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Asymmetry in business fluctuations: International evidence on Friedman's plucking model

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Abstract

Friedman's plucking model of business fluctuations suggests that output cannot exceed a ceiling level, and it is occasionally plucked downward by recession; output has depth and steepness. This study uses a sample of 12 industrial and emerging economies and finds some evidence that negative shocks are largely transitory, while positive shocks are mostly permanent. In a few cases, as implied by the plucking model, output fluctuations tend to be asymmetric: recessions are transitory, and duration dependent, although expansions are not. There is, however, serial correlation in almost all cases. International evidence on Friedman's plucking model is far from robust.

JEL classification: C3; E32

Keywords: Business cycle asymmetries; Markov-switching; Kalman filter

1. Introduction

Mitchell (1927) and Keynes (1936) noted that business contractions are briefer than business expansions, and they are also more sudden and violent. Therefore, business fluctuations are asymmetric; they display *depth and steepness*, in the terminology of Sichel (1993) and Ramsey and Rothman (1996). A real output series has depth if its troughs are deeper than its expansions are tall, and has steepness if its downturns are steeper than its expansions. Friedman (1964, 1993)

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also noted asymmetry in real output behavior in that the amplitude of a real output contraction is strongly correlated with the succeeding expansion, but the amplitude of an expansion is not correlated with the amplitude of the succeeding contraction. That observation led him to propose the ''plucking'' model of business cycles.

In the plucking model, output grows most of the time close to its natural rate determined by the resources available and the institutions that organize them, but it is plucked downward occasionally; hence, output has depth.[1] The plucking model is also consistent with Keynes' observation that downturns are steeper than are expansions. The plucking model suggests that output fluctuations are asymmetric and recessions transitory.[2]

Business cycle asymmetries such as the one suggested by Mitchell, Keynes, and Friedman have been studied in the literature (e.g., Neftcy, 1984; Hamilton, 1989; DeLong and Summers, 1986; Diebold et al., 1993). Friedman (1993) himself applied correlation analysis to the United States' real GNP and found evidence on the ceiling effect on real output and on the regularity that the size of a contraction influences the size of the subsequent expansion but not the other way round.

Studies on business cycle asymmetries, however, tend to be for real output in the United States; international evidence is relatively scarcer. Goodwin and Sweeney (1993) are one exception. They apply Friedman's correlation method and a frontier production approach to a set of eight industrial countries. They find that although there is weak support for the hypothesis of steepness, there is substantial support for the proposal that the output ceiling plays a major role in business cycle fluctuations in Canada, France, Germany, Switzerland, and the United States.[3] Also, Balke and Wynne (1992, 1996) find evidence of depth but not of steepness—defined as the average monthly growth rate of output over the course of the recession—or length for G7 countries. Razzak (2001) applies a nonparametric test to a set of six industrial countries and finds that Japan and Australia real GDP series show significant depth, while there is only significant steepness in real GDP for New Zealand.[4]

More recently, Ho and Tsui (2003) use the exponential generalized autoregressive conditional heteroskedasticity (EGARCH) model to test whether negative shocks generate higher volatility in output than positive shocks of the same magnitude. They find it to be the case for the United States and Canada, but not for the United Kingdom and Japan.[5] Using a nonparametric approach, Cook (2004) finds widespread evidence of business cycle asymmetry in a sample of 22 countries spanning the period 1870–1994. Kim et al. (2005) extend Hamilton's model with a ''bounce-back'' term linking the length of each recession with the strength of the following recovery (a regime-switching model in the trend component of output).[6] They find evidence of a strong ''bounce-back'' effect only for the United States and

[1] The plucking model is different from real business cycle models in that output shocks in the latter are always permanent.

[2] Another strand of literature looks at the problem from the employment viewpoint. For example, Caballero and Hammour (1994) find that job destruction is more cyclically responsive than job creation, and that while job creation is symmetric around its mean, job destruction is highly asymmetric. This may suggest that the output behavior asymmetries noted by Friedman are smoothed out through the asymmetry in the job creation process.

[3] The sample covers real GNP, 1957:1–1990:1, for Canada, France, Germany, Italy, Japan, Switzerland, the United Kingdom, and the United States.

[4] The sample covers real GDP, 1960:4–1999:2, for Australia, Germany, Japan, New Zealand, the United Kingdom, and the United States.

[5] The sample period is 1961:Q1–1997:Q4.

[6] The sample comprises the period 1947:Q1–2003:Q1 for the United States and the period 1973:Q1–2003:Q1 for Australia, Canada, France, Germany, and Italy.