Inflation outlook

6

This chapter of the *Inflation Report* presents the Monetary Policy Committee's (Copom) assessment of the behavior of the Brazilian economy and of the international scenario since the release of the last *Report* in March 2009, as well as the inflation outlook up to the second quarter of 2011 and the GDP growth by the end of 2009. The projections for inflation are presented in two main scenarios. The first scenario, called the baseline scenario, assumes that the Selic rate will remain unchanged over the forecast horizon, at the 9.25% per year, the level set by Copom at its most recent meeting on June 9th and 10th, and the exchange rate will remain at R$1.95 per US dollar. The second scenario, named the market scenario, is based on expected paths for the Selic rate and the exchange rate drawn from the survey carried out by Banco Central do Brasil's Investors Relations Group (Gerin) among independent analysts. It is important to stress that these scenarios serve only as support for monetary policy decisions, and their assumptions should not be viewed as Copom forecasts about the future behavior of interest and exchange rates. The projections released here are based on the information set available up to the cutoff date of June 12, 2009.

The projections for inflation and of GDP growth released in this *Report* are not point estimates. They consist of probability intervals which embody the degree of uncertainty present at the aforementioned cutoff date. Inflation projections depend not only on assumptions about interest and exchange rates, but also on a set of assumptions about the behavior of exogenous variables. The most likely set of assumptions considered by the Monetary Policy Committee is used to construct the scenarios to which the Committee attaches the greatest weight on making its interest rate decisions. On setting out these assumptions, the Committee seeks to foster transparency to monetary policy decisions, thereby contributing to its effectiveness in controlling inflation, which is its main objective.

6.1 Inflation determinants

After reaching 6.41% in October 2008, inflation in twelve months as measured by the by the change in the Broad National Consumer Price Index (IPCA) is receding, while remaining at a level situated above the central target. In fact, after finishing last year at 5.90% – rate 1.44 percentage points (p.p.) higher rate than in 2007 (4.46%) – inflation moved to 5.20% in May. In 2009 until May, the IPCA recorded inflation of 2.20%, a rate 0.68 p.p. lower than that observed in the same period last year. Initially, this dynamic was influenced by a decline in commodity prices observed in the second half of 2008 and subsequently by the slowing domestic economy recorded since the last quarter of last year, a result of the deepening crisis in international financial markets. So far, it is plausible to claim that the effects of these two factors more than offset price pressures, arising from exchange rate depreciation since August last year. Nonetheless, more recently, commodity prices have shown signs of recovery, while the exchange rate came into path of appreciation, after overcoming the threshold of R$2.50 per US dollar in December.

By May, the set of regulated and monitored prices accumulated a variation of 1.99% and market prices of 2.29%. In the set of market prices, there was a change in the price of non-tradable items (3.13%), much higher than that found in the case of tradable goods (1.38%), despite the slowing of the economy. This phenomenon points out the importance of evaluating the price of imports in R$, instead of considering only the exchange rate as a proxy for the behavior of tradable goods. The recent dynamics of prices has led to a narrowing of the difference between inflation in twelve months of market prices and the set of regulated and monitored prices, which rose from 6.21 p.p. in June 2008 to 1.57 p.p. in May. Moreover, showing some resilience in domestic demand as well as the presence of widespread indexation mechanisms in the informal economy, the prices of services have been recording an acceleration in both the criterion of the accumulated variation in twelve months (7.23% in May, against 6 39% in December 2008, and 5.58% in the same month last year) and in the accumulated year variation (3.92% between January and May, against 3.10% in the same period of 2008). In short, the behavior of inflation confirmed the assessment, included in the *Inflation Report* of March that, despite the expected decline of inflation in 2009, it should provide some resistance given the demand conditions.

After decreasing 3.6% in the last quarter of 2008, compared with the previous one, according to seasonally adjusted data by the Brazilian Institute of Geography and Statistics (IBGE), the GDP at market prices fell by 0.8% in the first quarter of 2009. Note that since the third quarter of 2003, GDP has not diminished by two consecutive quarters, in this basis of comparison. In the same period of 2008, the decrease amounted to 1.8% in the first quarter of 2009, interrupting twenty-eight quarters of expansion according to that criterion. The slowdown of activity reflects the contractionary effects of the deepening world economic crisis starting in September, particularly in relation to declining exports and the credit crunch, which provoked sharp reactions in the levels of output and employment. However, expectations of market participants point to the recovery of activity in the second quarter of 2009, a move that reverberates, in large part, the resilience of household consumption.

From the production viewpoint, the decline in the industrial sector stands out which, after falling 8.2% in the fourth quarter of last year, compared to the previous quarter (according to seasonally adjusted data by the IBGE) recorded a further contraction (3.1%) in the first quarter. The performance of this sector was strongly influenced by a reduction in demand for durable goods and investment, besides the fall in external demand, reflecting intensely on some key industries such as metallurgy, automobiles and machinery and equipment. Moreover, because of the discontinuity in the pace of demand expansion, the industry entered the most severe period of global financial crisis with high inventories, which hampered the speed of recovery in progress. In turn, the agricultural sector declined by 0.5% in the first quarter, compared to the previous quarter, while the service sector – the largest in GDP – has shown some resilience and has grown 0.8%, recovering from a downturn of 0.4% in the previous quarter. Over the same period last year, these sectors recorded a decrease of 1.6% and a growth of 1.7%, respectively.

With regard to demand, a negative highlight came from the Gross Fixed Capital Formation (GFCF) that, according to seasonally adjusted data, fell by 12.6% compared to the fourth quarter, even after shrinking 9.3% in the last quarter of 2008. Thus, GFCF, which expanded 19.7% in the third quarter last year, compared to the same quarter of 2007, grew only 3.8% in the fourth quarter and fell 14.0% in the first quarter of this year (using the same basis of comparison). In turn, household consumption expanded 0.7% from the previous quarter, after decreasing 1.8% in the fourth quarter. On the same basis of comparison, government expenditure recorded, respectively, increases of 0.6% and 0.5%. Compared to the same period last year, both grew

1.3% and 2.7%, respectively. In turn, contrary to what has happened since the first quarter of 2006, in the first quarter of 2009 the external sector contributed positively to GDP growth (0.1 p.p.), while imports fell 16.0% (contribution of 2.3 p.p.), exports fell by 15.2% (-2.2 p.p. contribution). Nevertheless, given the unpromising outlook for global economic growth and recovery in the domestic economy, as well as the expected effects of monetary easing already in place, the Committee believes that domestic demand will remain the key factor for sustaining economic activity.

The resilience of domestic demand has been a stabilizing element of the Brazilian economy. The data of retail sales, which have faded production data in recent months – partly due to high inventory levels that industry began the year with – corroborate this assessment. Retail sales recorded a growth of 4.5% in the first four months of the year, compared with the same period last year. While showing deceleration in relation to the expansion in 2008, when the increase reached 11.0%, growth remains high. In fact, the expansion in the twelve months decreased from 10.3% in September, when the international crisis intensified, to 7.0% in April. It is noticeable the strong increase of sales in the segment "equipment, office supplies, computer and communication" whose growth reached 18.1% in the first four months of the year. Expanded retail sales – which includes "vehicles, motorcycles, parts and accessories" and "construction material" (sectors more sensitive to credit conditions) – has also shown resilience by growing 2.5% over the same period. Thus, the Committee understands that, although it should provide less momentum than that observed in the first three quarters of 2008, retail sales should continue to record positive results over the coming quarters.

Unemployment rate, measured by the monthly survey of IBGE, which had been consistently falling over recent years (annual average of 10% in 2006, 9.3% in 2007 and 7.9% in 2008), has increased in recent months, reflecting the effects of an economic slowdown. According to seasonally adjusted data, after reaching the minimum in October (7.5%) since the beginning of the unemployment series under the current methodology, unemployment rose to 8.3% in April. On the other hand, the deterioration of the labor market did not affect in a clear way the labor income. According to IBGE, the average real earnings usually received by the employed population, which increased 3.2% in 2007 and 3.4% in 2008, continued to soar in 2009 and by April showed an increase of 4.1%. In turn, the average number of employed persons, which grew 2.6% in 2007 and 3.4% in 2008, rose 2.6% in the year to April. As a result, real payroll – important factor driving aggregate demand in recent years – which had advanced 5.8% in 2007 and 6.9% in 2008, increased by 5.9% in the year to April. According to the National Confederation of Industry (CNI), the level of employment in manufacturing, which increased 3.6% in 2007 and 4.0% in 2008, fell 2.0% in 2009 up to April. This reflects, in large part, the decline in industrial production in recent quarters. With regard to the evolution of formal employment, data from the Ministry of Labor and Employment (MTE) showed marginal recovery, after heavy falls at the end of last year and early this year. The losses in early 2009 reversed, provided that up to April, the figures from MTE show the creation of 48,500 new jobs. Note also that after five consecutive months of decline, the manufacturing sector showed stability in the creation of formal jobs in April.

In addition to the rising payroll, the availability of credit to households – largely determined by macroeconomic stability and institutional reforms – was an important driving force of the growth in household consumption in recent years. Since the intensification of the global economic crisis, financing conditions have deteriorated sharply from September 2008 (either through higher rates or shorter maturities). Additionally, given the greater macroeconomic uncertainty and a weakening of the labor market, agents have become more reluctant to get credit. This more restrictive scenario began to dissipate in a more pronounced way since the release of last *Report*. In addition to increased credit supply via state-owned banks, private companies are returning to raise funds either abroad or through capital markets, a channel that had been closed after September. In comparison to the same month last year, in April earmarked loans from the financial system to individuals grew by 18.7% (23.2% in January), with emphasis on the expansion of leasing operations (64.8%, compared to 84.1% in January). There is also an ongoing recovery of credit to individuals, especially payroll-deductible loans. Importantly, this credit expansion has been characterized by a modest elevation, so far, in delinquency rates. The expectations of market analysts and representatives of the banking sector indicate that, although there should be slowing down compared to 2008, the volume of credit will continue to expand in 2009.

Investment, which until the third quarter of 2008 was shaping up as the most dynamic component of domestic demand, turned out to be the one that showed the biggest decrease in the last two quarters, following the cyclical pattern. In fact, during this period, while GFCF shrank 20.8%, government expenditure rose by 1.1%. The worsening of world financial crisis led to revaluation of investment plans of businesses, either because of the worsening outlook for demand growth, because of greater macroeconomic uncertainty, or even the deterioration in financing conditions, both in terms of maturities as the price of credit. The heavy losses in the stock market after September 2008 caused the loss of attractiveness of financing via the capital market, further intensifying the funding restrictions. Another factor limiting investment was the depreciation of the Real, leading to increased costs of imported capital goods. However, in both cases, there are signs of a reversal of the scenario. In fact, the stock market recorded a good recovery in 2009 and the exchange rate appreciated. In this context, the Committee understands that the most likely scenario contemplates recovery of investments in the Brazilian economy over the coming quarters.

Capital markets were strongly affected by the intensification of global economic crisis. After the significant volume of initial public offerings of shares in the first half of last year, and the virtual absence of significant funding in the second half of 2008 (R$31.7 by August and R$32.1 billion in 2008), encouraging signs that companies will again use this funding channel are beginning to emerge. In fact, several of them have already announced plans to undertake new financing, including initial public offerings of shares. In turn, the bond issuance (excluding emissions by leasing companies) has proved to be relatively stable. After having raised R$6.3 billion in 2008 through this financial instrument, the companies have already picked up R$4.2 billion up to May. In turn, loans and financing with resources from The Brazilian Development Bank (BNDES) totaled R$25.6 billion in the first four months of the year, volume that was 1.1% below the same period in 2008.

Regarding the external sector, after recording a surplus of US$40 billion in 2007 and US$24.8 billion in 2008, the trade balance reached US$9.4 billion by May this year, an increase of 9.3% over the same period last year, contradicting more negative predictions prevailed in the beginning of the year. Despite this increase in the trade balance, both imports and exports show significant reductions in the year, in line with the contraction that has occurred in world trade. After hitting a record US$197.9 billion in 2008 (23.2% increase over 2007), exports reached US$55.5 billion in the first five months of the year, a figure 23.0% lower than in the same period last year. Likewise, after the record of US$173.1 billion in 2008 (an increase of 43.5% over 2007), imports fell to US$46.1 billion by May, falling 27.4% over the same period last year. Thus, the declining trend observed in the trade surplus during the last *Report* was reversed.

Nevertheless, even this dynamic is maintained over the years, the effects of global economic crisis on the global flow of trade – both by lower global economic activity as a fall in prices, especially of commodities – allow to anticipate a decrease of the exported volume in 2009 – something that has not happened since 1999, despite the average exchange rate depreciation – as imports.

After decreasing 2.5% in 2008, the quantum of exports decreased 10.6% by April, clearly reflecting the effects of the slowdown in external demand. Moreover, after increasing 26.3% in 2008, the average price of exports declined by 7.9% up to April, and did not offset, as occurred last year, the fall in quantum of exports. In turn, after growing 17.7% in 2008, the quantum of imports shrank by 20.2% in April, clearly reflecting the effects of global crisis on the domestic economy, on both by the demand as the exchange rate. On the other hand, after a strong increase of 22.0% in 2008, the price of imports shows a reduction of 4.9% by April.

Since the release of the last *Report*, the global economic crisis began to show the first signs of cooling, albeit weakly and heterogeneously, among the mature economies. In addition, there are signs that its effects on some developing countries could dissipate quicker than expected. These facts are starting to be clearly reflected in commodity prices, which showed significant recovery in 2009, particularly regarding oil prices, which recently surpassed the US$70 barrier. Another indicator has been the appreciation of currencies of emerging countries, partly reflecting lower fears about the evolution of their economies and reducing global risk aversion. The current account deficit, after registering US$28.2 billion, or 1.8% of GDP in 2008, reached US$4.9 billion in April, falling to 1.4% of GDP (1.4% in twelve months), strongly contradicting the predictions made by independent analysts earlier this year, which envisioned figures of much higher magnitude. This deficit was fully financed by the net inflow of foreign direct investments, which totaled US$8.8 billion up to April and accounted for 2.6% of GDP.

After nearly two years since its onset, the effects of the "subprime crisis" – which began in the US housing market and had spreaded to the US financial and credit markets and other mature economies – could be starting to cool, especially with regard to the impacts on the momentum of emerging economies, including Brazil. In this context, the various measures implemented by the Federal Reserve and other central banks, including setting targets for the basic interest rates near zero and the adoption of monetary policy strategies based in quantitative easing, in some cases supplemented by aggressive fiscal measures, indicate a depletion of the contractive trend observed in previous quarters, although the process is subject to reversal. The problems of the international financial system persist and, therefore, persists an ongoing risk of further intensification of the slowdown. In summary, the outlook for the global economy has stabilized since the release of the previous *Report*, and the most likely scenario remains that the global economic recovery will only be consolidated in 2010.

Regarding aggregate supply, after registering a decrease in the fourth quarter of 2008 compared to the third one, according to seasonally adjusted data, both the industrial and agriculture sectors returned to recede in the first quarter of 2009 (3.10% and 0.5%, respectively). In turn, after declining in the last quarter of last year (-0.4%), the service sector, which has the greatest weight in the economy, regained its growth in the first quarter (0.8%). Comparing to the same period last year, the shrinkage of the manufacturing sector reaches 9.3%, and 1.6% by agriculture. The service sector registered growth of 1.7%.

Industrial production suffered a significant slowdown after the worsening global economic crisis in September 2008. Up to this month, it recorded an increase of 6.4% in the year, a rate which was reduced to 3.1% by the end of 2008, following falls in respect to the previous month of 7.1% and 12.7% in November and December, respectively, according to seasonally adjusted data. Although growing since January (at monthly rates of 2.1%, 1.9%, 0.9% and 1.1%), industrial production is still at levels well below those recorded in the same period last year. In fact, up to April, industrial production decreased 14.7% in comparison to the same period last year. The decline was equally severe in both the manufacturing industry and in the mining industry. However, the sectors most dependent on credit, such as automotive and construction, which were initially hit hardest by the global economic crisis, showed recovery in large part due to the effects of counter-cyclical measures implemented by government, such as tax reduction of the IPI over the white line goods and cars, as well as the gradual restoration of access to credit. Incidentally, the auto industry, which exhibited excess inventory at the end of last year, faces a shortage of localized models.

On the demand side, GDP shrank 1.9% in the first quarter of 2009, with the external sector showing positive contribution of 0.1 p.p. After falling below the 100 level in August – implying that the number of companies who evaluate stocks as excessive surpasses that of assessing that they are insufficient – the indicator from the Manufacturing Industry Survey of FGV continued to fall and reached the level of 81 in December and January – the lowest level since July 2003. Since then, the indicator had rose again and reached 88 points in May, suggesting that the normalization process of inventories is ongoing. The adjustment of inventory levels has apparently generated a discrepancy between the dynamics of production and sales, and partly explains the lack of momentum in the industry early this year. It is expected that, as the inventory level comes close to its equilibrium level, the growth of industrial production gains force, with positive effects on employment and income levels. In this sense, besides the natural dynamics of adjustment, the measures taken by the government, such as the tax reduction of the IPI for automotive sector and white line goods, and monetary easing, have contributed to set the effective inventories closer to the respective planned levels.

After reaching 86.6% in August last year, the monthly Level of Utilization of Installed Capacity (Nuci), without seasonal adjustment, computed by FGV moved to 78.7% in May, falling 6.9 p.p. compared to the same month last year, constituting the eighth consecutive reduction using the same basis of comparison. With regard to the expansion of capacity following consecutive increases over the past years (5.1% in 2005, 13.5% in 2006 and 19.3% in 2007) the growth of the absorption of capital goods reduced to 17.7% in December 2008, after reaching 22.2% in September. The reversal observed at the end of last year has intensified in the early months of 2009. In fact, up to April there was a strong contraction (18.6%) in the absorption of capital goods, due to the decrease of 7.5% in imports of capital goods and of 22.6% in the production of these goods. It should be noted that, on the same basis of comparison, the production of inputs for construction also fell sharply in January (-11.1%). Despite the large increase in idleness, considering the interannual basis of comparison, recent figures for industrial production, in conjunction with automobile sales and retail figures, suggest a recovery of industrial activity. In fact, the indicator of the level of global demand from the Economic Outlook Survey of FGV for the manufacturing industry shows that, after falling from a 121 level in September to 65 in January, the indicator rose to 85 in May.

After a long period of acceleration in prices of the construction sector, the National Cost of Construction Index – Domestic (INCC-DI) began to show signs of cooling in the last quarter of 2008, whose intensity has increased in recent months. After peaking in November (12.34%), in twelve-months the INCC receded to 8.98% in May.

This level is still slightly higher than that observed in the same period of 2008 (8.06%). These developments reflect higher inflation persistence, despite the marked slowdown in the sector since the global financial crisis intensified in September last year, partly derived from the rising costs of manpower.

After two consecutive years of reduction (10% in 2006, 9.3% in 2007 and 7.9% in 2008) the average unemployment rate rose to 8.7% in the first four months of the year, a level 0.2 p.p. higher than that observed in the same period last year. This reversal becomes clear when looking at the average rate of unemployment for the last twelve months, with their 23 straight months of reduction discontinued in January. This trend should persist over the next months, when the labor market will tend to more clearly reflect the effects of the global crisis on the level of activity. In fact, the adverse repercussions on the labor market are clearly registered in the figures of formal employment and in statistics on manufacturing employment. So far, however, the granting of collective vacations, declining working hours and other emergency measures, beyond the discouragement effect, have mitigated the rise in unemployment rates.

The price of oil, a source of systematic uncertainty arising from the international scene, remains at levels below those prevailing until the middle of last year, although it shows a clear reversal against the downward trend observed in the second half of 2008. In fact, after reaching nearly US$150 in mid 2008, the price of oil per barrel fell to levels around US$40, but recently rose above US$70. This recovery reflects not only the reduction of macroeconomic uncertainty, reflected in the assessment that the inflection point of the financial crisis already occurred or would be about to occur, but, above all, the comments of the first signs of economic recovery, which have appeared more clearly in developing countries. As far as the considerable uncertainty regarding oil price projections is concerned, the main scenario adopted by Copom, which assumes unchanged domestic gasoline prices for the remainder of 2009, remains plausible. It should also be noted that the influence of international oil prices on domestic inflation is not transmitted solely through the fuel prices for the consumer, but also by other channels such as transport costs for industry, the production chain of the petrochemical industry, as well as the expectations of consumers and entrepreneurs. It is worth mentioning that, just as what happened with the price of oil since the beginning of the year, prices of agricultural commodities, which are important from the standpoint of the dynamics of food costs, such as soybeans and wheat, have shown consistent recovery, although in different intensities.

After more than doubling in 2007 (7.89% against 3.79% in 2006) and the continued growth in 2008 (when it reached 9.10%) the broader inflation – measured by the General Price Index IGP-DI – slowed sharply in recent months. In fact, inflation accumulated in twelve months, which in July 2008 was at the level of 14.81%, moved to 2.99% in May. In addition, until May 2009 there was a deflation of 0.73%, compared to inflation of 5.16% over the same period last year. The deceleration of this index mainly reflected the IPA-DI (the main component of the index), whose variation in twelve months moved from 18.91% in July 2008 to 1.18% in May this year, despite the exchange rate depreciation in the recent past. Contrary to observed since the last *Inflation Report*, the National Cost of Construction Index (INCC) also came to exhibit the reduction of inflationary pressures. After reaching 12.34% in November 2008, inflation in the construction sector reduced to 8.98% in May. In turn, in the same period, inflation measured by IPC-Br reduced from 6.27% to 5.55%. The dynamics of the IPA-DI is explained largely by the changing behavior of agricultural prices, whose variation in twelve months moved from 37.91% in June 2008 to a deflation of 1.52% in May. Moreover, industrial prices, which accelerated during most of 2008, also declined with intensity. In this case, the variation in twelve months moved from 15.41% in October 2008 to 2.24% in May this year. As highlighted in previous *Reports*, the Committee evaluates that the effects of the behavior of wholesale prices over consumer price inflation will depend on current and prospective demand conditions, as well as on price setters' expectations for the future path of inflation.

The deterioration of the consumer prices, which had been occurring since mid-2007 and intensified during 2008, showed a reversal after the worsening of the global crisis in September. The initial fears regarding the current magnitude of pass-through to prices of final goods and services were not confirmed, as a result of both the behavior of foreign currency prices of imports and, in particular, of the degree of slowing economic activity. While commodity prices have showed recovery, especially oil, the prospective scenario does not contemplate a return to the previous inflationary cycle. Nonetheless, the Committee reaffirms that it will continue to conduct its actions to ensure that the gains achieved in reducing inflation in recent years become permanent.

As with headline inflation, all three measures of core inflation computed by the Central Bank show a reduction in twelve months cumulative rates. The exclusion core measure (excluding regulated prices and food prices) registered inflation of 5.96% in twelve months up to May, after reaching

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

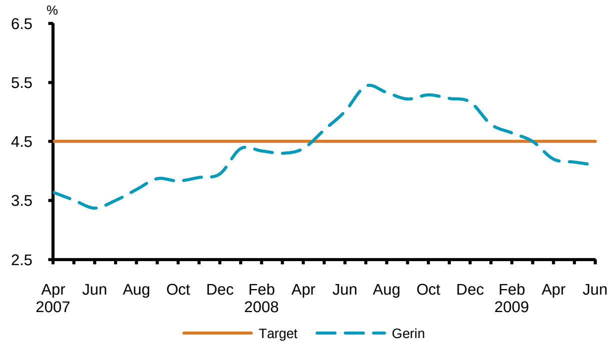
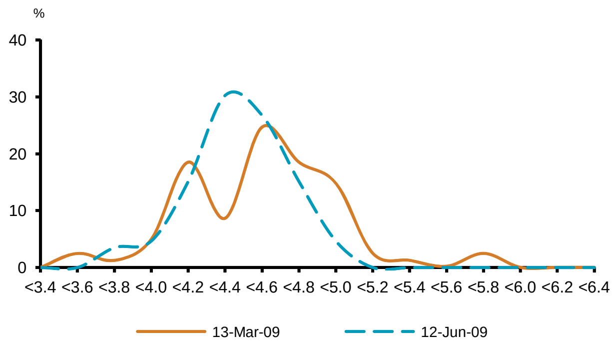


Figure 6.2 – Dispersion of inflation expectations for 2009
Relative frequency



6.38% in October. Nevertheless, compared with the same period last year, there is an increase of 0.93 p.p. In turn, core inflation measured by the trimmed means and smoothed trimmed means of predetermined items fell, respectively, from 4.97% and 5.15% in September, to 4.65% and 4.34% in May, virtually equal to the levels observed in the same period last year. Thus, measures of core inflation exhibit high persistence, and two of them are still above the central target, despite the reduction observed in recent months.

Inflation expectations for 2009 declined slightly since the release of the last *Report* and, at the cutoff date of June 12, were at 4.39%, against 4.52% in March 13. In turn, expectations for 2010 moved from 4.50% to 4.30% in the same period. For 2011, expectations are at 4.50%. As shown in Figure 6.2, it is worth mentioning the decline, since the release of the last *Report*, of the dispersion around the central tendency of inflation expectations, particularly for 2009, which, besides the typical pattern of convergence over the calendar year, aligns with the evaluation that the prospective outlook for inflation was slightly less uncertain since the release of the last *Report*.

6.2 Main scenario: associated risks and monetary policy implementation

The Copom projections are based on a set of assumptions about the behavior of main macroeconomic variables. This set of assumptions, and risks associated with them, comprises the main prospective scenario based on which the Committee makes policy decisions. On the whole, this prospective scenario, embodied in the projections to be presented in the following section, contemplates continuity of the global downturn in 2009, with recovery in 2010, on the external side, and gradual recovery of economic activity, within a still benign scenario for inflation, on the domestic side. From the standpoint of the balance of risks to the outlook for inflation, the main risks associated with the main scenario are the duration and magnitude of the global crisis, as well as its consequences in the path of domestic economic activity. In particular, in the short term, a disinflationary risk consists in a recovery of domestic activity at a slower pace than considered in the main scenario. On the other side, a major risk lies in the role of institutional mechanisms that inhibit a more intense response to inflation to higher idleness in resources of the economy. Another risk relates to the effects of a recovery in commodity prices on domestic inflation, for instance, through food prices. In turn, in a medium-term perspective, a risk to be monitored is associated with the possibility of cumulative and lagged effects of monetary easing reaching maximum intensity in a period of less significant idleness of factors.

The external environment includes a continuing global economic downturn, especially in developed countries. The period since the last *Report* was marked by the reduction of stress in international financial markets, originated in the US and Europe, whose impact on emerging economies were significant. The unprecedented actions by US and European authorities, who used a wide range of instruments in order to ensure minimum conditions of operation and liquidity in asset markets, reduced the systemic risk perception. In this environment, there were signs of reduced risk aversion, but the return of confidence remains fragile and subject to reversals. The decrease in risk aversion and the scarcity of capital flows, as well as some concerns among investors about the tax situation in the US, continued to encourage the recovery of the currencies of emerging and mature economies, against the US dollar.

Yet in the global scene, trends of contractive activity prevail over inflationary pressures. The current predominant view points to contraction of the global economy in 2009, with recovery only in 2010. The consensus projections for 2009 indicate intense shrinkage of activity in the US, Europe and Japan (G3), which would not be totally offset by the economic dynamism of some emerging economies, especially in Asia. There is evidence that economic activity in G3 could be stabilizing, with some improvement in disposable income and demand for durable goods in the US, recovery of business confidence in Europe and real exports in Japan. However, the problems of the international financial system can be exacerbated by a cyclical deterioration in credit quality, focused in the US and Europe, which would tend to strengthen the contraction of financial conditions and, therefore, the risk of a further intensification of the slowdown. In mature economies, where the anchoring of inflation expectations is stronger and the economic activity is weakening over time, inflationary pressures have reduced rapidly. Strictly speaking, in emerging economies the process of disinflation appears to have gained momentum, despite the greater persistence of inflation dynamics. In this context, while that in mature economies the monetary policy stance is strongly expansionary, even with the use of unconventional measures, emerging economies expansionary stance has been more moderate. Simultaneously, authorities in the US, Western Europe and Asia have been announcing a series of initiatives aimed at sustaining economic activity through tax incentives, which could contribute to a gradual economic recovery. Note, however, that estimates of the fiscal costs of macroeconomic stimulus packages and support to the financial sector have been increasing, which has caused pressure on the rating of several sovereign credits, including advanced economies. The accumulation of signs that the world economy would be close to an inflection, as well as the deterioration of public finances, has resulted in the elevation of the term structure of interest rates in major developed economies.

As highlighted in recent *Reports*, the effects of the global crisis on the Brazilian inflation have signaled *a priori* ambiguousness. On the one hand, the reduction in exports, while acting as a factor in restraining aggregate demand, and the retreat in commodity prices, helped ease domestic inflationary pressures. Second, the intensification of global risk aversion and the consequent reduction in demand for assets of emerging economies have led to sharp depreciation of several national currencies against the US dollar, which eventually pushed up prices in these economies. Within this context, although the Brazilian economy markedly became more resistant to changes of perceptions in international financial markets, the ability of the external sector to help mitigating the risk of inflation has been compromised.

It is plausible to claim, however, that the net effect of global slowdown on the domestic inflation path remains, so far, mostly benign, with the effects on domestic demand dominating the impacts of exchange rate depreciation. In fact, the global crisis is affecting the activity level of the Brazilian economy not only by reduced foreign demand, but also, given the restriction on external financing sources, by the indirect effect, but not least important, on the domestic financial conditions, and formation of a general framework of uncertainty that adversely affects the confidence of agents and leads them to a postponement of decisions on consumption and investment. Incidentally, the main element of uncertainty and risk factor on the external side refers to the duration of the global crisis, for which it is worth considering two alternative scenarios. In the first case, if the crisis persists longer, for example, extending to 2010, the contractionary effects and repercussions on the domestic economy would last throughout the inflation forecast horizon. In the second case, the recovery occurring faster than it is anticipated; the restoration of financial conditions and confidence, aligned to the recovery of commodity prices, would increase the risk of inflation. The resilience of activity in emerging economies, especially in Asia, and certain return of appetite for risk in international financial markets, suggests that the probability attributed to the second scenario increased, although the first remains likely.

It is worth mentioning that the expansion of public debt and monetary aggregates in mature economies, in reaction to the crisis, may cause changes in the behavior of asset prices and the term structure of interest rates, which would have potentially significant implications for foreign funding of the Brazilian economy in the most distant part of the forecast horizon.

From the standpoint of commodity prices, there were changes in the scenario of the last *Report*. In general, since then, both oil and other commodities prices had significant elevation. The future path of these prices, however, is still quite uncertain because it depends on the duration of the contraction of economic activity in mature economies and on the pace of reaction of the most important emerging economies. Until now, when converted into local currency, commodity prices still show some stability, given the recent appreciation. However, a new source of inflationary pressure could arise if the recent trend of rising commodity prices continues. Anyway, as mentioned in previous *Reports*, the analysis of the possible inflationary effects of recent trends in prices of raw materials cannot be detached from the analysis of pressures that they exert on the Brazilian asset prices.

The scenario for the exchange rate has changed over the last two *Reports*, given the exchange rate appreciation in the current quarter. However, despite this finding, the nominal exchange rate is still above baseline values before the current global crisis worsened in September last year. Therefore, it is also worthwhile an analysis of possible factors affecting the magnitude of pass-through to consumer prices. To date, monitoring of price developments shows no significant effect of the depreciation of the exchange rate, confirming issues addressed in recent *Reports*. First, the institutional consolidation, notably the inflation targeting regime, acts to dampen the pass-through. It should be also noted that the current context deviates enough from verified, for example, in 2002, when agents even considered the possibility of change in monetary regime, which exacerbated inflation expectations, boosting its own exchange rate pass-through. A second aspect is the decline in prices of commodities in foreign currency occurring until the beginning of this year, which to some extent, offset the impact of exchange rate depreciation and contained the change in prices of such goods in domestic currency. The third factor was the contraction of domestic economic activity observed in the last quarter of last year and the first quarter of this year. In fact, there is empirical evidence that the magnitude of pass-through depends on the economic cycle, being more marked when the economy is booming, and *vice versa*. The fourth element refers to initial conditions in terms of real effective exchange rate. When the nominal exchange rate represents, to a large extent, an adjustment of real exchange rate towards a historical average, the pass-through tends to be lower. It is also possible that the currency appreciation in previous years and the first half of 2008 has generated margin in price levels that would allow agents to absorb an exchange rate depreciation with less pass-through.

It should also be emphasized the existence of risk associated with the lag between exchange rate variation and its impact on consumer prices. First, because there is a chain that goes from the price at customs of imported products in national currency, passes to transports, through wholesale, and finally achieves the final consumer. Second, because due to the intense volatility of the exchange rate and, consequently, to the uncertainty about the level around which this rate would stabilize, the price setters may be waiting for a clearer picture before defining possible adjustments. In contrast, in the event that the exchange rate levels previously seen as transitional become permanent, increases the likelihood that the pass-through will intensify. In this case, monetary policy should avoid that price movements resulting from the exchange rate depreciation affect inflation expectations or induce second-round effects stemming from an attempt to realign prices, including wages, to pre-depreciation values. Given these caveats, it is worth acknowledging that the price movements observed so far at both the consumer and wholesale levels, and the recent exchange rate appreciation, indicate a reduced risk associated with exchange rate pass-through, compared with the existing ones prevailing at the release of two most recent *Reports*. However, in the medium term, as the recovery of activity intensifies, the monetary authority must be aware of possible delayed pass-through effects. In other words, if the recent contraction in activity restricted the scope for the exchange rate pass-through, it can be inferred that once reversed the contraction increases the scope for the development of such transfers.

Another risk for the prospective scenario is related to growth prospects of the Brazilian economy. After two consecutive quarters of GDP shrinkage, coincident and leading indicators point to the start of recovery this quarter, although gradually. In fact, some indicators support this assessment, such as industrial production, confidence indices, the level of utilization of installed capacity and the granting of loans to individuals. Indeed, the fall in GDP in the first quarter this year of intensity lower than market analysts expected led, until now, to some upward revision of GDP growth expectations for 2009, or at least to stop its deterioration. From the standpoint of the components of aggregate demand, the behavior has been very different. Investment and exports declined significantly in the first quarter, the government expenditure remained at positive rates, and household consumption grew.

The prospect of economic recovery is mainly based on three elements. Firstly, in contrast to what happened in previous oil shocks, even of less intensity, there was no break in the Balance of Payments, crisis in the public sector, high inflation, or fear of regime change. In summary, as pointed out on several occasions, the Brazilian economy is more resilient to external shocks. Secondly, monetary policy, without jeopardizing the commitment to inflation targeting, and fiscal policy tend to contribute to the resumption of economic activity. Thirdly, consumption, the largest portion of aggregate demand, is relatively resistant, partly due to the decline in inflation. Also, it is worth mentioning that, in respect to the previous quarter, the overall confidence has changed for the better in the country and seems to emerge some consensus that the worst of the crisis had been overcome. However, some uncertainty remains about the projections of economic growth. The risk here is that the recovery might be slower than that assumed in the current projections. Despite the improvement in confidence sentiment, investment should recover slowly in the light of current low levels of utilization of installed capacity. Exports, in turn, continue to suffer the effects of a global economic downturn that still shows signs of persistence. Consumption, despite the improvement in credit conditions and reduced tax rates on certain items, can still be affected by a worsening in labor market conditions and the reversal of tax exemptions.

From the standpoint of inflation, there is still the possibility of a risk of growth, represented by price adjustment mechanisms that contribute to lengthen over time inflationary pressures observed in the past, as evidenced by the behavior of service prices and items of regulated and monitored prices since the beginning of the year. In fact, despite the contraction in economic activity for two consecutive quarters, the service prices grew by 3.92% in the first five months of the year (7.23% for the accumulated rate in twelve months), against 3.10% in the same period of 2008, when the economy was rapidly expanding. As it is well known, the presence of price indexation mechanisms, even informal, reduces the sensitivity of inflation to fluctuations in demand. Note specifically that by containing the disinflation process of the economy, such mechanisms could increase the "initial condition" of inflation rate within a cycle of economic recovery, thus helping to increase the risks for the prospective inflation scenario.

In a medium-term perspective, however, the risk for the inflationary trajectory comes from the effects, cumulative and lagged, of the easing in financial conditions on the evolution of domestic demand in the context of a gradual resumption of the use of production factors. The Selic rate reached a historical low (9.25% per year), with a cumulative reduction in the present cycle of 450 basis points. Much of the effects of the easing in financial conditions will further materialize over the next few quarters (see box "The lagged transmission mechanism of monetary policy to prices" in this *Report*). Uncertainties regarding the magnitude and the lag of the transmission mechanisms of monetary policy tend to be stronger in the current context due to the global crisis and the resulting contraction of credit conditions. Anyway, in the medium term, the outlook points out that some of these effects will possibly materialize given the idleness of the factors much smaller than the current one, which must be taken into account by the monetary authority.

On the fiscal side, the uncertainty over the behavior of GDP translates into uncertainty about future tax revenues, in the framework of rigidity in government spending, which is transmitted to the evolution of the primary surplus of the consolidated public sector. Even so, the Copom understands, based on the current available information set, that there should not be a significant and consistent inflection in the reduction trend of the public debt to GDP ratio.

As noted in the last *Report*, the Brazilian economy is facing the global crisis with no disruptions, no change in economic policy regime, unlike what occurred in early 1999. The basic framework of economic policy, based on the tripod of inflation targeting, fiscal adjustment and floating exchange rate is consolidated and combines resilience and flexibility. Moreover, the strong external financial position, with the significant volume of international reserves, trade surpluses and external financing, mainly based on direct investment, strengthen the view that the current turmoil may be overcome without disruption.

By decomposing the IPCA into market prices and regulated and monitored prices, note that the latter will probably no longer play the role of cooling inflationary pressures seen in the last two years. In fact, for 2009, the main scenario assumes changes in regulated prices above the inflation target, given that these prices are mainly due to past movements of the price level, particularly, of wholesale prices, and are less sensitive to the economic cycle. For 2010, however, in view of the slowdown in wholesale prices recorded in the first half this year and the expectations of independent analysts that these prices will remain contained until late this year, the scenario for regulated and monitored prices appears relatively benign, even though the effect of the slowdown in the IGP-DI on the future trajectory of these items should not be overestimated. In particular, with respect to gasoline prices, as the recent decrease in price at the refinery was roughly fully offset by a tax increase of Cide, and as the oil price in international market has significantly risen since March, apparently, the possibility of relevant change in gasoline prices in 2009 is limited.

By the third quarter of last year, job growth (partly based on macroeconomic stability) had been one of the pillars of growth of real wages at a robust pace. The last few months have seen shrinkage of the labor market, partly seasonal, but it might eventually intensify, since employment generally reacts with some lag to developments in economic activity. A larger cooling in jobs creation can amplify initial movements of slowing demand and, therefore, act as a mitigator of possible inflationary pressures.

Credit, whose growth was an important element of sustaining aggregate demand, exerted a central role in the process of deceleration. The widening of banking spreads and shortening of the contract maturities (possibly associated with quantitative restrictions) have helped to contain aggregate demand. However, conditions in the credit market developed positively in recent months. Interest rates of loans to individuals are already at levels similar to or lower than those in force in August last year. The volume of loans is also in recovery. Thus, the main scenario assumes continued recovery of domestic credit market, although many uncertainties remain about the evolution of external credit.

The possibility that changes in inflation dynamics, which appear to be transitory in a preliminary assessment, will have an effect on agents' expectations about the inflationary trajectory in the medium and long term constitutes a perennial risk for the implementation of monetary policy and, therefore, deserves continuous monitoring. In principle, short-term concentrated effects may give rise to the spread of second-order effects, since significant variations in relative prices, which translate into higher rates of inflation, tend to generate responses for recovery of real income by agents, which in its turn, feeds the inflationary process. International experience, as well as inflation history in our country, recommends that the monetary authority's stance remains cautious in order to address potential secondary effects.

The strategy adopted by the Copom aims to bring inflation, which ended 2008 near the upper limit of tolerance allowed by the regime, back to the central target of 4.5% determined by the National Monetary Council (CMN) in 2009, and keep it at a level consistent with the target path in 2010. This strategy, which will show its results over time, takes into account the lags in the transmission mechanism, and is the most adequate to deal with the uncertainty inherent to the process of formulating and implementing monetary policy.

The Committee continued to consolidate the prospects of achieving a benign inflation scenario, in which IPCA return to evolve consistently with the inflation targets. Incidentally, this evolution of the prospective scenario is consistent with inflation projections considered by the Monetary Policy Committee and on inflation expectations set by independent analysts. Thus, despite having room for a residual process of easing, monetary policy should be cautiously in order to ensure convergence of inflation to the target path. The Committee understands that the demand slowdown, driven by the tightening of financial conditions and the deteriorating confidence of the agents, although in both cases some improvement at the margin can be observed, as well as by the contraction of the global economy, has created significant idleness in production factors, which should not be eliminated quickly in a scenario of gradual recovery of economic activity. This development should help to contain inflationary pressures. On the other hand, the Committee notes that the significant easing of monetary policy implemented since January will have cumulative effects that will be highlighted over time on the economy.

In light of these considerations, the Committee decided to reduce the Selic rate from 11.25% per year to 10.25% and 9.25% in April and June meetings, respectively. This adjustment of the basic interest rate has lagged and cumulative effects on economic activity and inflation. In this context, any additional monetary easing should be implemented in a more parsimonious manner.

6.3 Inflation forecasts

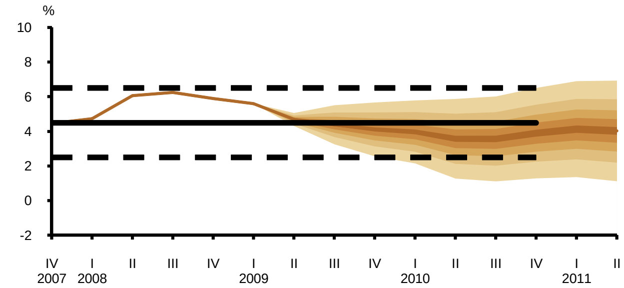
According to traditionally adopted procedures, and taking into account the available information up to the cutoff date of June 12, 2009, the baseline scenario assumes the exchange rate remains unchanged over the forecast horizon at R$1.95/US$, and the target for the Selic rate stays at 9.25% per year – the level set by the June Copom meeting – against R$2.35/US$ and 11.25% per year considered in the *Inflation Report* of March 2009. The projection for the change in 2009 of the set of regulated and monitored prices reduced to 4.8%, compared to 5.5% seen in the last *Report*. This projection is based on the hypotheses, for accumulated in 2009, of stable prices for gasoline and bottled gas, increase of 4.7% for electricity rates, and of 5.0% in the fixed telephone rates. The items for which more information is available, price changes were estimated individually, whereas for the others, the projections are based on models of endogenous determination of regulated prices, which consider seasonal components, exchange rate variations, market price inflation and General Price Index (IGP) inflation, among others. According to these models, the projected increase of regulated and monitored prices for 2010 is 4.5%, against the rate of 4.8% presented in the March *Report*, and for 2011 is at 4.5%.

The market scenario, on the other hand, is based on data from the expectations survey carried out by Gerin with a representative group of institutions up to the cutoff date. In this scenario, average exchange rate expectations reduced in comparison to the values released in the March *Inflation Report*. For the last quarter of 2009, those expectations moved from R$2.30/US$ to R$2.00/US$, and for the last quarter of 2010, from R$2.30/US$ to R$2.09/US$. For the second quarter of 2011, survey expectations project exchange rate of R$2.13/US$. The expectation about the average Selic rate declined when compared to figures in the last *Report*. For the last quarter of 2009, it moved from 9.75% to 9.00% and, for the last quarter of 2010, from 9.61% to 8.98%. For the second quarter of 2011, analysts' projection for the average Selic rate is 9.50%. This trajectory for the average Selic rate is consistent with a twelve-month pre-DI swap spread, with respect to the current target for the Selic rate, of -3 b.p. and 31 b.p., in the last quarter of 2009 and 2010, respectively. Additionally, the market scenario assumes variations of 4.4%, 4.7% and 4.5% for the set of regulated and monitored prices in 2009, 2010 and 2011.

Regarding fiscal policy, the projections presented in this *Report* are based on the working hypothesis of accomplishment of the primary surplus targets of 2.5% of GDP in 2009 and 3.3% of GDP in 2010, in both cases adjusted by the possibility that the percentages are reduced by up to 0.5 p.p., due to the implementation of the Pilot Investment Project (PPI).

Figure 6.3 – Forecasted IPCA-inflation with interest rate constant at 9.25% p.a. (Benchmark scenario)

Inflation fan chart



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

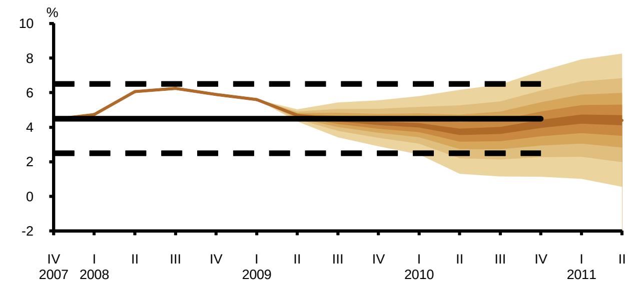
Table 6.1 – IPCA-inflation with interest rate constant at 9.25% p.a.
(Benchmark scenario)

Year	Q	Probability Interval						Central projection
		50%						
			30%					
				10%				
2009	2	4.5	4.6	4.7	4.7	4.8	4.8	4.7
2009	3	3.9	4.1	4.3	4.5	4.6	4.8	4.4
2009	4	3.5	3.8	4.0	4.2	4.5	4.8	4.1
2010	1	3.2	3.5	3.8	4.1	4.4	4.7	4.0
2010	2	2.6	3.0	3.4	3.7	4.1	4.5	3.6
2010	3	2.6	3.0	3.4	3.8	4.1	4.6	3.6
2010	4	2.8	3.3	3.7	4.1	4.5	5.0	3.9
2011	1	3.0	3.5	3.9	4.3	4.8	5.3	4.1
2011	2	2.8	3.3	3.8	4.2	4.7	5.2	4.0

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.).

Based on the above assumptions and using the available information set, projections were constructed for the IPCA inflation accumulated over four quarters, consistent with the interest and exchange rate paths of the baseline and market scenarios.

The central projection associated with the baseline scenario indicates inflation of 4.1% in 2009, an increase of 0.1 p.p. in comparison to the projection presented in the *Report* of March, and below the central value of 4.5% for the target determined by the CMN. As shown in Figure 6.3, from the third quarter of 2009, inflation accumulated over four quarters is positioned below the central value of 4.5% for the inflation target in 2009 and 2010. This reflects, essentially, the lagged effects of higher idleness of production factors observed from the fourth quarter of 2008. Note, however, that this impact was partly offset by reductions in the Selic rate and the fiscal stimulus implemented this semester. The inflation accumulated in twelve months moved from 4.7% in the second quarter of 2009 to 4.1% in the last quarter. In 2010, inflation stays at 4.0% in the first quarter, and below this level in the remaining quarters. In the first two quarters of 2011, the inflation projection is around 4.0%.

The data shown on Table 6.1 indicates, for 2009, a decrease of 0.9 p.p. in twelve-month accumulated inflation in the second quarter, compared to 5.6% observed in the first quarter, and of 0.3 p.p. in the third and fourth quarters, when compared, respectively, to the second and third quarters. In the first case, the move reflects an inflation projection for the second quarter of 2009 lower than the inflation observed in the same period in 2008 (2.09%), indeed an outlier and which was due mainly to the surging prices of commodities recorded in that period. In the second case, inflation projections for market prices, in the third and fourth quarters of 2009, lower than the values achieved in the corresponding quarters of 2008, considering that for the regulated and monitored prices the opposite occurs. According to confidence intervals shown in Table 6.1, the estimated probability of inflation exceeding the upper tolerance level of the target in 2009 is residual, according to the baseline scenario.

In the market scenario, the projection of 4.2% for inflation in 2009 is 0.1 p.p. higher than that associated to the baseline scenario, and higher than the figure presented in the last *Report*. As can be inferred from Figure 6.4 and Table 6.2, the projections indicate continued decline in twelve-month accumulated inflation in 2009, which moves from 5.6%, recorded in the first quarter, to 4.7% in the second quarter, reaches 4.4% in the third one, and ends the year

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

Year	Q	Probability Interval 50%	30%	10%	10%	30%	50%	Central projection
2009	2	4.5	4.6	4.7	4.7	4.8	4.8	4.7
2009	3	4.0	4.2	4.4	4.5	4.7	4.8	4.4
2009	4	3.7	3.9	4.1	4.3	4.5	4.8	4.2
2010	1	3.4	3.7	4.0	4.2	4.5	4.8	4.1
2010	2	2.7	3.2	3.6	3.9	4.3	4.7	3.7
2010	3	2.7	3.2	3.6	4.0	4.4	4.9	3.8
2010	4	2.9	3.5	4.0	4.4	4.9	5.5	4.2
2011	1	3.1	3.7	4.2	4.7	5.3	5.9	4.5
2011	2	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 – March 2009 *Inflation Report* forecasts

Period	Benchmark scenario	Market scenario
2009 I	5.7	5.7
2009 II	4.7	4.6
2009 III	4.1	4.1
2009 IV	4.0	4.1
2010 I	4.3	4.4
2010 II	4.0	4.3
2010 III	4.2	4.6
2010 IV	4.0	4.4
2011 I	3.9	4.4

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

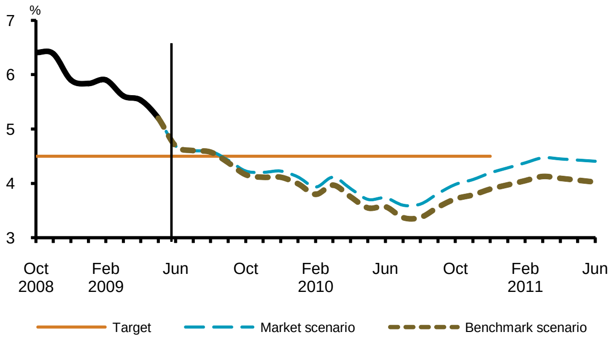
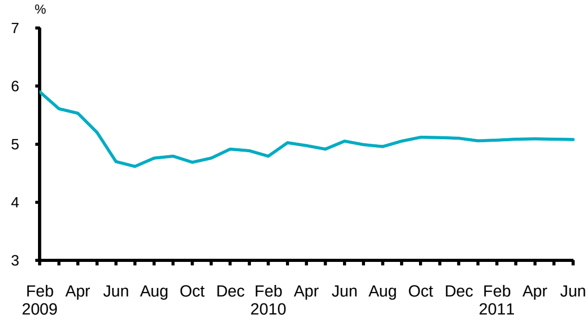


Figure 6.6 – Inflation Forecast: VAR models



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

at 4.2%, below the central value of 4.5% for the target. In comparison with the baseline scenario, the slight increase in the projection for inflation in 2009 is explained, primarily, by analysts' expectations that the exchange rate ends 2009 at R$ 2.00/US$, against the R$ 1.95/US$ level assumed in the baseline scenario. As in the baseline scenario, in the market scenario is residual the estimated probability of inflation exceeding the upper tolerance level of the target in 2009. For 2010, the projection in the market scenario, in the first semester, drop in twelve-month accumulated inflation, which, however, returns to the level of 4.2% in the fourth quarter, still below the central value of 4.5% for the target determined by the CMN. In the first two quarters of 2011, the inflation projection for the last twelve months stands around that value. It is worth mentioning that the projection of inflation, both in the last quarter of 2010 as in the first one of 2011, takes into account the fact that inflation expectations for 2011 are at 4.5%.

The comparison of the trajectories presented in this *Report* with those released in the previous *Report*, contained in Table 6.3, shows the projected paths intersect at several points, indicating a change in the distribution of projected inflation. In the market scenario, the current projection points to higher inflation rates in 2009 and first quarter of 2011, interspersed by a lower rate in 2010. Similar assessment applies to the baseline scenario.

Figure 6.5 shows the evolution of inflation accumulated in twelve months, according to the baseline and market scenarios until the second quarter of 2011, along with the inflation target by the end of 2010. By May 2009, figures refer to actual twelve-month inflation and, thereafter, projections according to the two scenarios for the construction of the accumulated values. The projections recede almost monotonically until reaching the minimum in the second quarter of 2010 (around 3.6% in the baseline scenario, and 3.7% in the market scenario). From this quarter projections rise, but remain below 4.5%. The fact that the trajectory of projections, according to the market scenario, stand above the respective trajectory of the baseline scenario reflects, in part, expected exchange rate depreciation.

The average forecast generated by the Vector Autoregression (VAR) models for the twelve-month accumulated inflation is presented in Figure 6.6. By May 2009, figures refer to actual twelve-month inflation and, thereafter, refer to forecasts. A downward trend of the forecasts is observed for twelve-month accumulated inflation up to the third quarter of 2009, from the fourth quarter onwards there is a slight reversal of this trend, such that from the last quarter of 2010 forecasts virtually stabilize around 5.0%, without converging to the central target.

Figure 6.7 – GDP growth with interest rate constant at 9.25% p.a. (Benchmark scenario)

Output fan chart

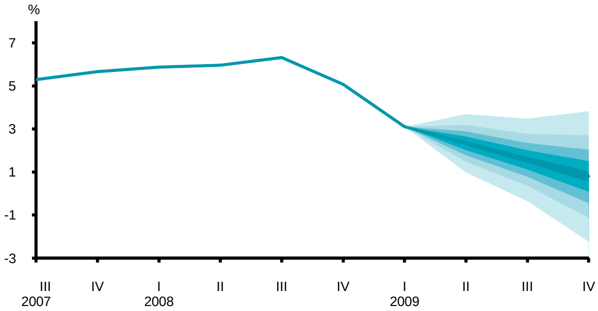


Figure 6.7 illustrates the output growth fan chart built under the baseline scenario assumptions. Considering that the model which generates GDP growth projections uses two variables that are not directly observable, potential output and the output gap, the forecast errors associated to these projections are considerably higher than the errors related to the inflation projections. According to this scenario, the GDP growth projected for 2009 is 0.8%, thus, a decrease of 0.4 p.p. in comparison to the projection presented in the *Inflation Report* of March 2009. This change reflects, in part, a recovery of economic activity slower than what was previously anticipated.

Forecasting the Yield Curve: a statistical model with macroeconomic variables

Research about term structure of interest rates (TSIR) basically rests on two classes of models, usually known as statistical models and equilibrium models. In the first group the TSIR is constructed through an interpolation process and forecasts are done using time series models. In the second group, the models incorporate equilibrium arguments, such as no-arbitrage, and forecasts are produced by the dynamics implied in the model.

Despite the lack of economic theory grounds, statistical models are preferred in practical problems due to their lesser estimation complexity. Following this trend, this box, based on Leite et al. (2009), presents a statistical model of the yield curve (premium/expectation model) that incorporates three ingredients: macroeconomic information, data collected in market survey and risk premium of forward rates. This model is used to forecast the Brazilian yield curve six months ahead and its performance is confronted with the performance of three other well known methods: the random walk, forward rate and Diebold and Li (2006) model (henceforth, DL model).[1]

Each new day the time to maturity of an ID future contract decreases by one day. Thus, the time to maturity of the yields changes from one observation to the next. In order to eliminate this variability of times to maturity, yields are interpolated yields the Svensson parametric model (1994):

1/ The database used is composed of 1day ID future yields extracted from contracts traded on the Brazilian Mercantile and Futures Exchange (BM&F) and inflation expectations (measured by the National Index of Consumer Prices), collected by the Central Bank, observed in the first working day of each month during the period of December 2002/December 2007.

$$R_t(\tau) = \beta_{1t} + \beta_{2t}\left(\frac{1-e^{-\lambda_{1t}\tau}}{\lambda_{1t}\tau}\right) + \beta_{3t}\left(\frac{1-e^{-\lambda_{1t}\tau}}{\lambda_{1t}\tau} - e^{-\lambda_{1t}\tau}\right) + \beta_{4t}\left(\frac{1-e^{-\lambda_{2t}\tau}}{\lambda_{2t}\tau} - e^{-\lambda_{2t}\tau}\right). \quad (1)$$

Figure 1 – Evolution of spot rates

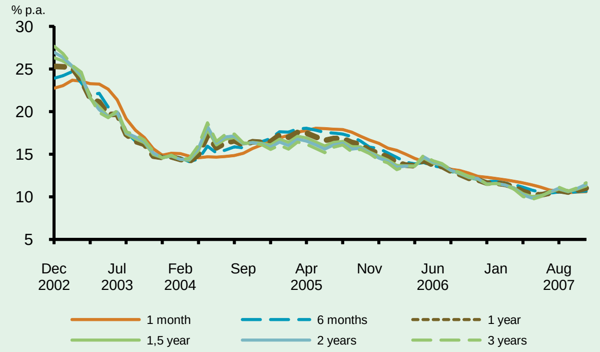
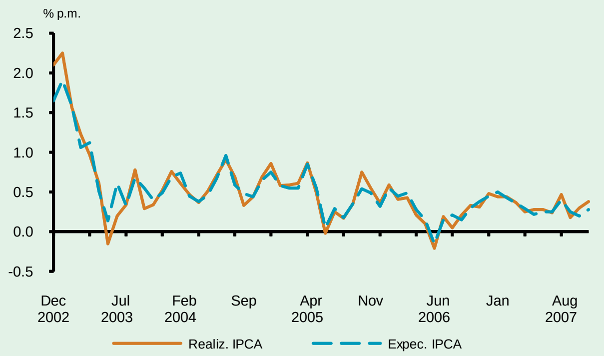


Figure 2 – Evolution of inflation and inflation expectations



The lambda (l) is fixed according to the approach suggested by Almeida et al (2007), which implies l_{1t} = 3.58 and l_{2t} = 7.17, for all *t*. Then, using OLS, beta coefficients (b) are estimated. Figure 1 shows the evolution of spot rates for maturities of 1 month, 6 months, 1 year, 1.5 years 2 years and 3 years over the sample period considered.

Figure 2 shows the evolution of the inflation expectation median of the institutions listed in the Top 5 group, as well as the observed inflation. It should be noted that the inflation rate refers to the month immediately previous to the date of collection of information on the ID future and inflation expectation. The two series present strong positive correlation and a preliminary analysis allows one to infer that inflation expectations would be a good leading indicator of actual inflation.

If R_t (t) is the spot rate at *t* for the time to maturity t and P(t, t) = exp {- Rt (t) t} is the value at *t* of one monetary unit at t + t, then the instantaneous forward rate at *t* for the term *t* is

$$f(t,\tau) = -\frac{\partial \log(P(t,\tau))}{\partial \tau}\ .$$

From Equation 1:

$$f(t,\tau) = \beta_1 + \beta_2 e^{-\lambda_1\tau} + \beta_3\lambda_1\tau e^{-\lambda_1\tau} + \beta_4\lambda_2\tau e^{-\lambda_2\tau}.$$

Considering the Selic rate as the instantaneous short-term rate, the risk premium of the forward rate should be defined as:

$$\eta(t,\tau) = f(t,\tau) - Selic_t$$

Ludvigson and Ng (2007) show that the risk premium return on bonds is strongly related to macroeconomic fundamentals such as price indices. Using this result, a linear relationship between the risk premium of the forward rate and the inflation expectation is specified:

$$\eta(t,\tau) = \gamma_1 IPCA_t + \gamma_0, \quad (2)$$

where the $IPCA_t$ is the inflation expectation measured by the IPCA in t for the first IPCA not yet announced.

The estimations and forecasts were performed using data from December 2002 and the month until the forecasting time. The forecasts for six months ahead start in December 2005 (forecast for June 2006), and extend until June 2007 (forecast for December 2007), with a total of 19 forecasts.

Using Equation 2 and the estimated values of g_0 and g_1, it is possible to forecast the forward rate risk premium six months ahead. To do that, it is necessary to know the expectation of the first unknown IPCA six months ahead. The forecast for the seventh unknown IPCA provided by the Central Bank survey is used as a proxy for this expectation. Then, to forecast yields it is also necessary to know the expectation of the Selic rate six months ahead. Once more, this variable is provided by the Central Bank survey.

Tables 1 and 2 present, respectively, the six month ahead forecasting bias and the RMSE, both in basis points, from the premium/expectation model and three other competitors: the random walk, the forecasts based on forward rates and the DL model. This latest forecasting technique adjusts the yield curve on each day via a parametric form similar to equation 1, but with only three factors (it does not consider the second curvature). The forecasts are performed by applying an autoregressive process for beta coefficients. The decay factor of the yield curve (l) was set at 3.58 for the DL model.

The results presented indicate that the premium/expectation model outperforms the three other competitors for all maturities when the comparison criterion is the RMSE. However, when bias (observed value minus forecast value) is used as a metric to compare the models, none of the models is clearly superior, despite the slight superiority of the DL model.

Table 1 – Bias for out of sample forecasts (p.b.)

	6 months	1 year	1,5 year	2 years	3 years
PE	47	70	88	99	110
RW	-136	-120	-110	-104	-98
FR	-96	-101	-98	-96	-92
DL	24	51	-77	95	113

Table 2 – Mean-square error for out of sample forecasts

	6 months	1 year	1,5 year	2 years	3 years
PE	68	98	119	133	148
RW	144	139	144	151	162
FR	122	153	167	173	177
DL	129	143	158	169	181

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The Lags in the Transmission of Monetary Policy to Prices

Considering its uncertain and variable nature, the lags in the effects of monetary policy on activity and prices are a constant concern for policymakers. Among the various channels most often cited as relevant to the monetary policy transmission, the demand channel, the channel associated with external variables and the expectations channel receive special attention from the Central Bank. Historically, these channels have been the most effective ones, despite the growing importance of the credit channel in recent years. This box discusses issues regarding the lags of the monetary policy transmission mechanism in the Brazilian economy, with particular attention to estimates from economic models in use at the Central Bank.

In a way, the demand channel reflects the institutional arrangement of the production sector, in the sense that the lags in the transmission mechanism are determined by the duration of contracts between agents (firms, individuals and governments) and the frictions that slow down the propagation of shocks along the production chain. The exchange rate channel is primarily based on two no-arbitrage conditions: one in the asset market and the other in the market of internationally tradable goods. Due to relatively lower transaction costs, the first mechanism, in principle, would operate quickly. However, due to the difficulties in accurately assessing the risks associated with both the domestic and foreign assets, it is not a simple task to identify arbitrage opportunities. This makes highly unpredictable the movements of the exchange rate that are related to the functioning of asset markets. In turn, the channel capturing expectations – which are directly implicated by the structure of the economy in models with rational expectations –

of the three, is perhaps the easier to understand. Nevertheless, the uncertainty that this channel adds to the analysis is significant – although the evidence for the Brazilian case suggests that expectations respond to policy decisions in an important way.[1]

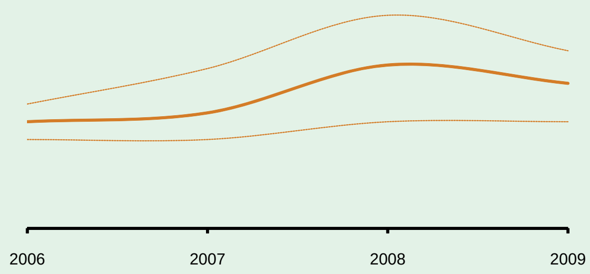
Due to the maturity of Brazilian institutions and the perception of the consolidation of macroeconomic stability, expectations regarding the evolution of the Brazilian economy seem to be well anchored. This phenomenon could be illustrated by the resilience of the economy to the recent turmoil in international financial markets. Indeed, expectations regarding economic activity, exchange rate and the premium on Brazilian sovereign bonds experienced much lower deterioration compared to the levels observed in the past, even when the shocks were smaller. In such circumstances, with expectations better anchored, hence less volatile, the demand channel becomes more important.

As explained in previous boxes and other publications of the Central Bank, the transmission of monetary policy to prices through the demand channel occurs in two steps. Initially, through the mechanism described in the Investment and Savings Curve (IS Curve),[2] a monetary policy easing (a reduction of the base interest rate Selic) leads to a fall of the long-term interest rates. Lower rates allow individuals and companies to finance consumption and investment at lower cost, which ultimately boosts aggregate demand. According to the estimates of the Central Bank in recent years, the maximum effect of the policy rate on aggregate demand would take something like two to three quarters to materialize. In the second step, and given a constant aggregate supply in the short run, the Phillips curve implies that the increase in demand puts upward pressure on the market prices of goods and services. Due to the wage rigidity inherent in labor contracts, the maximum effect on prices would take around three to four quarters to materialize, according to the estimates of the Central Bank.

1/ See, eg, A. S. Bevilaqua, M. Mesquita and A. Minella (2007), "Brazil: taminginflation expectations," Central Bank of Brazil, Working Paper Series N. 129; F. A. Carvalho and A. Minella (2009), "Market Forecasts in Brazil: performance and determinants," Central Bank of Brazil, Working Paper Series N. 185.

2/ IS = Investment and Savings.

Figure 1 – Lags in the demand channel
Estimated minimum, average and maximum values



The two main pieces of the small structural models used by the Central Bank are the aggregate demand equation (IS curve) and the aggregate supply equation (Phillips curve). Figure 1, drawn from a broad set of different specifications for the IS and Phillips curves, illustrates how the lags (minimum, average and maximum) in the transmission of monetary policy to prices have evolved in recent years. The figure considers the combined effect of interest rates on aggregate demand and the effects of the latter on prices.

It should be noted that in recent years, there was an increase in the lags of the monetary policy transmission mechanism, as a result of the longer duration of contracts over the same period. In this regard, the maximum effect on economic activity of the ongoing monetary policy easing, which started in January 2009, will take place next semester, whereas the effect on prices will materialize by the end of this year and early 2010.

The lags in the transmission mechanism can also be evaluated through the lens of the medium-sized semi-structural models used by the Central Bank. These models allow decomposing the total effects of monetary policy into the contributions of the three aforementioned channels: exchange rate channel, expectations channel and demand channel.[3] According to the medium-sized models, using information for the inflation-targeting period, the maximum effect of changes in the Selic rate on output and inflation takes, respectively, 3-4 quarters and 5-6 quarters to materialize.[4] In addition, three points should be highlighted: (1) there are no large differences between the lags implied by the small structural models and those implied by the medium-sized semi-structural models; (2) the effect of monetary policy through the expectation channel occurs relatively faster than through the other channels; and (3) according to the medium-sized models the lags associated with the exchange rate channel are relatively long, contrary to the common sense. This suggests that the exchange rate channel operates more intensively

3/ In the medium-sized models, the demand channel is represented by the channels associated with the interest rates that are relevant for consumption and investment. For details, see André Minella and Nelson F.Souza-Sobrinho (2009). "Monetary Channels in Brazil through the Lens of a Semi-Structural Model." Central Bank of Brazil Working Paper Series N. 181.

4/ Roughly speaking, these ranges can be seen as average lags for the period 1999/2008.

through the market of tradable goods market than through the asset market.

To conclude, it should be noted that the estimates presented in this box refer to the maximum effect of monetary policy on economic activity and prices through the aggregate demand channel. On the other hand, in statistical sense, the initial impact on activity and prices occurs after 1-2 quarters and 2-3 quarters, respectively.