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Inflation targeting: An indirect approach to assess the direct impact

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It is quite difficult to assess the benefits of inflation targeting (IT) since its immediate effect will be on inflation expectations, an unobserved variable. Due to lack of comprehensive data on inflation expectations, most studies so far concentrated on the impact of IT either on observable variables like output, unemployment, and inflation or compared post-IT surveys of IT countries with non-IT countries. In our study, we focus on a yet unanswered question, i.e., how the expectations *change* with the adoption of IT. We suggest that heterogeneous inflation expectations lead to long memory in actual inflation, and IT, if successful, should decrease this persistence by concentrating the public's expectations toward the announced target. Empirical results confirm our hypothesis with a reduction in inflation memory after the adoption of IT in almost all eight developed countries in our sample.

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1. Introduction

Since its first adoption by the Central Bank of New Zealand, inflation targeting (hereafter IT) has proved to be a popular policy option among central banks. Along with the policy comparisons, a plethora of theoretical and empirical literature¹ appeared on the relative performance of IT. Most of the issues revolved around its impact on observable policy variables like inflation (Siklos, 1999; Neumann and von Hagen, 2002; Petursson, 2004) and output (Bernanke et al., 1999; Levin et al., 2004). However, an important measure of success for any monetary authority in reaching their

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¹ Leiderman and Svensson (1995), Bernanke and Mishkin (1997), Bernanke et al. (1999), Siklos (1999), Mishkin and Schmidt-Hebbel (2001), Amato and Gerlach (2002), Johnson (2002, 2003).

ultimate goals depends on the extent to which the expectations of the public are reshaped by the announced or implemented policy (Woodford, 2004). The difficulty in observing the inflation expectations though, led some researchers to utilize consensus surveys for testing the effectiveness of IT (Johnson, 2002, 2003; Levin et al., 2004).

Surveys unfortunately provide very little information on the conditions prior to the adoption of IT. Therefore, the studies using them concentrate more on the comparison of inflation expectations of targeters versus the non-targeters in order to evaluate IT's effectiveness. However, the true assessment of how adoption of IT changes inflation expectations requires the comparison of expectations *before* and *after* the switch to IT. In this study, we offer an indirect methodology that enables one to make that very comparison by deriving inference on inflation expectations from long run dynamics of the inflation process. Two useful byproducts of our analysis are (1) offering an alternative explanation as to why long memory exists in inflation, and (2) providing an alternative theoretical explanation to the empirical evidence of the decline in inflation persistence for inflation targeting countries (Siklos, 1999; Kuttner and Posen, 2001; Petursson, 2004; Levin et al., 2004).

The basis of our theory is to indirectly examine the distribution of inflation expectations through an analysis of the time series properties of inflation. As an initial step, we show how the heterogeneity in inflation expectations (in a discretionary policy environment) leads to increased persistence in actual inflation. If an IT monetary policy succeeds in decreasing this heterogeneity, inflation persistence will decline as well. Therefore, testing for and observing the reduction in persistence after the switch to IT will constitute the indirect evidence of IT's effectiveness in focusing the expectations toward the announced target. Our theoretical and empirical findings will also offer a new explanation as to why there exists a long memory process² (fractional integration) in inflation. Observing the reduction of inflation inertia after the switch to IT, we deduce that the aggregation of heterogeneous inflation expectations is the real culprit behind the long memory in inflation. In addition, our theory offers a possible theoretical justification to the empirical evidence of persistence declines in inflation after IT.

For any monetary policy to be effective, it is important that the public understands the central bank's actions and forms their expectations in accordance with these actions. The inflation targeting rule facilitates the public's understanding of the monetary policy and thus has an effect on the expectations of the public. According to Woodford (2004) and Faust and Henderson (2004), such a commitment to an announced target helps the public to form anchored expectations for the policy outcome. Siklos (1999), Corbo et al. (2001), and Petursson (2004) examine these effects of inflation targeting using multiple countries to find that the level and fluctuations of inflation along with its persistence have all decreased after the adoption of IT. While these authors concentrate on the "observable" effects of IT, others aimed to test its effectiveness on expectations directly. Johnson (2002, 2003) and Levin et al. (2004) utilize *Consensus Economic Forecasts* to measure the effectiveness of IT on inflation and output. While Johnson finds IT effectiveness on the mean, variability, and forecast errors of inflation, Levin et al. shows that it holds for the sacrifice ratio as well. Our study forms a bridge between these two branches in the literature by deriving conclusions on unobservable changes such as the distribution of inflation expectations via the analysis of observable inflation persistence. In this regard, we make up for the lack of such an analysis in the literature and explain how expectations *change* with the adoption of IT.

As a byproduct, our analysis contributes to the literature on long memory processes. Despite substantial evidence of its relevance in many macroeconomic series,³ there have not been many papers establishing the economic origins of long memory processes in macroeconomic variables. Until

² Long memory refers to when persistence of shocks is caused by either a unit or a fractional root. Unit root or $I(1)$ models have non-decreasing autocorrelation functions while fractionally integrated and stationary ARMA or $I(0)$ processes have hyperbolic and geometric declines, respectively. In other words, fractionally integrated models constitute a middle ground between the $I(1)$ and $I(0)$ worlds.

³ Sowell (1992) and Abadir and Talmain (2002) show existence of long memory in aggregate economic activity, while Hassler and Wolters (1995), Baillie et al. (1996) analyze fractional integration in aggregate prices. Andersen and Bollerslev (1997) and Liu (2000) provide evidence of long memory in asset price volatility.

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