Central Bank of Brazil's market expectations system: a tool for monetary policy[1]

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Abstract

This paper presents the Market Expectations System developed by the Central Bank of Brazil, an online framework that collects projections from more than a hundred professional forecasters about the main macroeconomic variables in Brazil. It highlights its history, characteristics, and procedures for inputting data in the system and its innovative character and importance as a tool for the monetary policy stance. Moreover, it brings the methodology for the best forecasters' rankings, an incentive for the surveyed institutions to provide accurate and timely forecasts, and raises some questions about the efficiency of the market in anticipating the evolution of the main macroeconomic variables, under the recent Brazilian experience.

Keywords: expectations, market, projections, inflation, targeting, economy, Brazil

JEL classification: E52

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1.   Introduction

Aiming at getting subsidies for its monetary policy decisions, the Central Bank of Brazil conducts a daily survey of market expectations for the evolution of the main Brazilian macroeconomic variables.

The market expectations survey started in May 1999. At that time, the Research Department of the Central Bank developed the studies and econometric models that would be fundamental for the inflation targeting regime, formally implemented in June 1999. Market expectations for inflation then showed a strong disparity, due to the uncertainty that followed the collapse of the foreign exchange anchor.[3]

On an inflation targeting regime, expectations are crucial for most of the forecast inflation models. Thus, the knowledge of the behavior of market expectations is a key factor for conducting monetary policy. For this reason, the Central Bank created, in April 1999, the Institutional Communication Group (GCI), that had as main attribution to monitor permanently economic agents' expectations.

Initially, around 50 financial institutions and consultancies used to be contacted and the Central Bank had replies by telephone, fac-simile or e-mail for the annual forecasts for the main price indices (IPCA, IGP-DI, IGP-M e IPA) and GDP growth. Afterwards the survey was sophisticated, not only for the higher number of surveyed institutions, but also for the consideration of other variables (other price indices, exchange rate, basic interest rate, fiscal data and BoP variables) and for getting forecasts on monthly and quarterly bases.

With the growing importance of monitoring expectations for the monetary policy, in November 2001 the Market Expectations System was created, mainly aiming to expedite the process of collection and to prevent errors in the information. The data started to be informed on-line, at any moment, by previously accredited institutions, with specific password for accessing the System. In March 2010, after a detailed process of revision and enhancement, the modular structure of the System was replaced by an integrated application, more resourceful, agile and safe, resulting in the present version of the Market Expectations System.

From the collected data, the system may calculate real time statistics, generating daily reports for the Monetary Policy Committee (Copom) members. Moreover, a weekly Market Readout is produced and made available for the public through the Central Bank webpage (in Portuguese and in English).

In order to foster the commitment of the surveyed institutions to update the projections on a regular basis and to reward their analytical work, the Central Bank elaborates rankings with the best forecasters, classifying the institutions based upon their accuracy in short, medium and long term. The medians of the variables forecasted by the most well ranked institutions are also published at the Market Readout.

In the next section, the main characteristics of the system are presented, such as the variables collected and the surveyed institutions, emphasizing the high impact that the weekly Focus-Market Readout, a summary of its statistics, has in the media. The third section briefly describes the main procedures for inputting data in the system. The fourth section brings the methodology for the best forecasters' rankings, an incentive for the surveyed institutions to provide accurate and timely forecasts. The fifth section raises some questions about the efficiency of the market in anticipating the evolution of the main macroeconomic variables, under the recent Brazilian experience, and analyses some of the

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[3]   For greater detail about the antecedents of the market expectations survey and the macroeconomic environment in the transition for the inflation targeting regime, see Bogdanski, Tombini and Werlang (2000).

results of the calculations using the system database, besides bringing some issues on the international recognition the System has achieved, followed by the conclusion.

2.   Presentation of the Market Expectations System

The Market Expectations System is an online tool, developed for the web, and accessed at www.bcb.gov.br/expectativa. This access is only permitted for Gerin (Investor Relations and Special Studies Department of the Brazilian Central Bank, that replaced the former GCI), as the system manager, and previously accredited institutions. Gerin reports to the Deputy Governor for Economic Policy. New institutions may be included in the survey under request by Gerin, which checks some basic information on the applicant´s profile, and provides to the newcomers specific logins and passwords. In principle, any entity (banks and other financial institutions, non-financial corporate, consultancies, class associations, universities, etc.) may ask for being included in the survey. As the survey is meant to be a professional forecasting survey, there must be an economist responsible for the economic projections.

Presently, around 120 logins are active in the system, mostly banks, brokers, asset managers, consultancies and other non-financial entities. There are also around 100 inactive logins that had already been on the survey in the past. Out of the universe of active logins, many update the forecasts at least twice a month for the IPCA (headline inflation). The system may be accessed at any moment, and there is not a pre-defined periodicity for the updates. However, data informed after 5:00 PM are considered in the calculation of the statistics of the next business day.

The system just considers data provided in the last 30 days. Thus, if an institution does not update its forecasts in 30 days, the system automatically disregards its projections when calculating the daily statistics. The objective of this filter is to avoid statistics influenced by old data, especially for variables with higher volatility. Thus, even if forecasts have not been modified by its models, in order to be considered valid, the providing institution shall confirm the data within 30 days.

The statistics generated by the system and published by the Central Bank are median, average, standard deviation, coefficient of variation, maximum and minimum. The median is the statistic more attentively monitored (including the recent graphic evolution) in the Focus-Market Readout, which is published every Monday, regularly at 8:30 AM, with data collected up to 5 pm of the previous Friday,[4] with high impact in the specialized media in Brazil.

The individual information in the Market Expectations System is confidential and just the members of the Copom and the managers of the system (Gerin staff) may get access to them. All the reports and series based on these data just consider consolidated data.

The Market Expectations System collects annual and monthly forecasts for the main price indices (IPCA, IPCA-15, INPC, IPC-Fipe, IGP-DI, IGP-M, IPA-DI, IPA-M), industrial output, exchange rate, and Selic rate, and annual forecasts for administered prices, variables of the BoP (external trade, current account balance and FDI) and fiscal results (primary result, nominal result and debt-to-GDP ratio). GDP growth forecasts are collected for the next 6 quarters and, similarly to other variables, for the next 5 calendar years. Table 1 summarizes the surveyed data.

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[4]   The use of median (and not the average or the mode) is justified by the asymmetry of the expectations distribution. For this regard, consult Bank of England (1999), pg 52.

Table 1

Market Expectations System – Summary of Surveyed Data

	Indicator	Projections
Price Indices	IPCA IPCA-15 INPC IPC-Fipe IGP-DI IGP-M IPA-DI IPA-M Industrial Output	18 monthly and 5 annual
Economic Activity	GDP GDP - Agriculture GDP - Industry GDP - Services	6 quarterly and 5 annual
Exchange and Selic Rates		18 monthly (end-of-period), 5 annual (average) and 5 annual (end-of-period)
Fiscal	Primary Result Nominal Result Public Sector Net Debt/GDP	
BoP	Exports Imports Trade Balance Current Account Balance FDI	5 annual

3.   Data Inputting

Projections made by accredited institutions may be provided to the Expectations System at any time. A specific website is formatted for registering up to 18 monthly forecasts for price indices, industrial output, Selic rate, exchange rate; up to 6 quarterly forecasts for the GDP growth and up to 5 annual results for these variables and exports, imports, trade balance, current account balance, net FDI (which shall include intercompany loans, deducted the respective amortizations), fiscal data, including expectations for primary result, nominal result and debt-to-GDP ratio (considering the consolidated public sector, including states, municipalities, the Central Bank, state-owned companies and the central government), and regulated prices.

As part of the solutions of internal consistence, the fields relative to annual forecasts for inflation, industrial production and GDP for the current year and the next are automatically calculated when the institution informs all monthly forecasts for the respective year, for the first two variables, and all quarterly forecasts for the respective year, for GDP. In this case, the system accumulates effective data already known and forecasts for the remaining months/quarters of the current year, saving the result as the annual forecast. If all the monthly/quarterly forecasts are not informed for the year, the annual forecast may be informed.

The surveyed institutions may access the data they provide, besides the calendar considered by the system, their position in the top 5 rankings, the indicators to be published, dates of reference[5] for top 5 variables, and the information regarding themselves, such as name of the institution, address and name of the chief-economist.

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[5]   Dates of reference are dates on which projections are used for top 5 calculations – see Section 4.4.

The historical series of all variables of the system **may be accessed by the general public** at https://www3.bcb.gov.br/expectativas/publico/en/serieestatisticas. The presented screen brings two boxes of options where the indicator (trade balance, BoP, fiscal, price indices, inflation for the next 12 months, inflation for the next 12 months – smoothed, Selic target rate, GDP, regulated prices, industrial output, exchange rate, top 5 indicators) and the statistic (average, median, standard deviation, coefficient of variation, maximum or minimum) may be chosen for the consult. Choosing an indicator leads to a box of options to choose periodicity (monthly or annual; quarterly or annual, for GDP) – for the inflation in the next 12 months and inflation in the next 12 months – smoothed, there is not this choice. Choosing a price index or inflation for the next 12 months leads to the possibility of choosing one or more price indices (IGP-DI, IGP-M, INPC, IPA-DI, IPA-M, IPCA, IPCA-15 and IPC-Fipe). Choosing GDP leads to the possibility of choosing one or more sectors in the supply side of the economy (agriculture, industry, services or total). Choosing top 5 indicators leads to the possibility of choosing one or more indicators for which the top 5 ranking is made (IGP-DI, IGP-M, IPCA, exchange rate and Selic target rate) and the modality (monthly short term, monthly medium term, and long term).

Other inputs must be informed: a) starting and end date of the series (WHEN the forecasts were informed), with a maximum range of two years, between January 2000 and the date of the most recent Focus-Market Readout; and b) the period FOR WHICH forecasts refer (not chosen for the inflation for the next 12 months and inflation for the next 12 months – smoothed) – if the chosen period exceeds the period when forecasts are available, only the available data will be presented. CSV and XLS files may be generated. If periods are long, horizontal and vertical rolling bars are presented to help. There are options for generating results in a format adequate for printing.

Statistics for the inflation for the next 12 months are based upon the set of institutions that have monthly forecasts for **all** twelve months ahead. Thus, even though some proximity is expected between the accumulated medians of the forecasts for monthly inflation of the next 12 months and the median of the inflation for the next 12 months, both values might be different, since the sets of institutions that are part of each of these groups for which the median is calculated (month 1, month 2, ... month 12) are distinct.

Additionally, the System calculates the smoothed inflation for the next 12 months, that may be also consulted, and whose methodology was originally published in the Inflation Report of June 2005 (http://www.bcb.gov.br/htms/relinf/ing/2005/06/ri200506b5i.pdf). The smoothed series has the advantage of clearly delineating the subjacent trend of the expectations, without the discontinuities of the original series, which occurred when a certain price index was published and the series started to incorporate a new month ahead replacing the month for which the effective index had been known. This methodology turns the series more stable, without interfering on its trend along the period between two succesive publications.

The period of calculation of the forecasts for the inflation for the next 12 months, published in the Focus-Market Readout, changes automatically when the monthly price index is known. In such occasions, the period advances a month in the calendar, with the month for which the index was published being taken off and the equivalent month of the next year being included. Thus, the series of forecasts for the inflation for the next 12 months presents typical steps (exactly in the days when the inflation indices are published), due to the difference between the forecasts for the month that is included and for the month that is excluded.

An alternative to minor the effect of the steps on the trend for the inflation for the next 12 months is, in each period between two successive publications, to add to the forecasts for 12 months the difference between the forecast for the 13th month ahead (that will be the next to be included in the trailing 12-month indicator) and the forecast for the inflation for the month that will be excluded of the trailing period, weighted by the number of days in the period, in each day. Thus, the smoothed forecast for the next 12 months will be:

$$E'_{12m}(d)=(((1+\underline{E_{12m}(d)})*((1+\underline{E_{m13}(d)})/(1+\underline{E_{m1}(d)}))^{(ndt/ndp)})-1)*100,$$
$$\phantom{E'_{12m}(d)=(((1+)}100100100$$

where, for the period between the publication of the most recent inflation index until the eve of the day of publication of the next inflation index, for each institution in the survey:

d: current day;

$E'_{12m}(d)$: smoothed forecast for inflation for the next 12 months;

$E_{12m}(d)$: forecast for inflation for the next 12 months;

ndp: total number of days in the period;

ndt: current number of days passed since the last publication;

$E_{m13}(d)$: forecast, in d, of inflation for the 13th month ahead;

$E_{m1}(d)$: forecast, in d, of inflation for the 1st month ahead.

   If there is a positive difference between the median/average of expectations for the 13th month ahead and the 1st month ahead, the smoothed expectations for the next 12 months will be positively changed, proportionally to the number of days in the period since the last publication of the index. As it gets closer to the next publication, there is more information (weighted) relative to the forecast for the month that will be included in the cumulated figure. The result is a smoothed series, with a clear trend, with no steps like in the original series.

4. Top 5 Rankings

Gerin recognizes the excellence and timeliness of the forecasts provided by the surveyed institutions through short-, medium- and long-term rankings. All rankings are made for IPCA, IGP-M, IGP-DI, Selic target rate and exchange rate.

4.1. Original Rankings

Top 5 rankings of short- and medium-term are released monthly. In the original short-term ranking, the accuracy of the projections is evaluated considering a 1-month lag to the release of the effective variable, in the last 6 months (Figure 1). The original medium-term ranking considers the average accuracy of projections in three consecutive periods of 4 months as compared to the effective results in three months – the reference month and the two previous months (Figure 2). The long-term ranking considers the accuracy of projections informed in 12 months for the annual variable released in the subsequent January (Figure 3). For the original rankings of short-, medium- and long-term, the statistics referring to the five best ranked institutions (or a few more, if there are ties) are available as historical series at the BCB webpage under the reference "top 5 institutions". The short- and medium-term rankings for the Selic Rate are released just for the months in which Copom meetings were held.
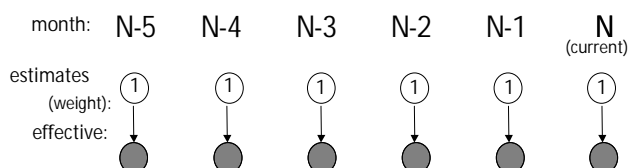

Figure 1

Original Short-Term Top 5
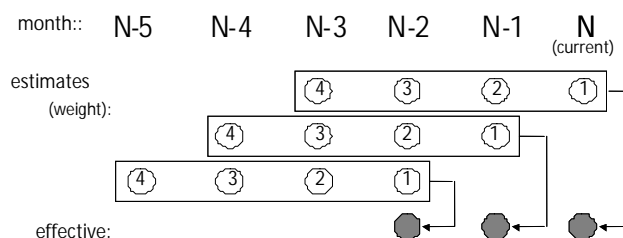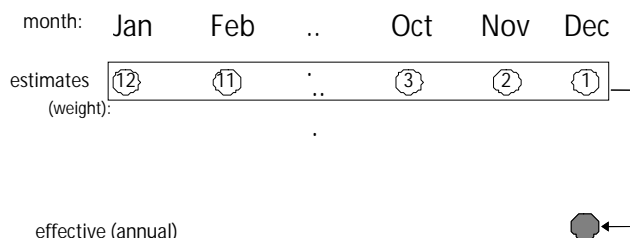
Figure 2

Original Medium-Term Top 5

Figure 3

Long-Term Top 5

4.2. Annual Rankings

Since January 2009, short- and medium-term annual rankings have also been annually released, in each January, considering, for each institution, a linear transformation of the deviations used for the original monthly calculations of short- and medium-term rankings, so that the institution with the lowest absolute monthly deviation in a specific ranking for a given variable in a given horizon gets 10 points; the institution with the highest absolute monthly deviation in the same ranking, for the same variable and the same horizon, gets zero point; and the other institutions get points interpolated between zero and 10. The final score, used to rank the participants in the annual rankings, is the average of the monthly scores for the civil year that had ended. To be considered in a ranking for a specific year, an institution must have been ranked in at least six monthly rankings in this year, for a given horizon (having started its projections, as a consequence, up to the last day of June of that year) and also: a) for the short-term, the deviations for the parcels of calculations for each monthly ranking are equal to the absolute average deviation of the participating institutions for each of the dates prior to the start of its projections, calculating which deviation should be attributed to this institution if it were included in the rankings of these months – the linear transformation for the new ranking follows the already mentioned standard; and b) for the medium-term, instead of the absolute average deviation, the maximum absolute deviation is used. Thus, these procedures are coherent with the calculations used for the monthly short- and medium-term top 5, as described in the section 4.5. Hence, for each of the 12 months (or 8 meetings, for the Selic rate), variable (IPCA, IGP-DI, IGP-M, Exchange Rate and Selic Rate) and horizon (short and medium), institutions will have scores in the 0-10 range, and the average of these scores for the year is the basis for the ranking. The intermediate calculations of the deviations and the average scores are always rounded to the fourth decimal place.

4.3.   Exclusion Criteria

Some criteria apply to all rankings, defined with the aim of imposing penalties to institutions that do not comply with minimum requisites of timeliness and transparency on updating their projections: in the calculation of a monthly ranking, the institutions that had neither confirmed nor updated, in the 30 days previous to the last date of reference (or on each of the two last dates of reference, for Selic and Exchange Rates-details in section 4.4), at least three monthly and one annual projection, are excluded from the ranking. As an example, in the short-term ranking for Exchange Rate in January 2007, released in February 2007, the institutions that did not have any valid projections in both dates of reference referring to January–Dec 29th, 2006 (last business day of the previous month) and Jan 15th, 2007, were not ranked. If the Market Expectations System identifies, for any institution, that there are no valid projections on the dates of reference, this institution does not participate in this ranking, for this variable. Valid projections for a date must be understood as projections confirmed or updated in the system in the previous 30 days.

4.4.   Dates of Reference

The dates of reference, for each variable, are:

- IPCA: last business day before the IPCA-15 release date;

- IGP-DI: last business day before the 2nd 10-day IGP-M release;

- IGP-M: last business day before the 1st 10-day IGP-M release;

- Exchange Rate: last business day in the previous month AND last business day equal to or before the 15th day of the current month;

- Selic Rate: last business day equal to or before the Wednesday of the week previous to the Copom meeting AND last business day equal to or before the Wednesday of the 4th week previous to the Copom meeting.

To be considered on a specific date of reference, projections must be included in the Market Expectations System up to 5pm on this day, Brasília time, with no exceptions. These dates are the ones considered for the top 5 ranking calculations.

4.5.   Penalties

All original rankings are based on equations that set penalties for each institution, considering the deviation of its projections from effective results of the variables: the lower the penalty, the better the ranking. For different horizons (short-, medium- and long-term), there are different lags between projections and releases of effective results (one, 1-to-4, and 1-to-12 months) and different weights for past projections.

For the monthly medium- and long-term rankings, the institutions with no valid projections in each date of reference are penalized on that date by getting the maximum absolute deviation among the other institutions. For the monthly short-term ranking, the penalty for missing information is the maximum absolute deviation if the institution had already been able, on the date of reference, to inform its projections to the system; if not, it will get the average absolute deviation.

For the Selic and Exchange Rates, with two dates of reference for each month/meeting, the penalties to be considered for each parcel in the equations will be the averages of the absolute deviations for the two dates of reference.

4.6. Equations for the Calculation of the Monthly Deviations

4.6.1. Short-Term

Institutions in the short-term ranking are ranked according to the value of $\psi^R ST$, as defined in Equation 1.

$$\psi^R ST = \sum_{t=N-5}^{N} \{(\text{avg. penalty})_{d_t} .(1 - j_{d_t}) + j_{d_t} .[(\text{max. penalty})_{d_t} .(1 - k_{d_t}) + |E_{d_t} \tau_t^R - \tau_t| k_{d_t}]\}/6 \quad (1),$$

where:

$\psi^R ST$ = penalty attributed to institution R;

t = month for which the deviation is calculated;

N= month referring to the last date of reference in the period;

d_t = date of reference of τ in the month t;

$E_{d_t} \tau_t^R$ = projection of the institution R that is valid on d_t for τ_t (for Exchange and Selic rates, there are two dates of reference);

τ_t = effective result of the variable τ in the month t;

$(\text{avg. penalty})_{d_t}$ = average absolute deviation of the projections valid on d_t, for τ_t, as compared to the effective result in the month t;

$(\text{max. penalty})_{d_t}$ = maximum absolute deviation of the projections valid on d_t, for τ_t, as compared to the effective result in the month t;

k_{d_t} = 0, when the institution has no valid projection on d_t;

       1, when the institution has valid projection on d_t;

j_{d_t} = 0, if d_t is previous to the day when the institution was able to inform its projections for τ to the System;

       1, if d_t is equal to or after the day when the institution was able to inform its projections for τ to the System.

4.6.2. Medium-Term

In the medium-term ranking, institutions are ranked according to the value of $\psi^R MT$, as defined in Equation 2.

$$\psi^R MT = \left\{ \sum_{t=N-3}^{N} (N - t + 1) . \sum_{w=1}^{3} [(\text{max. penalty})_{d_{t-w+1}} .(1 - k_{d_{t-w+1}}) + |E_{d_{t-w+1}} \tau_{N-w+1}^R - \tau_{N-w+1}| . k_{d_{t-w+1}}] \right\}/30 \quad (2),$$

where:

$\psi^R MT$ = penalty attributed to institution R;

t = month for which the deviation is calculated;

N= month referring to the last date of reference in the period;

w= group of projections for the same monthly indicator;

d_{t-w+1} = date of reference of τ in the month t-w+1;

$\mathrm{E}_{\mathrm{d}_{t-w+1}} \tau^R_{N-w+1}$ = projection of the institution R that is valid on d_{t-w+1} for τ_{N-w+1} (for Exchange and Selic rates, there are two dates of reference);

τ_{N-w+1} = effective result of the variable τ in the month *N-w+1*;

$(\max.\text{penalty})_{\mathrm{d}_{t-w+1}}$ = maximum absolute deviation of the projections valid on d_{t-w+1}, for τ_{N-w+1}, as compared to the effective result in the month;

$\mathrm{k}_{\mathrm{d}_{t-w+1}}$ = 0, when the institution has no valid projection on d_{t-w+1};

    1, when the institution has valid projection on d_{t-w+1}.

4.6.3. Long-Term

In the long-term ranking, institutions are ranked according to the value of $\psi^R LT$, as defined in Equation 3.

$$\psi^R LT = \sum_{t=N-11}^{N} (N-t+1).[(\max.\text{penalty})_{\mathrm{d}_t}.(1-\mathrm{k}_{\mathrm{d}_t}) + \left| \mathrm{E}_{\mathrm{d}_t} \tau^R - \tau \right|.\mathrm{k}_{\mathrm{d}_t}]/78 \tag{3},$$

where:

$\psi^R LT$ = penalty attributed to the institution *R*;

t = month for which the deviation is calculated;

N= month referring to the last date of reference in the period;

d_t = date of reference of τ in the month *t*;

$\mathrm{E}_{\mathrm{d}_t} \tau^R$ = projection of the institution *R* that is valid on d_t for τ (for Exchange and Selic rates, there are two dates of reference);

τ = effective annual result of the variable τ;

$(\max.\text{penalty})_{\mathrm{d}_t}$ = maximum absolute deviation of the projections valid on d_t, for τ, as compared to the effective result in the year;

$\mathrm{k}_{\mathrm{d}_t}$ = 0, when the institution has no valid projection on d_t;

    1, when the institution has valid projection on d_t.

4.7. Equations for the Calculation of the Annual Scores

4.7.1. Short-Term

Institutions in the annual short-term ranking are ranked based on the value of $\mathrm{NB}^R\mathrm{ST}$, as defined in Equation 4, for each variable τ:

$$NB^R ST = \sum_{m=1}^{12} \{\mathrm{Score}^R\mathrm{STm}\}/12 \tag{4},$$

where:

$\mathrm{NB}^R\mathrm{ST}$ = annual score attributed to the institution R for the short-term;

$$\text{Score}^R STm = 10 * (\psi^R STm - \psi STm \max)/(\psi STm \min - \psi STm \max) \tag{5},$$

and

ψ^R STm= penalty attributed to the institution R, for the month m, according to Equation 1 in 4.6.1;

ψ STmmax= maximum penalty of the institutions, for the month m, according to Equation 1 in 4.6.1;

ψ STmmin= minimum penalty of the institutions, for the month m, according to Equation 1 in 4.6.1.

4.7.2. *Medium-Term*

Institutions in the derivative medium-term ranking are ranked based on the value of $NB^R MT$, as defined in Equation 6, for each variable τ :

$$NB^R MT = \sum_{m=1}^{12}\{\text{Score}^R MTm\}/12 \tag{6},$$

where:

$NB^R MT$ = annual score attributed to the institution R for the medium-term;

$Score^R MTm = 10 * (\psi^R MTm - \psi MTm \max)/(\psi MTm \min - \psi MTm \max)$ (7), and

ψ^R MTm= penalty attributed to the institution R, for the month m, according to Equation 2 in 4.6.2;

ψ MTmmax= maximum penalty of the institutions, for the month m, according to Equation 2 in 4.6.2;

ψ MTmmin= minimum penalty of the institutions, for the month m, according to Equation 2 in 4.6.2.

5.   Evaluation of the Results

5.1.   Investigations with Gerin Database

Data collected by Gerin allow advances in the investigation about the process of expectations formation in the Brazilian economy. This is a topic that has received some attention with regard to the academic research in the Brazilian Central Bank. Among the papers in this direction, Alves (2001) tests the efficiency of market projections for the IPCA with data up to Q32000, concluding that errors are reduced up to two quarters ahead. The paper also presents a comparison between the forecast capacity of the structural model then used by the Central Bank *vis-à-vis* market expectations.[6]

Freitas *et al.* (2002) come to two important conclusions based on the econometric examination of the market expectations for Jan/2000 to June/2002: (i) inflation targets effectively anchored expectations in the period, contributing decisively for the inflation

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[6]   Partial update of this study, with data up to 2002, may be found in the Inflation Report of March, 2003.

control; and (ii) the monetary authority reacts to inflation expectations, conducting a forward-looking stance for the monetary policy.

A study held by Gerin, based upon the market expectations for the IPCA, collected between January 2006 and June 2012, shows that a significant parcel of the surveyed institutions has already been ranked as a top 5 best forecaster in this period – 72% as a short-term top 5 OR a medium-term top 5 (50% as a short-term top 5, and 64% as a medium-term top 5). Analyzing how good these institutions were at forecasting the IPCA in comparison to the whole universe of surveyed institutions, in the same period, shows that there is not a historical stability in the prevalence of one group over the other: there are periods in which the highest error comes from the aggregate group, as expected, but in other occasions the whole group has better forecasts than the top 5 institutions – see Graph 1.

Graph 1

**Monthly IPCA % p.m. – effective vs. projected (aggregate, top 5 s/t and top 5 m/t)**
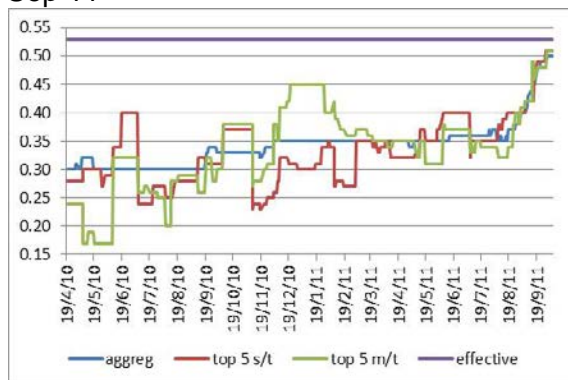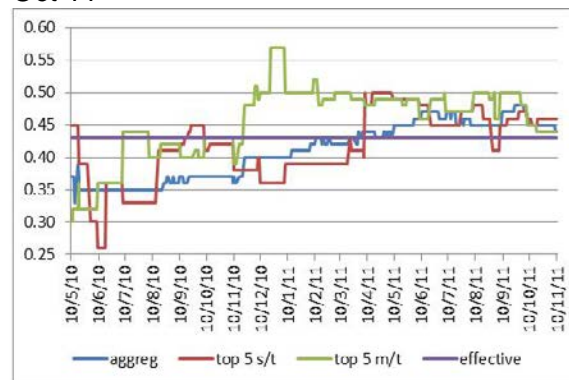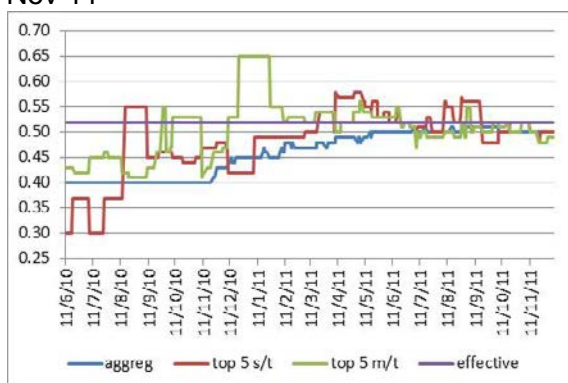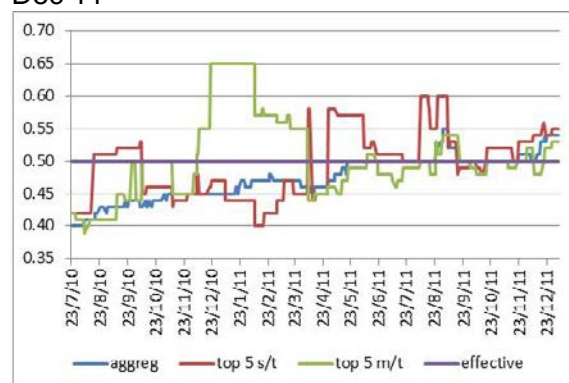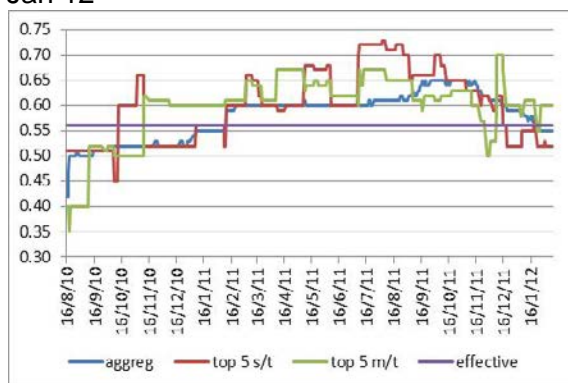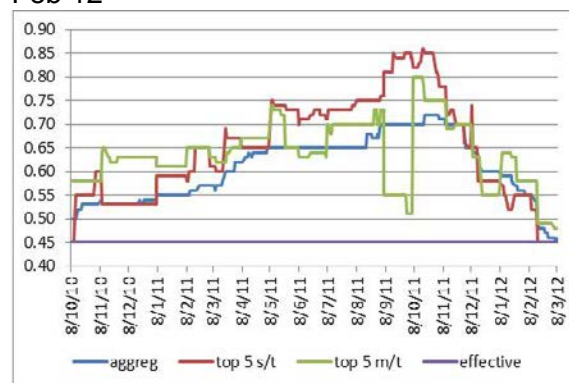
The 12-month trailing absolute errors[7] for the medians of aggregate, short- and medium-term top 5 groups in the most recent date of reference are shown in the first figure in Graph 2, for the period Mar/2011–Jun/2012. For different lags, shown in the following figures in the same graph and different points in time, aggregate, short-term and medium-term top5 have alternate best results, ratifying the previous conclusion of non-prevalence. Thus, it is not necessarily correct to affirm that those who forecasted better, based on a backward looking assessment, will have the best results, when forward looking is concerned.

Graph 2

12-Month trailing absolute error (percentage points, from Mar/11 through Jun/12)

date of reference   date of ref-1m   date of ref-2m   date of ref-3m
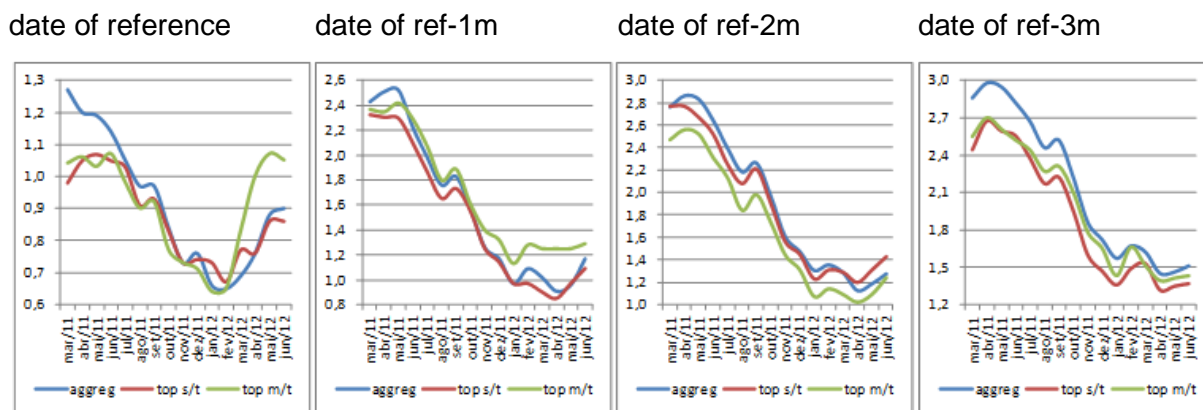
Another question regards a supposed incentive for extreme forecasts for the occasional benefit of performing better in the top 5 rankings, with some exclusiveness. Participants might have an incentive to inform projections in the tail of the respective frequency distribution, aiming at increasing their chances of being ranked as top 5, under the hypothesis that median projections would not differentiate from the group, even when guessing right, while extreme ones, if correct, would guarantee privileged positions in the ranking. But this is not supported by the practical results: Graph 3 shows the distributions of frequencies for the projections in the dates of reference from Mar/2009 through Feb/2012 and where the projections of the short-term top 5 best ranked institutions had fit in the curve, showing that the best ones rarely had their projections close to the tails.

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[7]   The absolute difference between projections on the dates of reference and effective IPCA.

Graph 3

Distribution of relative frequencies of projections for monthly IPCA in the date of reference with short-term top 5 institutions' projections positions
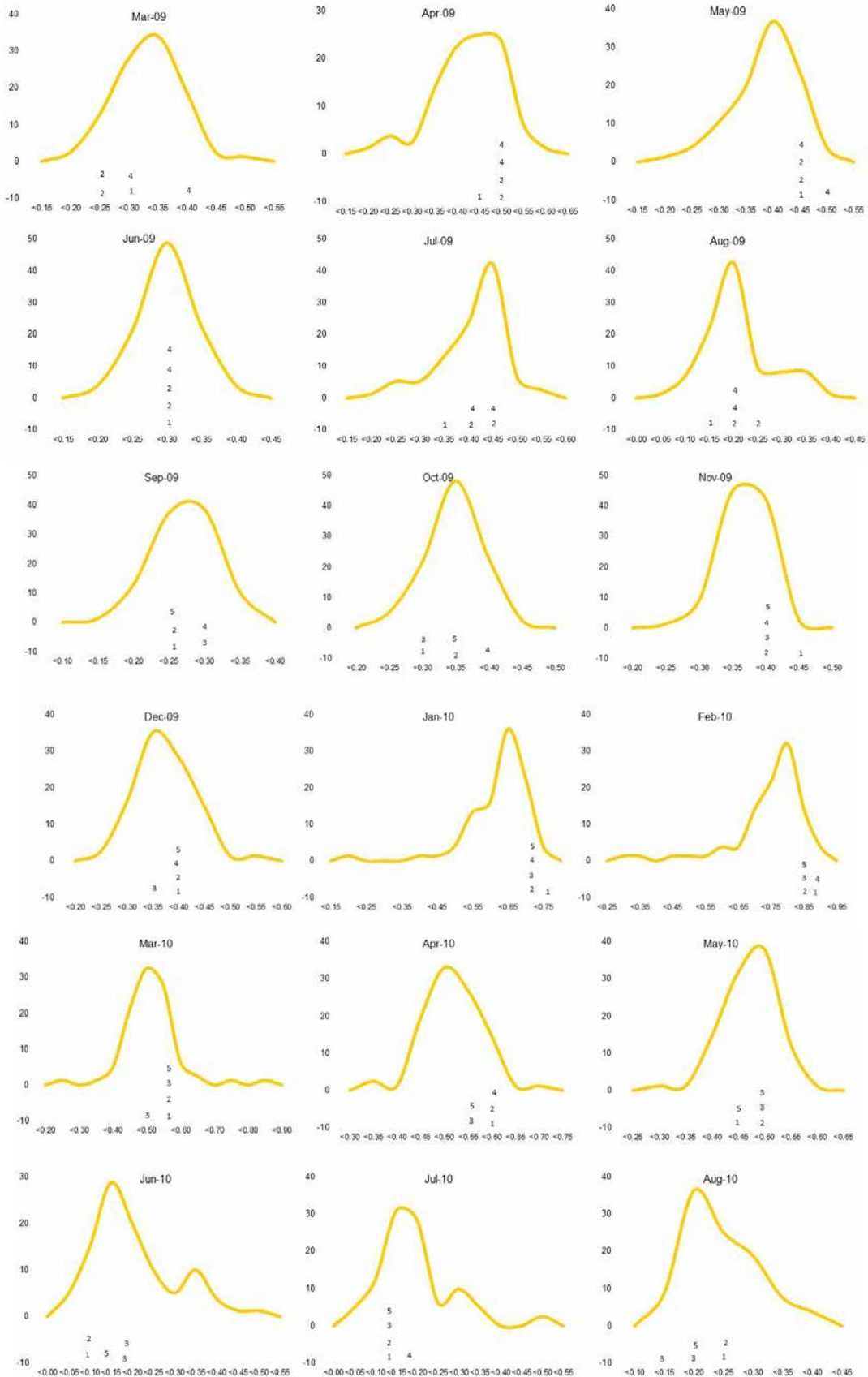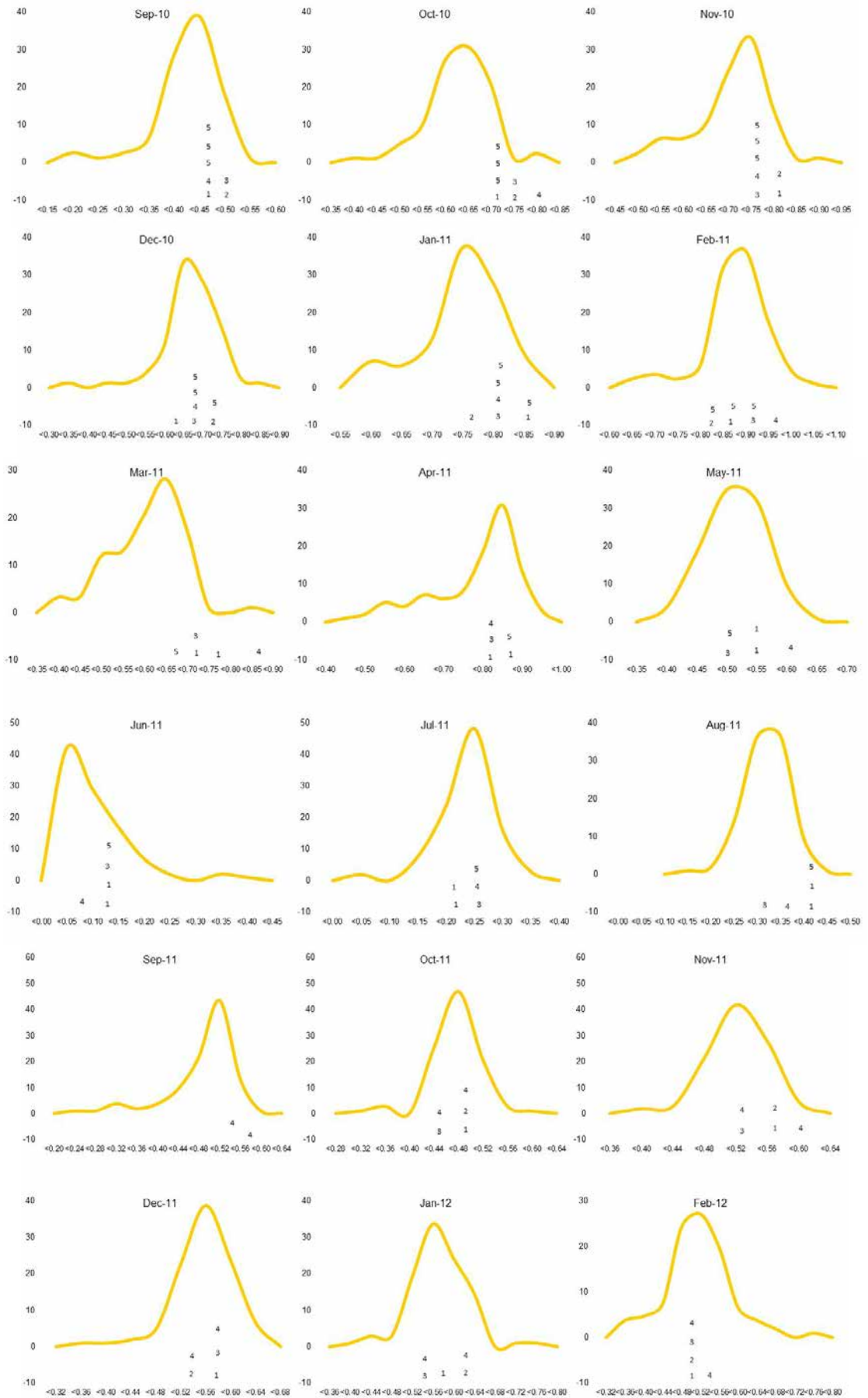
Confirming this result, Graph 4 shows the relation between position in the monthly short-term top 5 rankings (in the x-axis) and the average of the absolute standardized projections[8] (in the y-axis) in the six dates of reference for the respective short-term top 5 ranking, suggesting there is not a negative correlation. A similar study for the medium-term reached similar conclusions. Thus, better positions in the rankings did not mean extreme projections.
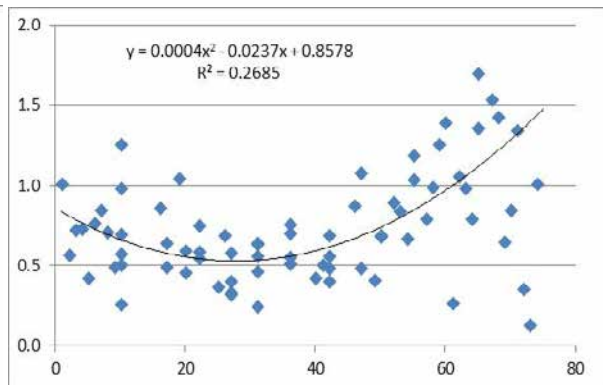
Graph 4

Relation between position in the short-term top 5 ranking (x-axis) and average standardized projections (y-axis)
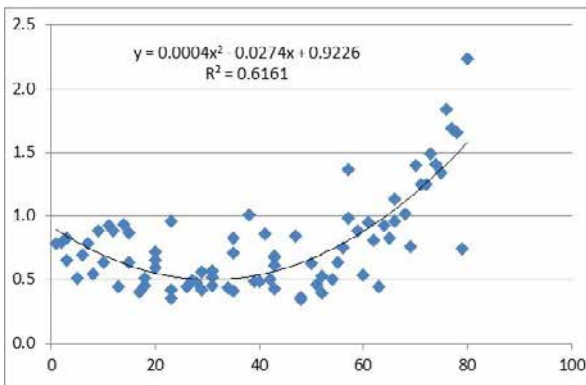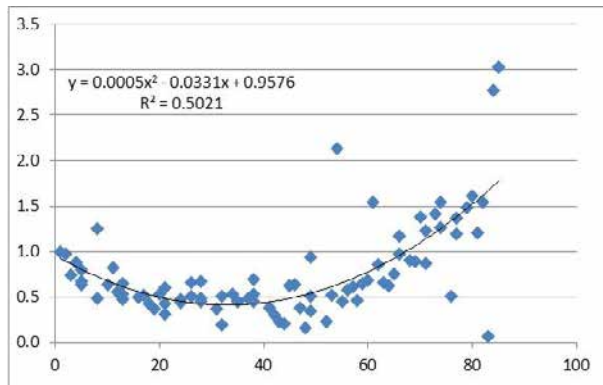
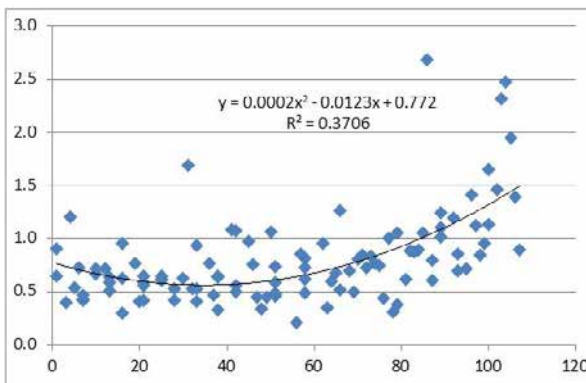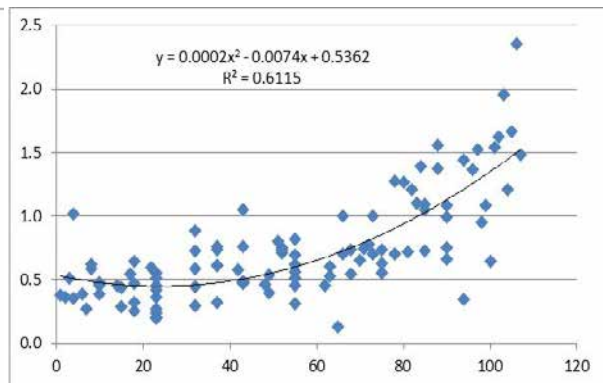Aug 09
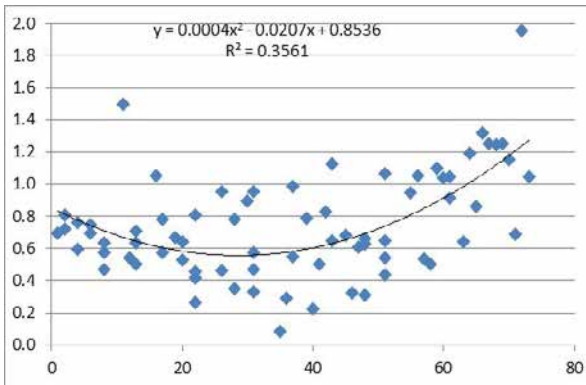
Feb 10

Aug 10

Feb 11

Aug 11

Feb 12

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[8]   Standardized projection = (original individual projection – average of the projections)/standard deviation of the projections

From that, distributions of frequencies of the effective monthly IPCA standardized by the respective average and standard deviation of individual projections considering lags from 0 to 3 were plotted, aiming at investigating the distance, in standard deviations, between effective IPCA and average projections (in the last date of reference and in the 3 previous dates of reference). The idea was to verify the chance of an extreme projection to guess correctly the effective result of IPCA and therefore permitting a small error in the top 5 ranking calculation. Graph 5 shows consolidated results: considering the period between Jan 06 through Feb 12, more than 80% of the effective IPCA monthly results were less than 2 standard deviations far from the average of the projections in the last date of reference; with one more month back, the percentage falls to 67%; one more month back and the percentage reaches 60% (this result was the same for date of reference – 2m and date of reference – 3m). Thus, there is a small probability of guessing the effective IPCA for extreme projections in the last date of reference (the most important date of reference concerning short-term top 5), but the chance increases for bigger lags (for those lags with more importance for the medium-term top 5 ranking: last date of reference through last date of reference – 3m). This effect is reinforced by the fact that there are bigger weights for bigger lags in the medium-term top 5 ranking.

Graph 5

Distribution of frequencies of the monthly IPCA standardized by market projections' average and standard deviation in 4 different dates of reference
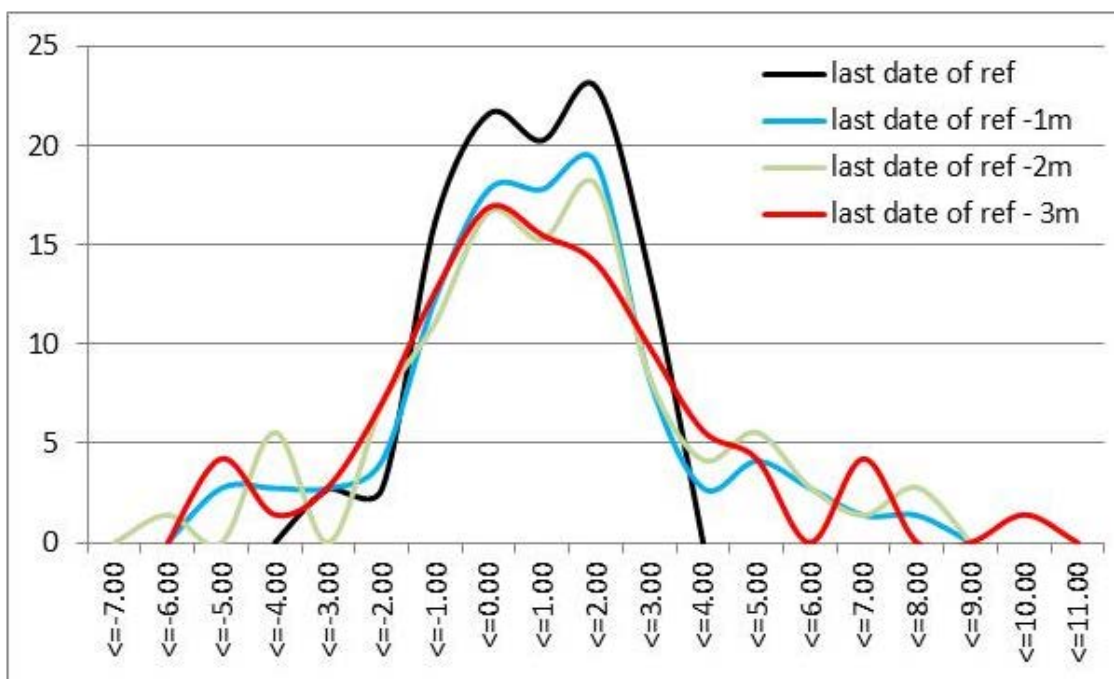

Graph 6 shows how the accumulated absolute error of the groups (aggregate, short-term top 5 and medium-term top 5) increases when the lag between the date of projection and the date of the effective release of the monthly IPCA increases. A 0 lag (in the x-axis) means the last date of reference – results are shown for the period Jan/06-Jun/12, for the last 36 months up to Jun/12 and for the last 12 months up to Jun/12. In the short-term, there is no prevalence of any group. Above the lag of 6 months, medium-term top 5 institutions are better forecasters (lower accumulate error). The increase in the accumulated absolute error from lag 0 to lag 1 is noticeable when larger periods are considered, showing how uncertainty grows for projections with more than 20 days before the effective result is known, which is the lag in the last date of reference.
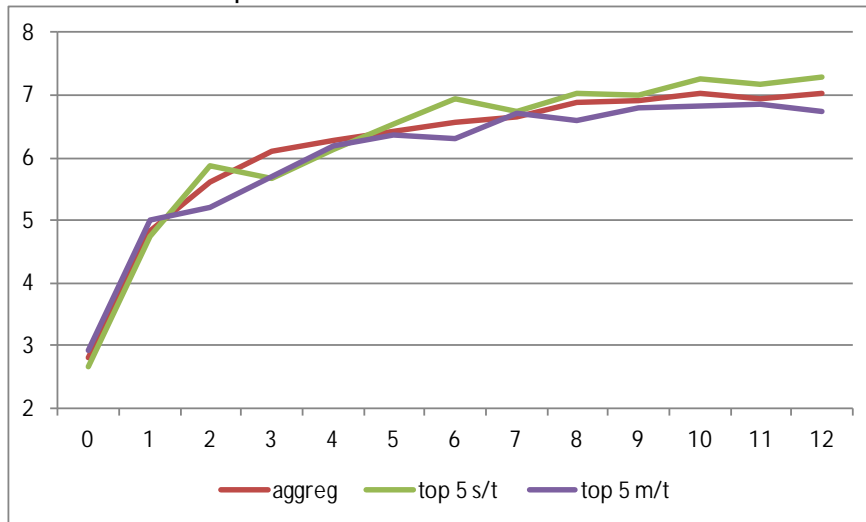
Graph 6

Accumulated Absolute Error vs. Lag between projection and effective result (in dates of reference)
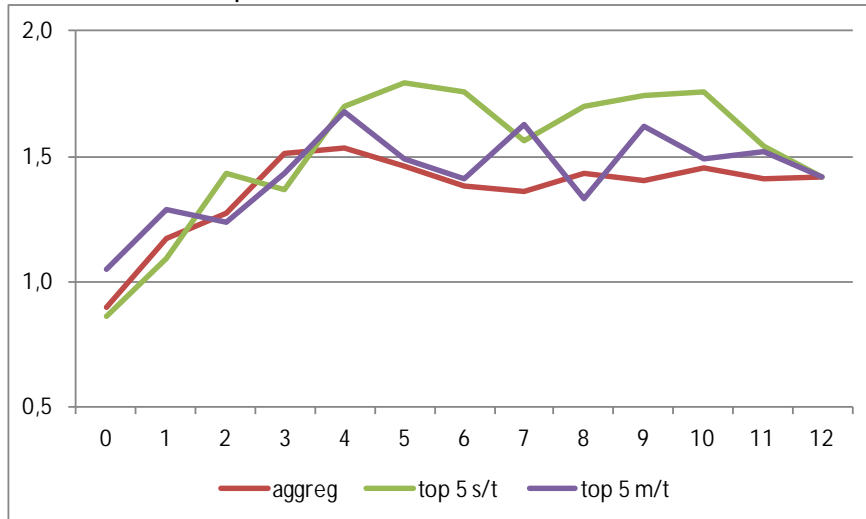
Jan 06–Jun 12
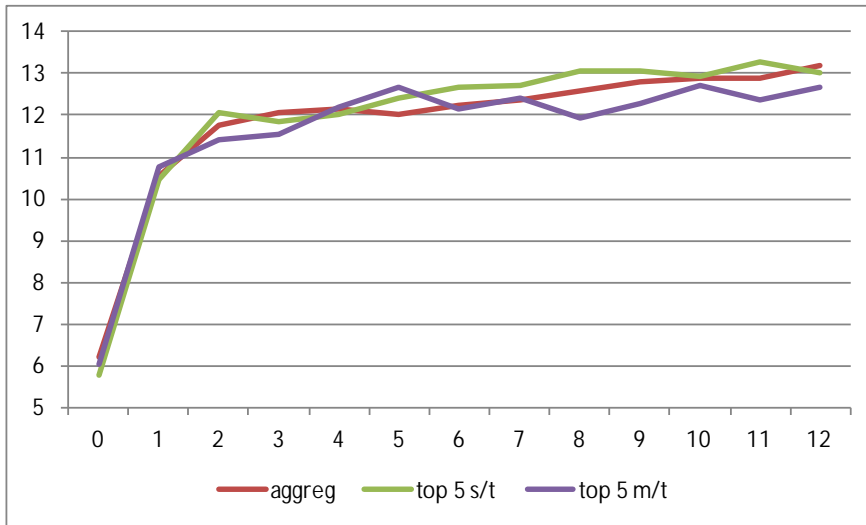
Last 36 months up to Jun 12

Last 12 months up to Jun 12

Another study shows that the frequency of forecasts updating is higher among top 5 institutions, vis-à-vis the other surveyed institutions during the six months previous to the release of each ranking. The top 5 institutions update their forecasts every 7 days, on average, while the remaining institutions do it every 12 days. The average number of updates is 13 institutions per day, reaching 50 in dates of reference.

Gerin, based on market expectations for 2011, verified the difficulty of projecting the result of economic variables in a longer time horizon. In the years 2010 and 2011, the uncertainty surrounding the international environment and its impact on the Brazilian economy, together with the unanticipated behavior of macroeconomic variables covered by the survey, resulted in the overestimation of the IGP-DI, the ratio of net public sector debt to GDP and the GDP growth for 2011, besides the target for the Selic rate (during most of the period), and the underestimation of the actual results of the exchange rate, trade balance and Foreign Direct Investment (FDI); the projections for the IPCA underestimated the actual result along 2010, converging to values close to the effective index in 2011. The commodities shock that hit the global economy in that period, with price increases over 50% in the domestic currency largely contributed to the higher forecasting error.

5.2. International Recognition

The Market Expectations System developed in Brazil was used as a model to implement similar tools in other countries, and foreign delegations, such as those from Argentina and China, had the opportunity of visiting Brazil and taking the Brazilian experience as a benchmark for developing their own mechanisms of following up market expectations.

The World Bank, with support from the Department for International Development of the United Kingdom, launched in September 2007 the Regional Award for Innovation in Statistics (the first in its category at the international level). The competition aims to reward the statistical programs and activities that stand out for their quality, usefulness in the design, implementation and evaluation of public policy priority for development, and that contain clear elements of innovation. The award gives prestige and recognition for major advances in statistical development which are often unknown. It offers the opportunity to increase visibility of the work of the winners at the national, regional and international levels. Program winners and finalists are published to a wide audience of experts and international donors, government officials, academics and representatives of other important statistical community. The experiences of the winning programs are included in a publication of the World Bank and its website for international distribution. All proposals that meet the basic requirements of the award are part of a virtual inventory of good practices in the statistical development of the region. The Market Expectation System developed by BCB participated in the Second Regional Award for Innovation Statistics, which received over 170 entries by public and private entities from 26 countries in Latin America and the Caribbean. Entries closed on February 15th, 2010. Approximately 40 programs / activities regarding statistics were selected to enter the second stage of the competition, which consisted of completing a report with more detailed information about the activities, products and importance of statistical programs and the availability of an optional Internet video with explanation about the activity entered. This stage had the participation of institutions from Argentina, Brazil, Chile, Colombia, Costa Rica, Guatemala, Honduras, Trinidad & Tobago, Mexico, Panama, Paraguay, Peru, Dominican Republic, Saint Lucia and Uruguay. The second phase of the contest ended on May 7th, 2010, and 16 statistical programs were selected as finalists to attend the awards ceremony in Washington on May 20th, 2010. The Market Expectations System, representing the Central Bank of Brazil, won second place in the award, and received the Certificate of Innovation Statistics from the World Bank. The statistical programs and activities were assessed by the World Bank, IBRD, IDB, and Eurostaat National Statistics Institute of Spain.

6. Conclusion

The Market Expectations System developed by the Central Bank of Brazil is almost a unique tool. It gives valuable information for the monetary policy decision by authorities in Brazil that would not be so readily and comprehensively known from other sources. Statistics generated from this database are inputs for the inflation forecasting models developed by the Central Bank of Brazil. It is transparent and the online access to weekly updated information provides an important tool for any user that might be interested in knowing what the market expects for the main economic variables in Brazil.

The top 5 rankings stimulate the accuracy and timeliness of forecasts, and many studies may be done with the data collected by this System. It is important to know that those that had performed better as forecasters in the past do not guarantee the best performances in the future.

Many other studies may be developed based on the Expectations database. For instance, based on market expectations for 2011, Gerin showed the difficulty of projecting the result of economic variables in a longer time horizon. In the years 2010 and 2011, the uncertainty surrounding the international environment and its impact on the Brazilian economy, together with the unanticipated behavior of macroeconomic variables covered by the survey, resulted in the overestimation of the IGP-DI, the ratio of net public sector debt to GDP and the GDP growth for 2011, besides the target for the Selic rate (during most of the period), and the underestimation of the actual results of the exchange rate, trade balance and Foreign Direct Investment (FDI); the projections for the IPCA underestimated the actual result along 2010, converging to values close to the effective index in 2011. The commodities shock that hit the global economy in that period, with price increases over 50% in the domestic currency largely contributed to the higher forecasting error.

Therefore, along with other instruments – like inflation break-even rates extracted from financial assets, the information collected by the Market Expectations System provides the monetary policy with an online assessment of the expectations, which is a relevant aspect required by the inflation targeting framework. This is the great contribution of the market expectations survey: to know on a real-time basis the market sentiment for the main macroeconomic variables, providing a key input for the monetary policy decision.

However, there are still many open questions regarding the expectations formation in the Brazilian economy. For instance, how are expectations for the exchange rate formed and how do they interact with inflation expectations? Regarding expectations for the Selic rate, to what extent the market anticipates economic policy responses to adverse shocks? How are expectations for GDP growth formed? What are the factors that explain the inflation expectations dispersion? Are there any biases in the participants' forecasts? Summarizing, there is a vast field to be researched, enriched and deepened using data generated by the Brazilian Central Bank's Market Expectations System.

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