Inflation outlook

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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 2008, as well as the analysis of inflation prospects up to the first quarter of 2011 and GDP growth up to the end of 2009. The inflation forecasts are presented in two main scenarios. The first, named benchmark scenario, supposes unaltered Selic rate during the forecast horizon, at 11.25% p.a., value decided by Copom in its last meeting held on March 10 and 11, and that the foreign exchange rate will remain at R$2.35/US$ along the same period. The second scenario, denominated market scenario, uses the trajectories for Selic rate and for the exchange rate which are included in the survey carried out by Central Bank of Brazil's Gerin with the private sector analysts. It is important to highlight that these scenarios only serve as an input to the monetary policy decisions, and their hypotheses do not constitute and should not be seen as Copom's forecasts on the future behavior of interest and exchange rates. One must take into account that the forecasts released herewith utilize the set of available information up to the cutoff date of March 13, 2009.

The prospects of inflation and of GDP growth released in this *Report* are not punctual. They explicitly present probability intervals, which highlight the degree of uncertainty present in the above-mentioned cutoff date. The inflation forecasts depend not only on the hypotheses about the interest and foreign exchange rates, but also on a set of assumptions on the behavior of exogenous variables. The set of hypotheses considered more likely by Copom is utilized to construct the scenarios to which the Committee attaches greater weight in decision making on the interest rate. On presenting them, Copom seeks to attach greater transparency to the monetary policy decisions, thereby contributing to their efficacy in terms of inflation control, which is its primary objective.

6.1 Determinants of inflation

After exceeding the center of the target in January 2008 and growing monotonically up to July, inflation measured by the twelve-month change in IPCA cooled off in the second half of the year, despite the exchange depreciation occurred in the period. This dynamics was impacted, at a first moment, by the fall in the price of important commodities and, on a second occasion, by the slowing down of economy. In this way, twelve-month inflation, which reached 6.37% in July, came down to 5.90% at the end of 2008. Even so, inflation was 1.44 p.p. greater than that verified in 2007 (4.46%), and remain on this level in the first bimester of the current year. In 2008, the government-monitored prices accumulated variation of 3.27%, while the market prices rose 7.05%. Within the set of market prices, the most important developments were similar variations in prices of tradable and non-tradable goods of 6.99%, and of 7.10% respectively, in spite of the movement in the foreign exchange rate. There was a replay of what occurred in 2007, in which, for the first time since inception of the inflation targeting system, in 1999, monitored prices increased less than market prices. This dynamics was impacted by the behavior of the exchange rate, given its appreciation, in the latest years. In this context, given the exchange depreciation occurred in the second half of 2008; one cannot discard an acceleration of monitored prices in 2009, even if not necessarily with the same intensity observed in previous situations. In summary, in spite of a scenario less favorable to inflationary pressures and the expectation of inflation falloff in 2009, it is expected that it shows some resistance to the demand conditions.

GDP, at market prices, dropped 3.6% in the final quarter of 2008, as compared to the previous quarter, according to seasonally adjusted data from IBGE. This result interrupted the sequence of twelve quarters of growth, the most extensive period of growth of the series under this comparison criterion. Even so, GDP grew 5.1% in 2008, a rate only 0.5 p.p. lower than that observed in 2007 and well above the average of the latest twenty years. In comparison with the same period of 2007, GDP expanded 1.3% in the fourth quarter, against expansion of 6.8% in the third. The slowing down of activity reflects the contractionary effects of the global economic crisis on the Brazilian economy.

From the production viewpoint, after sustaining a highlight position in the third quarter, the industrial sector registered contraction of 7.4% in the fourth quarter, as compared to the third quarter, according to IBGE-seasonally adjusted data, the largest cutback since the fourth quarter of 1996.

The performance of this sector was markedly impacted by the process of reduction in inventories. For its part, the farm sector and that of services had contractions of 0.5% and 0.4%, respectively, on the same comparison basis. Compared to the same period of last year, these sectors registered growth of 2.2% and 2.5%, respectively, while the industrial sector dropped by 2.1%.

Regarding demand, the negative performance is due to the Gross Fixed Capital Formation (GFCF), which fell 9.8% compared to the previous quarter in terms of seasonally adjusted data, this is the greatest fall since the beginning of the new series in 1996. In this way, the expansion against the same quarter of the previous year, which had reached 19.7% on the third quarter – greatest expansion of the new series – moved to 3.8%. On the other hand, household consumption dropped 2% against the previous quarter, whereas the government consumption rose 0.5%, according to seasonally adjusted data. In the comparison with the same period of the previous year, both expanded: 2.2% and 5.5%, respectively. Just as what is happening since the first quarter of 2006, GDP growth was dictated solely by the dynamics of domestic demand in 2008, which contributed with 7.3 p.p. for the expansion of 5.1% of GDP in 2008, while the external sector registered negative contribution of 2.3 p.p. Copom assesses that, given the domestic demand will remain the key factor for sustaining the economic activity given the substantial deterioration in the prospects of global economic growth since the release of last *Report*.

At a moment in which the downturn of global economic activity continues surprising by its intensity and magnitude, the resilience of domestic demand depicts an element of stabilization of the Brazilian economy during the next quarters. Data related to the retail sales – discrepant from production data – seem to corroborate this assessment. Incidentally, one should note that, in 2008, household consumption expanded 5.4%, and that of government, 5.6%, in both cases with expansion higher than that of GDP. After falling three consecutive months, seasonal adjusted retail sales increased 1.4% in January compared with the previous month. In the comparison with the same month of the previous year, the increase topped 6%, a level well above that verified in December (3.8%). Although the twelve month expansion has reduced from 10.3% in October to 8.7% in January, the pace of growth still remains high. One should highlight that the rise in sales in the segments "books, newspapers, magazines and school supplies", the expansion of which reached 7.6% in January against the previous month, and in furniture and house appliances (7.1%), in the first case, which are

very dependent on income components, and in the second, dependent on credit supply conditions. The good performance of sales extended to the expanded retail sales – which includes vehicles, motorcycles, parts and spares and construction material, segments more vulnerable to credit conditions – of which the growth reached 4.4% in January compared with the previous month, according to seasonally adjusted data. In general terms, although the production data suggest a sharp deceleration of the economic activity level, the retail sales data suggest that an important part of this movement was due to inventories adjustments. In this way, the Committee assesses that, despite having to show lesser dynamics than in the recent past, retail sales should continue registering positive results throughout next quarters.

The dynamics of economic activity produced consistent improvements in the labor market in the latest years. According to PME, the average unemployment rate, which stood at 10% in 2006, moved to 9.3% in 2007 and to 7.9% in 2008. This situation reflected on the labor income, with the average real income usually received by the occupied population increasing 3.4% in 2008, after increment of 3.2% in 2007 and of 4% in 2006. On the other hand, the number of persons occupied increased by 3% in 2008 after expansion of 2.6% in 2007. As a consequence, the overall real wages – an important boosting factor of aggregated demand in the latest years – advance 6.9% in 2008, after increment of 5.8% in 2007. As per CNI data, the average employment level in the manufacturing industry expanded by 3.9% in 2008. However, there were significant changes in the industrial labor market in the latest months. When compared to equal month of the previous year, one verifies that the increase in December reduced to 1.4% and, in January, a contraction of 0.1% was observed. This deterioration in employment level reflects, to a large extent, the fall of industrial production in the latest months. As with the evolution of formal (CLT) employment, MTE-released data shows that after the closing of 655 thousand job positions in December, there was a new reduction in January (102 thousand job positions).

In combination with increased overall payroll, credit availability to households, favored by the macroeconomic stability and by institutional advances, had been an important element in the propulsion of private consumption and, therefore, of aggregated demand. Notwithstanding, not only did financing conditions deteriorate since the worsening of the global crisis (either through higher rates or shorter maturities), but also the economic agents have shown to be more reluctant in taking loans in an environment of greater macroeconomic uncertainty and of a weakening

labor market. In twelve months up to January, credit with no earmarked resources of the financial system to individual persons expanded 23.2% (28.2% up to October), with highlights to the expansion of leasing operations (84.1%, against 116.3% up to October). It is important to highlight that credit expansion has been characterized by the increase, up to this moment a modest one, of delinquency. Regarding the prospective scenario, expectations by market analysts and banking sector representatives indicate that credit will continue to expand in 2009, although there should be deceleration in relation to 2008, partly due to the effects of the global crisis. These effects, however, tend to be attenuated by the impacts of the liquidity management measures and monetary policies adopted by the Central Bank.

Investment, which had shown to be the most dynamic component of domestic demand, presented the greatest adjustment in the fourth quarter of 2008, in line with a stylized fact long before identified. After expansion of 8.4% in the third quarter, against the previous quarter, GFCF fell 9.8% in the fourth quarter, interrupting a sequence of nine quarters of growth. In relation to the same quarter of the previous year, variation moved from 19.7% in the third quarter to 3.9% in the last quarter. Even so, after increment of 9.8% in 2006 and of 13.5% in 2007, GFCF expanded 13.7% in 2008. Note, however, that as percentage of GDP, the GFCF moved from 17.5% in 2007 to 19% in 2008. However, the aggravation of the world's financial crisis led to the deterioration of the scenario for investments. Besides the revaluation of the investment plans, in part due to worsening prospects for growth of demand and of greater macroeconomic uncertainty, the companies confront deterioration of the financing conditions, as it comes to credit maturities and cost. Also, due to the fall in prices of shares, the option for financing via capital market lost attractiveness. Finally, one should note that the depreciation of Real may have determined an increase in the costs of imported capital goods, with adverse impact on the volume of investments. In this context, Copom foresees deceleration of investments on the Brazilian economy in 2009, compared to what was observed in previous years, despite it considers that the situation may evolve toward a more benign scenario in which domestic demand experiences recovery.

The volume of credit with no earmarked resources to corporate entities expanded 37.2% in twelve months up to January (45.9% up to October) and showed a 1.4% contraction in the month to month comparison. In addition, the intensification of the international financial crisis also affected the dynamics of the capital market. In fact, after

significant volumes of initial public offerings of shares verified in the first half of 2008, the amount remained practically constant since August (R$32.1 billion in the year in 2008, against R$31.7 billion, up to August, and R$33.2 billion in 2007). Similarly, the issuance of debentures (excluding the issuance carried out by leasing companies) showed to be stable (R$6.3 billion in 2008, strictly, the value observed up to October). However, it is plausible to assume that the easing of the monetary policy leads to the recovery of the domestic capital market, especially regarding the fixed-income operations, during the next quarters. On the other hand, the disbursements of loans and BNDES – System financing expanded 1.2% in January, compared to January 2008.

With reference to the external sector, after registering surplus of US$40 billion in 2007, a favorable balance of trade topped US$24.7 billion in 2008. Despite this decrease, in 2008 the exports reached the record of US$197.9 billion (an increase of 23.3% over 2007), as well as imports, of US$173.2 billion (increase of 43.6% over 2007). The decreasing trend of the trade surplus continued in the first two months of 2009. Indeed, up to February the balance of trade reached US$1.2 billion, a value 29.9% lower than obtained in the same period of 2008. The effects of the global economic crisis over the international trade – both due to the smaller level of global economic activity, and by the fall in prices, particularly of commodities – allow anticipating a decrease in the balance of exports in 2009, a fact which does not occur since 1999, despite the expansionist effects deriving from the alignment of relative prices due to foreign exchange depreciation. On the other hand, the slowing in the pace of domestic activity also allows foreseeing a less robust performance of imports, which may experience a cutback in relation to 2008.

After expanding 5.5% in 2007, exports decreased 2.5% in 2008, in part reflecting the effects of deceleration of external demand and of the re-direction of the share of production previously channeled to the external market, to the domestic market (for instance, in the iron and steel sector). Notwithstanding, the cutback in the export volume was more than offset by the increase of 26.3% of prices in 2008, even after increments of 12.5% in 2006 and of 10.5% in 2007. On the other hand, after expansion of 22% in 2007, imports increased 17.7% in 2008, reflecting, to a good extent, the expansion of external acquisitions of capital goods, as well as the greater level of economic activity. Imports prices, which rose 8.2% in 2007 (against 6.9% in 2006), strongly appreciated in 2008 (22%).

The global economic crisis, which had already intensified at the time of the last *Inflation Report*, does not yet show signs of cooling off. Besides, its magnitude has shown to be more comprehensive than initially foreseen, especially with reference to the impact on the emerging markets. The net effect of the exchange rate depreciation occurred since September 2008, coupled with the intense fall in price of commodities, which was a factor of great uncertainty in the prospective inflation scenario when the last *Report* was released, has shown, up to this moment, to be more benign than that was anticipated. As with current transactions, the deficit in 2008 reached US$28.3 billion, or 1.8% of GDP. One should highlight that it was fully financed by the net inflow of foreign direct investment, which totaled US$45.1 billion and corresponded to 2.8% of GDP.

After more than one year since its inception, the subprime crisis – which originated in the North-American real estate market, spread itself to the financial and credit markets of the US and other mature economies – continues surprising negatively, especially regarding the impacts on the dynamics of emerging market economies, including the Brazilian one, which, up to the third quarter of 2008, had been showing substantial resilience. In fact, partly as a result of the adjustment in inventories occurred in the latest months, the contraction of domestic economic activity has been intensive. In this context, despite the diverse measures implemented by the Fed and other central banks, including the fixing of targets for basic interest rates close to zero, the adoption of monetary policy strategies based on quantitative expansion and, in some cases, aggressive fiscal measures, there are no convincing signs, up to now, of economic recovery. Note, in particular, that credit conditions remain very restricted in the international financial market, since the impacts of these measures may take some time to come up. In summary, the prospects for global economy have been deteriorated further since the publication of the last *Report*, and so does the balance of risks, with a bias still negative for activity. As consequence, the most likely scenario indicates that the global economic recovery, which for many analysts would come in the second half of 2009, will only take place in 2010.

With regard to the aggregate supply, the three sectors of economy experienced a cutback in the fourth quarter of 2008 against the previous quarter, after having registered strong growth during 2008 and, in particular, in the third quarter. According to the national accounts, the worst performance derived from the industrial sector, the one which had shown the highest growth in the previous quarter. While industrial production fell by 7.4% against the third quarter, the sectors

of services and farming retroacted, respectively, 0.4% and 0.5%, according to seasonally adjusted data. When comparing with the same period of the previous year, the contraction of the textile sector reaches 2.1%. Note, however, that on the same basis of comparison, the services sector registered a 2.5% expansion, while the farm sector grew 2.2%. In 2008, the growth of the three sectors reached 4.3%, 4.8% and 5.8%, respectively.

In 2008, industrial production expanded 3.1%, reflecting the growth of 3.8% in the mining industry and of 3.1% of the manufacturing industry. Similarly to what was observed in national accounts, industrial production registered strong deceleration in the last quarter of 2008, after spending a good part of the year growing at twelve-month rates above 6%. The effects of the worsening in the global economic crisis started to be mirrored on statistics related to the fourth quarter of 2008, especially in more credit-dependent sectors, such as automotive and construction, also petrochemical and iron and steel industries. In fact, the monthly comparison based on seasonally adjusted data indicates that industrial production fell 7.1% in November and 12.7% in December, a performance impacted, to a large extent, by the fall in production of the automotive industry and in its productive chain. It is compelling to recognize that this result partially derived from the adjustment in the industrial inventories, as well as from the increase in sales and production of automobiles in January and February. Even so, there is a high uncertainty over the magnitude and persistence of the crisis effects on the industry and economy in general.

From the demand perspective, GDP expanded 7.5% in 2008, with the external sector showing a negative contribution of 2.3 p.p. On the other hand, after falling under 100 in August – implying that the number of companies considering inventories as excessive exceeds that of those which assess that they are insufficient – the inventories indicator of the FGV's Outlook Survey persisted on this tendency, signaling that the companies may have been surprised by the intensity of the deceleration of industrial demand which came up after the intensification of the international financial crisis. Notwithstanding, after reaching the level of 81 in December and in January – smallest level since July 2003 – the inventories indicator rose to 84 in February, suggesting that the recovery in inventories could be initiating. On the other hand, the indicator's low level shows that this process may take some time. It is worth stating that, at least in part, the industrial growth observed in the three first quarters of 2008 had been the result of preemptive formation of inventories of raw materials and inputs on the part of the companies.

Such behavior probably accounts for the intensification of growth of the sector of intermediate goods in 2008 and, consequently, for its deceleration since the fourth quarter of last year.

The monthly Nuci (capacity mutilization rate) without seasonal adjustment, calculated by FGV, reached 79.6% in February, showing a cutback of 7.8 p.p. compared with same month of the previous year. As regards the expansion of capacity, the absorption of capital goods, which showed robust growth in the latest years (5.1% in 2005, 13.5% in 2006 and 19.3% in 2007), increased 17.7% in 2008, despite the contraction in the final months of the year. In January 2009, the absorption of capital goods contracted by 19.6% compared to the same month of 2008, being strongly affected by the falls of 12.4% of capital goods imports and of 13.3% in the production of these goods. One should also note that, on the same basis of comparison, the production of construction inputs also fell sharply in January (-9.7%). Despite the great increase of inactivity, the recent numbers of industrial production, coupled with the numbers of sales of automobiles and on retail, suggest a recovery of the textile activity, even if it is difficult to foresee its extension and intensity. In fact, the FGV's Outlook Survey indicator of global demand for the manufacturing industry shows that, after the sharp fall in the level from 121 in September to 65 in January, the indicator rose to 70 in February, returning to the December level.

After a long period of acceleration in construction sector prices the National Construction Cost Index – Internal Availability (INCC-DI) started to show signs of cooling off in December, although still at a modest pace. After reaching the peak in November (12.34%), the INCC twelve-month variation fell to 11.67% in February. Even so, this level is well superior to that observed in the same period of 2008 (6.28%). Furthermore, inflationary pressures would hardly be reduced in a substantial way by imports given the production structure of the construction sector.

After falling to 9.3% in 2007 (10% in 2006), the average unemployment rate plummeted in 2008 (to 7.9%). Notwithstanding, the rate of unemployment tends to experience a climb in this and next quarters, reflecting both seasonal patterns and the effects of the world's economic crisis over domestic economy. In fact, employment rate stood at 8.2% in January, 0.2 p.p. above that registered in the same month of the previous year, the first increase after twenty-three consecutive falls. In reality, the adverse effects on the labor market clearly demonstrate the numbers of formal jobs

as well as on the industrial employment statistics. Up to this moment, however, temporary layoffs, plus the reduction in working hours and other emergency measures have mitigated the expansion of unemployment rates. However, even if there is a marginal recovery on of industrial production and despite the more stimulating numbers of retail sales, the reduction of the activity level may lead to increases of unemployment rates during the next months.

The petroleum price, a systematic source of uncertainty derived from the international scenario, remains on levels lower than those prevailing up to the middle of last year. After reaching almost US$150 in mid-2008, the price of a barrel of petroleum fell to levels around US$40-50 and has remained around this level, although with high volatility. This fall reflects not only the smaller global demand, due to the economic deceleration in course, but also, above all, uncertainties regarding the size and length of the current contractionary cycle, besides the effects of the deleverage on speculative positions in the markets of commodities. Despite considerable uncertainty inherent to forecasts over the path of petroleum prices, the baseline scenario adopted by Copom, which foresees unaltered domestic prices of gasoline for 2009, remains plausible, but, if the current situation in the petroleum market remains, one must not discard the occurrence of reductions in prices during the year. It is also worth noting that the impact of international petroleum prices over domestic inflation is not transmitted exclusively by prices of fuels, which, for the time being, have been stable, but, also, by other channels, such as the productive chain of the petrochemical sector, as well as the of consumers and entrepreneurs. The strong reduction petroleum prices between the middle and end of last year extended to agricultural and metallic commodities, whose quotations of also reflected the deterioration of prospects for global growth. It is worth registering, however, that since the beginning of the year the prices of commodities have shown some elevation, notably regarding precious metals and part of the energy sector.

After more than doubling in 2007 (7.89%, against 3.79% in 2006), and continuing to rise in 2008, when it reached 9.10%, broad inflation – measured by IGP-DI – starts giving consistent signs of cooling off. Since August 2008, IGP-DI registered monthly deflation on three occasions and, in four months up to February, it shows negative variation of 0.49%. Therefore, twelve-month inflation, which reached 14.81% in July 2008, reduced to practically half (7.50%) in February. The index deceleration, essentially due to the behavior of IPA-DI which the twelve-month change moved

from 18.91% in July to 7.39% in February, despite the exchange depreciation occurred in the recent past. In fact, in this period, twelve-month inflation measured by INCC expanded from 10.38% to 11.67%, while inflation measured by IPC-Br showed a slight reduction (from 6.23% to 6.15%). The dynamics of IPA-DI is explained, to a great extent, by the change in behavior of farm products, the variation of which in twelve months moved from 37.91% in June 2008 to only 1.94% in February of this year, after registering six monthly deflations in seven months up to February. Additionally, the industrial prices, which showed strength during most of 2008, started falling off in November, and accumulated deflation of 2.17% in four months up to February. As consequence, the twelve month variation of Industrial IPA moved from 15.41% in October to 9.49% in February. As pointed out in previous *Reports*, Copom assesses that the effects of wholesale price behavior over consumer inflation will depend on current and prospective demand conditions and on expectations of price makers in relation to future inflationary path.

The deterioration in the scenario of consumer prices, present since mid-2007 and intensified during 2008, started to show a reversal at the end of last year. Although the consumer inflation cutback has been modest up to this moment (contrary to broad inflation), it has been happening despite the exchange depreciation occurred in the second half of 2008. The prevailing fears at the time of writing the December *Report*, with regard to the magnitude of the foreign exchange pass-through to the prices of final goods and services have not confirmed, up to this moment, as consequence both of the behavior of prices in foreign currency of imports, and of the deceleration of economic activity. Although the macroeconomic scenario has been characterized by a high degree of uncertainty, the general and intensive fall in the commodity prices, along with the pessimistic expectations concerning the growth of the world economy and the deceleration of domestic growth, suggest that the inflationary cycle observed in the latest quarters tend to be surpassed. In any case, the Committee reaffirms that it will continue to conduct its actions in order to ensure that the gains obtained in combating inflation in recent years could be permanent.

The three core inflation measures calculated by the Central Bank show a slight reduction in the twelve-month changes, evidence similar to that observed for the headline inflation. The core by exclusion of regulated and administered prices and food at home prices registers inflation of 6.14% in twelve months up to February, after having reached

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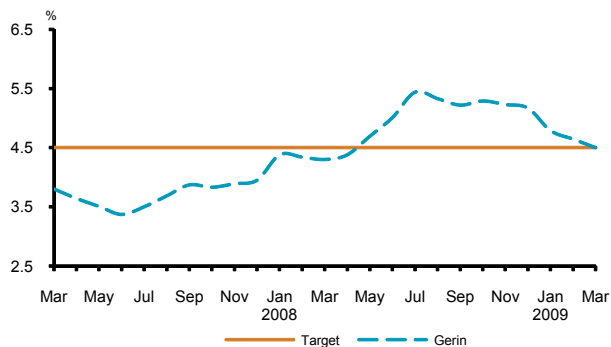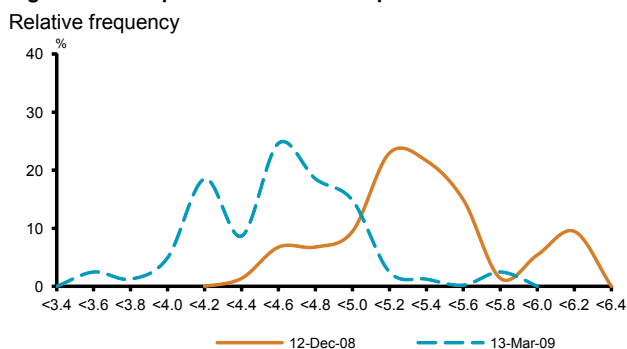

Figure 6.2 – Dispersion of inflation expectations for 2009

6.38% in October, while inflation measured by the core by non-smoothed trimmed mean reduced from 5.15% to 4.85% on the same basis of comparison. On the other hand, inflation measured by the core by the smoothed trimmed mean show virtual stability (4.89% in February against 4.97% in September). Therefore, all core measures still find themselves above the center of the target.

Inflation expectations for 2009 dropped significantly since the release of the last *Report* and, at the cutoff date of March 13, they reach 4.52%, against 5.20% on December 12. On the other hand, expectations for 2010 remain anchored at 4.50%. As illustrated by Figure 6.2, it is compelling to highlight the increase, since the release of the last *Report*, of the dispersion around the central tendency of inflation expectations, mainly for 2009, which matches with the assessment that the prospective scenario for inflation became more uncertain since the release of the last *Report*.

6.2 Main scenario: associated risks and monetary policy implementation

The forecasts presented at the Copom meetings consider a set of hypotheses on the behavior of the main macroeconomic variables. This set of assumptions, as well as the risks associated to it, make up the main prospective scenario based on which the Committee makes decisions. In general terms, the current prospective scenario considers the continuity of global contraction, on the external side, the slowdown of economic activity and the reduction of inflationary pressures, on the domestic side. The forecasts, used in the current prospective scenario, will be presented in the following section. In particular, from the viewpoint of the balance of risks related to inflation prospects, the main risks associated to the main scenario stem from the duration, the magnitude, and the impact of the developments of the world crisis over the trajectory of the domestic economic activity. Some risk associated to the exchange transfer due to the depreciation of the national currency observed in the last months of 2008 still remains. However, the assessment of this kind of risk is now reduced when compared with that in the last *Report*.

The external scenario considers the world's economic downturn continues to impact both at the developed and the emerging countries. Even though, recently, the financial markets have reacted positively to the initiatives of the American authorities to deal with the issues affecting their

banking system, there is still considerable uncertainty is left about the future developments of the financial crisis. Actually, since the publication of the last *Inflation Report*, the financial markets have been over continued stress. Although, originating in the USA and Europe, the financial crisis repercussions over emerging economies remain significant. In particular, despite unpublished actions of American and European authorities, aiming at ensuring the minimum functioning and liquidity conditions to the assets markets, the perception of systemic risk continues at a high level. The lack of international liquidity continued to foster the unleveraging of resource administrators who also had to face a low level trend of asset prices. In an economic environment where there is increased wariness to risk and shorter capital flows, the volatility of the currencies of emerging economies persist, and there is no apparent trend so far.

Regarding the global macroeconomic scenario, slowdown tendencies prevail and inflationary pressures cool off. The currently dominant view points to the slowdown of the world's economy in 2009, and the recovery only in 2010. The consensual forecasts indicate activity slowdown in the USA, Europe and Japan, will not be totally offset by the existing dynamics among the emerging markets economies, mainly in Asia. There is evidence that the more pronounced frailty of economic activity in Europe and in parts of Asia was, to an important extent, due to the negative shock on swap terms. This shock was caused by the hike in commodities prices in the first half of 2008, but reverted in the second half of the same year, allowing for increments of available income in these regions. On the other hand, the cyclical deterioration in the credit quality, centered in the USA and in Europe, helps to intensify the problems of the international financial system worsening financial conditions and consequently increasing the risks a deeper recession. In mature economies, where inflation expectations have been successfully anchored and the economic growth has been weak for a long time, inflationary pressures have shown rapid reduction. In emerging economies, inflationary pressures have also lessened, although in many cases, it still displays strong persistence. In these economies, there were secondary effects of the rise in the prices of raw materials on the consumer prices, and a more intensive pressure from heated demand on the capacity to increase production. Also, exchange rate has depreciated in these countries. In this context, while monetary policies were very expansionist in mature economies, in emerging economies, the expansionist stance of policy makers have been more moderate. In mature economies, the authorities have been announcing a series of important initiatives aimed at sustaining activity by means

of fiscal incentives, which may contribute towards a gradual upward movement. Developed countries authorities have announced a series of fiscal incentives with the purpose of sustaining economic activity. These were important policy decisions that may contribute towards a gradual recovery. On the other hand, increasing estimates of the fiscal expenditures with these macroeconomic incentive packages and with those aimed at supporting the financial sector deteriorating the risk classification of diverse sovereign credits, even for advanced economies.

As highlighted in the latest *Reports*, the world crisis effects on Brazilian inflation is, a priori, ambiguous. On the one hand, reduction of exports contributes to limit aggregated demand expansion, and the cutback in prices of commodities helps to mitigate the domestic inflationary pressures. On the other, increased risk wariness and the repatriation of capitals towards mature economies reduced the demand for assets from emerging economies, leading to a sharp depreciation of various national currencies against the North-American dollar. Depreciation, in turn, ended up pushing up the prices in these economies. In this context, even if the Brazilian economy were to be less vulnerable to changes of the international financial markets, the capacity of the external sector to mitigate inflationary risks has been jeopardized.

However, the net effect of global deceleration on domestic inflation path has been mostly benign. This is a consequence of the dominant impact of the international crisis on domestic demand that prevailed over the pressures stemming from the exchange rate market. Note that the reduced external demand induced by the world crisis is not the only impact on the level of activity of the Brazilian economy. The restriction of external financing sources has had an indirect but important effect over the domestic financial conditions. Also, increasing uncertainty has led the agents to postpone important consumption and investment-related decisions. More specifically, the duration of the world crisis is one of the main components of uncertainty and risk on the external side. In case the crisis persists for a longer period of time, extending into 2010, the effects of deceleration over domestic economy would last for the whole forecast horizon. If recovery occurs more rapidly than currently anticipated, the restoration of financial and confidence conditions coupled with the upturn of the commodities prices will cause inflationary risk to increase.

Also, it is worth mentioning that the recent expansion of both the public indebtedness and the monetary aggregates in the mature economies, compared to the crisis, may lead

to changes in the behavior of asset prices and in the time structure of interest rates. This could lead to potentially relevant implications for the external financing of the Brazilian economy in the future, within the forecast horizon.

Regarding the behavior of commodities prices, the scenario remains benign, as described in the last *Report*. Although still volatile, in general, these prices are close to those verified in the previous quarter. Taking into account the global economic growth deceleration, the prospect is that both the price of petroleum and of other commodities will contribute to restrain domestic inflation. However, as mentioned in the previous *Reports*, the analysis of the possible deflationary effects of recent trends of the prices of raw materials cannot be decoupled from the implications on the prices of Brazilian assets.

In this context, it is convenient to do a careful assessment of the possible effects of the national currency depreciation, verified since September of the last year, on inflation. Evolution of prices has been monitored and, so far, it does not show significant effects of exchange rate depreciation on inflation, as pointed out in the last *Report*. At first, the increasing credibility of the inflation targeting system tends to mitigate the exchange rate pass-through. One should also highlight that the current economic environment is fairly different from that verified, for instance, in 2002. On that occasion, the agents considered even the possibility of a change of the monetary system, which exacerbated the inflationary expectations, and potentially the exchange rate pass-through. A second aspect is that the cutback of commodities prices in international currency terms, to a certain extent, counterbalanced the impact of exchange rate depreciation and contained the impact on domestic prices. In fact, the CRB index, measured in domestic currency, decreased in the latest months. On the other hand, one should acknowledge that commodities represent a small share in the basked of imported goods. The price index of imports in dollar, calculated by Funcex, fell only 12% between August 2008 and January 2009, meanwhile exchange rate depreciation reached 43%. Also, domestic economic activity fell since the final quarter of last year. There is empirical evidence that the magnitude of the exchange pass-through depends on the economic cycle tending to be higher when the economy is heated. Lastly, one should consider the initial conditions in terms of the real exchange rate. When the nominal exchange variation represents, to a large extent, an adjustment of the real exchange rate toward a historic average value, the transfer tends to be smaller. Also, it is possible that the exchange rate appreciation, verified in previous years and

in the first half of 2008, was not completed incorporated on the price level, allowing for a smaller pass-through of the current exchange rate depreciation. On the other hand, it is necessary to take into account that the current exchange rate depreciation was substantial. Therefore, the potential inflationary effect might be significant even with small pass-through coefficient.

It is important to highlight the existence of risk associated to the lag between the exchange rate variation and its impacts on the consumer prices. This is because there is a chain which goes from the import price in national currency at the customs house, through transportation, through the wholesaler and finally gets to the final consumer. Secondly, the high volatility of the exchange rate during the final months of 2008 generated uncertainty over the level at which this rate would converge. Therefore, it might be the case that price setters decided to wait for a more stable scenario before defining price readjustment. In principle, the latest movements of wholesale prices have pointed to a scenario of limited pass-through in the short-run. However, in the event that levels of exchange rate previously seen as transitory turn to be assessed as permanent, the probability of a higher pass-through increases. In this case, monetary policy should prevent such price movements stemming from exchange depreciation from passing to inflation expectations or from generating second round effects due to the attempt to realign prices, including salaries, to previous levels of the exchange rate depreciation episode. Considering all these arguments, the developments of both consumer and wholesale prices indicate a decline of the risks associated with exchange rate pass-through since the assessment in the last *Inflation Report*.

Another risk is related to the prospects of economic growth for the Brazilian economy. In fact, the GDP contraction in the final quarter of 2008 confirms the prognosis in the last *Report*. Up to the third quarter of last year, the strong GDP expansion was led by the vigorous growth in domestic demand, which exceeded supply expansion and caused, at least in part, both the divergence of inflation relative to its target and deterioration of the current account balance. However, in spite of the greater resistance of the Brazilian economy to external shocks, the global crisis seems to be affecting, more than anticipated, the domestic economic activity. The contraction of the economic activity in the final quarter of 2008, with effects over the performance of the economy in the current year was a result of the following developments: in an environment of greater uncertainty, consumption and investment decisions were postponed; more restrictive

conditions of internal and external credit; reduction of world's demand and exchange rate depreciation, which, in turn, made imported investment goods more expensive. The slowdown of economic activities is confirmed by other preceding and effective activity indicators that are released with greater frequency than those of the national accounts. Examples are sales, industrial production, sales on the retail trade, the confidence indices, and the degree of idle capacity.

In fact, data on the performance of the economy by the end of 2008 led to a reassessment of the prospect for the economic growth this year. The magnitude of deceleration, however, is still enshrouded in high degree of uncertainty as indicated by the great dispersion of market expectations for 2009 GDP growth, collected by Gerin. Actually, the variation the coefficient of expectations, measured by the ratio between the standard deviation and the average of forecasts, reached, in March 2009, values four times greater than the maximum value verified until then in this series (considering the forecasts made in March of each year). As a result, inflation forecasts were also affected by greater uncertainty.

On the fiscal side, uncertainty about GDP growth mirrors the uncertainty on the future fiscal balance, especially because of governmental expenditures rigidity, which transmits itself to the evolution of the consolidated public sector's primary surplus. Nevertheless, Copom assesses, with the information so far available, that there should not be significant and consistent change of the trend in the reduction of the ratio debt-output.

The assessment of the macroeconomic outlook becomes more complex because economy sectors tend to be affected in a heterogeneous manner by the international financial crisis. At least in the very beginning, the most credit dependent is the good the most affected it is. In particular, goods whose purchase implies greater income commitment by the households, either in terms of the size of the budget share or in terms of the period of commitment, tend to be more affected because in an environment of uncertainty the agents postpone more significant purchasing decisions. On the other hand, the prospects for the minimum wage and overall income, which is in part sustained by the social transfers, may act favorably to cushion the impact of external turbulences over the level of activity in the short term.

Even disregarding the stock adjustment verified in recent months, the effects of the economic activity contraction in the last quarter, which was concentrated in the month of December, tend to spread to the following quarters. As pointed

out in the last *Report*, some feedback mechanisms tend to be effective over time. Restrictive credit conditions and greater uncertainty generates postponement of consumption and investment decisions is translated into effective economic dampening. The resulting reduction of overall real income, in turn, strengthens the initial driving forces in the process. On the other hand, the domestic agents should realize there is no reason to behave preemptively once the worse moments of the international financial crisis are overcome and their attention turn the to the solid foundations of the Brazilian economy. As a result, the economy may gradually resume its positive growth trend. In this context, the government's policy decisions, such as the recently announced housing program, will also be a contributing factor.

Additionally, observe that the expectation of reduction of the agricultural harvest in 2009 adds up uncertainty to the prospective scenario. On the one hand, such development would reinforce the contractive movement of the industrial sector. On the other, the reduction of the farming supply would raise pressures over the prices of foodstuffs, with potential inflationary consequences.

The Committee assesses that the Brazilian economy may face the global crisis without ruptures. Actually, the situation does not require a change of the country's economic policy regime, differently from what occurred at the beginning of 1999. The basic framework of the economic policy, based on the tripod inflation targets, fiscal adjustment and floating exchange rate is consolidated and combines resilience and flexibility. Besides, the solid external financial position, with the significant volume of international reserves, the trade surpluses and the external financing based mainly on direct investment reinforce the assessment that the current turbulences may be overcome without ruptures.

The domestic economic deceleration must also be analyzed under the prism of the external financing conditions. In fact, the accelerated growth pace of the Brazilian economy, up to the third quarter of last year, was, in part, sustained by a growing worldwide demand for exports and by a boom in the prices of raw materials, which made feasible the high expansion of imports. Thereby, the inflationary pressures derived from the domestic demand which expands at a pace incompatible with the capacity of expansion of domestic supply were mitigated. In reality, the external sector, in the latest years, had been playing an important role in the maintenance of inflation in a trajectory consistent with the targets established by CMN. This occurred, especially, by means of the discipline imposed over the prices of tradable goods and by means of the expansion

of investments. The external conditions, however, changed substantially in the latest quarters, with reduction of demand for exports and fall in price of the commodities. Thus, the pace of domestic absorption should adjust itself to the changes in the external conditions.

Upon breaking down the IPCA into free prices and monitored prices, one observes that the monitored prices will probably cease to play the role of cooling off the inflationary pressures, verified in the last two years. In fact, for 2009, the main scenario considers that variations in the monitored prices should be higher than the inflation target. As the monitored prices respond mainly to movements beyond the level of prices and are not very sensitive to the economic cycle, the still high levels of the twelve-month accumulated inflation tend to result in still significant variation in this group of prices. In any case, it would be reasonable to expect, at any moment, the variation of monitored prices to converge toward the average variation of free prices and, thereby, ceased to contribute to mitigating pressures over full the inflation rate. On the other hand, although the central work scenario adopted by Copom foresees domestic prices of gasoline unaltered in 2009, if the current status of the petroleum market persists, it does not seem prudent to discard completely the hypothesis of a reduction of these prices.

Up to the third quarter of last year, employment expansion, in part backed by macroeconomic stability, had sustained the growth of overall real wages at a robust pace. The latest months show signs of contraction of the job market, which eventually may intensify, considering that in general this market reacts with some delay to the level of activity. This stronger downturn may even expand initial deceleration movements of demand, but, in contrast, they may function as a mitigator of possible inflationary pressures.

Credit growth that was an important element to sustain aggregated demand has now played a central role for the deceleration. The expansion of banking spreads, even in view of the reduction of the cost of banks' funding, coupled with the shortening of the contractual term and of conditionality for credit cession, should, if persistent, contribute to contain the aggregated demand. On the other hand, the recovery of credit or, in more general terms, of the financial conditions in general, including the capital market, may enable a quicker resumption of economic activity, than is currently anticipated.

The possibility that alterations in the inflation dynamics, which in a preliminary assessment seem transitory, may have

effects over the agents' expectations as to the inflationary trajectory in the medium and long term constitutes a perennial risk for the implementation of the monetary policy and, therefore, merits continuous monitoring. In principle, short-term concentrated effects of the exchange rate pass-through may lead to dissemination of the second round effects. This happens because significant variations in relative prices, which substantiate in high inflation indices, tend to generate reactions by recomposition of real income by the agents, which in turn, feeds back the inflationary process. The international experience, as well as the very history of inflation in our country, recommends that the stance of the monetary authority remain cautious in order to face potential second-round effects.

However, Copom assesses that the probability that initial inflationary pressures may pose risks to the inflation trajectory continues to diminish. In fact, in comparison with the previous *Inflation Report*, the committee states that the risk of materialization of a benign inflationary scenario has expanded. The contraction in economic activity has limited the inflationary impact of the adjustment on the balance of payments. Actually, the economy had been, up to the third quarter of 2008, showing substantial gap between the expansion of goods and services supply and that of demand, which caused inflationary pressures at that moment and prospectively. In this sense, the demand contraction acted towards the elimination of this gap. Incidentally, this evolution of the prospective scenario is expressed in the inflation forecasts considered by the Committee. However, the duration and magnitude of the economic deceleration still remains surrounded by uncertainty. In these circumstances, the monetary policy should remain cautious, aiming to ensure the convergence of inflation of inflation toward the targeted trajectory.

Remember that inflation ended 2008 near the upper limit of the tolerance interval for the inflation target. The strategy adopted by Copom aims to bring inflation back to the central target of 4.4%, established by the CMN, in 2009, and keep it at a level consistent with the trajectory of targets in 2010. Such a strategy, which shows it's results over time, takes into account the transmission mechanisms gaps and is the most appropriate way to deal with the uncertainty inherent to the process of formulation and implementation of the monetary policy. The Committee understands that the downturn of demand, motivated by the squeeze of financial conditions, by the deterioration of the agents' confidence and by the contraction of global economic activity, created an important amount of idle capacity of production

factors. This development should contribute to contain the inflationary pressures, even in the face of the consequences of the adjustment process of the balance of payments and in the presence of inflationary feedback mechanisms in the economy, making way to relax the monetary policy. On the other hand, besides the fact that the changes of the basic interest rate have effects on the activity and inflation that accumulate over time, Copom's assessment about the room for additional monetary easing also takes into account aspects resulting from the long period of high inflation, which subsist in the institutional framework of the national financial system.

In the light of these considerations, Copom decided to reduce the Selic rate from13.75% p.a. to 12.75% and 11.25% in its January and March meetings, respectively. This adjustment of the basic interest rate will have delayed and cumulative effects on the economic activity and inflation.

6.3 Inflation forecasts

According to the traditionally adopted procedures, and taking into account the set of available information up to March 13, 2009 (cutoff date), the benchmark scenario assumes the exchange rate constant over the forecasting horizon at R$2.35/US$, and the target for the Selic rate at 11.25% p.a. – set on the Copom meeting of March – against R$2.40/US$ and 13.75% considered in the *Inflation Report* of December 2008. In the benchmark scenario, the projection for variation, in 2009, of the set of administered prices was maintained at 5.5%, as considered in the last *Report*. This forecast is based on hypotheses, for the accumulated of 2009, of nil variation for the prices of gasoline and of cooking gas; of 7.6% in prices of electricity; and of 5% in the fixed telephone tariffs. The items for which more information is available were projected individually. For the others, projections are based on models of endogenous determination of administered prices, which consider seasonal components, exchange variations, market prices inflation and General Price Index (IGP) inflation, among other variables. According to these models, the readjustment projections of administered prices for 2010 is 4.8%, the same presented the December *Report*, and for 2011 it stands at 4.5%.

The market scenario, on the other hand, incorporates data from the survey carried out by Gerin with market analysts up to the cutoff date. In this scenario, the evolution of exchange rate expectations increased in the comparison with the values released in the December *Inflation Report*.

For the last quarters of 2009 and of 2010, these expectations moved from R$2.20 to R$2.30. For the first quarter of 2011, the expectations forecast a exchange rate of R$ 2.30. The Selic interest rate expectation suffered a significant reduction regarding the values of the last *Report*. For the last quarter of 2009, the average went from 13% to 9.75% p.a., whereas, for the last quarter of 2010, it moved from 11.83% to 9.61%. For the first quarter of 2011, expectations point to an average Selic rate of 9.79%. This trajectory is consistent with spreads for the pre-DI swap for 360 days of -123 b.p. and -117 b.p., regarding the current Selic rate, the last quarter of 2009 and of 2010, respectively. Additionally, the market scenario assumes variations of 5.5% and of 4.8% for the set of administered prices in 2009 and in 2010, respectively. According to the market scenario, for 2011, the forecast stands at 4.5%.

With regard to the fiscal policy, the forecasts presented in this *Report* are based on the working hypothesis of one primary surplus of 3.3% of GDP in 2009, which takes into account the implementation of the Investment Pilot Project (PPI), and 3.8% of GDP in 2010 and 2011.

Based on above assumptions and using the information set available, forecasts were constructed for the four quarter accumulated IPCA, given the benchmark and the market scenarios interests and exchange rate trajectories.

The central forecast associated with the benchmark scenario indicates inflation of 4% in 2009, a level 0.7 p.p. lower than forecasted in the December *Report*, therefore, below the central value of 4.5% for the target established by the CMN. As illustrated in Figure 6.3, the four quarter accumulated inflation tends to stabilize around 4%, as of the second semester of 2009. This reflects, mainly, the effects of the rising of production factor idle observed in the fourth quarter of 2008, which in a way, surpass the effects of reduction in the basic interest rates determined by Copom in its last two meetings. Twelve month accumulated inflation starts from 5.7% in the first quarter of 2009, reaches 4% in the fourth quarter of 2009 and remains around this value during the forecast horizon.

Data on Table 6.1 indicates, for 2009, a decrease of 1 p.p. in the accumulated inflation of the last twelve months in the second quarter, regarding to the first; and of 0.6 p.p. in the third quarter, when compared to the second. The movement reflects a forecast of free price inflation, both for the second and the third quarter of 2009, well below the inflation observed in the same period of 2008, considering that in the

Figure 6.3 – Forecasted IPCA-inflation with interest rate constant at 11.25% p.a. (Benchmark scenario)
Inflation fan chart
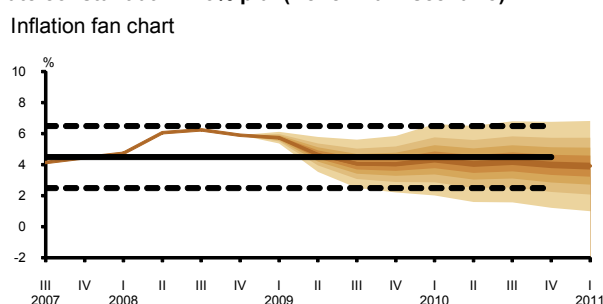
Note: Accumulated inflation in 12 months (% p.a.).

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

Year	Q	Probability Interval						Central projection
				50%				
			30%					
				10%				
2009	1	5.6	5.7	5.7	5.8	5.8	5.9	5.7
2009	2	4.2	4.4	4.6	4.7	4.9	5.1	4.7
2009	3	3.4	3.7	3.9	4.2	4.4	4.7	4.1
2009	4	3.3	3.6	3.9	4.2	4.5	4.8	4.0
2010	1	3.4	3.8	4.1	4.5	4.9	5.3	4.3
2010	2	3.0	3.5	3.9	4.2	4.6	5.1	4.0
2010	3	3.1	3.6	4.0	4.4	4.8	5.3	4.2
2010	4	2.9	3.3	3.8	4.2	4.6	5.1	4.0
2011	1	2.7	3.2	3.7	4.1	4.6	5.1	3.9

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

Figure 6.4 – Forecasted IPCA-inflation with market expected interest and exchange rates

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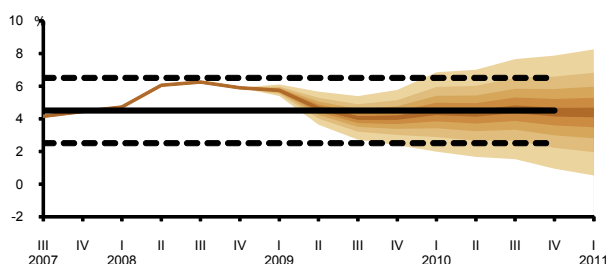
Note: Accumulated inflation in 12 months (% p.a.).

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

Year	Q	Probability Interval						Central projection
				50%				
			30%					
				10%				
2009	1	5.6	5.7	5.7	5.8	5.8	5.9	5.7
2009	2	4.2	4.4	4.6	4.7	4.9	5.1	4.6
2009	3	3.5	3.7	4.0	4.2	4.4	4.6	4.1
2009	4	3.4	3.7	3.9	4.2	4.5	4.8	4.1
2010	1	3.4	3.8	4.2	4.6	5.0	5.4	4.4
2010	2	3.2	3.7	4.1	4.5	5.0	5.4	4.3
2010	3	3.3	3.9	4.4	4.8	5.3	5.8	4.6
2010	4	3.0	3.6	4.1	4.7	5.2	5.8	4.4
2011	1	2.8	3.5	4.1	4.7	5.3	6.0	4.4

Note: accumulated inflation in 12 months (% p.a.).
1/ According to Gerin.

Table 6.3 – December 2008 *Inflation Report* forecasts

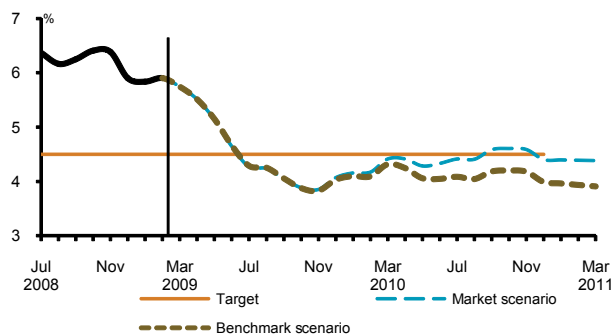| Period	Benchmark scenario	Market scenario
2008 IV	6.2	6.2
2009 I	6.3	6.1
2009 II	5.2	5.0
2009 III	5.1	4.9
2009 IV	4.7	4.5
2010 I	4.7	4.5
2010 II	4.5	4.5
2010 III	4.3	4.3
2010 IV	4.2	4.3

case of administered prices, the contrary occurs. According to data shown on Table 6.1, the estimated probability that inflation will surpass the upper limit of the target for 2009, according the benchmark scenario stands at around 1%.

In the market scenario, the forecast for inflation of 2009 (4.1%) is 0.1 p.p. higher than that associated to the benchmark scenario, and 0.4 p.p. lower than that registered in the last *Report*. This cutback in the forecast, to a large extent, is explained by the rise of idle capacity verified as of the fourth quarter of 2008, which in a way surpass the joint effects of the monetary relaxation occurred and expected by the market participants. As can be inferred from Figure 6.4 and from Table 6.2, forecasts indicate a twelve-month accumulated inflation drop during 2009, from 5.7% in the first quarter to 4.1% in the year closure, therefore, below the central value of 4.5% for the target. In the comparison with the benchmark scenario, the slight upturn of the inflation forecast for 2009 is explained, basically, by the expectation, on the part of the market analysts, of continuity in the process of reduction of the basic interest rate initiated by Copom in the January meeting. In the market scenario, as well as in the benchmark scenario, the estimated probability that inflation will surpass the upper limit of the target for 2009 also stands at around 1%. Still according to market scenario, the twelve month accumulated inflation forecast rises in the first quarter of 2010, when it reaches a level near the central value of 4.5% for the target established by CMN. The forecast fluctuates around this value up to the first quarter of 2011. The forecast for both the last quarter of 2010 and the first of 2011 is influenced by the fact that inflation expectations for 2011 are positioned at 4.5%.

Comparing the trajectories shown in this *Report* with those released in the previous *Report*, which forecasts are reproduced in Table 6.3, indicates that there was a significant reduction in the forecasts, in the benchmark scenario, for 2009. In the market scenario, although there was also reduction in inflation forecasts for 2009, the movement was smoother. In part, in both cases, the cutback in the forecasts is explained by the fact that inflation rates for recent months have been below the expectations prevailing at the release of the last *Report*. For 2010, in the benchmark scenario, the inflation forecast falls regarding the value contained in the last *Report*, with the opposite happening to the market scenario. It is worth registering that the monetary policy decisions will have effects increasingly concentrated at the end of 2009 and, particularly, in 2010.
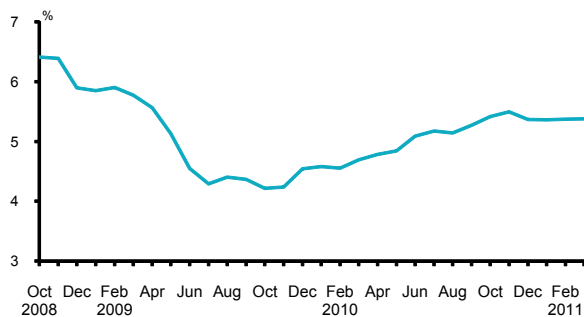
Figure 6.5 illustrates the evolution of twelve-month accumulated inflation, according to the benchmark and

Figure 6.5 – Forecasts and target path for twelve-month cummulative inflation

Target
Benchmark scenario
Market scenario

Figure 6.6 – Inflation Forecast: VAR Models

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

Average forecast generated by the VAR models.

Figure 6.7 – GDP growth with interest rate constant at 11.25% p.a.   Benchmark scenario

Output fan chart

market scenarios, jointly with the target trajectory, up to the first quarter of 2011. Up to February 2009, the values refer to inflation occurred in twelve months and as of March the accumulated values trajectories consider the forecasts of the respective scenarios. The forecasts in the benchmark scenario are below the central value of the target (4.5%) over the forecast horizon. The forecasts under the market scenario, however, are below the central target during 2009, but converge toward the central value in 2010, and in the first quarter of 2011.

The average forecasts generated by the Vector Autoregressive models (VAR) for twelve-month accumulated inflation is shown on Figure 6.6. Up to February 2009, the values refer to inflation occurred and, as of March, to forecasts. The models indicate the downward trend of the twelve-month accumulated inflation up to the third quarter and stability around the central value of the target until the beginning of 2010. From that point the forecast rises practically over all considered horizon, reaching values near 5%. Note that, for the period up to mid-2010, the average of the forecasts generated by the VAR models was reduced when compared to the one presented in the last *Report*.

Figure 6.7 shows the output growth fan chart, built on the hypotheses of the benchmark scenario. Taking into account that the forecasts of GDP growth consider two variables which are not directly observable, potential output and output gap, the forecast errors associated here are considerably greater than the errors contained in the inflation forecasts. According to this scenario, forecasted GDP growth for 2009 is 1.2%, 2 p.p. below that presented in the December 2008 *Inflation Report*. This reflects, in part, the fall in economic activity in the last quarter of 2008, more intensive than projected; besides the signs that the recovery will occur in a gradual manner along the year.

Impact of Imported Goods Inflation in Brazil

The Central Bank of Brazil (BCB) uses several structural models with the aim of identifying and assessing the transmission mechanisms of the monetary policy. In this sense, the Phillips curve performs a relevant role in relating current inflation to variables of concern – for instance, measurements of imbalance in real economy, past inflation, inflation expectations, and foreign inflation. Regarding the last variable, it is worth mentioning the significant volatility, observed in the latest quarters, of the U.S. Producer Price Index (PPI), the international prices of the main commodities and the nominal exchange rate. Given the importance and contemporariness of the subject, this Box assesses the recent behavior of foreign inflation and their potential effects on inflation dynamics in Brazil.

According to Batini & Haldane (1999), a Phillips curve for an open economy may be represented by means of the following reduced form:

$$\pi_t = \chi_0 E_t(\pi_{t+1}) + (1 - \chi_0)\pi_{t-1} + \chi_1(y_t + y_{t-1})$$
$$+\mu[(1 - \chi_0)\Delta c_t - \chi_0 E_t(\Delta c_{t+1})] + \varepsilon_t \qquad (1)$$

where π_t represents the domestic inflation rate; E_t represents the expectation operator; y_t is the real output; Δ is the difference operator; $c_t \stackrel{\text{def}}{=} e_t + p_t^* - p_t$ is the real exchange rate; e_t is the nominal exchange rate; p_t^* is the price level of imported goods expressed in foreign currency; p_t is the domestic price level, and ε_t represents a supply shock. In addition, note that all the variables are considered as (logarithm) deviations from the respective equilibrium values. Theoretically, this specification can be justified by means of a micro-founded framework, such as the neo-Keynesian Phillips curve proposed by Woodford (2003) for an open economy with full capital mobility.

In addition, one theoretical feature usually incorporated into the Phillips curve is the long-term verticality, which implies neutrality of the monetary policy on this time horizon. In practice, the adoption of this restriction in empirical investigations generally leads to more stable parameters of the Phillips curve, as well as to more intuitive specifications. In Batiti & Haldane (1999), where foreign inflation is transmitted to domestic inflation through a real exchange measure, the verticality restriction can be easily interpreted in terms of inflation. To do so, one can isolate the domestic prices term and rearrange the Phillips curve in order to obtain inflation as a function of the foreign inflation.

Regarding the Phillips curve specifications estimated by BCB, it is worth mentioning that, in most cases, market prices inflation is considered as a dependent variable[1], following the general form below:

$$\pi_t^{livres} = \sum_{k>0} \alpha_k \pi_{t-k} + \sum_{k>0} \beta_k E_t(\pi_{t+1}) +$$

$$+ \left(1 - \sum_{k>0} \alpha_k - \sum_{k>0} \beta_k - \sum_{k>0} \gamma_k\right)(\Delta e_t + \pi_t^*) +$$

$$+ \sum_{k>0} \gamma_k \left(\Delta e_{t-k} + \pi_{t-k}^*\right) + \sum_{k>0} \theta_k h_{t-i} + \varepsilon_t \quad (2)$$

where all the variables are in logarithm form, π_t^{livres} representing market prices inflation; π_t is the headline inflation measured by IPCA; π_t^* is inflation of imported goods measured in foreign currency, and h_t is the output gap. Estimations for the pass-through coefficient in Equation (2) suggest that the impact of foreign inflation on domestic inflation has diminished in the last years, period in which the credibility of the Brazilian inflation targeting system has been consolidated.

In this sense, the evolution of the pass-through coefficient can also be inferred from Figure 1, for the period 2002-2008, which presents the two components of foreign inflation: the U.S. Producer Price Index related to all commodities – PPI-all commodities – and the nominal exchange rate R$/US$. It should be mentioned that both the PPI-all commodities and the nominal exchange rate

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1/ Regulated prices inflation is separately modeled due to its particular features.

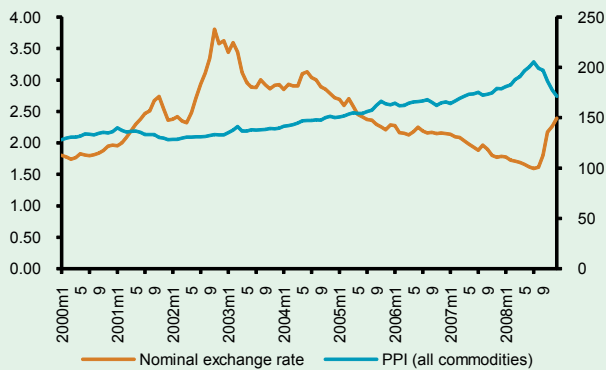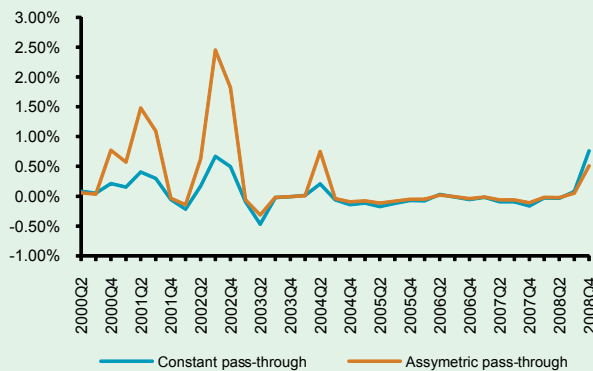**Figure 1 – Nominal exchange rate (R$/US$) and PPI**
all commodities

Nominal exchange rate   PPI (all commodities)

Figure 2 – Evolution of pass-through

Constant pass-through   Assymetric pass-through

constitute proxies, respectively, for the imported goods inflation, in terms of foreign currency, and for the exchange rate, which effectively impact CPI inflation in Brazil. Based on Figure 1, the dynamics of PPI-all commodities has apparently been important in attenuating the effects of exchange rate variations on inflation and *vis-a-vis*. In particular, since mid-2002, these two series exhibit opposite movements, with correlation equal to -0.92. In fact, from the third quarter of 2002 up to the third of 2008, the average quarterly change of nominal exchange rate and PPI-all commodities reached, respectively, -1.63% and 1.71%, which leads to a net impact of only 0.08%.

Nonetheless, from the point of view of the impact of foreign inflation on domestic inflation, besides the movements of PPI-all commodities and nominal exchange rate, one must also consider the dynamics of the pass-through coefficient. In order to assess how the interaction of these three effects (changes in nominal exchange rate, the dynamics of the imported goods inflation in foreign currency and the evolution of the pass-through coefficient) could have impacted the domestic inflation in recent years, the following exercise is conducted: Following Correa & Minella (2006), an asymmetric pass-through coefficient is adopted, with differentiated regimes for periods of exchange rate appreciation/depreciation. As depicted in Figure 2, the mechanism of asymmetry is expressed in a more pronounced manner in periods of high exchange rate volatility, such as in 2002.

Therefore, the exchange rate dynamics observed in the latest years, in a certain way counterbalanced by the movements of imported goods inflation (in terms of foreign currency), gives support to the hypothesis of impact attenuation of the foreign inflation on domestic inflation.

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Inflation Expectations Collected by the Central Bank of Brazil

Inflation expectations play a fundamental role in the inflation formation process. However, since these variables cannot be directly observed, some proxies are usually adopted by central banks, such as: (i) expectations extracted from financial market data; and (ii) survey-based expectations. In 1999, the Central Bank of Brazil implemented a daily survey as part of the transition to the inflation targeting system. Nowadays, the Market Expectations System collects information – on several variables, among which inflation rate – from roughly one hundred financial and non-financial institutions. Because of the importance of the subject for monetary policy, this Box aims to identify the main features of survey-based inflation expectations collected by the Central Bank of Brazil, as well as to map the driving forces behind the expectation formation process.

Overall, by comparing the time series of short and medium-term expectations (Table 1), and of long-term expectations (Table 2) with the respective monthly percentage change of the National Consumer Price Index – extended (IPCA), it can be noticed that the average and median values of the expectations approach the observed inflation rate as long as the

Table 1 – Descriptive Statistics (series in % month)

	IPCA (% p.m.)	*Top5* Short h=1 month	Median h=1 month	*Top5* Average h=3 months	Median h=3 months	*Top5Average* h=6 months	Median h=6 months
mean	0.55	0.50	0.48	0.44	0.43	0.43	0.43
median	0.46	0.45	0.45	0.4	0.4	0.4	0.4
maximum	3.02	1.88	1.49	1.72	1.4	1.3	1.4
minimum	-0.21	0.10	0.10	0.15	0.16	0.2	0.21
standard deviation	0.48	0.29	0.22	0.20	0.17	0.17	0.17
correl (IPCA , .)	1.0	0.78	0.69	0.18	0.2	(0.08)	(0.08)

Nota: *Top5* expectations refer to median series of Top 5 (short or medium term), while expectations denominated Median represent the medians of all surveyed institutions in a certain time period. The Sample is from 2002m05 to 2008m12 (80 observations).

Table 2 – Descriptive Statistics (series in % 12 months)

	IPCA (% 12 months)	Median (h=12 months)
mean	7.1	5.57
median	6.1	4.92
maximum	17.2	13.18
minimum	3.0	3.37
standard deviation	3.9	2.01
correl (IPCA , .)	1.0	0.17

Note: sample from 200m1 to 2008m12 (74 observations)

forecast horizon diminishes, whereas the correlation between the inflation rate and the expectations increases, approaching the unit value.

A relevant issue to be investigated regarding any inflation expectations series is the existence of bias. To do so, first consider the following regression:

$$\pi_t = C_1 + C_2 \pi_{t,t-h}^e + \varepsilon_t, \tag{1}$$

where π_t represents the observed inflation rate; $\pi_{t,t-h}^e$ is the respective inflation expectation, formed with a forecast horizon of h periods; and ε_t is a random residual. According to Grant & Thomas (1999), the existence of bias, or a "weak" form of rationality[1], can be verified through the following joint null hypothesis Ho: $(c_1;c_2) = (0;1)$[2]. Tables 3 and 4 show the bias test results for the survey-based inflation expectations in Brazil.

Table 3 – Bias Test H_0: $(C_1; C_2) = (0; 1)$

Sample 2002m05 – 2008m12	Top5 Short h=1 month	Median h=1 month	Top5 mean h=3 month	Median h=3 month	Top5 mean h=6 month	Median h=6 months	Median h=12 months
C_1	(0.11)	(0.15)	0.37	0.32	0.66	0.65	5.22
standard deviation	0.07	0.13	0.21	0.24	0.22	0.22	1.88
C_2	1.31	1.47	0.41	0.55	(0.23)	(0.21)	0.34
standard deviation	0.17	0.35	0.51	0.61	0.35	0.35	0.24
P Value	0.19	0.36	0.09	0.15	0.00	0.00	0.02

Nota: o teste de hipótese utilizou a correção de Newey & West (1987). Para a regressão da Mediana (h=12 meses), adota-se como variável dependente IPCA (%12 meses), com uma amostra de 2002m11 até 2008m12.

Table 4 – Bias Test H_0: $(C_1; C_2) = (0; 1)$

Sample 2002m05 – 2008m12	Top5 Short h=1 month	Median h=1 month	Top5 mean h=3 month	Median h=3 month	Top5 mean h=6 month	Median h=6 months	Median h=12 months
C_1	0.04	0.04	0.16	0.10	0.16	0.18	1.74
standard deviation	0.09	0.09	0.12	0.15	0.17	0.19	1.80
C_2	0.94	0.95	0.70	0.86	0.70	0.65	0.70
standard deviation	0.16	0.17	0.25	0.35	0.39	0.48	0.35
P Value	0.91	0.77	0.36	0.48	0.55	0.47	0.56

Notes: the hyphotesis test used Newey & West (1987). For the regression of the median (h=12 months), we adopt as dependent variable IPCA (%12 months). In this case, for a sample from 2005m01 até 2008m12, we obtain a p-value of 0.56

1/ According to the authors, the "strong" form of rationality requires the forecast errors to be uncorrelated to any relevant available economic information.

2/ Obstfeld and Rogoff (1996, p. 79) argue that rational expectation is a mathematical expectation conditional on the available information set. In other words, the rational expectations hypothesis does not require the forecasts to be strictly correct in all periods but, instead, requires the forecast errors to be unbiased and uncorrelated with any information in which the forecast is conditioned. See also Clements (2005, p 5) for further details.

Notice from Table 3 that the null hypothesis is rejected at a 5% confidence level only for longer forecast horizons (6 and 12 months), whereas for 1 and 3 months the results suggest the inexistence of a forecast bias. However, the results based on more recent samples suggest the inexistence of bias for all the considered forecast horizons (Table 4). Such results support the "weak" form of rationality of market agents researched by the Central Bank's survey, reflecting in some way the degree of sophistication of the models used in the expectations formation process[3].

A more in-depth investigation reveals some factors that help explaining the dynamics of inflation expectations in Brazil. Tables 5 and 6 show some specifications for the inflation expectations, based on the following regressors: autoregressive term, inflation target (for the next 12 months), inflation and Selic rates (both in percentage over 12 months), nominal exchange rate, industrial production, the Emerging Markets Bond Index Plus Brazil (Embi+Br) and industrial capacity utilization(UCI)[4].

Table 5 – Estimation of inflation expectations for the next 12 months

Regressors	I	II	III	IV
expectation (t+11,t-1)	**0.723**	**0.720**	**0.684**	**0.709**
	(0.000)	(0,000)	(0,000)	(0,000)
Inflation target (t+12,t)	**0.207**	**0.210**	(0.005)	(-4.1)
	(0.000)	(0,001)	(0,977)	(0.229)
IPCA (t)	**0.155**	**0.161**	**0.133**	**0.142**
	(0.000)	(0,000)	(0,004)	(0.002)
selic (t)	**(0.071)**	**(0.074)**	**(0.068)**	**(0.051)**
	(0.000)	(0.000)	(0.000)	(0.045)
exchange rate (t)	**0.007**	**0.007**	0.004	**0.008**
	(0.043)	(0.032)	(0.173)	(0.033)
Δ(industrial production)(t)		0.014		
		(0.130)		
embi+Br (t)			0.002	
			(0.211)	
capacity utilization (t)				0.043
				(0.208)
R^2	0.936	0.939	0.936	0.938
Adjusted R^2	0.931	0.933	0.933	0.932
LM Test (p-value)	0.117	0.094	0.172	0.116

3/ The formation of expectations of some US surveys is analyzed by Mankiw et al (2003), in which the authors investigate the hypotheses of adaptive, rational or "sticky-information" expectations.

4/ All variables are in log terms, excepting IPCA, Selic, inflation target and expectation, which are used in log (1 + rate/100). None of the regressions has intercept, since inflation target is constant in the adopted sample period.

According to Table 5, the autoregressive coefficient (around 0.70) indicates quite a significant persistence of inflation expectations. In addition, as expected, the expectations are positively related to the inflation target, as well as to the current inflation and nominal exchange rates. On the other hand, the results also suggest a negative coefficient for the Selic short-term interest rate, revealing the due reaction of the long-term inflation expectations *vis-à-vis* the changes in monetary policy, also reflecting the credibility of monetary authority, according to market agents.

Table 6 – Estimation of inflation expectations for the next 3 months

Regressores	I	II	III	IV
expectation (t+11,t-1)	**0.535**	**0.534**	**0.499**	**0.547**
	(0.000)	(0.000)	(0.000)	(0.000)
Inflation target (t+12,t)	**0.033**	**0.033**	(0.059)	(-3.41)
	(0.361)	(0.366)	(0.554)	(0.397)
IPCA (t)	**0.071**	**0.071**	**0.058**	**0.053**
	(0.015)	(0.016)	(0.093)	(0,133)
selic (t)	**0.001**	**0.001**	**(0.002)**	**0.019**
	(0.939)	(0.939)	(0.853)	(0.446)
exchange rate (t)	**0.166**	**0.165**	0.132	**0.223**
	(0001)	(0.028)	(0.003)	(0.016)
Δ(industrial production)(t)		0.000		
		(0.987)		
embi+Br (t)			0.001	
			(0.317)	
capacity utilization (t)				0.031
				(0.392)
R^2	0.654	0.654	0.660	0.660
Adjusted R^2	0.629	0.622	0.629	0.629
LM Test (p value)	0.901	0.904	0.514	0.806

Notes: all specifications use Newey & West (1987). Sample from 2004m01 to 2008m12 (60 observations). The significant coefficients at 5% are marked in black, with respective p-values below the estimated coeficients in the parentesis. In Table 5, inflation expectations (median of expectations of all economic agents surveyed) are measured in 12 months, with forecast horizon of h=12 meses. In Table 6, inflation expectations (mediam of medium term forecasts of *Top5*) are measured quartely, with forecast horizon of h=3 meses. The exchange rate volatility refers to the average (of the last 3 months) of the volatility of the monthly nominal exchange rate.

Table 6 presents the behavior of inflation expectations, in quarterly rates, with a three-month forecast horizon. First, a lower persistence of expectations is obtained in comparison to the results of Table 5, probably due to the higher frequency of the inflation expectation rate. In addition, the coefficient for inflation is again positive, but the responses to the inflation target and Selic seem to be not significant. These results are not surprising, taking into account the short-term horizon of the considered expectations.

On the other hand, the results of Table 6 suggest that the past exchange rate volatility has a positive impact on inflation expectations.

In summary, these exercises suggest that the factors explaining the formation of inflation expectations vary with the considered forecast horizon. In particular, the analysis presented herein corroborates the notion that both the inflation target and Selic interest rate play an important role on the formation of inflationary expectations in the relevant horizon for the monetary policy.

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Inflation Expectations Collected by the Central Bank of Brazil

Following the procedure adopted in previous years, this Box examines the behavior of inflation rate in 2008 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 inflation target; (iv) market prices inflation, excluding the impacts of the three previous items; and (v) inflation of contractually administered and regulated prices, excluding the impacts of the models of items "(i)" and "(ii)". It is worth highlighting that these estimates are approximations, based on models, and are subject to the uncertainties inherent in the process.

IPCA inflation reached 5.90% in 2008, thus registering an increase compared to 4.46% observed in the previous year. Considering the two large groups of prices which make up the IPCA, market prices inflation closed the year at 7.05%, and the variation of the regulated prices reached 3.27%. Thus, as it occurred in the four 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 3.77 p.p. to the 2008 inflation, and the regulated ones, with 1.05 p.p. In relative terms, the effect of market prices and the regulated prices on inflation reached 63.9% and 17.8%, respectively (Figure 1).

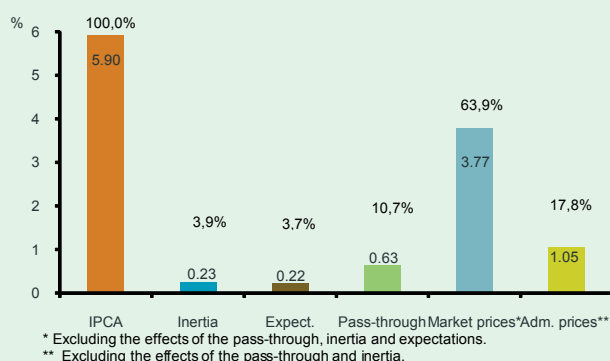**Table 1 – Inflation decomposition: 2002 – 2008 (p.p.)**

Component	2002	2003	2004	2005	2006	2007	2008
IPCA inflation (variation %)	12.53	9.30	7.60	5.69	3.14	4.46	5.90
Inertia	0.93	5.92	0.28	0.77	0.47	0.01	0.23
Expectations	1.65	1.71	0.37	0.27	-0.13	-0.43	0.22
Pass-through	5.82	-1.11	-0.34	-2.06	-0.55	-1.12	0.63
Market prices inflation[*]	2.28	1.12	4.35	3.41	1.76	5.03	3.77
Administered prices inflations[**]	1.85	1.66	2.93	3.31	1.60	0.96	1.05

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

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

Figure 1 – Inflation decomposition: 2008

* Excluding the effects of the pass-through, inertia and expectations.
** Excluding the effects of the pass-through and inertia.
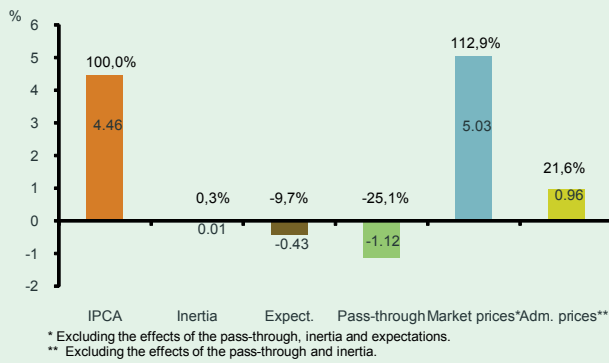
With an opposite effect, the set of items described in "(i)", "(ii)", and "(iii)", is estimated to have contributed to an increase of 1.08 p.p. in IPCA, differently from what occurred in the previous three, when the estimated contribution of these three components was negative – a variation basically due to the impact of pass-through.

According to Figure 1 and to data on Table 1, it is noted that, in contrast with that verified in the five previous years, in 2008 the variation of the exchange rate would have contributed to raising inflation rate, but on a scale considerably lower than that observed in 2002, for instance. Specifically, in 2008 the variation of the exchange rate was accountable for 0.63 p.p. of the IPCA increase, equivalent to 10.7% of total inflation – in 2002 the pass through had accounted for 46.4% of total inflation. On the other and, despite the deterioration in expectations, notably since the second quarter of 2008, the contribution of the component, given by the difference between the inflation expectations of agents and the target, was relatively small, though positive. Even in view of the strong uncertainty derived from the global markets and exchange rate depreciation observed in 2008, the relatively modest impact of these components on inflation may be associated, at least in part, to the policy of strengthening of economic defenses against external shocks – for instance, via accumulation of reserves –, as well as to the agents' confidence in the management of the monetary policy, focused on the objective of maintaining inflation at levels compatible with the targets' trajectory, and which has rapidly adjusted during the year to the changes in the prospective scenario for the inflationary dynamics. This assessment finds support in the fact that the inflation expectations for longer horizons have remained well anchored.

Figure 2 – Inflation decomposition: 2007

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

Finally, the analysis of Figures 1 and 2 indicates that the component associated to the inertia contributed to inflation in a less intensive manner than verified in 2007. It is worth highlighting that, from total inertia estimated for 2008, 71% corresponds to the inertia of market prices, an item with greater contribution (63.9%) in the 2008 inflation.