Robust Control and Monetary Policy Delegation

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1. Introduction

In the recent literature on optimal monetary policy, policymakers are assumed to know the true model of the economy and observe accurately all relevant variables. The sources and properties of economic disturbance are also taken to be known. Uncertainty in this case arises only due to the unknown future realisations of these disturbances. In this context, “uncertainty” means the realisation of an event whose true probability distribution is known. Pure uncertainty, where the state space of outcomes is known but one is unable to assign probabilities, has largely been ignored. In practice, the policymaker’s choice is made in the face of tremendous uncertainty about the true structure of the economy, the impact policy actions have on the economy, and even about the current state of the economy. The policymaker is therefore unsure about his model, in the sense that there is a group of approximate models that he also considers as possibly true. Because uncertainty is pervasive, it is important to understand how alternative policies work when the policymaker cannot accurately observe important macro variables or when he employs a model of the economy that is incorrect in unknown ways.

The resulting problem is one of robust control, in the sense of Hansen and Sargent (2004), where the objective is to choose a rule that will work under a range of different model specifications. The notion that policy decisions may be more robust if based on systematically distorted models of the economy is a key implication of the recent research on robust control1.  

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1 For an application of robust control framework to the optimal monetary rules, see Walsh (2004). Robust control framework is also applied in other topics in re-
In this context, it is particularly important to search for monetary policies that are able to deliver good macroeconomic outcomes even when policymakers are uncertain with regard to the true structure of the economy. The purpose of this paper is to show how a robust control framework of model misspecification doubts can be applied to the government’s problem of monetary policy delegation to a “conservative” central banker. More precisely, we try to give an answer to the question whether model uncertainty can affect the government’s optimal commitment to fight inflation, as well as its will to delegate the conduct of monetary policy to a “conservative” central banker.

We proceed from the assumption that the government has a model of the economy that it believes is a reasonable approximation to the true model but that this approximating model may be subject to misspecification. Rather than viewing the set of possible misspecifications as simply random, the policymaker assumes “nature” is an evil agent who will choose the misspecification that makes the policymaker look as bad as possible. In such an environment, we find that the government’s robust choice reveals the emergence of a precautionary behaviour in the case of uncertainty about the true structure of the economy, reducing its willingness to delegate monetary policy to a “conservative” central banker in the sense of Rogoff’s classical 1985 article.

The rest of the paper is organised as follows. Section 2 sets up a one-period model of monetary policy. Section 3 derives the discretionary equilibrium. Section 4 derives the optimal degree of conservativeness of the central banker. Section 5 summarises the main conclusions.

2. A one-period model of monetary policy

The model used here is based on Rogoff’s (1985) game-theoretic model of monetary policy delegation in which the policymaker sets inflation in view of the following standard expectation-augmented Phillips curve:

\[ u = u^* - (\pi - \pi^e) + \varepsilon \]

(1)

where \( u \) is the unemployment rate, \( u^* > 0 \) the natural rate of unemployment, \( \pi \) the inflation rate, \( \pi^e \) the rationally expected inflation rate, and \( \varepsilon \) is a random variable with mean zero and variance 1. However, according to Hansen and Sargent (2004), we modify Rogoff’s (1985) model by as-