Comment

Luis Felipe Céspedes: Carvalho and Bugarin do a good job of providing new estimations on the rationality of inflation forecasts for a group of three emerging economies. The novelty of their analysis stems from the fact that information on inflation expectations based on survey data has recently become available. The topic is important: many central banks around the world use private inflation forecasts as a key element in policymaking. On the one hand, inflation forecasts may be a good proxy of inflationary pressure. On the other, for economies with an explicit inflation target, they could serve as an indicator of the credibility of the inflation target itself. For example, the Central Bank of Chile aggressively reduced its monetary policy interest rate in January 2004 as low inflation rates were feeding into medium- to long-term inflation expectations, pulling them below the 3 percent annual target.

Given the important role of private inflation forecasts as a proxy for inflation expectations, it is vital to determine whether they satisfy some basic rationality conditions. In the first part of the paper, the authors test whether these forecasts are unbiased and efficient.

A first comment on the paper is related to the nature of the information: survey data. These surveys do not necessarily measure informed opinion. The survey used for Brazil is a survey of professional forecasters, while in Chile a mix of academics and professional forecasters are surveyed. In the case of Mexico, the data sources are organizations, so it is less clear who the forecasters are and whether they change frequently. This could shed some light on the authors' empirical results regarding the efficiency of inflation forecasts in Mexico, especially those related to the use of interest rates.

Another important point involves the significance of the unit root analysis component of the paper. The main problem with these unit root tests and with their empirical analysis in general is their robustness. Small sample bias is a serious problem in empirical implementation. The authors only have a few years of observations for each country. Is that enough to be confident about

the results they obtain? The authors acknowledge this problem and proceed by estimating the series without considering its integration order. This strategy may be reasonable for the case of Chile, but it may not be for Mexico. The inflation target was decreasing in Mexico throughout the sample period. Inflation in this case may be stationary around the inflation target, but not stationary in and of itself.

A key issue for the efficiency of forecasts is the information available to the forecasters when the forecast is made. For Chile and Brazil, the authors assume that the output gap is known at the moment the forecast is made. This is not actually the case, however, which reduces the credibility of results based on this information. The forecasters may have other ways of determining current demand conditions before making their forecasts, but if that is the case, the authors should use this information in their analysis.

The second part of the paper investigates the inflation expectations formation process. A key element in the analysis is the role of the inflation target in this process. If the target is fully credible, inflation expectations for longer horizons should be anchored to the target. If the target is not credible, inflation expectations should not matter in the inflation expectation formation rule.

There is a serious problem with the analysis when the inflation target is changing over the sample period. If the economy is converging from high levels of inflation to a lower stable rate, the inflation target itself is very likely to be endogenous. For example, if output is below potential, the authorities are likely to set a less strict inflation target in order to have some room to stimulate the economy. This clearly limits the usefulness of the analysis presented for Mexico and Brazil.

In the case of Chile, the credibility analysis of the twelve-month inflation forecast is misleading. The Central Bank of Chile is charged with keeping inflation between 2 and 4 percent (the point target is 3 percent) over a twenty-four-month horizon. Deviations of the twelve-month inflation forecasts from 3 percent are therefore not unexpected. Monetary policy is conducted in such a way that transitory deviations of inflation from the 3 percent point target in the short term are the result of a flexible implementation of the inflation-targeting regime. This is made possible by the high credibility of the inflation target.

The authors seem to believe that the fact that some central banks—such as Brazil's—respond to changes in private inflation forecasts proves that central banks conduct monetary policy on a forward-looking basis. I believe that the main reason behind this behavior is a credibility problem. Responding to inflation expectations, in general, is evidence of a forward-looking monetary policy. At the limit, private inflation forecasts can be exactly equal to the infla-

tion target, which does not imply that central banks do not respond to infla-
tionary pressures. In this hypothetical situation, they may be very actively
adjusting the interest rate to keep inflation expectations equal to the target.

Private inflation forecasts from surveys are certainly relevant to the con-
duct of monetary policy, but the extent to which they provide useful infor-
mation regarding future inflationary pressures for the three countries under
study is unclear. Some of the questions raised here should be clarified with
more data. Despite these limitations, Carvalho and Bugarin have provided a
valuable first contribution to this issue.

Munir A. Jalil: Part of the communication strategy proposed for modern cen-
tral banks (especially if the central banks in question are targeting inflation) is
to educate people by providing the necessary information for them to form
better expectations (for this to work, credibility is a must). Central banks should
then check whether their efforts are having the desired effect. This is where
inflation expectations surveys come into play, since they give central banks a
glimpse into the effectiveness of their work. Carvalho and Bugarin provide a
welcome advance in using the information contained in inflation expectations
surveys for Brazil, Chile, and Mexico.

The paper addresses two relevant questions. First, are inflation expectations
rational for Brazil, Chile, and Mexico? If rationality is defined as the fore-
casters' attempt to form unbiased expectations, then a test developed by Muth
can be carried out to check for this condition.[1] Carvalho and Bugarin perform
these tests and find evidence that inflation expectations are, in fact, unbiased
in the aforementioned countries.

Second, are targets part of the formation rule of expectations? Carvalho and
Bugarin explore this question based on efficiency tests. Efficiency in this con-
text indicates the full use of the information available at the time the forecast
is made. The authors find that while targets are generally part of the formation
rule, forecasters in some countries are not considering some relevant variables
in their information set. The latter raises the question of why that is the case
for each particular country.

Since doubt is the key to knowledge, I next present a critique that raises
important issues with the paper. Although Carvalho and Bugarin justify their
approaches by citing previous work (which clearly shows their careful review
of the literature), they really went too far in showing some results that render
their own results hazy. In the case of Brazil, for example, their results include

1. Muth (1961).

data created by an interpolation technique. Their results are fine after November 2001, which is when data become available; the interpolation just adds noise that blurs the results. The problem with this approach is that it raises a lot of hypotheses as to why this happened: maybe the results would be better without the interpolation, or maybe something really happened in terms of the relations among the variables. Any attempt to discard any of the hypotheses, however, creates more problems than it solves.

The authors also point out if the variable to be forecasted is highly persistent, as is inflation, then both the dependent and the explanatory variables are highly persistent in the regression

$$\pi_{t+k} = \alpha + \beta E_t \pi_{t+k} + u_{t+k},$$

which causes problems with the distributions the tests follow. They differentiate the series, setting up the regression

$$\Delta\pi_{t+k} = \beta\Delta E_t \pi_{t+k} + \Delta u_{t+k},$$

and present their results on both the above equations. The persistence of inflation has long been subject to a big debate, with people at both ends of the spectrum. The authors take a neutral position and show results for both cases, thus providing answers for the two possibilities at hand. This approach is valid, but it would be better to take a position regarding this issue and then show the results based on that position.

With regard to the rationality tests used, Granger and Newbold correctly indicate that the regression only tests a necessary condition for the optimality of the forecasts.[2] A forecast could be unbiased without being optimal. Caution should be taken in interpreting the results as indicating rationality.

Another caveat is that in order for the original test to work, it is necessary to assume that the error in the first regression is white noise, which is only true for optimal one-step-ahead forecasts. Tests should then check for autocorrelation in excess of what an optimal forecast should have. Using Newey-West estimators for the standard errors does not identify which type of autocorrelation is present: is it the optimal or the excessive one?

Horizons other than twelve and twenty-four months are also important. Twelve-month-ahead forecasts are relevant in January, but they are not nec-

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2. Granger and Newbold (1986).

essarily the most relevant horizon in, say, June. As a central banker, my first goal is to hit my target at the end of the year, since that will help me build credibility. The six-month-ahead forecast will therefore be more relevant in June. I realize that this would require for a longer version of the paper, but I would like to know how the tests perform under these horizons.

Finally, I raise an open question: from a statistical viewpoint, it is true that expectations equal the forecast, but is that always the case for people answering a survey? From the perspective of semantics, the expectation can be considered a forecast, but does the forecast have the same meaning in this context as its statistical counterpart? Some analysts may say yes, since this involves using the set of available information to make an inference (that is, $E_t\pi_{t+k}$), but is that conditional expectation the best description of the process that people go through in answering the survey? Even more, do all participants have the same information set at the moment of producing their expectations? If the information set varies enough, I could reject the hypothesis tested in the paper and still consider the people surveyed to be rational in the sense that they are using all the available information to make their inference. Caution should then be advised with regard to the power of the tests performed.

Both the rationality and the efficiency tests are built on the concept of a symmetric loss function, that is, the forecaster assigns the same value to negative and positive forecast errors. The idea of asymmetric loss functions merits further research. Depending on who is doing the forecasting, they may prefer to predict inflation of, say, 4 percent and have it end up at 3.8 percent than predict 4 percent and have it end up at 4.2 percent. Performing the analysis using asymmetric loss functions could show that agents are being cautious and that they are using fully rational principles to create their expectations.

For the efficiency tests, future research should try to incorporate the data people had available at the moment they made their decisions. That type of data is usually called real-time data. Such data sets are currently not available for the analyzed countries, but this is a good time to remind central bankers and government officials about the importance of starting to build them.

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