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Optimal target criteria for stabilization policy ☆

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Abstract

This paper considers a general class of nonlinear rational-expectations models in which policymakers seek to maximize an objective function that may be household expected utility. We show how to derive a target criterion that is: (i) consistent with the model's structural equations, (ii) strong enough to imply a unique equilibrium, and (iii) optimal, in the sense that a commitment to adjust the policy instrument at all dates so as to satisfy the target criterion maximizes the objective function. The proposed optimal target criterion is a linear equation that must be satisfied by the projected paths of certain economically relevant "target variables." It takes the same form at all times and generally involves only a small number of target variables, regardless of the size and complexity of the model. While the projected path of the economy requires information about the current state, the target criterion itself can be stated without reference to a complete description of the state of the world. We illustrate the application of the method to a nonlinear DSGE model with staggered price-setting, in which the objective of policy is to maximize household expected utility.

JEL classification: C61; C62; E32; E52

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☆ The views expressed herein are solely those of the authors and do not necessarily reflect those of the Federal Reserve Bank of New York or the Federal Reserve System.

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1. Introduction

Forecast targeting has become an increasingly popular approach, both to the organization of monetary policy deliberations and to communication with the public about monetary policy decisions, at central banks around the world. In this approach, a contemplated forward path for policy is judged correct to the extent that quantitative projections for one or more economic variables, conditional on the contemplated policy, conform to a *target criterion.*[1] The present paper considers whether the conditions required for the conduct of policy to maximize welfare can be cast in the form of such a target criterion.[2] This has previously been shown to be possible in special examples in Svensson and Woodford (2005) and Giannoni and Woodford (2005). These papers showed, for instance, that in the simple linearized New Keynesian model with a quadratic policy objective function that depends on variation in inflation π_t and the output gap x_t, the optimal target criterion can be expressed as a simple linear combination of the form:

$$\pi_t + \phi\,(x_t - x_{t-1}) = 0, \tag{1.1}$$

where ϕ is a coefficient that depends on the model's structural parameters. A commitment to setting the policy instrument (*e.g.*, the short-term interest rate) at each date and in each state so as to satisfy this relationship implements the optimal equilibrium.

In this paper, we consider a general class of stabilization problems, in which the set of possible equilibrium evolutions of the economy is determined by a system of structural equations characterizing the behavior and constraints of the private sector. (Our abstract framework need not apply only to monetary policy,[3] though that is the leading example that motivates our formulation of the problem.)

We show that it is possible quite generally to choose a target criterion with three important properties. First, we seek a target criterion that is consistent with the structural equations. Second, the target criterion should be strong enough to imply a determinate forward path for the economy. Thus we must verify that there exists an evolution that satisfies the target criterion, looking forward from any possible situation that may have been reached, and also that the evolution consistent with the target criterion is unique. Third, we seek a target criterion such that the state-contingent evolution determined by the criterion is optimal, in the sense of maximizing an ex ante expected welfare criterion.

It might be thought that a sufficient solution to this problem would simply be to compute the optimal state-contingent evolution of all endogenous variables, under an optimal commitment chosen at some initial date t_0, and to refer to the solution to this problem at any later date t to determine what forward path for policy from date t onward is consistent with the optimal equilibrium. In practice, however, such a once-and-for-all description of the optimal evolution under all possible situations that can ever arise will be impractical, even for decision-making

[1] For further discussion and examples, see, *e.g.*, Svensson (1997, 2005). Advantages of formulating policy in terms of a target criterion, rather than an explicit instrument rule, are discussed in Svensson (2003, 2011) and Woodford (2011, 2012).

[2] The present exposition offers a simpler expression for the optimal target criterion than in our previous attempt at a general theory, in Giannoni and Woodford (2003a), in addition to allowing a considerably more general class of possible objectives for policy, so that the present approach can be applied to problems, like the one in section 4, where the objective of policy is assumed to be the maximization of household utility.

[3] Benigno and Woodford (2004) show how (joint) optimal monetary and fiscal policy can be implemented by having the monetary and fiscal authorities each responsible for satisfaction of a target criterion.