

A daily frequency inflation measure and its information content on forecasts

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Every day since 2006, the Getulio Vargas Foundation (FGV) calculates two rates of inflation for the period of 30 days ending on the date of computation. Both are consumer price indices. One of them is the daily version of the Consumer Price Index-Brazil (IPC-BR), built and released by the FGV itself on a monthly basis for over six decades. The other one is the daily estimate of the Broad Consumer Price Index (IPCA), the official inflation index in the country, calculated under the responsibility of the IBGE, the federal statistics agency in Brazil. Besides the usual functions of an official index, IPCA is used by the Central Bank as the reference in its inflation targeting policy. The daily estimation of IPCA, here mentioned, combines prices collected by the FGV and the index structure defined by IBGE. The whole set of daily information produced by FGV is named inflation Monitor.

For the daily calculations described above to be viable, two conditions are required. First, the collection of prices must be uniformly distributed over time. This requirement ensures that for the completion of each day's calculation, there is a relatively constant flow of new prices joining the sample. The second condition is that the collection should be performed fast enough to ensure that data collected are processed the same day.

The following text describes, first, the composition and the methodology of the two indices mentioned - the IPC-BR and IPCA. Following it are presented the possible reasons for the calculation in parallel of the two indices by separate institutions - FGV and IBGE, emphasizing those of historical nature. In the following block, the focus shifts to the high frequency information. The text identifies the demand for daily information as well as the incentives to the supply of such services. The fourth part of the text covers operational aspects both from the point of view of those who use and that of those who produce the numbers. Among these, we highlight the distribution of price collection throughout the reference period and the technology used to ensure the required agility.

In the fifth, the obtained results are analyzed and the estimates compared to official figures. The conclusion reached is that the service is efficient in its central objective. Examining the 84 results generated between January 2006 and December 2012, it is noted that the number of months in which the predictions of IPCA strayed from the value subsequently released by IBGE by a distance less than or equal to 0.1 percentage point, plus or minus, was 72, which equates to 85.7% of total. In the sixth section, we also compare the predictive ability of the Monitor to a different measure of market expectations, and thereby evaluate the informational content of the Inflation Monitor.

I

The Consumer Price Index-Brazil (IPC-BR) estimated by the Getulio Vargas Foundation (FGV) since 1947, represents the evolution of the value of a consumer basket for families with income between 1 and 33 minimum wages, living in seven municipalities of state capitals¹. The index is divided into eight categories of expenditure with the weights shown in the table below.

Table 1 - IPC-BR, categories and weights

Description	Weight
General Index	100,0000
Food	22,3709
Housing	25,3187
Clothing	5,8896
Health and personal care	11,4276
Education, reading and recreation	7,3748
Transportation	19,1501
Miscellaneous expenses	2,6659
Communication	5,8023

Source: FGV

The product selection and their respective weights are obtained from household budget surveys, the most recent having been held between 2008 and 2009². Based on this latest research, the IPC-BR was calculated with 338 products and services.

The Broad Consumer Price Index (IPCA) is calculated by the Brazilian Institute of Geography and Statistics (IBGE), since 1981, based on the structure of household expenditure with monthly income between 1 and 40 minimum wages. Geographically, the IPCA covers nine metropolitan areas, a municipality of a state capital and the Federal District. The total number of goods and services covered by the survey is 365. The index structure, presented below, was generated according to the consumer expenditure survey (CES) conducted from 2008 to 2009.

¹ It is common in Brazil the use of the minimum wage as a reference for stratifications of family income. In the last decade, the minimum wage has doubled in real terms in response to a government policy for rebuilding its purchasing power. In January 2013, it was equivalent to US\$ 325. In the range from 1 to 33 minimum wages, are situated more than 85% of the families living in the seven capitals surveyed (São Paulo, Rio de Janeiro, Salvador, Recife, Belo Horizonte, Brasília and Porto Alegre).

² For the first time since it calculates the IPC-BR, the FGV used microdata from a consumer expenditure survey conducted by IBGE. In previous decades, FGV performed its own budget surveys.

Table 2 - IPCA, categories and weights

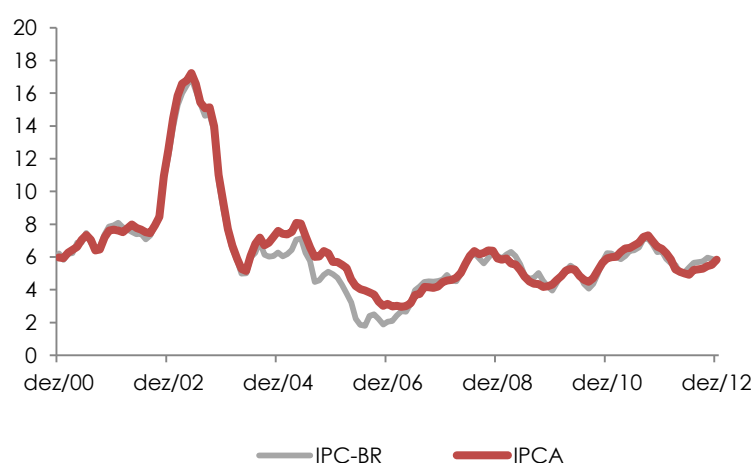
Description	Weight
General Index	100,0000
Food and beverage	22,0946
Housing	14,2522
Household items	5,4097
Clothing	6,2122
Transportation	21,9749
Health and personal care	11,0558
Personal expenses	9,2191
Education	4,2163
Communication	5,5652

Source: IBGE

Although calculated by different institutions, there are several methodological similarities between the two indices. Firstly, both follow the Laspeyres formula, in which the weights are adjusted monthly according to the changes in relative prices. Similar are also the aggregation procedures. Initially, in each region, the relative prices of basic items are aggregated by simple geometric mean to obtain the average result of the product or service in each municipality. Thereafter, the aggregative criterion is arithmetic. In order to reach the overall indicator, the regional indices are aggregated in proportion to family incomes, in the case of IPCA, and to consumption, in the case of IPC-BR.

With so many similarities in construction, it is not surprising that inflation rates, measured by two indices, evolve so related. Temporary divergences, as occurred between 2005 and 2006, are due to specific forms of price collection. In the period mentioned above, differences are explained by the way of collecting clothing prices and airfare, among other items. The chart below compares the two rates accumulated in 12 months.

Chart 1 – Accumulated rates in 12 months for IPC-BR and IPCA(%)



Sources: FGV and IBGE

II

Given the similarities between the two calculations, what would justify the performing of the two surveys? Wouldn't it be a waste of resources? There is no single answer to this question, but a good starting point for understanding the coexistence of the two statistics is to observe the history of both and the precedence and little more than three decades of IPC-BR compared to IPCA. The calculation of the IPC-BR was one of the first projects implemented by FGV, an institution created in 1944 with public funds, but without directly integrating the federal administration. The FGV had, from the outset, the mission to support the federal government, providing qualified professionals as well as studies and statistics. The first version of the IPC-BR³, project inserted within the scope of the institutional mission of FGV, was restricted to the city of Rio de Janeiro, then the federal capital.

In this period, the IBGE, created in 1937, prior to the FGV, was dividing its attention between the economic and demographic surveys. Among the former ones, the agency gave high priority to agricultural production. After all, Brazil was the largest producer and exporter of coffee in the world. It was only in January 1980 that the calculation of the IPCA began on a regular basis. Before that, FGV, for nearly four decades, held the role of producer of major economic statistics in the country. Starting spontaneously and later by the official delegation, FGV estimated the national accounts, balance of payments as well as consumer and producer price indices.

The first two blocks of accounts were transferred, on different occasions, to the IBGE and to the Central Bank, respectively. Moreover, the calculation of price indices by the FGV wasn't discontinued or transferred, even after ceasing to have the status of official statistic. Rather, the activity expanded within the FGV. The record of being an institution that shared with the federal government the responsibility for the production of information, maintaining as much independence as possible, assured to the FGV until today a unique position, recognized above all by users of statistics: the authority to issue a qualified view on price movement, alternative to the official one. This role was highlighted by two contingencies.

First, in early 1980, when the IPCA came to scene, the Brazilian inflation on an annual basis had overstepped the line of three digits. The threat posed by the rise in prices was discussed incessantly in the specialized and general media. The FGV could not get away from this topic in those circumstances. Secondly, FGV remained as the only Brazilian institute to calculate the producer price indices and those were essential to the operation of indexation mechanisms that spread through the economy. The reasons for the coexistence of FGV and IBGE indices are renewed from time to time. The disfigurement of the Argentinian consumer price index demonstrates categorically that a second calculation can be the best prevention against opportunistic intrusions by governments that fight against the facts.

III

Historically explained the simultaneous disclosure of consumer price indices by FGV and IBGE, why did the calculation receive the daily version? Again the starting point is historical. In the late 1980s, rising prices broke through four digits. There was in the country a semantic debate about the correct name of the phenomenon: hyper, super or mega inflation. In this environment, between two monthly results releases, prices rose by 30% to 50%. It was natural that governments, producers and citizens sought information more often.

³ The IPC-BR is calculated since 1947, but the historical series is retroactive to 1944.

In response, the FGV adapted indices already calculated to a scheme of disclosures every 10 days. Other institutions that also followed the evolution of prices preferred the weekly rhythm⁴. It is noteworthy that they were (and still are) indices with collection periods of 30 days, calculated with inevitable overlaps. Therefore, the first incursions in the area of infra monthly calculations, in the 1980s, were the direct consequence of high inflation.

The interest for high frequency measurements, however, survived to stabilization in 1994. It has been almost two decades since Brazil got rid of inflation rates over 2,500% per year. Since then, many practices developed during the hyperinflationary phase have been abandoned. The general indexing of prices, wages, taxes and private contracts, that had been applied, under the protection of the law, in monthly cycles, can no longer be made in terms of less than one year. This could lead, by the lower utilization, to the lengthening of periods for disclosure of the inflation indices. That's not what happened.

Prior to 1994, although the FGV and other institutes that calculated price indices had passed to disclose results in periods of less than one month, the most active financial institutions began to organize, in their technical departments, their own surveys for prices of goods and services. They thus had additional elements to enhance the predictions made on inflation in the short term and thus lead to more profitable operations.

The adoption of the system for inflation targeting, in 1999, brought new challenges to financial institutions. One of the pillars of the system is a survey of market expectations, collected weekly by the Central Bank. To encourage participation in the survey, the Central Bank publishes a monthly ranking of institutions with the best performance in the prediction of key macroeconomic variables, including the rate of inflation. The five participants with minor deviations from the observed value for each variable are selected and have their names announced by the monetary authority. Being among the "top five" is a matter of distinction that justifies investment in obtaining and processing information. At the same time, the market for future interest rates grew up and became more sophisticated, but the sensitivity to events and news has not decreased. Being well positioned in this market, separating signals from noise, requires careful Monitoring of inflation trends.

Even though there are other and even more important reasons for the market's interest in Monitoring inflation on a daily basis, the fact is that the demand for this type of information is robust and sustainable. The FGV, realizing the needs of financial institutions, launched in 2006 a service of daily Monitoring of the evolution of consumer prices, giving it the name of the official inflation Monitor. Since then, the number of contracting institutions has increased, reaching in December 2012 the mark of 50 clients. These include the country's largest commercial banks, investment banks, third-party asset managers and consulting companies.

At this point, it is completed the circuit of production from the perspective of financing. The FGV, although it was created on the initiative of the federal government with public resources, has got freedom and had gradually been defined as an institution of private nature. This means that most projects should be funded by users. The inflation Monitor has this feature. The direct costs of collecting, calculating and marketing are fully covered by revenue from subscriptions.

⁴ A good example is FIPE - Institute of Economic Research Foundation, linked to the University of São Paulo. FIPE's CPI is calculated according to 30 day periods ended every week. The results obtained are referred to each four-week period of the month.

It is a singular experience. A private institution produces and provides a daily index of consumer prices with the methodological accuracy of an official institution, the activity generates the resources necessary to its maintaining and the figures obtained from the calculations are incorporated into the analysis models developed by the FGV itself, which only reaffirms its status as a privileged observer of the inflationary scene.

IV

The users of the inflation Monitor can consult, every working day⁵, from 8 o'clock in the morning, a broad range of information about what happened to the prices the day before. For the IPC-BR, the Monitor shows the changes in prices of the items surveyed in seven capital cities covered by the index and the average of the seven. Intermediate aggregations are not disclosed nor the general index. In addition to rates calculated for moving periods of 30 days based on the preceding 30 days, comparisons are made for intervals of seven days, regarding the same period of the previous month. This type of comparison is called the "tip" indicator. Although more oscillating than the rates of 30 days, the "tip" indicators identify faster the course changes.

The estimates of the IPCA, also made for the period of 30 days and the "tip" criterion, combine price changes necessarily collected for the IPC-BR with the official index weightings. The FGV does further collection of prices in the seven cities covered by the IPC-BR in order to know the rate of change of items included in the IPCA, but not in its indices. Special attention is given to administered prices, such as energy tariffs and urban transportation. The collection of these prices does not require the presence of an agent and, for this reason, are obtained for all cities of IPCA.

The calculations for the IPCA also include the IPCA-15⁶, an index with the same features as the previous one, except collection period, anticipated in about 15 days compared to the IPCA. The collection period for the IPCA is not rigid, but approaches to the calendar month. The IPCA-15 covers 30-day intervals beginning at the midpoint of the reference month. The exact intervals for each month are reported in advance on the website of the IBGE. Although the FGV estimates, for the two indices, daily rates related to the current month, users tend to pay attention to the results of the days when the price collection interval by the FGV coincides with those announced by IBGE for the IPCA and IPCA-15.

The dates of disclosure by the IBGE of IPCA and IPCA-15 provide essential parameters for performing the estimates. When a monthly result is published, the weights that will be used in the subsequent month become known. This information is incorporated into calculations of FGV on the very day that IBGE announces its results. The routine is valid for the IPCA and IPCA-15. Additionally, the release of the IPCA-15, for methodological decision of IBGE, defines the rates of change of a few items that will be used in the calculation of the IPCA, fifteen days later. Residential rents, maids and airline tickets are among the items which have their result in the context of IPCA-15 repeated in the release of the IPCA. The determination of these rates reduces the variance of the estimates of IPCA relative to the ones of IPCA-15.

Three years after the release of the inflation Monitor, the FGV has developed a second version, in which the collected data are object of econometric adjustments. This second version, called 2.0, while the original is now called 1.0, pleased the users and although the signature value is higher, almost all migrated to it. Version 2.0 contains the

⁵ Although there is no price collection on Saturdays and Sundays, there are additional surveys on Mondays and Fridays, based on which are estimated rates that have the weekend days as the reference date.

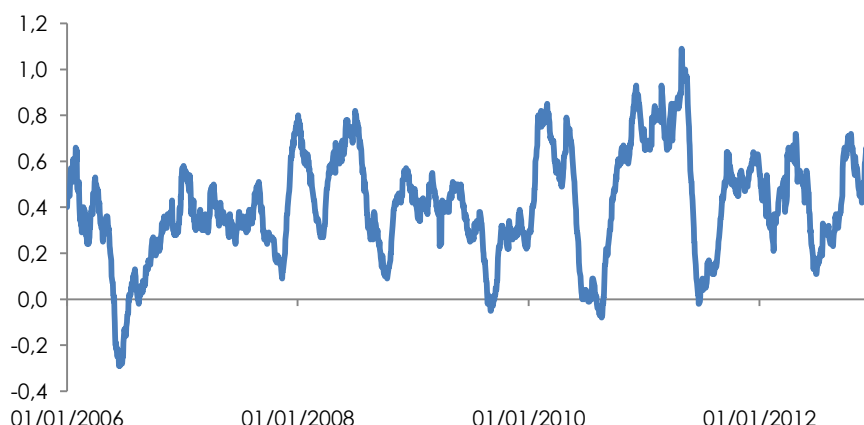
⁶ The IPCA-15 was created by IBGE in May 2000 and is usually seen as a preview of the official inflation of each month.

results from the 1.0, that is, the direct combination of prices collected by FGV with weights from IBGE. The use of econometric tools corrects, based on previous occurrences, possible prediction errors committed by method 1.0. This does not guarantee that the estimates 2.0 are always closer to the target than those from the version 1.0 although the average deviations are smaller. The Monitor 2.0 allows users to clarify, by phone, questions about the behavior of specific prices as well as the inflation trajectory in general.

The following picture is a "print screen" from the inflation Monitor on the website of the FGV (<http://portalibre.fgv.br>). The website displays charts and allows historical research and exporting files for use in spreadsheets.

After all these considerations about the operation of the Monitor, the chart below shows the rates of change in periods of 30 days, estimated for the IPCA on a daily frequency.

Chart 2 - Daily estimate for the monthly rate of IPCA (% per month)

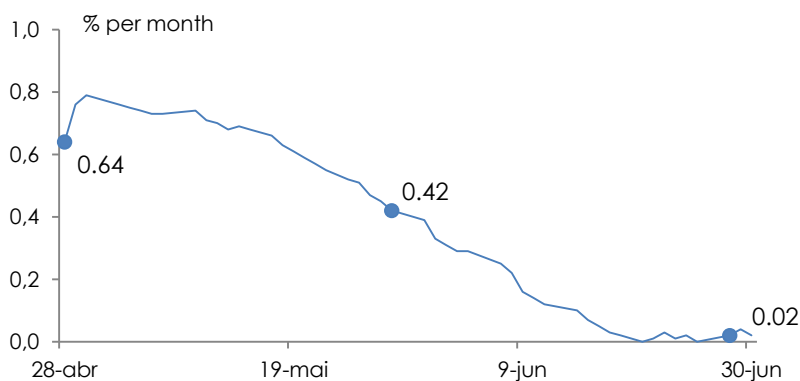


Source: FGV

One of the strengths of the indicator is its ability to shape day by day, large-scale changes in the monthly rate of the official index. This is evident, for example, in the transition between April and June 2010. In those three months, the IPCA recorded the

following rates: 0.57%, 0.43% and 0.00%. In the first half of May, the Monitor indicated some stability, but during the second the decline was evident. On May 28th, the estimation performed with data from the collection period of that month IPCA indicated 0.42%. The deceleration continued fast throughout the first half of June, when the estimated rates approached zero, but then lost momentum pointing for the month a variation of 0.02%. The chart highlights the estimates made by the Monitor on the closing dates of collection periods established by IBGE for the IPCA.

Chart 3 – Daily estimate of the monthly rate of IPCA monthly between April 28th and June 30th, 2010.



Source: FGV

The calculation of the Monitor depends on a distribution as uniform as possible of the price sample throughout the month. In 2006, the initial phase of operation, this requirement was halfway to reach the satisfactory level reached later. Routes for data collectors to follow and calendars of collection that identified days of the week in which promotions were systematically offered had been remade several times before they became efficient and precise.

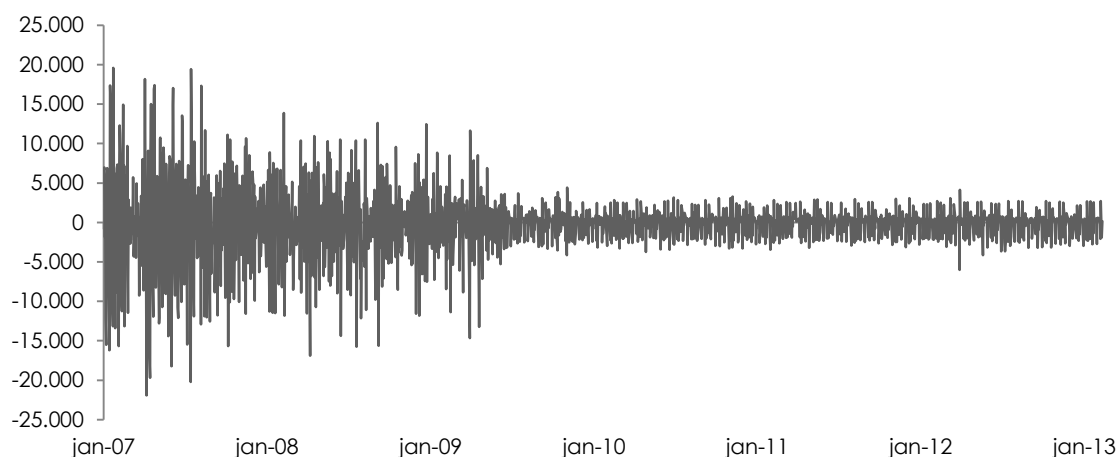
While the desired uniformity wasn't obtained, the sample was kept larger than the size required for an index to be calculated only once a month. This excess prevented that oscillations in the number of surveyed prices every day, resulting from a still unequal distribution of the collection activity, turned into fluctuations in the results that would confuse the users. As the standardization was being hit, and it was gradually, first in some products and towns to the completion, the sample was also being reduced, with favorable impact on production costs. This is an ongoing concern given the private nature of FGV.

By mid-2008, the number of prices in the sample for the calculation of monthly rates by the Monitor was around 250 thousand⁷. The dispersion, however, was significant, there being days when the calculation used 280 thousand quotations and others in which the available sample was not going beyond 220 thousand prices. In 2010, the average number of quotations had fallen to about 160 thousand, with deviations significantly lower than those of the initial stages of the Monitor. During 2012, following the revision of the structures of IPC-BR and IPCA based on the 2008-2009 CES, took place a new round of sample reduction which brought the number of quotations to less than 120 thousand.

⁷ This figure contains prices which are used repeatedly at 30 day moving intervals.

The following chart illustrates the process of standardizing the collection using as indicator the difference between the total of prices collected in two consecutive days. Although the complete standardization is practically unfeasible, the figure shows that over time there has been a considerable reduction in the sample fluctuation between two consecutive calculations.

Chart 4 – Daily difference in total quotations used in the estimates of the IPCA by the Monitor



Source: FGV

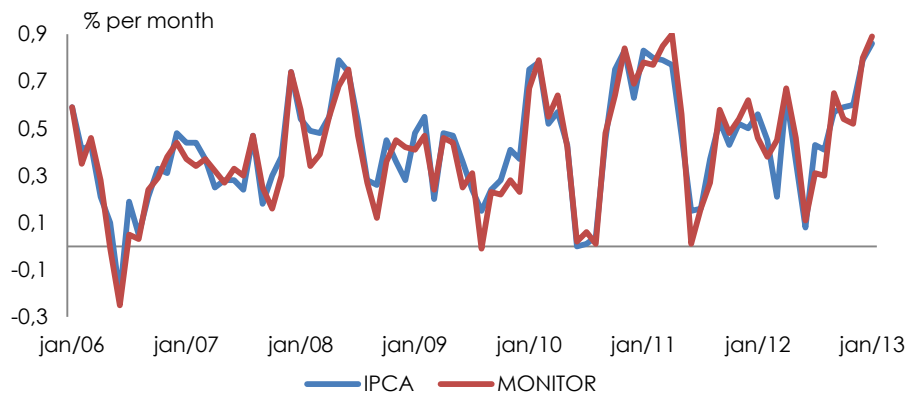
Another requirement for the good receptivity of the inflation Monitor is the quickness in the logistics, as well as the processing and dissemination of information. For this objective to be achieved it is necessary to combine technology and people management. The collection is made daily in each of the seven cities through mobile devices (palm tops, laptops, smartphones, etc.), allowing a first critique at the moment of the survey. Operations begin at 8 am and by 4 pm all prices collected on the day will have fed the database. A new round of critiques takes place involving the collection team and the one that, at the headquarters of FGV, performs the calculations. Under normal conditions, around 6:30 pm, the calculations are concluded and the loads on spread systems, completed.

V

A natural question can be posed: how are the Monitor estimates compared to the official numbers? Examining the 84 results generated between January 2006 and December 2012, it is noted that the number of months in which the predictions of the IPCA strayed from the value subsequently released by IBGE by a distance less than or equal to 0.1 percentage points, plus or minus, was 72, which equates to 85.7% of the total. Of this total, on six occasions, Monitor forecasts coincided with the rate calculated by the IBGE.

The correlation coefficient between the two series - the IPCA and the estimate made by the Monitor in the day the collection interval coincides with that published by IBGE for calculating the official index is 0.94. There is a slight predominance of underestimates: 43, or 51.2%. The overestimations were 35, or 41.7%. This downward bias is confirmed both by the average deviation, of -0.015 percentage points (pp), and the median, of -0.01. The chart below illustrates this comparison.

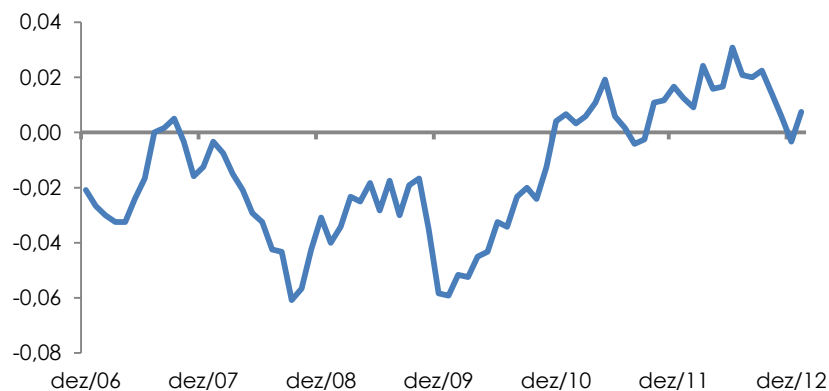
Chart 5 – Monthly inflation rates according to the Monitor and the IPCA



Sources: FGV and IBGE

The predominance of underestimates decreased over time. Dividing the interval into two equal periods of 42 observations each, the first one from January 2006 to June 2009, in 24 months underestimations occurred, the equivalent to 51.7%. In the second interval, also with 42 points, underestimates drop to 19, or 45.2%. The changing of pattern over time is depicted by the following chart, which depicts the 12-month moving average of monthly deviations.

Chart 6 – Difference in percentage points between the monthly rate estimated by the Monitor and the IPCA



Source: FGV

Note: moving averages of 12 months.

The predominance of underestimates in the first half of the analysis period results from the higher frequency of negative deviations. There is no evidence that errors have decreased in magnitude. The average deviation of underestimates goes to 0.083 pp in the second period from 0.075 pp in the first. Regarding the overestimates, they show small changes in amplitude, going to 0.060 pp from 0.059 pp, between the two periods.

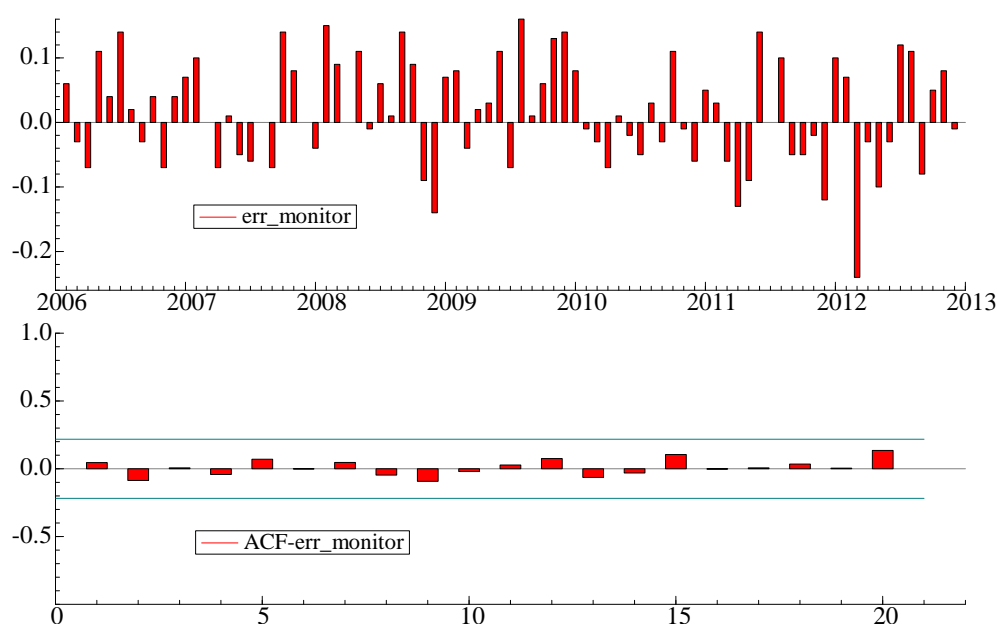
A factor that may have influenced this pattern change was the clothing group, the main source of underestimation. In the first half of the period, there was an average deviation of less than 0.35 percentage points per month. In the second half, the

average underestimation decreases to 0.17 pp, decreasing further in the end of the period.

The reduction in amplitude of underestimation is largely a result of standardizing the collection throughout the month. There was also greater interaction with the sellers of clothing and footwear in order to ensure intertemporal comparability of the items surveyed. This enhancement in collecting of clothing was incorporated to IPCA-BR and not just to the estimate of the IPCA made by the Monitor.

In any case, a fundamental statistical issue is whether the short-term deviations indicate an undesirable systematic behavior. As can be seen in Chart 7 below, there is no significant autocorrelation coefficient for any lags between 1 and 12 for the whole period:

Chart 7 – Monthly deviations of Monitor from IPCA, and its autocorrelation function



On a lower level of aggregation, the table below compares the predictive efficiency of the Monitor in relation to the nine groups that comprise the structure of the IPCA. It shows groups with rates of price changes oscillating more than others. This can be proved by the differences between the averages and between standard deviations among the several groups.

What matters, however, is to compare these two parameters - average and standard deviation of the IPCA with the ones of the Monitor. This comparison shows that, with the exception of clothing, in the other groups both the average and the standard deviation of the IPCA are closely monitored by the respective parameters calculated at the Monitor rate. In other words, more oscillating rates do not become less predictable, except in the case of clothing.

Table 3 – Average, standard deviation and coefficient of variation of the monthly rates of IPCA and the Monitor in the period from January 2006 to December 2012.

Description	Average		Standard Deviation		Coefficient of variation	
	IPCA	Monitor	IPCA	Monitor	IPCA	Monitor
GENERAL - IPCA	0.42	0.40	0.22	0.23	0.52	0.58
Food and beverage	0.62	0.60	0.66	0.67	1.07	1.11
Housing	0.40	0.41	0.27	0.28	0.67	0.68
Household items	0.05	0.05	0.39	0.40	8.06	7.31
Clothing	0.51	0.25	0.52	0.81	1.02	3.23
Transportation	0.22	0.24	0.52	0.50	2.36	2.08
Health and personal care	0.45	0.44	0.21	0.26	0.46	0.59
Personal expenses	0.64	0.63	0.37	0.33	0.58	0.52
Education	0.51	0.49	1.28	1.13	2.52	2.30
Communication	0.08	0.09	0.22	0.27	2.88	2.97

Sources: FGV and IBGE

VI

This section explores the information content of the Inflation Monitor. We evaluate the predictive performance of the Inflation Monitor under a new perspective. First, we compute its Root Mean Squared Error (RMSE) in relation to the actual IPCA figures. Then, we compare it to a survey of expectations produced by the Brazilian Central Bank (BCB) – the FOCUS survey.

Starting in 2001, BCB has been collecting and publishing information on expectations for a number of macroeconomic variables, including the IPCA (among other price indices). Expectations about the IPCA are of central importance, given that the monetary policy follows an explicit inflation-targeting regime, the 12-month accumulated figure for the IPCA in December of each year being the target. Besides 12-month ahead accumulated inflation, the values for monthly IPCA variations are collected daily, for periods 13 months ahead. The respondents of this survey are a panel of institutions from the private sector, mainly economics departments of banks, and consulting firms.

Each week, a complete roundup of the panel of informants is surveyed, and although the information is available from BCB on a daily basis, attention is focused on a weekly report published every Monday. Information for each variable includes daily values for measures of central tendency (mean and median) and dispersion (standard-deviations, as well as minimum and maximum values).

In what follows, we look at the median for the monthly expected variation of the IPCA. Departing from the daily information available from the BCB site (www.bcb.gov.br), we construct two different measures of expectation for each month. The first (FOCUS1) is a 7-day moving-average ending the day before IPCA data collection ends, whereas the second (FOCUS2) is a 7-day moving-average starting on the day where data collection for the IPCA ends (and for that reason, also the day where the daily value of the Monitor is taken to be the prediction of the monthly figure for the IPCA).

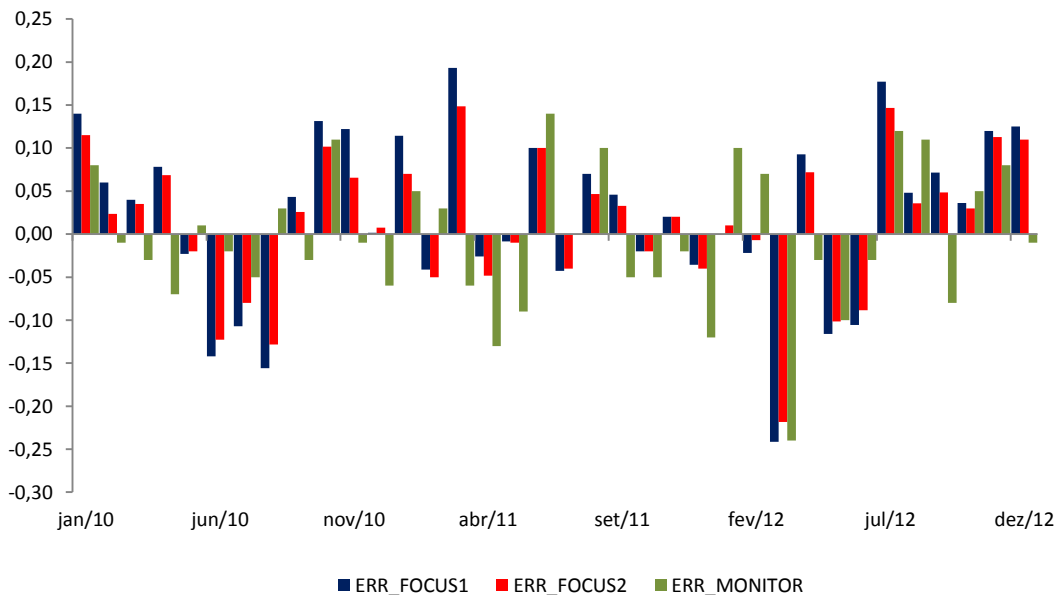
The reason for these two statistics is as follows. FOCUS1 is produced under the same information-set (in terms of availability of information of other economic variables) as

the Monitor. Therefore, we should compare the predictive ability of the Monitor directly with FOCUS1. After the day where data collection for the IPCA ends, new information for the panel of informants becomes available – both information concerning other economic variables and the Monitor prediction itself, which is known to the Monitor subscribers from that date onwards. FOCUS2 is the measure of expectations during the period after the Monitor figure is known, up to the day where the actual IPCA figure becomes known (usually a week after its data collection ends). As an example, supposing data collection for the March 2012 IPCA ends at the 28th of March, this is the day where the Monitor figure will be taken as the prediction for that month's inflation. FOCUS1 will be calculated as the moving-average of the market's median expectations on the 7 preceding days, and FOCUS2 will be the moving-average of the same expectations on the 7 following days. This series of expectations ends the day before the actual figure of the IPCA for that month becomes known, so in fact FOCUS2 represents the last available information on expectations for that particular month.

Ideally, if we had access to FOCUS data disaggregated by each individual participant of the panel, we could map into this set the subscribers and non-subscribers to the Monitor, and evaluate the impact of the Monitor information in terms of potential differences between these two groups. This, of course, assuming that the rest of the information set is largely public information available to both groups, or at least that there are no differences between the information sets before and after the Monitor figures between the participants. However, we still don't have access to this data, and so will produce a different set of results, leaving this issue aside while we wait for the necessary data.

In what follows, we directly compare the predictive ability of the Monitor with regard to both FOCUS1 and FOCUS2, and provide a tentative interpretation. Chart 8 below shows the errors of the 3 estimates, with a sub-sample including January 2010 through December 2012 for visualization clarity:

Chart 8 – Monthly deviations from actual IPCA: Monitor, FOCUS1 and FOCUS2.



Looking at Chart 8, even in this sub-sample a set of patterns valid for the full sample result:

- 1) The prediction of Monitor and the survey respondents differ somehow,
- 2) Some perform better than the others at particular months, with no clear overall pattern and,
- 3) There is some revision of expectations between FOCUS1 and FOCUS2.

The first natural question is: which one performs better considering the whole available sample (January 2006 through December 2012)? This is addressed on Table 4, according to the RMSE criterion:

Table 4 – RMSE of different expectations of the monthly IPCA (2006/Jan to 2012/Dec)

Root Mean Squared Error	
Monitor	0.081
FOCUS1	0.097
FOCUS2	0.077

The Monitor performs better than FOCUS1, and worse than FOCUS2. The expectations in the Focus Survey are individually produced by a set of potential different methods, including econometric univariate forecasts, structural-equations multivariate forecasts, private data collection, and combination of forecasts produced by third parties. We know that each of these methods plays a role on individual expectations, but we can't be sure of the relative shares of each one on the median result. In any case, it is significant that the Monitor performs better under the RSME criterion, since it justifies its existence as a separate prediction tool.

The fact that the Monitor performs worse than FOCUS2 (always under the RMSE criterion in this particular sample) allows some possible interpretations. First, FOCUS2 incorporates potentially larger information set than both FOCUS1 and the Monitor, since it is produced in a later period than both. Part of this richer information can come from new data on other variables, including independently collected prices and unanticipated increases public utilities tariffs and administered prices, for example. This certainly plays a role on the revisions between FOCUS1 and FOCUS2, but another potential factor is the information of the Monitor itself, since at least part of the panel participants are subscribers to the Monitor, allowing them to incorporate this new information when surveyed during the following days.

As already mentioned, the ideal test for this conjecture would necessitate the disaggregated Focus data, not yet currently available to us. However, and indirect informal test can be provided by analyzing the correlations between these different measures of expectations. This is shown in Table 5.

Table 5 – Correlations between different predictions of the IPCA, for the sample between January 2006 and December 2012.

	MONITOR	FOCUS1	FOCUS2
MONITOR	1	0.921	0.949
FOCUS1	0.921	1	0.990
FOCUS2	0.949	0.990	1

It is interesting to note that although FOCUS1 and FOCUS2 are very highly correlated, the fact that this correlation is not perfect means that there are small adjustments during the week following the Monitor figure up to the point in time where the actual IPCA figure becomes known. As already mentioned, these adjustments can include any new data update, but since there are Monitor subscribers among the participants, and also the correlation is higher between FOCUS2 and the Monitor than between FOCUS1 and the Monitor, there is potentially an indication of the role played by the Monitor in these revisions. Even though the correlation measure does not indicate causality between variables, we know that the FOCUS2 measure is constructed after the Monitor information, meaning that while it is possible to imagine that the former is affected by the latter, the reverse is clearly not true.

Availability of the disaggregated microdata, under negotiation, will allow testing for a more robust evidence of the impact of the information provided by the Monitor on the formation of expectations. What we can conclude for now, is that despite particular differences in performance at individual months, the Monitor performs better than market median expectations for the period covered under the available sample.

Conclusion

The calculation of a daily index to monitor the evolution of the monthly inflation rate with the same methods, processes and conceptual accuracy of a conventional calculation is an unusual experience. The Inflation Monitor, developed and operated by the FGV, is undoubtedly an exponent in this category of indicator⁸. Peculiarities of the Brazilian economy, such as the long history of high inflation rates and the responsiveness of statistical institutes to the seeking for higher frequency data on the movement of prices, certainly favored the initiative.

The project required - and, in order to succeed, FGV achieved - greater efficiency in collecting and processing the information gathered. Last but not least from the perspective of a private organization, the project is financially sustainable, including generating a surplus for immediate reinvestment in process improvement and also in studies and research.

By the way, FGV is implementing a first job that fits this analytical line, derived from the widespread use of the Monitor. It is the investigation of the behavior of short-term inflation expectations. The initial hypothesis to be tested is that the increasing use of the Monitor by financial institutions, consulted by the Central Bank in the context of the system of inflation targets, allowed some degree of convergence of expectations. This result, if econometrically confirmed, would give the Monitor a relevance that transcends the private goals of the project. After all, convergent expectations require a less tight monetary policy.

The full version of the work, however, still depends on a more complete access to microdata files managed by the monetary authority, which meets the requirements of statistical confidentiality. Aware of the responsibility inherent to the proper handling of these microdata files, both institutions, the Central Bank and the FGV, are advancing safely, without skipping stages. Access to information and the conclusions arising from it are, therefore, only a matter of time.

⁸ An indicator that enjoys great popularity is the DAILY ONLINE PRICE INDEX, calculated under the scope of The Billion Prices Project, an academic project by MIT. This index uses only prices collected online, which leaves out a significant fraction of services.