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Asymmetric information and rational expectations: When is it right to be “wrong”?[☆]

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In this paper we examine the *effects* of private agents being less than fully rational in their expectations. We examine this in the context of monetary policy, where the Central Bank may have uncertain preferences either by choice or by necessity. The new feature is that we allow the public to react in two different ways. They either form rational expectations and internalize the uncertainty about the Central Bank's preferences in full; or alternatively, and if this process of internalization is costly, it forms a 'best' guess regarding those preferences. This implies a certainty equivalence strategy applied to the preference parameters. As those parameters enter the decisions non-linearly, a systematic error emerges. We examine the magnitude of the resulting error in inflation and output, following the assumption of certainty equivalence. Under all reasonable levels of uncertainty, this error turns out to be small but involves trading a deflation bias against the cost of gathering the information needed for the full information rational expectations' solution.

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1. Introduction

In the process of forming expectations, the assumption of rational expectations allows all agents involved to share information from the same set. However, when the assumption of common information breaks down, either because it is not feasible, or simply because it is too costly to try to acquire all the information that others have, then agents have to resort to second-guessing the reactions of their counterparts. In this paper we examine how “wrong” agents could be when making educated guesses about the behavior of others and compare the consequences to the ideal case of full information and rational expectations.

We apply a monetary policy example in which, from the point of view of the private sector, the Central Bank (CB) has uncertain preferences. This maybe either by choice – because the bank itself chooses not to reveal certain aspects of what it knows – or by necessity – because the Central Bank does not have firm information itself and is therefore unable to commit to one specific set of parameters for all circumstances. The first case is the traditional one, in which the private sector faces preference uncertainty or control errors and has been studied by many authors [*inter alia*, Faust and Svensson (2001, 2002), Geraats (2002), Muscatelli (1998), Sibert (2002), Walsh (1999)]. The second case can be associated with potentially time inconsistent preferences in which the parameters applied by the Central Bank (CB) are state contingent, randomized or otherwise varied. In that case the Central Bank is unable to announce in advance exactly what values might be taken at any specific time. This kind of model has not been widely studied, but two key examples may be found in the *Rational Inattention* model of Sims (2003) and the *Constructive Ambiguity* approach of Cukierman and Meltzer (1986).

In this paper, we assume that there is uncertainty about what the Central Bank preferences really are and examine how the private sector might react when it is unsure about the source and the extent of this uncertainty. We also assume, as in most studies, that the private sector is unable to internalize the full effects of the uncertainty it faces. This may happen either because it does not realize that the Central Bank may be uncertain itself; or because it may not have sufficient information to characterize that uncertainty fully; or because it is too expensive to do so accurately. Instead it applies a first order certainty equivalent (FOCE) estimate of what the Bank is likely to deliver. Such simplifications, realistic though they may be in terms of how people actually behave, inevitably lead to systematic errors in private sector forecasts of inflation and the output gap. In order to evaluate these errors we compare the resulting inflation rate to that achieved when the private sector is fully rational and internalizes the consequences of the CB's preference uncertainty. Note that, unlike the literature on bounded rationality which investigates the *reasons* for not following a full rational expectations' solutions, we examine the *effects* here. We find that under all reasonable levels of preference uncertainty, the errors made by following a regime of certainty equivalence are small. If the costs of acquiring the extra information necessary to form rational expectations are significant, then a regime of certainty equivalence may become the optimal strategy.

The paper is organized as follows. Section 2 provides a standard set-up of monetary policy making. Section 3.1 then presents the full information rational expectations' solution when the private sector internalizes in full the effects of this uncertainty. Section 3.2 shows what happens to that solution when the private sector makes a simple assumption on the form of this uncertainty. We compare the two solutions in Section 4 and discuss how monetary policy might be affected by such an assumption on the way the private sector forms expectations. Furthermore, through the use of two examples, we evaluate and compare the welfare losses that the two solutions entail. Section 5 summarizes our results and concludes.

2. The set-up

We apply a monetary policy example to demonstrate that although preferable, rational expectations are not very different to scenarios where simple assumptions are imposed on the uncertain variables. We adopt a standard framework for examining the society's welfare losses:

$$L = \frac{1}{2}E[\pi^2 + b(y - k)^2], \quad (1)$$

constrained by a simple Lucas supply function:

$$y = \pi - \pi^e + \varepsilon, \quad (2)$$

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