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Are inflation expectations rational?☆

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Abstract

Several recent papers report evidence of an apparent statistical bias in inflation expectations and interpret these findings as overturning the rational expectations hypothesis. In this paper, we investigate the validity of such an interpretation. We present a computational dynamic general equilibrium model capable of generating aggregate behavior similar to the data along several dimensions. By construction, model agents form "rational" expectations. We run a standard regression on equilibrium realizations of inflation and inflation expectations over sample periods corresponding to those tests performed on actual data and find evidence of an apparent bias in inflation expectations. Our experiments suggest that this incorrect inference is largely the product of a small sample problem, exacerbated by short-run learning dynamics in response to infrequent shifts in monetary policy regimes.
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1. Introduction

It is well known that measured inflation expectations appear to evolve "sluggishly" relative to the time-path of actual inflation. In particular, expectations tend to underestimate inflation during periods of rising inflation, and overestimate inflation during periods of falling inflation.[1] This pattern is clearly evident in Fig. 1, which plots U.S. inflation and the Livingstone Survey measure of expected inflation over the sample period 1960–2005.[2]

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[1]This stylized fact appears robust to various measures of inflation expectations. See, for example, Dotsey and DeVaro (1995) and DeLong (1997).
[2]The Livingstone survey is maintained by the Federal Reserve Bank of Philadelphia; its history and structure are described in Croushore (1997).

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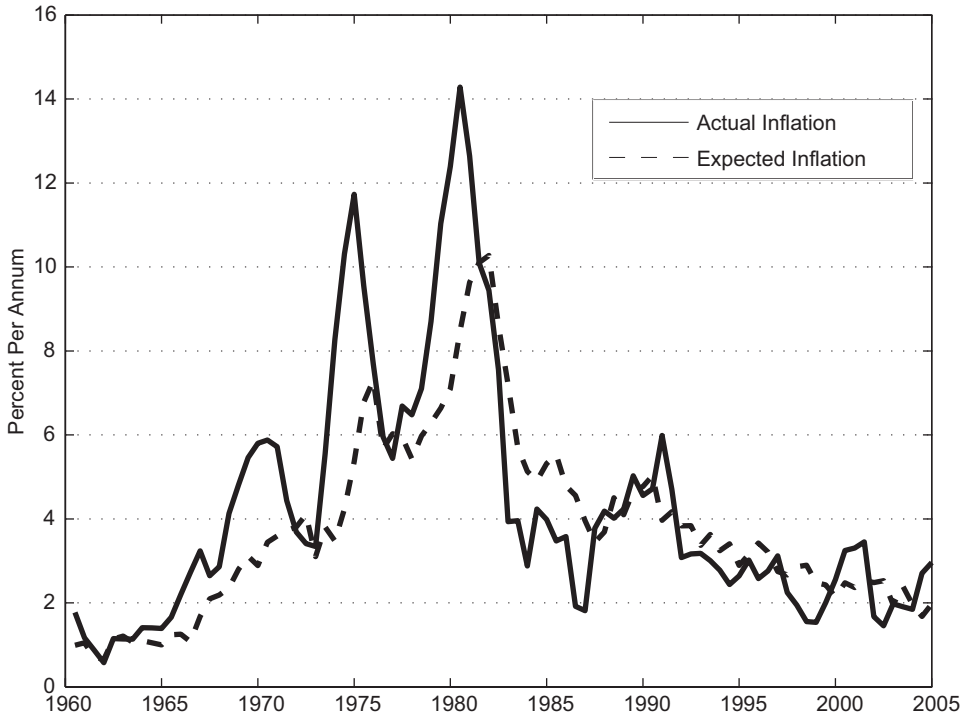

Fig. 1. Inflation and expected inflation (Livingstone Survey).

Assuming that expectations are measured accurately, the evidence in Fig. 1 suggests that individuals are prone to making persistent forecast errors. In other words, inflation expectations appear to be biased; a property that is inconsistent with the commonly maintained hypothesis of "rational expectations".[3]

Several studies report evidence against the hypothesis of "rational" expectations; see, for example, Mankiw et al. (2003), Mehra (2002), Thomas (1999), Roberts (1997), and Croushore (1997). The test of this hypothesis is typically formalized as follows. Let π_t denote the inflation rate and let $E_{t-k}[\pi_t]$ represent a measure of the inflation rate expected at date t, conditional on information available at date $t-k$. Using this data, run the following regression:

$$\pi_t = a_0 + a_1 \mathrm{E}_{t-k}[\pi_t] + e_t. \tag{1}$$

Under the null hypothesis of rational (unbiased) expectations, we have $\mathrm{H}_0 : (a_0, a_1) = (0, 1)$.

Typically, the hypothesis of unbiasedness tends to be rejected, particularly in small samples; in larger samples, the hypothesis is rejected less often. For example, Table 1 reports Thomas' (1999) regression results using the Livingstone data.[4] Table 1 shows that unbiasedness is rejected decisively in various subsamples, but not in the full sample.[5]

In this paper, we ask a simple question: Should rejections of unbiasedness, based on simple econometric tests such as the one described above, be construed as evidence against rational expectations?

We believe that there are good reasons to interpret such rejections with a grain of salt. First, as the evidence in Table 1 suggests, limitations on sample size are probably important here. Second, we know from the work of several authors that "sluggish" (adaptive) expectation formation may in fact be optimal (rational) in environments where agents cannot directly disentangle the effects of persistent and transitory shocks; see Muth (1960), Brunner et al. (1980), Andolfatto and Gomme (2003), and Erceg and Levin (2003). We think this

[3]For the purpose of this paper, we shall take "rational expectations" to mean unbiased expectations, or expectations that display serially uncorrelated forecast errors.

[4]These results have been updated and confirmed by Mehra (2002).

[5]Mankiw et al. (2003) reject the null even in their full sample (Table 4).

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