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# The real interest rate gap as an inflation indicator

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In this paper, we investigate the business cycle properties of the real interest rate relative to its natural value. Our investigation into the natural real interest rate is motivated by the possibility of constructing a measure of monetary policy stance based exclusively on interest rates. Recent work by Michael Woodford has revived the ideas of Knut Wicksell by focusing on ‘the gap between the current level of the ‘natural rate’ of interest and the interest rate controlled by the central bank’ as the key variable for the analysis of ‘inflationary or deflationary pressures’. In line with this terminology, we describe the spread between actual and natural real interest rates as the real interest rate gap.

This paper examines a number of questions involving the real interest rate gap, including:

- Does the real interest rate gap provide a useful tool for monetary policy analysis?
- Is the real interest rate gap more difficult to measure than the output gap?
- How do empirical measures of the real interest rate gap perform in forecasting UK inflation?

We develop a dynamic stochastic general equilibrium model with sticky prices in order to examine the behaviour of the natural real interest rate and the real interest rate gap. In our model, household spending and asset accumulation, and the prices that firms set, are based on optimising behaviour. We build on the existing literature by including capital formation (subject to adjustment costs), habit persistence in consumption, technology and demand shocks, and two alternative models of price stickiness. The baseline model of price stickiness that we use is Calvo price-setting, which can be interpreted as a system of staggered contracts for nominal prices.

We calibrate the model to the UK economy, and examine the response of the natural real interest rate to shocks to both technology and demand. Our focus is mainly on the indicator properties of the real interest rate gap, and so we examine how well the real interest rate gap does in signalling future inflation—both in response to specific shocks (which we examine using impulse response functions) and when all shocks are hitting the economy

simultaneously (which we examine using stochastic simulations).

Using our model as a guide, we also construct empirical estimates of the natural real rate and the real interest rate gap from UK data.

Our key results include:

- The response of the natural real interest rate to a technology shock depends on whether or not capital is included in the model and, if so, whether or not there are capital adjustment costs. We find that with capital adjustment costs, the natural real interest rate can fall in response to a technology shock. For a given actual real interest rate, this leads to a rise in the real interest rate gap.
- Conversely, the natural real interest rate rises in response to a demand shock. For a given actual real interest rate, this leads to a decline in the real interest rate gap.
- The less firms and households are willing to adjust their quantities, the more the natural real rate needs to adjust to maintain equilibrium.
- Stochastic simulations indicate that the real interest rate gap and output gap do equally well in forecasting inflation. In addition, the behaviour of the real interest rate is a reasonable approximation for the behaviour of the real interest rate gap. By contrast, output (or detrended output) is not a good indication of the behaviour of the output gap. This suggests the value of constructing measures of both gaps instead of concentrating only on output gap measures.

Finally, we test the predictive power of the real interest rate gap for UK inflation. On quarterly UK data, the real interest rate gap is closely related to future inflation, whether the relationship is judged by correlations or by the marginal predictive content of the gap for inflation in regressions. Our results suggest that constructing a real interest rate gap series, using theory as a guide, can have value for evaluating the stance of monetary policy and the prospects for future inflation, in keeping with the neo-Wicksellian framework of Woodford (2000).