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# Sticky prices and volatile output

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Cycles in economic activity have been evident for most of recorded history, yet economists are still struggling to explain convincingly the patterns revealed in these cycles. Keynesian macroeconomics was an attempt in the 1930s to show how aggregate demand failure could generate recessions, from which there would be no rapid or automatic recovery. However, this relied upon arbitrary assumptions about rigidities in prices and wages that few find plausible today. A more recent agenda within macroeconomics has focused on building explicit dynamic models of the economy that can potentially replicate the observed patterns of business cycles in advanced industrial economies. The current paper offers a contribution to this agenda.

A key component of the modern approach is to build models in which economic agents (households and firms) behave optimally, both currently and over time, subject to the constraints imposed upon them by factors such as accumulated assets, currently available resources and shocks hitting the economy. The behaviour of households as consumers and suppliers of labour should be consistent with the behaviour of firms as producers of goods and employers of labour. Models incorporating these characteristics have grown out of the so-called 'real business cycle' literature but are now generally referred to as dynamic stochastic general equilibrium models (DSGE).

Another key goal of the modern business cycle literature is to build models in which prices adjust to clear markets. Early Keynesians assumed that markets did not work flexibly, otherwise prices would always adjust to equate demand and supply, in which case there could be no unemployment. The Austrian School of the inter-war period tried but failed to build market clearing into their models of the cycle. The real business cycle literature revisited this challenging task with partial success, and DSGE models continue to be developed with this goal in mind.

The current paper presents a specific form of DSGE model. Special assumptions are that firms sell their output in imperfectly competitive markets (so firms have some discretion over the price they set for their product) and consumers are infinitely lived but operate under a cash-in-advance constraint. Two alternative assumptions about price flexibility are used. In one case, all firms can set whatever price they choose in each period, and in the other, only a random selection of firms can change their price in each period. The latter is referred to as the 'sticky price' case.

The method adopted is to derive a set of equations explaining the optimal behaviour of households and firms, and their interaction; then quantitatively to calibrate all the parameters in the various equations; and finally to simulate the dynamic behaviour of the economy in response to various 'shocks'.

One of the main results that emerges from this study is that the incorporation of sticky prices (generally thought necessary in the past to explain real world business cycles) improves the ability of the model to mimic at all frequencies the inflation behaviour observed in real economies. However, the bad news is that, under sticky prices, this model generates short-run output fluctuations well in excess of those observed in data from real economies. The incorporation of sticky prices also worsens the ability of this particular form of DSGE model to explain output fluctuations at business cycle frequencies.

In short, it is shown that the incorporation of sticky prices is not a sufficient condition for improving the realism of common forms of DSGE business cycle models. Future research may determine whether it is necessary, or whether some other form of real rigidity might suffice to reconcile optimisation-based cycle models with reality.