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The optimal neglect of inflation: An alternative interpretation of UK monetary policy during the "Great Moderation"

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ABSTRACT

This paper argues that UK monetary policymakers did not respond to the inflation rate during most of the "Great Moderation" that ran from the early 1990s to the mid-2000s. We derive a generalisation of the New Keynesian Phillips curve in which inflation is a non-linear function of the output gap and show that the optimal response of the policy rule to inflation depends on the slope of the Phillips curve; if this is flat, manipulation of aggregate demand through monetary policy does not affect inflation and so policymakers cannot affect inflation. We estimate the monetary policy rules implied by a variety of alternative Phillips curves; our preferred model is based on a Phillips curve that is flat when output is close to equilibrium. We find that policy rates do not respond to inflation when the output gap is small, a situation that characterised most of the "Great Moderation" period.

1. Introduction

This paper argues that the behaviour of monetary policymakers is more subtle and complex than implied by the simple monetary policy rules that are widely used in the literature. The response of policy rates to changes in inflation depends on the slope of the Phillips curve relationship that relates inflation to the level of output. If, as many have argued, the Phillips curve is non-linear, then the response of policy rates to inflation is not constant. More radically, if the Phillips curve is flat, inflation is unresponsive to output. In such regions, policy rates cannot affect inflation and it is therefore optimal for policymakers not to respond to inflation. Policymakers exhibit the optimal neglect of inflation.

Our evidence from UK data suggests that policy rates are unresponsive to inflation when the output gap is small but increasingly responsive as output moves away from equilibrium. As a result, we argue, policymakers have not responded to inflation when output was within 0.25% of equilibrium, while the Taylor (1993) principle that real policy rates should move in the same direction as inflation is only satisfied when the output gap is above 1%. As the output gap widens, the effect of policy rates on inflation increases and so the response of policymakers is increasingly vigorous. This implies a rather different account of UK monetary policy over the past fifteen years, as output was close to equilibrium for most of this period. We identify a response of policy rates to inflation in 1993–4 and in 2000–1 only. Policymakers therefore have neglected the inflation rate for most of the inflation-targeting period. They have instead mainly responded to the output gap.

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The paper is structured as follows. In Section 2 we derive the optimal monetary policy rule when the Phillips curve is non-linear. The standard model of the New Keynesian Phillips curve, as described in Galí and Gertler (1999) derives a linear relationship between inflation and proportional movements in real marginal cost around steady-state. A constant inter-temporal elasticity of elasticity labour supply function is then assumed, resulting in a proportional relationship between real marginal cost and the output gap. This then gives the familiar linear relationship between inflation and the output gap. We generalise this analysis by dropping the assumption of a constant inter-temporal elasticity labour supply. Doing so breaks the proportionality between movements in the output gap and real marginal cost and results in a non-linear relationship between inflation and the output gap. To derive a monetary policy rule, we assume policymakers choose the nominal interest in order to minimise a quadratic loss function taking into account the macroeconomic structure defined by the aggregate demand and Phillips curves. This results in an optimal monetary policy rule that resembles the familiar Taylor rule, but where the response of policy rates to inflation is a function of the output gap; we argue that this interaction is a distinctive characteristic of the optimal policy rule with a non-linear Phillips curve.

In Section 3, we consider the impact on monetary policy rules of the various Phillips curves that have been proposed in the literature. Most studies use a convex or concave Phillips curve; since these are flat when there is a slump or a boom respectively, they imply that the response of policy rates to inflation will be highly cyclical (cf Dolado et al., 2004; Kesriyeli et al., 2006). We argue that these effects may well be difficult to detect in our sample period, which covers the "Great Moderation" that ran from the early 1990s to the middle 2000s, when booms and slumps were largely avoided. We also consider an alternative form of the Phillips curve due to Solow (1969) in which inflation is highly sensitive to output in booms or slumps but unresponsive at other times. This implies that the optimal response of policy rates to inflation would be small in periods of stability but large when output is more volatile, which would suggest a low response of policy rates to inflation during the "Great Moderation". We close this section by proposing a functional form for the Phillips curve that encompasses these cases and deriving the implied optimal policy rule.

In Section 4 we outline our empirical methodology, explaining how we estimate policy rules for the alternative Phillips curve described above and how we confront the lack of identification of key parameters that bedevils work in this area. We present our estimates in Section 5. We find that the data imply a policy rule consistent with a "Solow-type" Philips curve that is flat when output is close to equilibrium but which becomes steep as output moves away from equilibrium. Section 6 discusses the implications of these estimates for UK monetary policy in recent years. As discussed above, we suggest a different interpretation of recent policy decisions in which policymakers have largely neglected inflation. Section 7 summarises and concludes.

2. The optimal monetary policy rule when the Phillips curve is non-linear

Our model is based closely on Galí (2008). The representative household has the utility function

$$E_0 \sum_{t=0}^{\infty} \beta^t U(C_t, N_t) \tag{1}$$

where C_t is a consumption bundle defined as $C_t = \left(\int_0^1 C_t(i)^{\frac{\varepsilon-1}{\varepsilon}} di\right)^{\frac{\varepsilon}{\varepsilon-1}}$, N is hours of work and β is the discount factor. Maximising C_t subject to the budget constraints $\int_0^1 P_t(i)C_t(i)di + Q_t B_t = B_{t-1} + W_t N_t$, where $P_t(i)$ is the price of good i, B are bond purchases, Q is the price of bonds and W is the wage rate, yields the demand functions

$$C_t(i) = \left(\frac{P_t(i)}{P_t}\right)^{-\varepsilon} C_t. \tag{2}$$

where $P_t = \left(\int_0^1 C_t(i)^{1-\varepsilon}\right)^{\frac{1}{1-\varepsilon}}$ is the aggregate price index. With these, the budget constraint can be re-written as $P_t C_t + Q_t B_t = B_{t-1} + W_t N_t$. The optimal choice of consumption and hours of work to maximise (1) subject to this constraint satisfies

$$-\frac{U_{N,t}}{U_{C,t}} = \frac{W_t}{P_t}. \tag{3}$$

There is a continuum of firms who have the production function

$$Y_t(i) = A_t N_t(i) \tag{4}$$

who each face the demand curve in (3). Here we depart from Galí (2008) in assuming constant returns, for simplicity. Following Calvo (1983), each firm can adjust price with fixed probability $1-\theta$. As is well-known (see, e.g., Galí and Gertler, 1999), this model implies the following log-linearised Phillips curve relationship

$$\pi_t = \beta E_t \pi_{t+1} + \frac{(1-\theta)(1-\beta\theta)}{\theta} \hat{mc}_t \tag{5}$$

where $\hat{mc}$ is the proportional deviation of aggregate real marginal cost from its steady-state value.