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Learning about monetary policy rules ☆

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Abstract

We study macroeconomic systems with forward-looking private sector agents and a monetary authority that is trying to control the economy through the use of a linear policy feedback rule. We use stability under recursive learning a la Evans and Honkapohja (Learning and Expectations in Macroeconomics, Princeton University Press, Princeton, New Jersey, 2001) as a criterion for evaluating monetary policy rules in this context. We find that considering learning can alter the evaluation of alternative policy rules.

JEL classification: E4; E5

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1. Introduction

1.1. Overview

Monetary policy rules have been the subject of a good deal of recent research in the literature on monetary economics and monetary policy.[1] While some of this work has focussed on systems which abstract from or suppress private sector expectations, many of the more recent papers analyze systems where private sector expectations enter the model explicitly. Most of these models involve small, forward-looking representations of the macroeconomy, such as those found in Clarida et al. (1999), McCallum and Nelson (1999), and Woodford (1999). In many cases the small model is a log-linearized and simplified version of a larger model derived from optimizing behavior in a dynamic stochastic general equilibrium context.

When private sector expectations enter such models explicitly, recent research has emphasized the possibility that certain policy rules may be associated with indeterminacy of rational expectations equilibrium, and therefore might be viewed as undesirable. Some of the authors who discuss this issue include Bernanke and Woodford (1997), Carlstrom and Fuerst (2000, 2001), Christiano and Gust (1999), Clarida et al. (2000), Rotemberg and Woodford (1998, 1999), and Woodford (1999). In a typical analysis, the authors compute the rational expectations solutions of the system with a given monetary policy rule, and if the rule induces indeterminacy then it is viewed as undesirable. The idea is that if the monetary authorities actually followed such a rule, the system might be unexpectedly volatile as agents are unable to coordinate on a particular equilibrium among the many that exist.[2] In contrast, when equilibrium is determinate, it is normally assumed that the agents can coordinate on that equilibrium.

It is far from clear, however, exactly how or whether such coordination would arise. In order to complete such an argument, one needs to show the potential for agents to learn the equilibrium of the model being analyzed. In this paper, we take on this task. We assume the agents of the model do not initially have rational expectations, and that they instead form forecasts by using recursive learning algorithms—such as recursive least squares—based on the data produced by the economy itself. Our methodology is that of Evans and Honkapohja (1999, 2001). We ask whether the agents in such a world can learn the fundamental or MSV equilibrium of the system under a range of possible Taylor-type monetary policy feedback rules. We use the criterion of *expectational stability* (*a.k.a.* E-*stability*) to calculate whether rational expectations equilibria are stable under real time recursive learning dynamics or not. The research of Marcet and Sargent (1989) and Evans and Honkapohja (1999, 2001) has shown that the expectational stability of rational

[1] For a sample of the recent work, see the volume edited by Taylor (1999c).

[2] Alternatively, the agents may be able to coordinate, but the risk exists that the equilibrium achieved may be one with undesirable properties, such as a large degree of volatility. See Woodford (1999, pp. 67–69).