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Inflation targeting credibility and reputation: The consequences for the interest rate

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ABSTRACT

The measurement of credibility and reputation is fundamental for the analysis of countries which adopted inflation targeting. Under this perspective, the objective of this article is to illustrate which measures of credibility and reputation are most useful in predicting variations of interest rates. Given a specific inflation target, this relationship is valuable for central bankers as well as for private agents trying to predict the central bank's policies. Due to the fact that Brazil represents a potential laboratory experiment in which the effects of an adoption of inflation targeting after more than a half decade can be observed, an analysis through several indices and its relation with the basic interest rate is made. The findings denote that the credibility indices based on reputation represent an alternative in the cases where the series of inflation expectation are not available. Furthermore, the empirical evidence confirms the hypothesis that higher credibility implies lower variations in the interest rate for controlling inflation.

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1. Introduction

During the 1990s the argument that the monetary policy must have as main objective the search for price stability became consolidated around the world. Moreover, the necessity for finding mechanisms which avoid the dynamic inconsistence problem became fundamental in the analysis of credibility in the conduction of the monetary policy. The basic idea is that an increase in central bank credibility contributes to an increase in credibility of the monetary policy, that is, the belief by the public in the probability of a successful execution of the policy (Drazen, 2000).

Since the collapse in the use of the exchange rate as a nominal anchor in the second half of the 1990s, the adoption of inflation targeting emerged as an alternative monetary regime. The main characteristic in the adoption of inflation targeting is the price stabilization as a way for creating an environment which promotes a convergence between inflation expectations and inflation target. Due to the essential role that public expectations have in this framework, reputation and credibility are essential to this monetary regime. Therefore, the measurement of credibility and reputation is fundamental for the analysis of countries which adopted inflation targeting.

With the objective to illustrate which measures of credibility and reputation are most useful in predicting variations of interest rates, the Brazilian case is used. Given a specific inflation target, this relationship is valuable for central bankers as well as for private agents trying to predict the central bank's policies. The justification for the use of Brazil in the analysis is that this country is still building its credibility and it is one of the most important developing countries that have adopted inflation targeting (more than half a decade ago). In particular, the adoption of inflation targeting in Brazil (June 1999) was due to the necessity of finding a new nominal anchor for stabilizing prices after the change in the exchange rate regime in January 1999.

In the last years, taking into consideration the argument presented by Agénor and Taylor (1992, 1993) and Svensson (2000) that series of inflation expectations could be used in the creation of credibility indices, the literature has shown some advances. Under this view, the present article analyzes the Brazilian monetary credibility through several indices and its relation with the basic interest rate (defined by financial market and the target defined by Monetary Policy Committee). This paper is organized as follows: the next section shows the several indices which are used in this study, Section 3 makes an analysis of the indices for the Brazilian economy, Section 4 shows empirical evidence between credibility and inflation taking into account the interest rate, and Section 5 concludes the paper.

2. Credibility indices

The appointment of the monetary authority in each contract with the society is used by the economic agents for planning its strategies. In this sense, a high credibility in the policy adopted by the monetary authority contributes to a stable economic environment which permits the public to plan the future. The objective of this section is to show the credibility indices which are used in this article. Two indices Cecchetti and Krause (2002) and de Mendonça (2007) are

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based on the idea that credibility is defined as negatively related to the distance between the private sector's inflation expectations and the bank's announced inflation target (Faust and Svensson, 2001). Thus, any deviation of inflation in relation to the central target implies a credibility loss. Besides these measures of credibility, an index which takes into consideration departures from interval fluctuation of inflation in relation to the inflation target and another three indices derived from reputation are shown.

Cecchetti and Krause (2002) built an index for measuring credibility (CI_K) which considers the difference between the expected inflation ($E(\pi)$) and the target (π_t). This index assumes values between "0" (without credibility) and "1" (full credibility). When the expected inflation is lower than the target this case represents maximum credibility. While the expected inflation departs from the target, the index decreases in a linear way until it arrives at "0" where the expected inflation crosses 20%.[1] Hence,

$$CI_{CK} = \left\{ \begin{array}{ll} 1 & \text{if } E(\pi) \le \pi_t \\ 1 - \dfrac{1}{0.2 - \pi_t}[E(\pi) - \pi_t] & \text{if } \pi_t < E(\pi) < 0.2 \\ 0 & \text{if } E(\pi) \ge 0.2 \end{array} \right\}. \quad (1)$$

Taking into account a similar framework to that presented by Cecchetti and Krause (2002), de Mendonça (2007) – CI_M – developed a credibility index which considers the inflation target and the tolerance intervals. The credibility index has a value equal to 1 when the annual expected inflation ($E(\pi)$) is equal to the target inflation and decreases in a linear way while inflationary expectation deviates from the announced target. Therefore, the credibility index shows a value between 0 and 1 strictly if the expected inflation is situated between the maximum and minimum limits (π_t^*) established for each year and assumes a value equal to 0 when the expected inflation exceeds one of these limits. Hence,

$$CI_M = \left\{ \begin{array}{ll} 1 & \text{if } E(\pi) = \pi_t \\ 1 - \dfrac{1}{\pi_t^* - \pi_t}[E(\pi) - \pi_t] & \text{if } \pi^*_{t\,\mathrm{Min}} < E(\pi) < \pi^*_{t\,\mathrm{Max}} \\ 0 & \text{if } E(\pi) \ge \pi^*_{t\,\mathrm{Max}} \text{ or } E(\pi) \le \pi^*_{t\,\mathrm{Min}} \end{array} \right\}. \quad (2)$$

A well-known cause for the failure in the achievement of the inflation target is the imperfect control over inflation by the monetary authority. In an attempt to eliminate this problem, the adoption of tolerance intervals gives more flexibility to the conduction of the monetary policy increasing the transparency and thus avoiding the necessity to justify few deviations of the inflation in relation to the target (Brunilla and Lahdenperä, 1995). Under this perspective, assuming that the public has rational expectations, a loss in credibility due to the deviation of inflation in relation to the target while the inflation is within the tolerance interval is too severe.

Taking into consideration the idea above, a different credibility index is elaborated (CI_A), which assumes a loss in credibility when the public expects that the central bank is not capable of bringing the inflation to the tolerance interval. Therefore, when the inflation expectation is found between upper bound ($\pi^*_{t\mathrm{Max}}$) and lower bound ($\pi^*_{t\mathrm{Min}}$) the credibility is full. The justification for this procedure is that the obligation of the monetary authority is the convergence of inflation for the interval and not for a specific value. On the other hand, there is no credibility in two cases: (i) when the inflation expectation is higher than 20%; or (ii) when the inflation expectation is null/negative. Moreover, when the inflation expectation is found between $\pi^*_{t\mathrm{Max}}$ and 20% or between $\pi^*_{t\mathrm{Min}}$ and 0% the credibility index varies between]0, 1[. Therefore, the loss in credibility is due to any deviation of the inflation in relation to the expected interval. That is,

$$CI_A = \left\{ \begin{array}{ll} 1 & \text{if } \pi^*_{t\,\mathrm{Min}} \le E(\pi) \le \pi^*_{t\,\mathrm{Max}} \\ 1 - \dfrac{1}{0.2 - \pi^*_{t\,\mathrm{Max}}}\left[E(\pi) - \pi^*_{t\,\mathrm{Max}}\right] & \text{if } \pi^*_{t\,\mathrm{Max}} < E(\pi) < 0.2 \\ 1 - \dfrac{1}{-\pi^*_{t\,\mathrm{Min}}}\left[E(\pi) - \pi^*_{t\,\mathrm{Min}}\right] & \text{if } 0\% < E(\pi) < \pi^*_{t\,\mathrm{Min}} \\ 0 & \text{if } E(\pi) \ge 0.2 \text{ or } E(\pi) \le 0 \end{array} \right\}. \quad (3)$$

The value of 20% adopted by CI_A as a limit for the loss in credibility is extracted from CI_{CK}. It is important to note that the adoption of an inflation of two digits is not adequate as a limit. A good example is the Brazilian case in 2002. Although the inflation reached 12.53% (much higher than the upper bound which was 5.5%) the Central Bank of Brazil (CBB) was capable of neutralizing the public expectation in respect to the increase in inflation. The value of 0% being considered critical for a loss in credibility is based on the argument that a null or negative inflation implies the risk of reducing output or increasing unemployment (Svensson, 2000).

The combination of fixed critical values with flexibility in the definition of the interval defined by the monetary authority creates an asymmetrical framework which is useful in the measurement of credibility. When the limit of interval is close to the critical point, more sensitivity is associated with the variation of the credibility for values that exceed this limit. In other words, if the central bank defines a tolerance interval where the upper limit is too close to 20%, any variation in the expectation above this limit will be strongly punished with a loss in credibility.

It is important to note that in the economies where credibility is still being built it is synonymous with reputation (de Mendonça, 2007). Besides this, due to the unavailability of the series relative to inflation expectation for some periods and for most countries, there is a difficulty in the application of the above-mentioned indices. Hence, instead of analyzing credibility through expectation, an alternative method which takes into consideration the observed performance, and thus the reputation obtained over time, is proposed. As reputation is essentially backward-looking (depends on past behavior of the monetary authority) while the credibility is forward-looking, the reputation can be fundamental for developing credibility. In short, central banks with little or no reputation would suffer limitations in the conduction of the monetary authority because their policies would not be credible ex-ante.

The next three indices are based on the premises that credibility can be measured by the sum of reputations over time. It is important to note that reputation indices neither are perfect substitutes nor try to emulate the behavior of the credibility indices. In addition, due to the fact that reputation depends on backward-looking behavior, a smooth pattern is expected in these indicators. As a consequence, the divergence between the indices of credibility and those indices derived from reputation is not a puzzle.

For the calculation of reputation (R) a framework which is similar to that applied for the CI_A is used. The main difference is that the deviations are calculated taking into account the observed inflation and not the expected inflation. It is important to note that credibility is a result of the state of expectation while reputation is given by departures of inflation from the target. Therefore,

$$R = \left\{ \begin{array}{ll} 1 & \text{if } \pi^*_{t\,\mathrm{Min}} \le \pi_{\mathrm{tOBS}} \le \pi^*_{t\,\mathrm{Max}} \\ 1 - \dfrac{1}{0.2 - \pi^*_{t\,\mathrm{Max}}}\left[\pi_{\mathrm{OBS}} - \pi^*_{t\,\mathrm{Max}}\right] & \text{if } \pi^*_{t\,\mathrm{Max}} < \pi_{\mathrm{OBS}} < 0.2 \\ 1 - \dfrac{1}{-\pi^*_{t\,\mathrm{Min}}}\left[\pi_{\mathrm{OBS}} - \pi^*_{t\,\mathrm{Min}}\right] & \text{if } 0\% < \pi_{\mathrm{OBS}} < \pi^*_{t\,\mathrm{Min}} \\ 0 & \text{if } \pi_{\mathrm{OBS}} \ge 0.2 \text{ or } \pi_{\mathrm{OBS}} \le 0 \end{array} \right\}. \quad (4)$$

[1] The creators of this index believe that an expected inflation higher than 20% implies a loss in the control of inflation by the monetary authority.

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