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A defense of moderation in monetary policy

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ABSTRACT

This paper examines the implications of uncertainty about the effects of monetary policy for optimal monetary policy with an application to the current situation. Using a stylized macroeconomic model, I derive optimal policies under uncertainty for both conventional and unconventional monetary policies. According to an estimated version of this model, the US economy is currently suffering from a large and persistent adverse demand shock. Optimal monetary policy absent uncertainty would quickly restore real GDP close to its potential level and allow the inflation rate to rise temporarily above the longer-run target. By contrast, the optimal policy under uncertainty is more muted in its response. As a result, output and inflation return to target levels only gradually. This analysis highlights three important insights for monetary policy under uncertainty. First, even in the presence of considerable uncertainty about the effects of monetary policy, the optimal policy nevertheless responds strongly to shocks: uncertainty does not imply inaction. Second, one cannot simply look at point forecasts and judge whether policy is optimal. Indeed, once one recognizes uncertainty, some moderation in monetary policy may well be optimal. Third, in the context of multiple policy instruments, the optimal strategy is to rely on the instrument associated with the least uncertainty and use alternative, more uncertain instruments only when the least uncertain instrument is employed to its fullest extent possible.

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1. Introduction

The Federal Reserve has been criticized by some for not acting aggressively enough to meet its statutory mandate of maximum employment and price stability (see, for example, Krugman, 2012). Inflation is below the Federal Reserve's preferred 2% rate and the unemployment rate is elevated and, according to many forecasts, these conditions are expected to persist for some time. These commentators argue that a more expansionary monetary policy stance would lower the path of the unemployment rate and raise the inflation rate. According to this argument, under reasonable assumptions regarding preferences over the two objectives, such a policy would bring the Fed closer to its mandated objectives more quickly.

The claim that the Fed is responding insufficiently to the shocks hitting the economy rests on the assumption that policy is made with complete certainty about the effects of policy on the economy. Nothing could be further from the truth. Policymakers are unsure of the future course of the economy and uncertain about the effects of their policy actions. Uncertainty about the effects of policies is especially acute in the case of unconventional policy instruments such as using the Fed's balance sheet to influence financial and economic conditions. And, as is well known since the seminal work of Brainard (1967), uncertainty about the effects of policy may be an argument for attenuated policy responses to shocks. This conservatism

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principle of optimal policy under uncertainty implies that one cannot necessarily infer from point forecasts of persistently low inflation and elevated unemployment that monetary policy is suboptimal.

This paper examines the implications of uncertainty for optimal monetary policy with an application to the current situation. I start with a stylized static macroeconomic model and derive optimal monetary policies under both certainty and uncertainty. I then examine optimal policy in the current environment using an estimated version of the stylized model. In this model, the Federal Reserve possesses two monetary policy instruments: the federal funds rate and unconventional balance sheet policies. The federal funds rate is assumed to be subject to a zero lower bound, giving rise to the use of the balance sheet instrument. Based on empirical studies, uncertainty regarding the effects of unconventional balance sheet policies on the economy is greater than for conventional policies.

According to the estimated stylized model, the US economy is currently suffering from a large and persistent adverse demand shock. Optimal monetary policy absent uncertainty would quickly restore real GDP close to its potential level and allow the inflation rate to temporarily rise somewhat above the 2% longer-run target. Thus, this model captures the argument of critics that more aggressive policy could bring the economy rapidly close to target levels in a world of perfect certainty. In contrast, the optimal policy under uncertainty is much more muted in its response to the negative demand shock. As a result, output and inflation return to their target levels only gradually.

This analysis highlights three important insights for monetary policy under uncertainty. First, even in the presence of considerable uncertainty about the effects of monetary policy, the optimal policy nevertheless responds strongly to shocks: uncertainty does not imply inaction. Indeed, in the estimated model, the optimal conventional and unconventional policy responses in the current situation are quite strong, just not as strong as would be called for absent uncertainty. Second, one cannot simply look at point forecasts and judge whether policy is optimal or not. One needs to evaluate policy in the context of the distribution of forecasts that accounts for uncertainty. Indeed, once one recognizes uncertainty, some moderation in monetary policy may well be optimal. Third, in the context of multiple policy instruments, the optimal strategy is to rely on the instrument with the least uncertainty and use other, more uncertain instruments, only when the least uncertain instrument is employed to its fullest extent possible.

The paper is organized as follows. Section 2 describes a simple static model and derives optimal monetary policy under certainty and uncertainty. Section 3 extends the model to include an unconventional monetary policy instrument and the zero lower bound on nominal interest rates. Section 4 reports optimal monetary policy based on empirical estimates of uncertainty regarding the effects of monetary policy actions. Section 5 applies these results to the current situation and reports forecasts under alternative monetary policy assumptions. Section 6 examines the effects of costs to unconventional monetary policy not captured by the model. Section 7 concludes.

2. Optimal conventional monetary policy in a simple static model

This section analyzes a simple static macroeconomic model that facilitates the analytical derivation of the optimal conventional monetary policy, both under certainty and uncertainty. By conventional monetary policy, I mean the use of the short-term interest rate as the policy instrument. This stylized model exactly corresponds to the textbook New Keynesian model in the case of i.i.d. shocks, the absence of a commitment technology on the part of the policymaker, and a zero target rate of inflation (Levin and Williams, 2003). In the following section, the model is extended to incorporate unconventional monetary policy and the zero lower bound.

The central bank seeks to minimize expected squared fluctuations in the inflation gap (the difference between the inflation rate and the central bank's target rate of inflation) and the output gap (defined as the percent deviation between the actual level of output and potential output). Specifically, the central bank's objective is to minimize the quadratic loss:

$$\mathcal{L} = E\{(\pi - \pi^*)^2 + \lambda y^2\}, \tag{1}$$

where π denotes the inflation rate, π^* is the target rate of inflation, y is the output gap, and E denotes expectations. The parameter $\lambda \geqslant 0$ is the fixed weight the policymaker places on output gap stabilization relative to inflation stabilization. The target inflation rate is assumed to be constant.

The model economy is described by equations for the output gap and the inflation rate. The output gap equation is given by:

$$y = -\eta(r - r^*) + u, \tag{2}$$

where r denotes the short-term nominal interest rate, r^* is the constant equilibrium interest rate, and u is an i.i.d. mean zero demand shock with variance σ_u^2. Note that the output gap is assumed to be negatively related to the nominal interest rate, not the real interest rate. This assumption simplifies the derivations, but does not materially affect the main results of the paper. The inflation equation is given by:

$$\pi = \pi^* + \kappa y + e, \tag{3}$$

where e is an i.i.d. mean zero inflation shock with variance σ_e^2. Note that if the output gap and the inflation shock are both zero, the inflation rate equals the target rate of inflation.