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Natural rate doubts

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Abstract

We study the low frequency comovements in unemployment, inflation and the federal funds rate in the U.S. From 1970 through 1979 all three series trended up together; after 1979 they all trended down. The conventional explanation for the buildup of inflation in the 1970s is that the Fed reacted to an increase in the natural rate of unemployment by conducting an overly passive monetary policy. We show that this explanation is difficult to reconcile with the observed comovement of the Fed funds rate and inflation. We argue instead that the source of the inflation buildup in the 1970s was a downward drift in the real interest rate that was translated into a simultaneous increase in unemployment and inflation by passive Fed policy. Our explanation relies on the existence in the data of a positive long-run unemployment–inflation relationship. This is consistent with non-superneutrality of money in the long-run, and hence the title of our paper 'natural rate doubts'.
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1. Introduction

Many macroeconomic time series are highly persistent and often these data are well modeled as cointegrated processes. Examples include the work by King et al. (1991). They link gross domestic product, consumption and investment by a pair of cointegrating equations that represent the 'great ratios'. King et al. have argued that inflation, the nominal interest rate and money growth are non-stationary but cointegrated in post-war U.S. data and that the unemployment rate is highly persistent and well approximated as an $I(1)$ variable in small samples. This paper shows how to use evidence from estimated cointegrating relationships like these to make inferences about the plausibility of alternative long-run structural models.

Typically, the data generating processes for macroeconomic time series are assumed to be autoregressive series whose joint distribution can be represented by vector autoregressions (VARs). However, it is well known that in practice VARs that are estimated from macroeconomic time series data very often suffer from parameter non-constancy, even if the samples are of modest length (see e.g. Rudebusch, 1998). A related issue in applied theoretical work is that assumptions about the underlying shocks – typically Gaussian – often do not hold when models are confronted with real world macro data. Several remedies have been proposed to this problem. The simplest, and one we follow in this paper, is to split a sample into sub-periods that are separated by one or more breaks and to model each sub-period separately by a stable parameter VAR (see e.g. Juselius (2001) for an early application).[2] In this paper we apply this method to a cointegrated VAR model, similar to that of King et al. We develop a reduced form that displays parameter shifts across sub-samples but parameter stability (including constant variance) within a given regime. We show how to use this estimated reduced form to distinguish between alternative structural models.

We illustrate our approach in the context of U.S. monetary policy and we show that the data can be used to shed light on the natural rate hypothesis, i.e., the assumption that the long-run unemployment rate is independent of monetary and fiscal policy.

In Section 2 we locate our work within the recent literature. Section 3 discusses the characteristics of the data and describes a statistical model that can account for these characteristics. Our main finding is that when a sample of U.S. data is split into two sub-samples, each sub-sample is well described by a cointegrated VAR with a single common trend and two cointegrating relationships. We estimate the parameters of the cointegrating relationships for each regime and find that one of them is stable across regimes but the other is different before and after 1979.

In Sections 4 and 5 we interpret our empirical results within a class of three equation new Keynesian models (NKM) each of which embodies the natural rate hypothesis. Under our identifying assumptions we are led to doubt the ability of this

[2]Alternative approaches to the issue of parameter instability includes work by Sims and Zha (2004) who apply the Markov switching approach and Cogley and Sargent (2005) who adopt a random coefficient approach. We discuss these alternatives further in Section 4.3.

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