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Regime switching and monetary policy measurement[☆]

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Abstract

This paper applies regime-switching methods to the problem of measuring monetary policy. Policy preferences and structural factors are specified parametrically as independent Markov processes. Interaction between the structural and preference parameters in the policy rule serves to identify the two processes. The estimates uncover policy episodes that are initiated by switches to “dove regimes,” shown to Granger-cause both NBER recessions and the Romer dates. These episodes imply real effects of monetary policy that are smaller than those found in previous studies.

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1. Introduction

Beginning with Hamilton's (1989) study of business cycle dynamics, regime-switching methods have proven extremely useful in a wide range of applications in macroeconomics and finance.¹ This approach also holds promise for the measurement of monetary policy, since policy is typically regarded in terms of fluctuations between persistent regimes involving stronger or weaker anti-inflationary postures. Commonly used vector autoregression (VAR) methods for measuring policy cannot capture such persistent policy regimes, as these methods can identify only highly transitory policy shocks.²

This paper conducts an exploratory study of the use of regime switching for estimating monetary policy preferences. Our strategy is to avoid theoretical details by adopting a stylized model of policy determination that captures inflation/unemployment tradeoffs in a simple way. This approach allows for straightforward resolution of estimation issues, and our results may be viewed as a first assessment of the usefulness of regime switching for monetary policy measurement.

The model posits that the policymaker is constrained by a standard expectations augmented Phillips curve. The Phillips curve contains a parameter that follows a two-state Markov process, reflecting periodic shifts in the natural rate of unemployment. The policymaker adopts an inflation target that embodies tradeoffs between inflation and unemployment, captured by a preference parameter that follows an independent two-state Markov process. The latter process switches between a "dove regime," in which the policymaker more readily accommodates increases in the natural rate, and a "hawk regime," in which there is less accommodation. Characterizing the policy process relies on the fact that a rise in the natural rate leads to a larger increase in the inflation target when the preference parameter is in the dove state, relative to the hawk state. Since the policy process is uncorrelated with the reduced-form residuals, the natural rate process can be distinguished probabilistically from the policy process, making it possible to estimate both processes.

Estimates of the model are obtained by means of Gibbs sampling using monthly data over the period 1965:3–1999:2. Highly persistent natural rate and policy processes are estimated, each having statistically distinct state values. Further, we obtain estimates of the posterior expected values of both the natural rate and policy parameters over the sample period, providing a picture of the evolution of natural rate and policy regimes. The policy process, in particular, displays three "dove episodes"—one each in the late 1960s, mid-1970s, and an interval around 1980. These episodes correspond closely to the onset of NBER recessions, as well as to the

¹See Kim and Nelson (1999) for a survey of regime-switching methods and applications.

²See Christiano et al. (1999) for a survey of the large literature that has utilized VAR methods to measure monetary policy. Within a structural VAR model, Bernanke and Mihov (1998) have utilized regime switching to measure shifts between the targeting of the federal funds rate and nonborrowed reserves. Recently, Sims (1999) and Rigobon and Sack (2003) have estimated regime-switching models of interest rate reaction functions. Sims and Zha (2002) and Owyang (2002) have recently considered Markov-switching in monetary VARs.

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