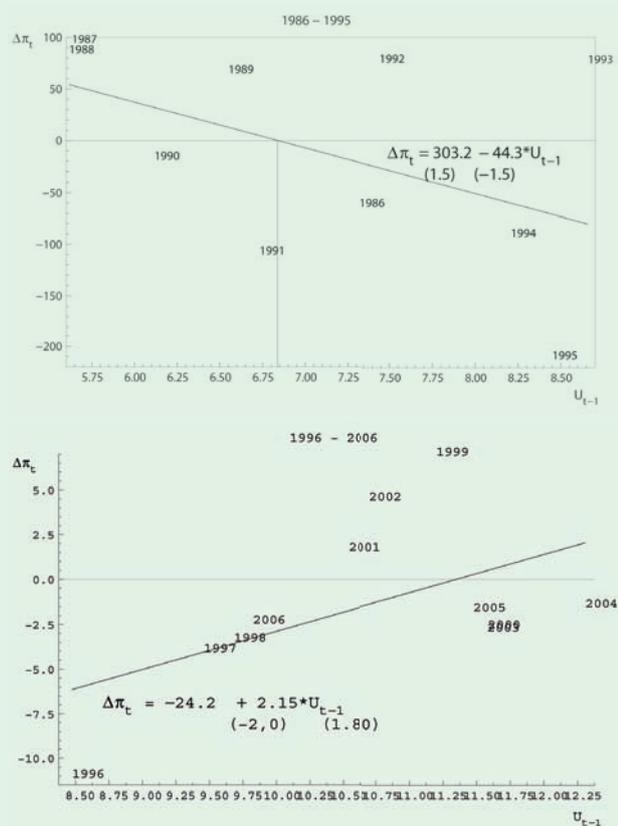
Figure 2 shows preliminary evidence on the relation between inflation and unemployment in Brazil, in the 1986-2006 period.⁵ Some points deserve attention. First, although the regression line shows a negative slope, that slope is not statistically significant. Second, this exercise suggests that the natural rate probably lie around 7.4%. Third, the large dispersion around the regression line reflects the great uncertainty behind that estimate. Indeed, when the year of 1994 – a year when inflation was sharply reduced due to the Real Plan – is discarded the estimate jumps to 9.9%.

Finally, as Figure 3 indicates, when the sample is divided in two sub-periods, a structural break in the link between inflation and unemployment after the Real Plan is revealed. In the first period (1986-1995) not only the regression line remains negatively sloped, but the slope is more statistically significant. On the other hand, in the second period (1996-2006), the slope becomes positive. This change suggests that in the last period there was an incidence of large supply shocks in the Brazilian economy. Building on that evidence – and constructing various supply shock proxies – da Silva Filho (2008) estimates the natural

4/ The plotted series extrapolates backward the actual PME series. For more details about its construction see da Silva Filho (2008a). The series shown in the Figure 1 is not seasonally adjusted, while the one used in estimation was seasonally adjusted using the Kalman Filter.

5/ The vertical axis refers to annual changes in inflation – measured by the IPCA – while the horizontal axis refers to the unemployment series lagged one period.

Figure 3 – Annual IPCA changes and lagged Unemployment



rate of unemployment for Brazil – for the second period only – using a Phillips Curve framework. The point estimates vary from 7.5% to 8.5%, values well below the unemployment average for the period under analysis and estimates using the HP Filter.⁶

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6/ Note that even using the Kalman Filter – models (4) and (5) above – the evidence was favorable to a constant NAIRU during the analyzed period.

Inflation Decomposition – 2007

This box examines the behavior of 2007 inflation rate and shows the estimates of the major factors contributing to explain its dynamics. The procedure consists in decomposing total variation of the Broad National Consumer Price Index (IPCA) for the calendar-year into the following components: (i) exchange rate variation; (ii) inertia, from the difference between previous year's target and actual inflation; (iii) difference between inflation expectations of agents and the target; (iv) market prices inflation, excluding the impacts of the three previous items; and (v) inflation of contractually administered and regulated prices, purged from the impacts of items “(i)” and “(ii)”.¹ It should be stressed that these estimates are approximations, based on models, and are subject to the uncertainties inherent in the process.

IPCA inflation reached 4.46% in 2007, thus registering an increase compared to 3.14% observed in the previous year. Considering the two large groups of prices which make up the IPCA, market prices inflation closed the year at 5.73% and the variation of the regulated prices reached 1.65%. Thus, as it occurred in the three previous years (Table 1), excluding the combined impact of pass-through, inertia, and expectations, the major contribution to IPCA's variation was due to the behavior of market prices and regulated prices. In fact, considering the above exclusions, market prices contributed with 5.03 p.p. to the 2007 inflation, and the regulated ones, with 0.96 p.p. In relative terms, the effect of market prices and regulated prices on inflation reached 112.9% and 21.6%, respectively (Figure 1).

Figure 1 – Inflation decomposition: 2007



1/ The procedure utilized in Freitas, Minella and Riella (2002), “Metodologia de Cálculo da Inércia Inflacionária e dos Efeitos do Choque dos Preços Administrados”, Banco Central do Brasil, Technical Note, n. 22.

With an opposite effect, the set of items described in “(i)”, “(ii)”, and “(iii)”, is estimated to have contributed to a decrease of 1.54 p.p. in IPCA.

Table 1 – Inflation decomposition: 2002 – 2007 (p.p.)

Component	2002	2003	2004	2005	2006	2007
IPCA inflation (variation %)	12.53	9.30	7.60	5.69	3.14	4.46
Inertia	0.93	5.92	0.28	0.77	0.47	0.01
Expectations	1.65	1.71	0.37	0.27	-0.13	-0.43
Pass-through	5.82	-1.11	-0.34	-2.06	-0.55	-1.12
Market prices inflation*	2.28	1.12	4.35	3.41	1.76	5.03
Administered prices inflations**	1.85	1.66	2.93	3.31	1.60	0.96

* Excluding the effects of the pass-through, inertia and expectations.

** Excluding the effects of the pass-through and inertia.

According to Figure 1, it is noted that, the exchange rate variation continued contributing to the decrease of inflation rate. In 2007, this contribution was approximately twice bigger than the one observed in the previous year, although it was considerably lower than in 2005. Precisely, in 2007 the exchange rate variation was responsible for -1.12 p.p. of the IPCA variation – -0.66 p.p. and -0.46 p.p., on market and regulated prices, respectively – or equivalent, in relative terms, from 25.1% of the total (4.46%). As observed in 2006, it highlights, once more, the role played by the exchange rate as one of the transmission mechanisms of monetary policy, contributing, in the specific case, to mitigate inflationary pressures, even if the effect was insufficient to prevent a significant acceleration of inflation. One must also recognize that, to a large extent, the dynamics of exchange rate reflected the effects of the strong trade surplus and record inflows of foreign direct investments. It was also important to observe the perception of a smaller country-risk that, on one hand, reflects at least in part, the agents’ confidence that the management of monetary policy will remain guided by the primary objective of maintaining inflation at levels compatible with the targeting trajectories.

Regarding the impact of the difference between agents’ expectations and the inflation target, as in 2006, the contribution was negative and relatively small. This result simply reflects the convergence of inflation expectations to the target trajectory and can also be interpreted as an evidence of credibility of the monetary policy.

Figure 2 – Inflation decomposition: 2006



* Excluding the effects of the pass-through, inertia and expectations.
 ** Excluding the effects of the pass-through and inertia.

According to Figures 1 and 2, with inflation following the trajectory of convergence to the target, it is noted that the component associated to the inertia has been losing importance and, in 2007, has contributed much less to inflation than in 2006. It is worth highlighting that, from the total inertia estimated for 2007, 11% corresponds to inertia of market prices, an item which contributed the most to inflation in 2007.