Session 7

Surveys of economics forecasts

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Buenos Aires

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Market Expectations Survey (REM)
Central Bank of Argentina

Francisco Gismondi[1]

Expectations regarding the development of macroeconomic variables play a fundamental role in the consumption and investment decisions of economic agents and in the handling of monetary policy by Central Banks. Because such expectations are not directly observable, they must be evaluated implicitly via financial asset prices, or they must be determined by means of surveys directed at economists, investors and consumers, among others.

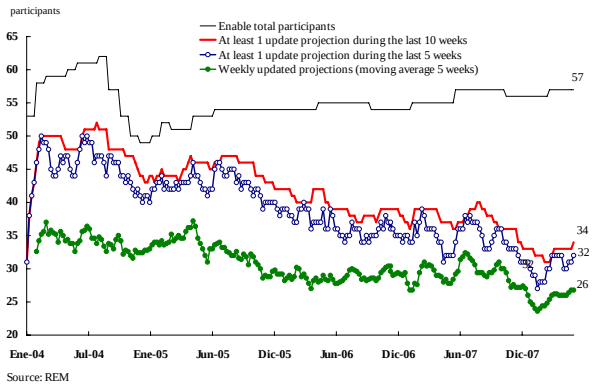
In this area, in January 2004 the Central Bank of Argentina (BCRA) launched its Market Expectations Survey (REM), to be able to count of the widest possible range of information for its monetary policy management, determine and communicate the market consensus, and provide the general public with a macroeconomic framework of reference. The REM consists of a continuous poll that surveys forecasts made by economists and domestic and international economists on a set of variables that reflect the current macroeconomic and financial situation.

The indicators surveyed have been specifically selected to summarize and determine short and medium-term macroeconomic and financial performance. For short-term monitoring, two-month forecasts are surveyed, while for a medium-term scenario, quarterly and annual projections are surveyed (two quarters/two years). Variables are classified according to the sector of the economy they describe: four price variables, seven economic activity variables, three external sector variables, two public finance variables and nine monetary and financial indicators.

Participation in the REM is entirely voluntary, and is open to all those institutions that provide robust estimates on a regular basis and offer recognized experience in the monitoring of the local context (such as commercial and investment banks, brokers, economic consultants, foundations, study centers, universities, etc.). Although the number of active participants has declined since the survey first began,[2] the selection now includes those respondents that update their forecasts with greater frequency, so that the representative nature of the data has not been affected (see Charts Nos. 1 and 2).

Chart 1

Level of participation



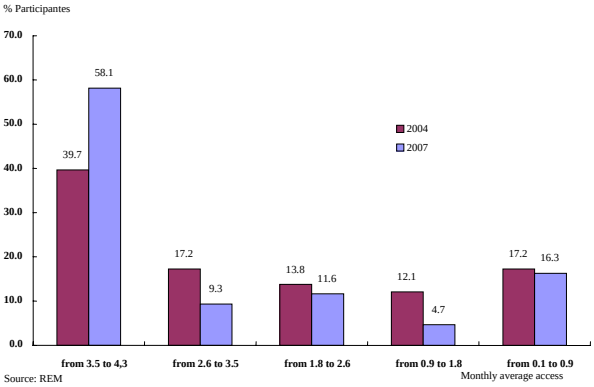
Source: REM

[1] Senior Manager of Short-term Macroeconomic Issues at the Central Bank of Argentina.

[2] Participants who recorded at least one forecast in any of the last ten weeks.

Chart 2

Monthly average access



Source: REM

The gathering of the forecasts takes place on a special secure Internet site created by the Central Bank for the purpose. Respondents gain access to this portal with a user name assigned to them by the Bank and a password chosen by each participant. The survey administrators are at no time aware of participant passwords, and they do not have write access to the original databases with the individual forecasts. The information is handled by an IT application that calculates all the statistical aggregates and rankings automatically, to ensure the transparency of the information.

Participants use this site to upload their forecasts (from Mondays to Wednesdays, 24 hours a day, every week), updating their contact details and making queries (results, rankings, series). Respondents can enter the site as often as they like during the loading period to inform new forecasts or modify those loaded previously. On Wednesday at midnight the loading window is closed and the data valid at that moment is registered.

If a participant does not update a variable forecast for any period during the week, account will be taken of the last variable reported in previous periods for the purpose of calculating the statistical aggregates and the rankings, as long as that participant has posted at least one forecast in the past ten weeks. This means that in order to preserve the quality of the statistical annexes, if a participant does not enter estimates for a period of ten consecutive weeks, it is presumed that its estimates are out-of-date, and that they have therefore lost validity.

As the individual estimates possess commercial and reputational value for the respondents, and bearing in mind that publication of individual forecasts could lead to a bias towards the central values of each distribution, the Central Bank preserves and guarantees the confidentiality of the data submitted by each participant. To ensure reserve in relation to this data, statistical aggregates are published, and only those directly responsible for the administration of the system have access to the individual forecasts. In addition, participants are given the opportunity to enter into a Confidentiality Agreement at the time of joining the survey.

With the aim of generating the correct incentives, a ranking is published for each of the variables surveyed that lists participants according to the deviation of their forecasts compared with actual results for the different variables. The existence of these rankings, together with the commitment not to publish individual forecasts, encourages constant forecast updating and limits bias towards the central values of the distribution. These rankings are published monthly on the Central Bank's public Internet site, as from the sixth month following the implementation of the Survey. In addition, those taking part benefit from other incentives, such as early access to results, a monthly report exclusively prepared for REM respondents containing additional information, and access to statistical series.

As to policy on publication, REM participants are provided a monthly document with detailed information on the distribution and evolution of forecasts. On the same day that the National Institute for Statistics and Census (INDEC) publishes the Consumer Price Index for Greater Buenos Aires (IPC GBA), the main results are published on the Central Bank's Internet page for the information of the general public.

The Central Bank has in the past made changes to the methodology to adapt the survey to the existing macroeconomic context and comply with technical requirements. New variables have been added to the survey, endowing it with greater flexibility. A further methodological review is being prepared that will again increase the number of variables and will make new statistical aggregates available to all participants.

Recently the Economic Research sector of the Central Bank published a working paper with the Bayesian averages calculation methodology for the REM forecasts, as a way of obtaining aggregate information with greater weight being granted to those participants with fewer historical errors. Such Bayesian averages are better predictors of real data than medians and averages, and are quicker to reflect any change in expectation trends. An analysis is currently being carried out as to whether the Macroeconomic Analysis sector should release these Bayesian forecast averages in addition to the statistics already being published on a regular basis, an indication of the coordination that exists between the various areas of the Institution, which would also improve the quality of the information generated by the REM. The document can be accessed via the following link: http://www.bcra.gov.ar/pdfs/investigaciones/REMBayesiano.pdf.

Summary: "A Bayesian method of forecast averaging for models known only by their historic outputs: an application to the BCRA's REM."[1]

Pedro Elosegui[2], Francisco Lepone[3] and George McCandless[4]

Similar to other Central Banks, the BCRA periodically publishes a Relevamiento de Expectativas de Mercado (REM) which summarizes short and medium term macroeconomic forecasts and projections of the group of economic analysts and consultants who volunteer to participate in the program. In part to protect the confidential nature of the forecasts that the analysts provide to the central bank, only a few principal statistics of the forecast sample are published. These statistics can provide the public and the central bank authorities with relevant information on the professional consensus of the process of important macroeconomic variables. This information can be useful for making decisions on monetary and economic policy as well as for private individuals making their own business and consumption decisions.

The short and medium term variables that are surveyed by the REM can be grouped in five categories: price indices, financial and monetary variables, indicators of economic activity, international trade and exchange rates, and the central government's budget. The short-term forecasts are taken every month and involve projections one and two months ahead. The medium term variables are quarterly or yearly, again with forecasts for two periods. Nominal GDP and the CPI are also published as end of the year forecasts. The internet page of the BCRA publishes the principal statistics of the sample, including the means, medians, and standard deviations for each variable. In addition, the BCRA periodically publishes the names for the firms that produced the three top forecasts in each category.

The present summary introduced a methodology developed to calculate a Bayesian average of the forecasts of the REM. Such a forecast would complement the information already provided to the public. In particular, the calculation of a Bayesian average would permit weighting the various forecasts based on the history of the underlying models and their relative forecasting success. The object is to have a weighted forecast that should be able to predict better than the median, which is currently used.

Crucial to the potential success of a Bayesian averaging methodology is the assumption that some forecasting firms have better underlying models than others. If this assumption holds, an averaging method that puts higher weights on the predictions of those forecasters who have done best in the past will be able to produce a better aggregate forecast.

The problem is how to determine these weights. We do not have access to the models, the participants in the REM only provide the BCRA with their predictions. In addition, the maximum amount of observations is relatively small, less than 30 data points and the sample is not balanced (although balanced subsets exist and can be extracted from the data).

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1 Working Paper 2006-7 - BCRA. Available at www.bcra.gov.ar.

2 Deputy Head of the Economic Research Department at the Central Bank of Argentina; pelosegui@bcra.gov.ar.

3 Economic Research Department of the Central Bank of Argentina.

4 Economic Research Department of the Central Bank of Argentina.

Bayesian techniques provide a method for using the data to calculate weights for the aggregate forecast and, potentially, for using additional (prior) information for finding those weights. Also, a correction factor has been developed to solve the missing observation problem.

The methodology assume that the forecast errors have a likelihood with a normal distribution of zero mean. The variance of this normal distribution is important in determining how much each firm contributes to the aggregate forecast. If the variance is too low then only one firm is selected; if, however, the variance is too large, then the method effectively amounts to taking the simple average of all firms. The value for the variance of this likelihood function is chosen so as to minimize the in-sample aggregate forecast error.

This paper broadly describes the details of the methodology, while the correction factor and the matlab code is available upon request. It also includes an application that illustrates the benefits of the Bayesian averaging method, relying on a generated data set of simple artificial predictions. This in turn used to compare the Bayesian method with five other methods usually employed to combine forecasts. The other methods used are simple average of all models, simple average of the top five models, the direct choice of the best model, the median of the forecasts distribution and a “method of pooling” average.

In the example, while simple arithmetic and min-variance forecasts have errors of ~8.8% and ~10.8% respectively, the Bayesian forecast is exact. Also, in order to compare the relative efficiency of the six methods, a test using ten thousand independent forecasting exercises was performed. The results showed that 71.1% of the cases the Bayesian averaging method gave the best forecast, the best model method ranked first 11.6% of the times, the min-variance averaging was first 5.4% of the times, the top 5 arithmetic averaging 4.9% of the times, the median method 4.0% of the times, and the simple arithmetic averaging the remaining 3.0%.

The implementation of the method on real data sets taken from REM was done taking the forecast series of one and two month ahead monthly inflation from February 2004 to March 2006. It should be noted that the history of forecasts is relatively short, between 26 and 27 data points. The total number of participants is formally 65, but only a fraction of them has consistently participated in all the periods (21 for one-month-ahead monthly inflation and 12 for two-month-ahead monthly inflation). The method, as discussed above, assumes a complete set of data. For incomplete samples some technicalities arise that make the computation of Bayesian weights more cumbersome, since a correction factor is needed. Analyzing results corresponding to complete samples, it is found that in all cases but one, Bayesian averaging gives the best answer to the inflation realized two months later. But what is more remarkable, Bayesian averaging proves to be very good at identifying a change in trend. As can be seen in the table below, the November-2005 and February-2006 periods illustrate this ability. In the first case, general expectations were well bellow (~0.5%) the realized value (~1.2%), but the Bayesian forecast gave a value of 1.0%. In the second case, the opposite happened: expectations were above the realized value and the Bayesian methodology partially corrected the misperception.

Survey/month	real-value	Bayesian avg	Median	Arithmetic avg
Oct-2005	0.8%	0.75%	0.7%	0.69%
Nov-2005	1.2%	1.0%	0.5%	0.583%
Dec-2005	1.1%	0.95%	0.95%	0.95%
Jan-2006	1.3%	1.285%	1.35%	1.275%
Feb-2006	0.4%	0.8%	1.0%	1.03%
March-2006	1.2%	1.208%	1.25%	1.208%

In conclusion, this method produces a forecast that is statistically superior to five other commonly used methods of producing aggregate forecasts. Bayesian averaging is a general methodology that can be applied for the purpose of averageing different forecasting methods. Its application to the to the BCRA's REM data set its been quite interesting, in the sense that, even with the short sample, the Bayesian aggregate forecasts dominate the median and arithmetic average. Since the method is able to pick out those REM forecasters who seem to have the best underlying models, it is clearly superior at capturing turning points. Given these desirable features the BCRA is planning to apply the methodology as an additional statistic to the ones currently published.

The Economic Expectations Survey (EES) of the Central Bank of Chile

Macarena García A.[1]

I. Introduction

The Organic Law of the Central Bank of Chile (CBC) establishes two objectives: "to pursue the stability of the currency and the normal functioning of domestic and external payments." The CBC's concern for price stability has translated into the application of an inflation targeting monetary approach. Even though since 1990 the CBC has implemented explicit inflation targets, since 2001 the target is to maintain the annual inflation of the consumer price index (CPI) at 3%. Operationally, the CBC conducts its monetary policy so as to keep expected inflation at 3% in a two years horizon. This commitment gives direction to economic agents' expectations and makes the center of the target range the nominal anchor of the economy. In this context, information about short- and medium-term inflation expected by economic agents is fundamental for the execution and effectiveness of monetary policy, requiring tools for constant monitoring. The Economic Expectations Survey (EES) is one of such tools, and has been carried out every month since February 2000. In this note, I tried to describe the principal characteristics and challenges of the EES, that has been arisen during these years.

II. EES characteristics

Some characteristics are:

The EES is a monthly survey of selected academics, consultants, and executives or advisors from financial institutions and corporations, mostly domestic (55). The selection criteria of the sample is market participation or influence. Although the survey participation is voluntary, nearly 68% of the sample population responds. The names of the participants are not disclosed. Survey questions deal with expected value of some macroeconomic variables at specific horizons. These macroeconomic variables are: inflation, the monetary policy rate, the five-year nominal and real interest rate of CBC notes, the bilateral exchange rate, monthly economic activity, and quarterly and annual GDP. Only the median and the deciles 1 and 9 are uploaded onto the Bank's website the day after the survey is closed.

The results of the EES are used in many different ways by the CBC, especially in those issues related to Monetary Policy. Some of the uses include: comparing inflation and GDP projections with other market expectations in order to measure the market climate; to identify whether the private inflation expectations are anchored or not; to study the accuracy and stability of the inflation forecasts for Chile;[2] and the derivation of the Monetary Policy Rate (MPR) path expected by the market. The graph below shows the MPR path deduced from the market expectations of May 2009.

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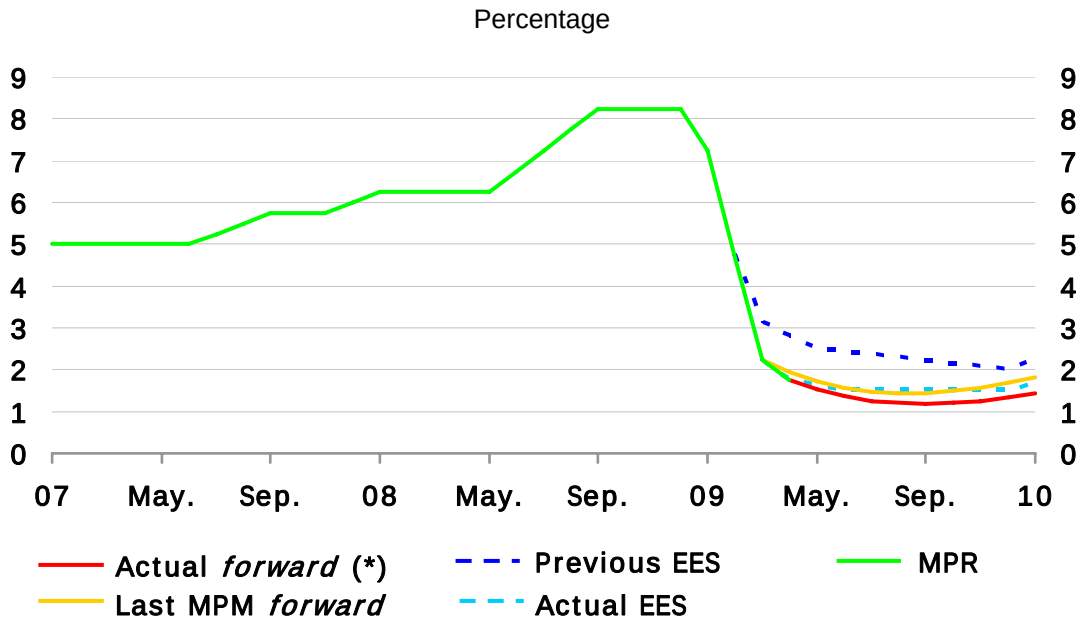
[1] Senior Economist, Macroeconomic Analysis Area at the Central Bank of Chile.

[2] One of these studies is Pincheira, Pablo and Álvaro García. "En Búsqueda de un Buen Benchmark Predictivo". Working papers, Central Bank of Chile. April 2009.

Market monetary policy rate expectations in May 2009



Source: Central Bank of Chile.

III. Challenges

Throughout the years, several issues relating with the EES's performance have arisen, including:

a) The definition of the survey's objective, like projecting inflation or just measuring the economic climate.

b) The criteria for participants' selection in order to generate a representative sample. Also the periodicity of the sample renewal is an important issue.

c) The forecasting ability of the information contained in the survey, or any other information that can be extracted.

d) The macroeconomic consistency of the participants' projections and their over- or under-reaction to different shocks.

e) The methodology used in the processing, regarding efficient use of time and output maximization.

f) The correct outputs, adequate to CBC needs and comparable for international uses (median, average, standard deviation, probabilities, etc.).

g) Ways to avoid abstention, due to the inexistence of enforcement tools in order to guarantee private respondents to send information.

h) Degree of understanding of the questions, which determines the quality of the answers.

i) The definition of the appropriate publication strategy. This means disclosure of each answer, with or without the identities.

In order to solve these issues, international experiences are very relevant because they have answered some of these questions. But one must keep in mind that the idiosyncrasy of each country is determinant in addressing these challenges.

IV. Conclusion

The main conclusion at the workshop was, in my opinion, the common challenges that the different surveys have across countries. So, every discussion than can be made, that includes different experiences will be very helpful in ensuring a better survey, and, ultimately, a better macroeconomic policy.

Quarterly surveys of economic expectations in Colombia

Héctor Zárate[1]

1. Introduction

The objective of the survey of economic expectations is to ascertain firms' perceptions of current and expected developments, over the very short term, for the main macroeconomic variables of the Colombian economy. This information gives the decision maker signals about the future level of those variables, which in turn could suggest modifications in the economic policy. The surveys seek to know the formation mechanism of expectations of economic agents and help to identify the transmission channels of monetary policy. Additionally from this brief introduction, in this note we briefly describe the main methodological issues of the survey and portray some of the results.

Contents of the survey: The questionnaire is divided into five categories explained below:

- **Prices and wage expectations:** in this section we are seeking to get a measure of the reliability, among economic agents, of the annual inflation target set by the central bank board. We also ask for annual inflation expectations over three, six, nine and twelve month horizons. Finally, the firm´s expectation of wage rises is investigated.
- **Monetary and credit conditions:** the questions in this section designed to find out about the perception of liquidity and credit availability that the economic agents have at the survey´s time. Moreover, the expected evolution of liquidity and credit for the coming six months is addressed.
- **Interest rates and devaluation:** in this section we ask about the expected level of the interest rate and the exchange rate, three, six and twelve months ahead. The benchmark interest rate used as a reference is the 90-day-DTF[2] and for the exchange rate the benchmark is the peso-dollar rate. Range intervals for both variables should be set by the respondents.
- **Economic activity and employment:** In this section, the economic agents answer questions about their expectations for GDP growth for both the current and next year. They also inform us about the plans to change the firm´s staffing levels for the coming six and twelve months.
- **Survey control questions:** we ask for information related to the reliability of the survey and the respondent´s identification.

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[1] This paper is a summary of the presentation at the IFC workshop "Statistics at the central bank", Buenos Aires, December 2007. This note is mainly based on an internal Newsletter at the central bank "Reportes del Emisor" 13, 2000. However, the views expressed in this paper are solely those of the author and he is responsible for any remaining errors. Correspondence author: hzaratso@banrep.gov.co. Head of Statistics section at Economic Studies of the Banco de la República and titular professor at Statistics Department at Universidad Nacional de Colombia.

[2] The DTF rate is a deposit rate offered by banks to their clients on their 90-day CDs.

Sectors of the economy surveyed: six economic sectors were chosen according to their importance for economic activity.

- Industry and mining
- Financial intermediation
- Major retailers
- Transport and communications
- Academics and economic consultants
- Trade unions

2. Sampling basis

The survey has been carried out by the Banco de la República since the first quarter of 2000.[3] The questionnaire combines both qualitative and quantitative questions that help the administrator of the survey to guarantee its coherence and allow the identification of additional variables. Below we point out some issues of the sampling design.

- Target population: senior-level corporate executives from businesses in each sector of the economy selected.
- Geographical coverage: it is formed by the country's principal cities: Bogotá, Barranquilla, Cali and Medellín.
- Survey dates: The questionnaire is applied on the beginning of January, April, July and October.
- The survey is conducted through an independent probability sample for each economic sector. Thus, the simple random sampling without replacement was implemented.[4] However, some firms are forced into the sample and the budget constraint will determine the limit of the sample size. The response rate has been close to 70% and a sample of 81 firms has been aimed at through the whole period.
- The population frame is formed by sampling frames constructed on the basis of information from chamber of commerce registers, administrative registers and firms' supervisory returns.
- Data collection: After the release of the macroeconomic variables by official authorities, the questionnaire, which contains all the available information, is launched for various ways: web page, email, fax or if necessary face to face contact. The recollection, data processing and publication last 25 days.
- Results and historical file are displayed on the web address: http://www.banrep.gov.co/informes-economicos/ine_enc_inf.htm#2. A quarterly publication with the survey's results is distributed among the respondents and the public at large. Moreover, a detailed presentation of the results is included in the

[3] This survey replaced a former expectations survey conducted from 1997. There were major changes that improved the sample coverage and the type of questions.

[4] Under simple random sampling, the sample mean of a variable and the sample proportion in a sector are unbiased estimators of the population mean of the variable and of the population proportion in the sector.

Inflation Report prepared by the Programming and Inflation Department of the Economic Studies Division of the Bank.

- Sample size: there are respondents from 140 firms. The sample size distribution is presented in Table 1.

3. What can be learn from the surveys

In the appendix, Figure 1 shows the observed inflation path and the associated expectations over different time horizons. The vertical line indicates the month in which the survey was realized. According to this figure, expected inflation rates for the coming six, nine and twelve months were lower than the rate actually observed. Thus, the survey conducted in September 2007 indicated that from September 2008 economic agents were expecting an annual inflation rate of around 4.9%, in a range of [4.7–5.2]. On the other hand, Figure 2 reveals the evolution of observed inflation, its expected values and the targets set by monetary authorities. Horizontal segments correspond to the annual inflation interval target. According to the survey, economic agents perceived that December inflation would be above the target. Figure 3 displays the time series of the benchmark interest rate, the DTF and its expected values. As can be seen, economic agents expecting an increase in the interest rate that followed the trend started in July 2006. So, the interest rate for the coming six, nine and twelve months was expected to be close to 8.7%. Figure 4 presents the expected GDP growth for the years 2007 and 2008. Expected economic growth was 6.5% for 2007, in an interval of [6.0%–6.8%] and 5.9% (within [5.5–6.4]) for 2008. This estimation is similar to the one observed in the former period.

4. Conclusion

In this essay we described the methodological issues of the quarterly survey of economic expectations realized by the Colombian Central Bank. We described its thematic coverage and explained the sampling design implemented. Finally, we sketched, as a way of illustration, some of the output assembled from the survey's data.

Appendix

Table 1

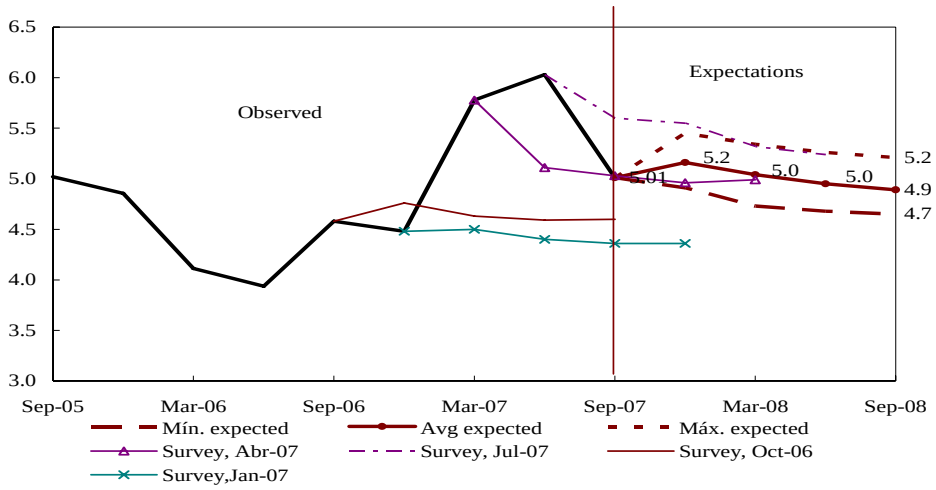
Distribution of the sample size according to the sector

Sectors	Size
Industry	57
Financial Intermediation	18
Major Retailers	7
Transport and Communications	32
Academic and Consultants	16
Trade Unions	10
Total	140

Figure 1

Observed inflation and expectations (three, six, nine and twelve months)

Annual inflation

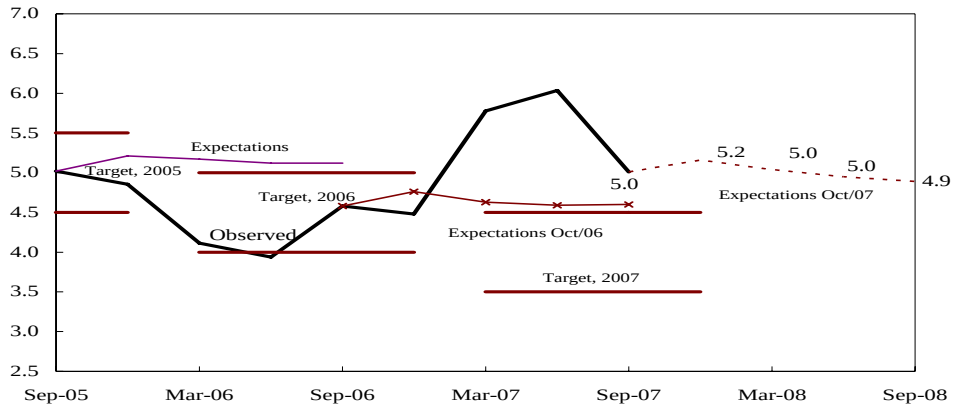


Source: Banco de la República.

Figure 2

Inflation, target and expectations

Annual inflation

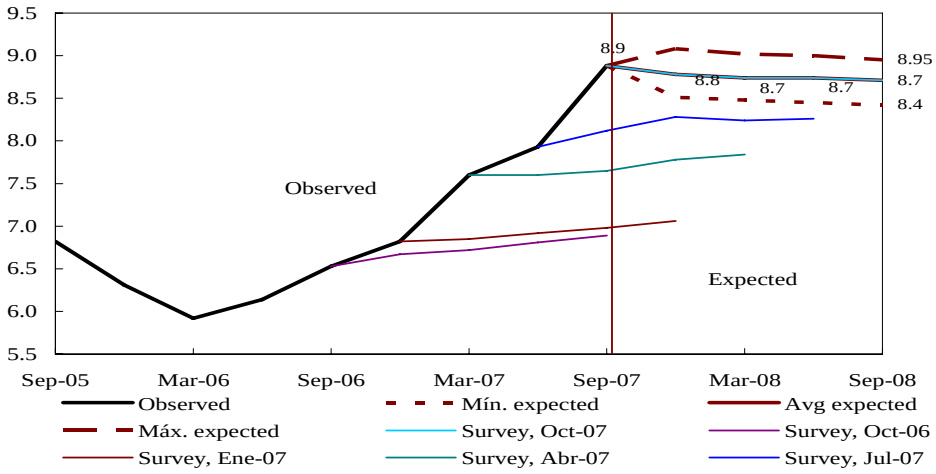


Source: Banco de la República.

Figure 3

Interest rate (FDT) observed, expected and intervals

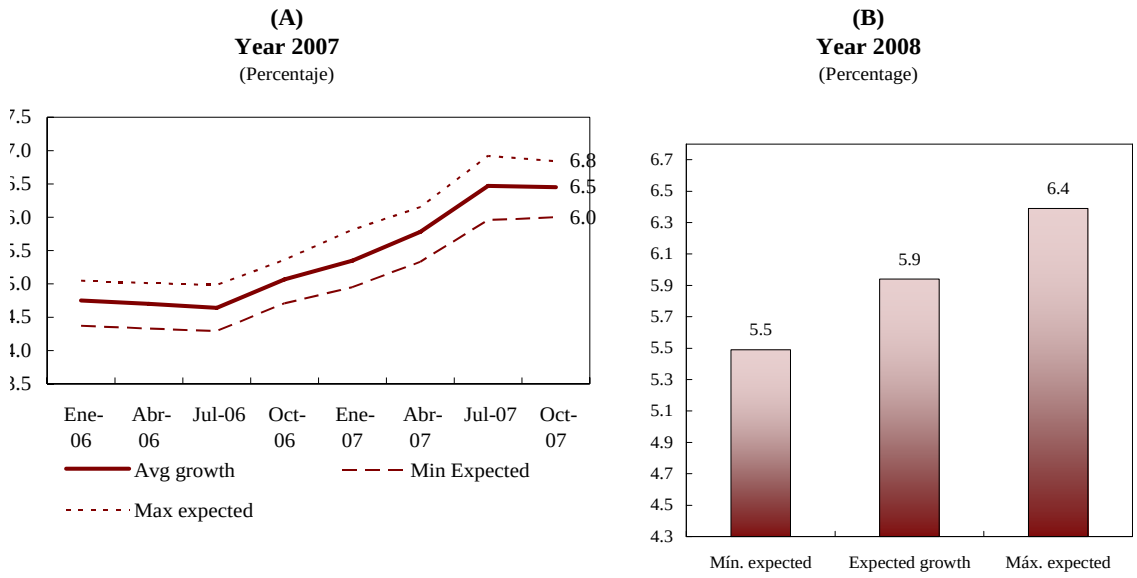
Annual effective



Source: Banco de la República.

Figure 4

Economic growth



Source: Banco de la República.

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