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Common stochastic trends, common cycles, and asymmetry in economic fluctuations ☆

Chang-Jin Kim[a], Jeremy Piger[b,*]

[a] *Korea University, Anam-Dong, Seongbuk-ku, Seoul, 136-701, South Korea*
[b] *Federal Reserve Bank of St. Louis, 411 Locust Street, St. Louis, MO 63102, USA*

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Abstract

This paper investigates the nature of U.S. business cycle asymmetry using a dynamic factor model of output, investment, and consumption. We identify a common stochastic trend and common transitory component by embedding the permanent income hypothesis within a simple growth model. Markov-switching in each component captures two types of asymmetry: Shifts in the growth rate of the common stochastic trend, having permanent effects, and "plucking" deviations from the common stochastic trend, having only transitory effects. Statistical tests suggest both asymmetries were present in post-war recessions, although the shifts in trend are less severe than found in the received literature.

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1. Introduction

The question of whether the dynamics of recessions are different from those of expansions has a long history. Early students of the business cycle, including

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*Corresponding author. Tel.: +1-314-444-8718; fax: +1-314-444-8731.
E-mail address: piger@stls.frb.org (J. Piger).

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Mitchell (1927), Keynes (1936), and Burns and Mitchell (1946) noted that declines in economic activity take hold quicker, are steeper, and last for a shorter amount of time than expansions. To these observers, recessions appeared to come from a different regime than booms. Recent interest in this type of asymmetry was sparked by Salih Neftci (1984), who presented evidence that increases in the unemployment rate are sharper and shorter than declines.

Since that time, two parametric time-series models of U.S. output were proposed that are capable of capturing steep, short recessions. However, they are fundamentally different in their implications for the effects of recessions on the long run level of output. In other words, the hypothesized persistence of shocks that lead to recessions is very different in the two models. The first model, due to Hamilton (1989), divides the business cycle into two phases, negative trend growth and positive trend growth, with the economy switching back and forth according to a latent state variable. This two-phase business cycle implies that following the trough of a recession, output switches back to the expansion growth phase, never regaining the ground lost during the downturn. Recessions will therefore have permanent effects on the level of output. The second model, having its roots in work by Friedman (1964, 1993) and recently formalized in an econometric model by Kim and Nelson (1999a), suggests that recessions are periods where output is hit by large negative transitory shocks, labeled "plucks" by Friedman. Following the trough, output enters a high growth recovery phase, returning to the trend. This "bounce-back effect" or "peak-reversion" is the critical phase of Friedman's model. Output then begins a normal, slower growth, expansion phase. Thus, Friedman's view is that recessions are entirely transitory deviations from trend, not movements in the trend itself.

Both forms of asymmetry have received substantial attention in the empirical literature, with conflicting conclusions. Using classical likelihood based tests, Hansen (1992) and Garcia (1998) both fail to reject a linear autoregressive model in favor of Hamilton's model for U.S. GNP. Kim and Nelson (2001) reach a similar conclusion using Bayesian methods. On the other hand, both Chib (1995) and Koop and Potter (1999) find evidence in favor of Hamilton's model using Bayesian techniques. Support for the peak-reversion implication of Friedman's model is given by Wynne and Balke (1992, 1996), Sichel (1993, 1994), and Beaudry and Koop (1993). However, Elwood (1998) argues that the evidence in favor of peak-reversion has been overstated. Specifically, Elwood presents evidence that negative shocks are not significantly less persistent than positive ones for U.S. GNP. A shortcoming of this empirical literature is that most authors have analyzed the two forms of asymmetry separately from one another. That is, little attention is paid to evaluating the marginal significance of the two forms of asymmetry.[1] An additional shortcoming is the literature's domination by univariate analysis. As pointed out by Kim and

[1] An exception is Kim and Murray (2002), who estimate a dynamic factor model that incorporates both types of asymmetry discussed above. However, their investigation employs economic indicators that are not cointegrated. Also, they do not investigate the implications of their model for the dynamics of real GNP.