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Learning dynamics in monetary policy: The robustness of an aggressive inflation stabilizing policy

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Abstract

This paper investigates the effect of an aggressive inflation stabilizing monetary policy on the ability of agents to reach a rational expectations equilibrium for inflation and output. Using an adaptive learning framework, we develop a model that combines a real wage contracting rigidity with an interest rate rule. We show that an AR(1) equilibrium requires more aggressive monetary policy to achieve both determinacy and learnability. This model and policy findings contrast with Bullard and Mitra's [Determinacy, learnability and monetary policy inertia (2001); Journal of Monetary Economics 49 (2002) 1105] model (no inflation persistence) and policy findings (less aggressive policy). These results suggest that aggressive policy is robust in different model specifications.

JEL classification: E4; E31; E52; D84
Keywords: Taylor rule; Real wage contract; Adaptive learning; Stability; Determinacy; Inflation persistence

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1. Introduction

In this paper, we examine the determinacy and expectational stability condition [1] of the rational expectations equilibrium (REE) in a simple macroeconomic model. [2] These conditions are established using a particular monetary policy tack under an interest rate rule—the Taylor rule. In previous work, Bullard and Mitra (2001, 2002) evaluate the determinacy and learnability of an REE with alternative policy rules. They use a purely forward-looking model of the economy suggested by Woodford (1999, p. 16) and combine that model with four information structures of the Taylor rule: (1) contemporaneous data, (2) lagged data, (3) forward-looking expectations, and (4) contemporaneous expectations. They find that policy rules which respond relatively aggressively to inflation with little or no reaction to the output gap generally induce both determinate and learnable REE (Bullard and Mitra, 2001, 2002).

We extend this line of thought by introducing a relative-real wage contracting model in combination with a Taylor rule (Fuhrer, 1995; Fuhrer and Moore, 1995; Taylor, 1993, 1994, 1999). [3] This model contains the characteristic of inflation persistence since agents not only consider a forward-looking component of the inflation rate but they also are concerned with the past values of inflation. A number of studies have argued that the model without inflation inertia is not realistic (Woodford, 1999). Owyang (2001), Siklos (1999) and Granato and Wong (2002) also show that the inflation rate in the United States is persistent. Ironically, it is Woodford who states that "the complete absence of inertial terms in the structural equations is not entirely realistic" (Woodford, 1999, p. 13). [4]

McCallum (2002) also argues that Woodford (1999) model is not robust to the inflation persistence situation. McCallum (2002) solves the model of Woodford (1999) with full price flexibility and shows that an alternative AR(1) REE of inflation is explosive if Taylor rule is aggressive to the deviations of inflation (McCallum, 2002, p. 5). [5] Comparing with the results suggested in Bullard and Mitra (2001, 2002) we show that the condition for determinacy and learnability of the AR(1) REE occurs when the policymaker responds more aggressively to inflation. This

[1] See Evans and Honkapohja (2001).

[2] We use the terms "expectational stability," "E-stability," and "learnability" interchangeably in this paper.

[3] In this paper, we investigate the effectiveness of a policy rule with contemporaneous data only (Taylor, 1993, 1994, 1999). There are number of studies that investigate this monetary policy rule and treat this specification as standard in the literature (see also Cecchetti and Ehrmann, 1999; Fuhrer and Moore, 1995; Bullard and Mitra, 2001, 2002; Taylor, 1993, 1994, 1999; Woodford, 1999). Taylor argues that this policy rule is derived from the quantity theory of money. He points out that it describes different historical time periods in the United States.

[4] We would like to thank the referee for suggesting this reference and also in pointing out this argument.

[5] McCallum (2002) shows that only the minimum state variable (MSV) solution is stationary under the set up of Woodford (1999) with full price flexibility. He then considers the other candidate solution, an AR(1) REE, and shows that the solution is explosive if the coefficient of inflation in the Taylor rule is positive.