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Persistence without too much price stickiness: the role of variable factor utilization

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Abstract

We study the propagation of monetary shocks in a sticky price model with capital utilization and labor effort. Variable factor utilization enriches the propagation mechanism of monetary shocks by reducing the sensitivity of marginal costs to changes in aggregate output. Variable labor effort is relatively more important for generating persistence than variable capital utilization, except when depreciation is fairly unresponsive to changes in utilization. In addition to reinforcing the propagation mechanism of monetary shocks, volatilities and comovements of output, capacity utilization and hours produced by the model are close to those observed in the UK.

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1. Introduction

The relationship between monetary shocks and real activity has been a central topic of debates for at least forty years. What kinds of models are consistent with the empirical features of the propagation mechanism of monetary shocks, documented for example in Christiano et al. (1999)? In particular, what kind of models can account for the magnitude of the impact response of output to monetary policy shocks and for its persistence over time? After a decade of studies employing flexible price, cash-in-advance type models, the literature has turned to a sticky price, monopolistic competitive framework. The 'New Keynesian' Phillips curve, a relationship between prices and real marginal costs, has become a distinctive feature of these models and represents the mechanism through which monetary disturbances are propagated to prices and the real economy. Following a monetary shock, demand increases and—given the monopolistic competitive assumption—employment and output also increase. The expansion in economic activity raises real marginal costs, which, in turn, exerts a cost-push effect on inflation.

Chari et al. (2000) (henceforth CKM) have shown that the only way to produce sizeable real effects in response to monetary policy disturbances in a basic sticky price model is to assume a high degree of price stickiness. This is a rather unsatisfactory mechanism for at least two reasons. First, there is substantial controversy in the literature surrounding the existence and the magnitude of price adjustment costs. Bils and Klenow (2002) estimate that the degree of price stickiness for US goods is rather low, 4.33 months, compared to the 12 months that Taylor (1999) supports as summary evidence in the *Handbook of Macroeconomics*. Second, even if there were an agreement on the existence of price adjustment costs, there is no accepted framework for modeling the costs that firms face for changing their price (see for example Mankiw and Reis, 2002). One way to address these criticisms is to reduce the model's reliance on nominal rigidities as a mechanism for propagating shocks. However, if the degree of nominal rigidity is low, monetary policy shocks have essentially no real effects.

The findings of CKM have engineered a growing literature aimed at producing alternative mechanisms for generating persistence without the need of extreme price stickiness. Most of these works use mechanisms that induce a steeper individual marginal cost and revenue curves, and/or flat aggregate marginal cost of output. The most popular approach is sticky nominal wages (see for example, Erceg, 1997 and Huang and Liu, 2002). Edge (2002) and Ascari (2000) question the ability of nominal wage contracts to generate persistence and Edge (2002) highlights the importance of firm specific factor inputs in generating persistent real responses to monetary shocks. Along the same lines, Bergin and Feenstra (1998) develop a model in which money shocks induce persistent output responses via an input–output structure of production.

As an alternative to nominal wage rigidity the literature has also used real rigidities for generating persistence. Ball and Romer (1990) indicate that real rigidities may play a crucial role in making nominal shocks non-neutral and in amplifying (small) nominal rigidities—an argument echoed in Farmer (2000). Kimball (1995) shows how real rigidities can generate persistence for a general class of models. Similarly, Gertler and Gilchrist (2000) emphasize the role of investment delays in generating hump-shaped output dynamics. Assuming highly elastic factors of production may also generate persistence.