Available online at www.sciencedirect.com
SCIENCE DIRECT®
Journal of Economic Theory 112 (2003) 66–78
JOURNAL OF Economic Theory
http://www.elsevier.com/locate/jet

Optimal random monetary policy with nominal rigidity

Bill Dupor*

Finance Department, The Wharton School, University of Pennsylvania, 2322 Steinberg Hall-Dietrich Hall, Philadelphia, PA 19104-6367, USA

Received 3 September 1999; final version received 27 June 2002

Abstract

This paper studies a money-in-the-utility function model with imperfect competition and one-period ahead nominal price setting. Under standard assumptions on preferences, Friedman's rule—setting the money growth rate equal to the household time discount factor—generates an equilibrium that is optimal within the class of deterministic policies. We then provide conditions under which a random monetary policy increases ex ante expected welfare relative to Friedman's rule. The result obtains because random policy can reduce the distortion associated with imperfect competition. Our result exhibits original features relative to existing cases of welfare-improving random monetary policy, such as Polemarchakis and Weiss (J. Econom. Theory 15 (1977) 345).

JEL classification: D5; E5

Keywords: Monetary policy; Price rigidity; Randomness

Introduction

Optimal monetary policy has been studied extensively when the transactions demand for cash is the sole monetary friction.[1] In these environments, the government often should maximize real balances by equating the rate of return between monetary and non-monetary assets. Friedman's rule—setting the money

*Fax: +1-215-898-6200.
E-mail address: dupor@wharton.upenn.edu.

[1] A few examples are [4,6,14]. Woodford [20] argues that, in financially sophisticated economies, this friction may be less important than other rigidities.

0022-0531/03/$ - see front matter
doi:10.1016/S0022-0531(03)00100-5

growth rate equal to the household time discount factor—often accomplishes this goal. Much less work addresses this problem when additional frictions, such as nominal price rigidity, are present.[2] With imperfect competition and predetermined prices, adding a purely random component to the money growth rate may improve on Friedman's rule from the standpoint of households' ex ante expected utility.

We model imperfectly competitive product markets by assuming that firms engage in monopolistic competition. Nominal rigidity exists because each firm must set its nominal price one period in advance. Money-in-the-utility function (MIUF) is the source of money demand.[3] Here is the intuition for why randomness can be welfare improving. Firms choose a price to maximize expected real profits discounted by marginal utility. If marginal utility is sufficiently convex, firms respond to monetary policy risk by lowering their expected markup.[4] Reducing the expected markup raises expected household consumption, which offsets the market power distortion. The fall in the expected markup must be sufficiently large to offset the decrease in expected utility caused by introducing consumption variance.

Our mechanism is different from another case where random monetary policy is welfare improving. Polemarchakis and Weiss [18] establish that the optimal money growth rate involves infinite variance in the Lucas [12] islands model. In the islands model, imperfect information leads households to respond to information about prices in a distortionary manner. Adding noise to the money growth rate leads households to ignore this information and distortionary activity is not undertaken. A criticism of this form of optimal randomness is that, realistically, governments do not want to destroy the information content of prices. Our mechanism applies to a different class of models and is not subject to this criticism.

Our paper is closely related to the work of Blanchard and Kiyotaki [3], who study an economy with MIUF, monopolistic competition and predetermined prices.[5] In that paper, holding nominal prices fixed, monetary injections can raise aggregate demand, thereby increasing output and welfare. We expand on Blanchard and Kiyotaki by modelling dynamic nominal price setting and stochastic monetary policy explicitly, whereas they consider a static, deterministic model.

In the next section, we describe the model and its associated equilibria. In Section 2, we prove a theorem concerning the optimality of random policy. Section 3 concludes.

1. A nominal price rigidity model

In this section, we present a dynamic equilibrium MIUF model with imperfect competition in product markets and predetermined nominal prices. The only

[2] A few examples are [1,9,19].

[3] Feenstra [8] establishes an equilivalence between MIUF and cash-in-advance models.

[4] Our condition for randomness to be welfare-improving depends upon sufficiently strong prudence—convexity of marginal utility (see [10]). At the end of the paper, we discuss estimates of prudence and whether our condition is likely to be satisfied empirically.

[5] Bassetto [2], considers a non-monetary model where policy randomization may be welfare enhancing.