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Drifts and volatilities: monetary policies and outcomes in the post WWII US

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Abstract

For a VAR with drifting coefficients and stochastic volatilities, we present posterior densities for several objects that are pertinent for designing and evaluating monetary policy. These include measures of inflation persistence, the natural rate of unemployment, a core rate of inflation, and 'activism coefficients' for monetary policy rules. Our posteriors imply substantial variation of all of these objects for post WWII US data. After adjusting for changes in volatility, persistence of inflation increases during the 1970s, then falls in the 1980s and 1990s. Innovation variances change systematically, being substantially larger in the late 1970s than during other times. Measures of uncertainty about core inflation and the degree of persistence covary positively. We use our posterior distributions to evaluate the power of several tests that have been used to test the null hypothesis of time-invariance of autoregressive coefficients of VARs against the alternative of time-varying coefficients. Except for one, we find that those tests have low power against the form of time variation captured by our model.

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1. Introduction

This paper extends the model of Cogley and Sargent (2001) to incorporate stochastic volatility and then reestimates it for post World War II US data in order to shed light on the following questions: Have aggregate time series responded via time-invariant linear impulse response functions to possibly heteroskedastic shocks? Or is it more likely that the impulse responses to shocks themselves have evolved over time because of drifting coefficients or other nonlinearities? We present evidence that shock variances evolved systematically over time, but that so did the autoregressive coefficients of VARs. One of our main conclusions is that much of our earlier evidence for drifting coefficients survives after we take stochastic volatility into account. We use our evidence about drift and stochastic volatility to infer that monetary policy rules have changed and that the persistence of inflation itself has drifted over time.

1.1. *Time invariance versus drift*

The statistical tests of Sims (1980, 1999) and Bernanke and Mihov (1998a, 1998b) seem to affirm a model that contradicts our findings. They failed to reject the hypothesis of time-invariance in the coefficients of VARs for periods and variables like ours. To shed light on whether our results are inconsistent with theirs, we examine the performance of various tests that have been used to detect deviations from time invariance. We find that those tests have low power against our particular model of drifting coefficients, except for one test. And that test actually rejects time invariance in the data. These results about power help reconcile our findings with those of Sims and Bernanke and Mihov.

1.2. *Bad policy or bad luck?*

This paper organizes evidence within a formal statistical model. We use the patterns of time variation that our statistical model detects to shed light on some important substantive and theoretical questions about post WWII US monetary policy. These revolve around whether it was bad monetary policy or bad luck that made inflation–unemployment outcomes worse in the 1970s than before or after. The view of DeLong (1997) and Romer and Romer (2002), which they support by selecting interesting anecdotes and passages from government reports, asserts that it was bad policy. Their story is that during the 1950s and early 1960s, the Fed understood a correct model (which in their view incorporates the natural rate theory that asserts that there is no exploitable trade off between inflation and unemployment); that Fed policy makers in the late 1960s and early 1970s were seduced by Samuelson and Solow (1960) promise of an exploitable trade-off between inflation and unemployment; and that under Volcker's leadership, the Fed came to its senses, again accepted the natural rate hypothesis, and used monetary policy to arrest inflation.

Aspects of this "Berkeley view"[1] receive backing from statistical work by Clarida et al. (2000) and Taylor (1993), who fit monetary policy rules for subperiods that they choose to

[1] Sargent (2002) summarizes and evaluates the Berkeley view.