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Procedia Economics and Finance 24 (2015) 435 – 443

Procedia Economics and Finance

www.elsevier.com/locate/procedia

International Conference on Applied Economics, ICOAE 2015, 2-4 July 2015, Kazan, Russia

Monetary policy's structural credibility and the role of the expected inflation: a Kalman filter investigation

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Abstract

This work proposes an alternative method for measuring monetary policy's structural credibility under inflation targeting regimes by the main determinants of the expected inflation, and using a Kalman approach. It shows that such a method does not present some restrictions found in the existing credibility indexes, such as in Cecchetti and Krause (2002). It applies the new model and approach on the Brazilian case as an illustration and obtains robust results demonstrating that there exists a mutual dynamic relationship between expected inflation, observed inflation and the credibility behavior over time.

Keywords: monetary policy's credibility; expected inflation; Kalman filter; Brazil.

1. Introduction

The expected inflation is a relevant variable when Central Banks adjust their monetary policies. As the expected inflation is one of the effective inflation's determinants, which is clear by a simple new Keynesian Phillips curve (Clarida et al. 1999; Svensson 2000), the higher the expected inflation the higher the social costs from reacting to inflation shocks. Additionally, the expected inflation is an important variable in determining expected short-term interest rates, and thus the long-term interest rate, thereby causing expressive effects on the output dynamics (Woodford 2003). Moreover, the expected inflation dynamics can inform on the monetary policy's credibility, as the latter depends on the weight of inflation targets (and of the lagged inflation) on the expected inflation (Lalonde 2005; Moreira 2013a).

Therefore, given that inflationary expectations are important in many aspects, it is not strange that there exists a recent literature which aims at explaining the expected inflation phenomenon at a theoretical level, and, at the same time, at researching empirical correlation and/or causality between that variable and lagged inflation, output dynamics, exchange rates, among others. Indeed, the empirical specification of the expected inflation dynamics

doi:10.1016/S2212-5671(15)00700-5

depends strongly on the theoretical specification of the effective inflation or Phillips curve, if the rational expectations hypothesis is assumed into the reference model.

Several developing economies have adopted the inflation targeting regime over the last decades as a way for controlling inflation rates and anchoring inflationary expectations. Brazil, particularly, has adopted inflation targets since 1999. However, the Brazilian Central Bank (BCB) has not achieved the inflation target (4.5% for the *Broad Consumer Prices Index*) in the last years, so that the monetary authorities' reputation presumably can be lost, thereby increasing costs of future disinflation cases. Deviations of the effective inflation around the inflation target affect the monetary policy's credibility, that is, they make the expected inflation more sensible to the observed or lagged inflation dynamics, and therefore less anchored on the inflation target (Moreira 2013b). Thus, measuring the long-term (and short-term) relationships between expected inflation and other relevant variables is useful in signaling on the *monetary policy's structural credibility*, besides informing on how to control inflationary expectations.

This work aims at presenting an alternative method for measuring monetary policy's credibility by means of a *time-varying or Kalman filter approach* and applying it on the Brazilian case as an illustration. As it will be argued, the existing indexes that measure monetary policy's credibility, such as in Cecchetti and Krause (2002), among others, have some methodological problems. My analysis builds on the study by Moreira (2013a,b), but extends his work in several directions, including theoretical contributions and the consideration of different robustness tests.

Regarding those methodological problems, e.g. imposition of *ad hoc* boundaries by the existing indexes, the current approach, however, does not impose restrictions on agents' behavior or evaluation, "*allowing the data to speak more directly about alternative expectations hypothesis*" (Fuhrer 1992, p.176). Fuhrer (op.cit.) proposed a seminal method applied on expectations behavior based on a model in which the main instrument of the US's monetary policy was the money growth, and the credibility of such policy could be inferred by the weight of the Fed's announcements of money growth on expectations. In turn, my approach is mainly applied on inflation targeting regimes (although it is feasible for countries that target implicitly consumer inflation such as the US), in which the main instrument of monetary policy is the basic interest rate and the credibility can be inferred by the weight of announced (or implicit) inflation targets on inflationary expectations.

The paper is structured as follows: Section 2 presents theoretical aspects and some related empirical results; Section 3 presents the data, the empirical strategy and the analysis of results, as well as the ways by which I tested for their robustness. Finally, concluding remarks, references and a statistical appendix are presented.

2. Related Literature

2.1. Theoretical aspects

Controlling expected inflation rates is an important aspect in the monetary policy literature. Basically, if the Central Bank aims at controlling inflation dynamics with lower social costs, consistently managing inflationary expectations is a necessary requirement. Such a management requires a credible commitment and when the Central Bank effectively commits itself to the announced target, the latter has higher weight on the expected inflation dynamics. There is a specific literature that studies the properties of the monetary policy's credibility and the impacts of its changes on macroeconomic performance and policy's efficiency (see Argov et al. 2007; Lalonde 2005; Moreira 2013a).

Under inflation targeting regimes, particularly when the Central Bank has low credibility degree, the expected inflation becomes more sensible to past inflation, and less sensible to the Central Bank's announced goals. Then, in such a situation, disinflation cases have to be attained through strongly increasing interest rates and thereby largely decreasing output levels. According to Moreira (2013a, p. 5), "C*entral banks with lower (higher) credibility degrees are constrained (improved) by inflationary dynamics which is more (less) sensible to the past inflation levels, that is, in such a case there is more (less) inertia in the inflationary process".* Thus measuring credibility is a fundamental step. The credibility index proposed by Cecchetti and Krause (2002) is: