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# The size and dynamic effect of aggregate-demand and aggregate-supply disturbances in expansionary and contractionary regimes

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**Abstract**

This paper examines the existence, size and dynamic effect of temporary aggregate-demand disturbances and permanent aggregate-supply disturbances to economic output in expansionary and contractionary regimes. It estimates a structural, bivariate threshold model which exploits the joint behavior of output and unemployment. This model finds that aggregate-demand (aggregate-supply) disturbances dominate output fluctuations in the contractionary (expansionary) regime. This is consistent with macroeconomic models with an aggregate-supply ceiling, credit rationing, or a convex aggregate-supply curve. It implies that policymakers should minimize the variance of aggregate-demand disturbances and maximize the level of aggregate supply.


*JEL classification:* E32; C32
*Keywords:* Threshold nonlinearity; Structural bivariate threshold model; Temporary–permanent decomposition; Expansionary and contractionary economic regimes; Asymmetric output innovations

## 1. Introduction

There has been a substantial debate in macroeconomics over the past 20 years regarding whether innovations to time series of economic output are temporary, permanent, or a combination of the two. If output innovations are temporary, then

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output fluctuates around an equilibrium trend in a predictable manner and inference consists of projecting the equilibrium trend into the future. If output innovations are permanent, then output drifts upward without any tendency toward an equilibrium and any observed cycles are spurious. Alternatively, some innovations may be temporary and others permanent if output is appropriately characterized as temporary fluctuations around an upward drift. This situation would exist if output responded differently to different types of economic disturbances such as aggregate-demand and aggregate-supply disturbances. The resolution of this debate has important consequences for theories of business-cycle fluctuations, theories of economic growth, macroeconomic models, and macroeconomic policy.

Nelson and Plosser (1982) initiated this debate, and they were followed by many prominent univariate and multivariate output studies. These studies, however, do not yield a consensus regarding the existence, size or dynamic effect of temporary and permanent innovations in economic output. Among the univariate studies, Campbell and Mankiw (1987) and Nelson and Plosser (1982) find that output innovations are largely permanent, Clark (1987) and Watson (1986) find that less than half of the output innovations are permanent, and Cochrane (1988) finds few or no permanent output innovations. Among the multivariate studies, Blanchard and Quah (1989), King et al. (1991), and Shapiro and Watson (1988) find that permanent innovations generally account for the majority of the long-run output variance, while Cochrane (1994) finds that permanent innovations account for relatively little of the long-run output variance.

These prominent univariate and multivariate output studies all assume that the data generating process for output is linear. There is a growing consensus, however, that output evolves as a nonlinear process in which there is an asymmetry over the business cycle. For example, see Brunner (1992) who applies a seminonparametric approach; Cooper (1998) who applies regression tree analysis; Ghysels (1994), Goodwin (1993) and Hamilton (1989) who apply Markov regime-switching models; and Sichel (1993) who uses the coefficient of skewness. Cover (1992), DeLong and Summers (1988) and Karras (1996) find that negative monetary disturbances to aggregate demand reduce output, but positive monetary disturbances to aggregate demand have no effect on output. Beaudry and Koop (1993) and Potter (1995) analyze output innovations by estimating univariate, nonlinear threshold models which explicitly account for two economic regimes. Beaudry and Koop (1993) find that negative output innovations are much less persistent than positive output innovations, and Potter (1995) finds that output innovations have a stabilizing impact in a contractionary regime in that output naturally reverts back toward an expansionary regime.

This paper analyzes output innovations, but it is distinguished from previous studies in that it takes a multivariate, nonlinear approach. First, it applies Tsay's (1998) chi-squared test for multivariate threshold nonlinearity. Using the growth rate of output as the threshold variable, this test shows that output and unemployment are highly consistent with threshold nonlinearity. The growth rate of output is used as the threshold variable because it is a stationary time series, and because output is the primary, single time series used to identify business-cycle fluctuations and economic growth. Then this paper partitions output and unemployment into expansion-