



Expectational diversity in monetary economies

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Abstract

We investigate an overlapping generations monetary economy in which expectations depend upon backward looking predictors of the future price level. We use discrete choice theory to model how agents select a predictor based on its past forecast error. Letting the number of available predictors tend to infinity, we obtain the *large type limit* of the system. Taking the large type limit dramatically reduces the number of free parameters, while maintaining the expectational diversity which we argue is necessary for constructing plausible learning-based models. The model's dynamics are strongly influenced by the *intensity of choice*, which measures how sensitive an agent's predictor choice is to differences in forecast errors across predictors. When the intensity of choice is low, the monetary steady state is stable. As the intensity of choice increases (and if certain parametric restrictions are met) the system undergoes a Hopf bifurcation, in which case we document the existence of highly irregular equilibrium price paths. © 2000 Published by Elsevier Science B.V. All rights reserved.

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1. Introduction

Overlapping generations (OLG) models of money (Samuelson, 1958; Wallace, 1980) typically display a continuum of deterministic rational expectations equilibria. One of these equilibria is the monetary steady state, in which fiat money retains a constant value forever. The other equilibria all converge to autarky, so that money gradually becomes worthless. The monetary steady state is appealing to economists largely because it corresponds to everyday experience; the other equilibria seem implausible because they do not. Agents in modern market economies take it for granted that, barring gross government misconduct, currency will retain its role as medium of exchange indefinitely. No U.S. resident places any serious probability on the economy degenerating into barter within the foreseeable future. The rational expectations hypothesis, however, provides no guidance as to which equilibrium path should prevail (Boldrin and Woodford (1990)). The problem (often called ‘indeterminacy’) is that each of these paths corresponds to *some* consistent set of expectations about future prices. This problem is serious because it implies that under rational expectations the OLG model cannot explain the existence of valued fiat money, which we have argued is a main ‘fact’ of everyday life.

Some have suggested resolving the indeterminacy problem by noting that when perfect foresight is replaced by learning rules, the OLG model often converges to the monetary steady state (Lucas, 1986; Marcat and Sargent, 1989a,b). Since learning rules provide a plausible approximation of how people actually behave, this convergence suggests that the monetary steady state is in fact the most reasonable long-run outcome.¹ Others, however, have shown that such answers to the indeterminacy problem suffer from an inherent lack of generality: while certain learning rules in certain models single out economically appealing equilibria, other rules in other models actually increase the number of possible equilibrium paths. In addition to generating explosive paths similar to those which emerge under perfect foresight (Evans and Honkapohja, 1994a,b), learning may lead to complex price paths which neither explode nor converge to the monetary steady state (Bullard, 1994; Grandmont and Laroque, 1991). In addition, Duffy (1994) shows that if agents use an adaptive rule to form expectations about inflation (rather than price level), then the economy can converge to a continuum of nonstationary equilibria.

Because of this lack of generality, Lucas (1986) believes it will be impossible to address fully the problem of indeterminacy via ‘purely mathematical’ methods: ‘It is hard to see what can advance the discussion short of assembling a collection of people, putting them in the situation of interest, and observing what they

¹ Evans and Honkapohja (1994a,b,1995) have written extensively on learning rules as selection criteria for rational expectations equilibria.

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