European Journal of Political Economy 27 (2011) 369–375

Contents lists available at ScienceDirect

European Journal of Political Economy

journal homepage: www.elsevier.com/locate/ejpe

Fiscal and monetary interaction under monetary policy uncertainty

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ARTICLE INFO

Article history:
Received 6 February 2010
Received in revised form 10 October 2010
Accepted 1 November 2010
Available online 17 November 2010

JEL classification:
E61
E63

Keywords:
Monetary–fiscal policy interactions
Parameter uncertainty
Symbiosis

ABSTRACT

Despite the increasing number of studies on monetary policy uncertainty, its role on the strategic interaction between fiscal and monetary policies has not been fully explored. Our paper aims to fill this gap by evaluating the consequences produced by multiplicative uncertainty in such a context.

1. Introduction

Nowadays one of the most important challenges for policymakers, in particular monetary authorities, is how to deal with uncertainty (Lane, 2003).[1] In a public speech, Alan Greenspan (2003) observed that "uncertainty is not just an important feature of the monetary policy landscape; it is the defining characteristic of that landscape." Central bankers face in fact a tremendous uncertainty about the state of the economy, its true structure and the impact policy actions have on the economy as "uncertainty – about the state of the economy, the economy's structure, and the inferences that the public will draw from policy actions or economic developments – is a pervasive feature of monetary policy making," in the words of another Fed Chairman, Ben Bernanke (2007).[2] Bernanke's speech also emphasizes that uncertainty may assume different forms. These can be summarized in model, parameter and data uncertainty.[3]

Many studies have recently revised the robustness of the optimal monetary policy prescriptions in the face of uncertainty. Among them some have attempted to highlight the importance of multiplicative or parameter uncertainty, i.e., when policymakers are uncertain about the structural parameters of the economy.[4] The interest on this kind of uncertainty is however old. About forty

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[1] Klomp and de Haan (2009) emphasized in a recent empirical study the effects of different kinds of uncertainty on macroeconomic volatility. In particular, they underline the relevance of monetary and fiscal policy uncertainty. Indeed, they focus on the effects of monetary and fiscal policy uncertainty on the outcomes, not on those of uncertain on policies. However, the two lines are clearly connected.

[2] Similar citations can be found in the public speeches of many other central bankers and in monetary authorities' operative meetings – e.g., "as a consequence of greater uncertainty – the second feature resulting from global economic integration–monetary policy formulation and implementation is more challenging, complex and demanding" (Solans, member of the executive board of the ECB, 2000) or "participants noted the considerable uncertainty surrounding estimates of the output and unemployment gaps and the extent of their effects on prices." (FOMC minutes, June 2009).

[3] See Dennis (2005) for a clear definition of this taxonomy.

[4] See Estrella and Mishkin (1999), Hansen and Sargent (2004), Onatski and Williams (2003), Peersman and Smets (1999), Svensson (1999), Rudebusch (2001, 2002), Giannoni (2002), Söderström (2002), Lawler (2002), Schellekens (2002), Walsh (2003), Castelnuovo and Surico (2004), Orphanides and Williams (2006), Gürkaynak et al. (2007).

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doi:10.1016/j.ejpoleco.2010.11.001

years ago, Brainard (1967) showed that multiplicative uncertainty affects policymakers' behavior and makes them more cautious, in the sense that they react less sharply to disturbances. By considering a linear quadratic context, Brainard (1967) shows that caution may be optimal because, in the presence of random multipliers, policy itself injects uncertainty into the economy. Aggressive policies, which might otherwise offset disturbances (under certainty or certainty equivalence[5]), can trigger further uncertainty via policy changes. Thus, when policymakers are unsure of the impact of their policy it would be preferable for them to adjust policy more cautiously and gradually; this is in summary Brainard's conservatism principle.[6]

Despite the increasing number of studies, the role of uncertainty in strategic contexts, in particular in the interactions between fiscal and monetary policies, has not been fully explored, although its empirical relevance has been emphasized.[7] Our paper tackles this issue by focusing on the effects of model uncertainty on the strategic interaction between fiscal and monetary authorities. Our aim is to evaluate the consequences produced by multiplicative uncertainty in a class of policy games recently developed by Dixit and Lambertini (2001, 2003a,b) — D&L from now onward. We test under parameter uncertainty some of D&L's prescriptions.

D&L's models are particularly attractive for our investigations as they consider both fiscal and monetary policies in a strategic but simplified New Keynesian framework and a non-linear structure for shocks on the basis of which the private sector forms its expectation. Hence they are appropriate to study policy interactions from our perspective.[8] In their models policymakers do however not face any uncertainty as they observe all the shocks. Under this assumption Dixit and Lambertini (2003b) show that if fiscal and monetary authorities share identical output and inflation targets, but not necessary equal trade-offs between these objectives (symbiosis assumption), ideal output and inflation can be always achieved.[9] We instead assume that through some process of theorizing and data analysis, policymakers have arrived at a reference model of the economy. They want to use this model to set policy, but are concerned about uncertain deviations from it. In particular, similar to Lawler (2007),[10] we assume uncertainty about the parameters of the monetary policy effectiveness: the central bank does not exactly know the value of some parameters but knows the distribution from which they were drawn.[11]

Our main findings are the following: D&L's symbiosis result no longer holds under unknown multiplicative shocks on monetary policy effects. Monetary uncertainty is not symmetric to the fiscal one, as the former may induce either more or less aggressive effects on the final outcomes according to the kind of existing interaction between the government and the central bank. Finally multiplicative uncertainty implies an endogenous Phillips relationship between inflation and output.

The rest of the paper is organized as follows. The next section describes our benchmark model when shocks are observed. In Section 3 we study the effects of multiplicative uncertainty on monetary policy effectiveness by assuming that policymakers may be not perfectly informed about all the shocks. A final section concludes.

2. The economic benchmark

We consider the extension of Dixit and Lambertini (2003b)[12] to multiplicative uncertainty for policymakers developed in Di Bartolomeo et al. (2009), where the focus is only on fiscal policy uncertainty. The model is described by two elements: the policymakers' losses and the structure of the economy. We assume that policymakers play simultaneously (Nash equilibrium).

The policymakers' expected losses depend on deviations of inflation π and real output y from some common targets, π^* and y^* (i.e., the symbiosis assumption). Formally, government's (L_G) and central bank's (L_B) preferences are:

$$L_i = E\left[\frac{1}{2}(\pi-\pi^*)^2 + \frac{\theta_i}{2}(y-y^*)^2\right] \text{ for } i\in\{G,B\} \tag{1}$$

where E denotes the expectation operator; θ_G and θ_B are their marginal rates of substitution between inflation and real output deviations from the targets. We assume a conservative central banker (i.e., $\theta_B \leq \theta_G$) — see e.g. Rogoff (1985) and Lambertini (2006).

The economy consists of a Lucas type supply equation and a simple demand equation:

$$y = \bar{y} + b(\pi-\pi^e) + ax \tag{2}$$

$$\pi = \varepsilon\pi_0 + \mu cx \tag{3}$$

[5] In this context, it is well known that additive shocks do not affect optimal policy.

[6] This principle has been challenged by some economists. Walsh (2003), e.g., shows that it cannot be obtained if the monetary authorities put no negligible weight on interest rate stabilization. In this case the central bank needs to act aggressively in order to neutralize the impact of demand shocks on output. See also Giuli (2010) for the case of Knightian uncertainty in a DSGE framework.

[7] See e.g. Lane (2003), De Grauwe and Sénégas (2006) and references therein.

[8] However, note that the model does not explicitly include interest rates and public debt. Thus, it does not consider important channels of interaction, e.g., the possibility of fiscal dominance. See e.g. Bajo-Rubio et al. (2009).

[9] Dixit and Lambertini (2001) also discuss the different results which are obtained when symbiosis does not hold.

[10] Who, however, focuses on the interaction between the central bank and the private sector (unions) under monetary policy uncertainty.

[11] The empirical relevance of parameter uncertainty for monetary policy has been emphasized, among others, by Sack (2000), Sack and Wieland (2000), Hall et al. (1999), and Tetlow and Ironside (2007).

[12] We only consider the one-country version of Dixit and Lambertini (2003b); however, our results can be easily extended to a monetary union (for a discussion, see Lambertini, 2006).