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OPPORTUNISTIC MONETARY POLICY: AN ALTERNATIVE RATIONALIZATION*

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Abstract

This paper offers an alternative rationalization for opportunistic behaviour i.e., a gradual disinflation strategy where policymakers react asymmetrically to supply shocks, opting to disinflate only in recessionary period. Specifically, we show that adaptive expectations combined with asymmetry in the Phillips

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curve of a specific sort together provide an optimizing justification for opportunism. However, the empirical basis for these conditions to be satisfied in the current low-inflation context of most OECD countries remains however to be established.

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I Introduction

During the 1990s many central banks pursued monetary policies committed to keeping inflation at or close to a target, with a secondary objective of stabilising output. Under rational expectations with a standard Phillips curve, such policies can be shown to be optimal. This principle has been challenged in the 1990s, somewhat surprisingly, by senior policymakers at the Fed, who have argued for 'opportunism' in monetary policy and have opposed the setting of a single central inflation target.[1] Their argument is that the Fed should move towards its long-run ambitions for inflation gradually and exploit opportunities for inflation reductions as they occur, for example through favourable supply shocks.

The 'opportunistic' approach to monetary policy can be neatly divided into two halves. First and foremost, there is the idea of delay: one should not pursue a target

[1] For academic literature see Orphanides and Wilcox (2002) and Bomfim and Rudebusch (2000).

for inflation that is too ambitious in the short run — it is 'impractical'. Rather one should pursue a practical target for inflation that is within grasp in the short term- an interim target. Secondly, there is the idea of asymmetry: one acts to reduce inflation when the economy is already producing lower inflation via a favourable burst of circumstances (a 'good supply shock').[2] One does not try to reduce inflation when inflation is strengthening; rather one aims to dampen it then — to 'hold the fort' as it were.[3]

For the process of disinflation from high (double digit) initial levels of inflation such ideas have been widely defended. However, in the conditions of the 1990s when inflation was already well within single digits, they seem rather surprising. Yet in the not so distant past, the late 1990s, there has been a recrudescence of these ideas in Federal Reserve pronouncements (see Meyer (1996) and Blinder (1997)). These ideas do seem incongruous in the light of optimising agents using information efficiently and a social objective function derived from these agents' utility. Nevertheless, it is only right to examine such claims carefully when they emanate from the world's most

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[2] We abstract from demand shocks because both the opportunistic and deliberate policymaker will fully neutralise the influence of those shocks. Thus, excluding demand shocks does not alter our results; their introduction is an uninteresting complication in the model.

[3] These ideas have a long history in central banking practice and advice to central banks. For example the first was espoused by the Bundesbank in the 1980s in its idea of 'avoidable inflation' while the second similarly has deep roots in central banking tactics.

powerful central bank.

This paper offers an alternative rationalization for opportunistic behaviour — alternative, that is, to the one given by Orphanides and Wilcox (2002).[4] Specifically, we show that adaptive expectations combined with asymmetry in the Phillips curve of a specific sort (i.e., a nonlinear effect of the shock on the position of the Phillips curve trade-off) together provide an optimizing justification for opportunism. Here adaptive inflation expectations provides the justification for delay in asserting the ultimate inflation target i.e., it acts as a proxy for market participants' learning in a context of uncertainty regarding policymakers' tastes and objectives. Nevertheless, the empirical basis for these conditions in the current low-inflation context of most OECD countries remains to be established. To anticipate our main conclusions, we find that rigorous defence of the opportunitic strategy can be mounted even if its empirical foundations may not obviously be robust. In section II we derive an optimal inflation response when the policymaker is opportunistic. The implications of opportunism are also explored. Section III seeks a set of sufficient conditions under which the opportunistic strategy is *optimal* for a central bank maximising the

[4] Orphanides and Wilcox (2002) specify a loss function for the policymaker that can be thought of as incurring a first-order loss from output deviation, and yet only a second-order loss from inflation deviations when inflation is close to its target. Hence when inflation is moderate policymakers refrain from inducing the loss in output but rather wait for favourable exogenous shocks to bring inflation down towards their long-term target.

preferences of the representative agent.[5] Section IV provides concluding remarks.

II Opportunistic Inflation Response

The treatment of inflation targeting under commitment follows Svensson (1997). The short-run Phillips curve is

$$y_t = \rho y_{t-1} + \alpha \left(\pi_t - \pi_t^e \right) + u_{t,} \tag{2.1}$$

where y_t is the output gap in period t, α and ρ are constants ($\alpha > 0$ and $0 < \rho < 1$), π_t is the inflation rate, π_t^e denotes expectations conditional upon information available in period $t-1$, and u_t is iid error, normally distributed with mean zero and variance σ_u^2. The private sector has rational expectations; that is,

$$\pi_t^e = E_{t-1}\pi_t, \tag{2.2}$$

Now suppose that there is a commitment mechanism, so that the central bank can commit to the optimal rule. Under commitment, the optimal rule under inflation targeting is

$$\pi_t = \pi_t^e + bu_{t,} \tag{2.3}$$

[5]Plainly these are ad hoc set-ups under which opportunism may be justified. However we believe it is of some interest to see whether opportunism can be justified under the demanding requirements of optimality.

where, inflation is independent of the lagged output gap and only depends on the new information that has arrived after the private sector formed its expectations. Thus, (2.1)–(2.3) represent the constraints facing the central bank. The central bank's objective under opportunistic disinflation strategy is given by

$$V(y_{t-1}) = E_{t-1} \min_{\pi_t^e,\, \pi_t} \left\{ \frac{1}{2} \left[\left(\pi_t - \pi_t^T \right)^2 + \lambda (y_t)^2 \right] + \beta V(y_t) \right\}, \tag{2.4}$$

where $\lambda > 0$ is the relative weight on output-gap stabilization, β is the discount factor and π_t^T is the intermediate target for inflation. In addition the model includes an equation describing the determination of the intermediate target as a function of the underlying supply shock and a weighted average of past inflation and the long-run target for inflation. In other words we assume that policymakers incentive to deflate is a nonlinear function of the underlying supply shock i.e.,

$$\Delta\pi_t^T = -\delta\left(e^{\gamma u_{t-1}}\right) - \phi\left(\pi_{t-1}^T - \pi^\star\right) + \delta\left(e^{\frac{\gamma^2\sigma_u^2}{2}}\right)$$

or

$$\pi_t^T = \pi^\star - \delta\sum_{i=0}^{\infty}(1-\phi)^i e^{\gamma u_{t-1-i}} + \frac{\delta}{\phi}\left(e^{\frac{\gamma^2\sigma_u^2}{2}}\right) \tag{2.5}$$

where $\delta,\ \phi,\ \gamma > 0$. Thus, the intermediate target will almost always lie between the inherited inflation target (π_{t-1}^T) and the long-run target ($\pi^\star$).[6] Only when a exceptionally bad shock (very very low $e^{\gamma u_{t-1}}$) hits the economy it would slightly

[6]The key feature of the interim target is that it exhibits path dependence i.e., allows the policymaker to react differently to a given level of inflation depending on the prior history of inflation

raise the interim target. This is part of the opportunism story really- that you give a bit on the target when times are really bad. The central bank is, for simplicity, assumed to have perfect control over the inflation rate π_t. It sets the inflation rate in each period after having observed the current value of the supply shock u_t. This is a dynamic programming problem with one state variable, y_{t-1}, and two control variables, π_t and π_t^e. For the linear-quadratic problem such as ours, $V(y_t)$ must also be quadratic. Thus, the indirect loss function can be written as

$$V(y_{t-1}) = \gamma_0 + \gamma_1 y_{t-1} + \frac{1}{2}\gamma_2 y_{t-1}^2, \tag{2.6}$$

so that $V'(y_{t-1}) = \gamma_1 + \gamma_2 y_{t-1}$ and $\gamma_i's$ are the undetermined coefficients. Using this condition together with Eqs. (2.1)–(2.3), we obtain the solution for inflation as:

$$\pi_t = \phi\pi^\star + (1-\phi)\,\pi_{t-1}^T - \delta\left(e^{\gamma u_{t-1}}\right) + \delta\left(e^{\frac{\gamma^2\sigma_u^2}{2}}\right) - \left[\frac{\alpha(\beta\gamma_2+\lambda)}{1+\alpha^2(\beta\gamma_2+\lambda)}\right]u_t \tag{2.7}$$

where $\gamma_2 = \frac{\lambda\rho^2}{1-\beta\rho^2}$ can be derived by exploiting the Envelope theorem. Eq.(2.7) is the optimal feedback rule for a opportunistic central banker under commitment expressed as a function of the parameters of the model and the coefficient, γ_2. Note that the inflation response to supply shocks under opportunism is strictly concave i.e., one acts to reduce inflation when the economy is already producing lower inflation via a favourable burst of circumstances (a 'good supply shock'). One does not try to

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itself (see Orphanides and Wilcox, 2002). Also note from Eq. (2.5) that in the long-run the interim target converges to the long-run target i.e., when supply shocks are zero, $\pi_t^T = \pi^\star$.

reduce inflation when inflation is strengthening; rather one aims to dampen it then-to 'hold the fort' as it were. In the next section we discuss how such a set-up could be justified as welfare-maximising.

III A Sufficient set of conditions for the opportunistic strategy

The first condition we suggest is adaptive inflation expectations; this provides the justification for delay in asserting the ultimate inflation target. When expectations are adaptive, inflation reduction requires a transitional cost in terms of lost output. Hence, authorities wait for favourable supply shocks to bring inflation down rather than engineer a downturn; in this way the transitional cost can be lowered or even eliminated as output need not fall below its natural rate. This is a well-known part of the justification for opportunism, and we do not say more here.[7]

To justify the asymmetry in the central bank's actions, it would be possible to appeal to asymmetric preferences of the central bank itself. There is some evidence of this (see Cukierman and Muscatelli, 2003). However, for optimality such bank preference asymmetry would have to be deriveable in some way from the preferences of households. This would require a more complete model linking household consump-

[7] See Orphanides and Wilcox (2002) and Minford and Srinivasan (2003) for example.

tion and leisure to output and inflation. While such derivations exist (see Rotemberg and Woodford, 1999) they are generally carried out by second order Taylor series expansions symmetrically around the steady state.[8] Plainly if nonlinearities exist within the model, even though under standard utility functions they do not exist at the level of household preferences over consumption and leisure, it could in principle be possible to derive an asymmetric representation of bank preferences over inflation and output. Doing so is however an ambitious task, not attempted before and not attempted here either.

Instead we appeal to asymmetry in the Phillips curve itself. Such asymmetry has a long empirical and theoretical history. Empirically, Phillip's original paper showed clear signs of asymmetry in the effects on wage inflation of rising unemployment and subsequent authors have periodically found the same (see Laxton et al., 1999). A nonlinear Phillips curve thus provides a rationale for asymmetry even when the policymaker's preferences are quadratic. The point is that with a nonlinear Phillips curve the sacrifice ratio is not independent of the size of an intended change in inflation- it rises as the economy goes further into recession. This suggests that inflation should be reduced more when the economy is in an expansionary mode induced by favourable supply shocks.

[8] We implicitly assume some such approximation as the basis for using quadratic central bank preferences.

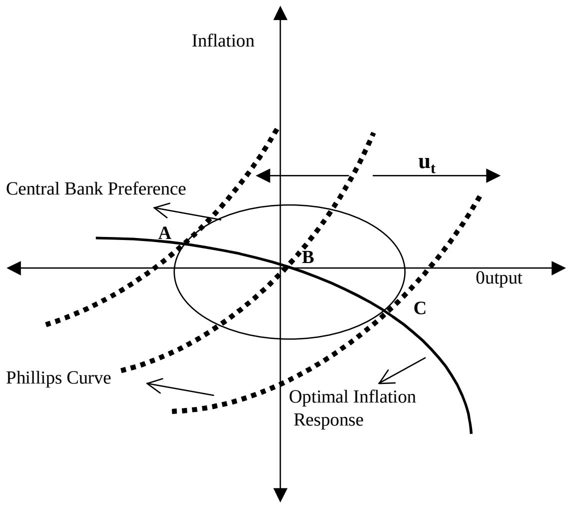

Figure 1: Optimal Inflation response when the Phillips curve is Nonlinear

We proceed as follows. We assume that the Phillips curve is linear but the effect of the shock itself on the position of the trade-off is nonlinear. We use this formulation as a tractable representation of nonlinearity in the Phillips curve. Figure 1 plots the optimal inflation response when the Phillips curve is nonlinear and the effect of the shock 'u_t' on the position of the trade-off is nonlinear.[9] The concentric ellipse in Figure 1 is the central bank's indifference curve, with 'B' denoting the 'bliss point'. The tangency points of the central bank's indifference curve with the Phillips curve

[9]This later assumption is crucial for obtaining a concave inflation response in Figure 1. The Phillips curve in Figure 1 is given by $\pi_t = \alpha \left(e^{\beta y_t - u_t} - 1\right)$. The objective function is a quadratic in both π_t and y_t. If the shock to the Phillips curve is linear i.e., $\pi_t = \alpha \left(e^{\beta y_t} - 1\right) + u_t$, this makes the optimal reaction convex.

trace out an inflation response of just the asymmetric sort we seek; of course it can only be done numerically.[10] A nonlinear Phillips curve with quadratic central bank preferences does not yield a closed-form solution for inflation and must be evaluated numerically — see Orphanides and Wieland (2000). However it can be shown numerically that the optimal reaction function will be nonlinear, with the approximate form: $\pi_t = \pi^\star - a\left(e^{\gamma u_t} - 1\right)$. This closed form solution is obtained from the assumption we now make. We assume the following functional form for the Phillips curve:

$$y_t = \rho y_{t-1} + \alpha\left(\pi_t - \pi_t^e\right) + \left(e^{b u_t} - 1\right), \tag{3.1}$$

where b is a positive constant and Eq.(3.1) is the short-run Phillips curve where output is assumed to respond asymmetrically to supply disturbances. In addition we assume that expectations of inflation rate are adaptive and are determined by

$$\pi_t^e - \pi_{t-1}^e = a\left(\pi_{t-1} - \pi_{t-1}^e\right) = \frac{a\pi_{t-1}}{1-(1-a)L}, \tag{3.2}$$

where $0 < a < 1$ and L is the lag operator. Thus, the decision problem of the central bank can be expressed as

$$V\left(y_{t-1}\right) = E_{t-1} \min_{\pi_t} \left\{ \begin{array}{c} \frac{1}{2}\left[\left(\pi_t - \pi^\star\right)^2 + \lambda\left(y_t\right)^2\right] \\ + \left(\tau_0 + \tau_1 y_{t-1}\right)\left(\pi_t - \pi^\star\right) + \beta V\left(y_t\right) \end{array} \right\}, \tag{3.3}$$

[10] It is clear from the figure that when there is a positive supply shock (u_t) inflation is adjusted downwards while it stays put when we have a negative shock.

where τ_0, τ_1 are constant parameters of a Walsh (1995) inflation contract which is designed to eliminate the state-dependent inflation bias that comes from the inability to commit under adaptive expectations. Here the minimization in period t is subject to Eqs.(3.1) and (3.2). The first-order condition from Eq.(3.3) with respect to π_t, yields:

$$\pi_t = \pi^\star - \lambda\alpha\left(y_t\right) - \alpha\beta\left[\gamma_1 + \gamma_2\left(y_t\right)\right] - \left(\tau_0 + \tau_1 y_{t-1}\right) \tag{3.4}$$

Substituting Eq.(3.1) for y_t and Eq.(3.2) for π_t^e in Eq.(3.4) and by continuous backward substitution we have:

$$\pi_t = c - \left(\tau_0 + \frac{\tau_1 \sum_{i=0}^{\infty} k^i y_{t-1-i}}{1+\alpha^2\left(\beta\gamma_2+\lambda\right)}\right) - d\left(\rho\sum_{i=0}^{\infty} k^i y_{t-1-i} + \sum_{i=0}^{\infty} k^i\left(e^{bu_{t-i}}-1\right)\right) \tag{3.5}$$

where $k = \left(\frac{a}{1-(1-a)L}\right)\left(\frac{\alpha^2(\beta\gamma_2+\lambda)}{1+\alpha^2(\beta\gamma_2+\lambda)}\right)$, $c = \pi^\star - \beta\gamma_1\alpha$ and $d = \left(\frac{\alpha(\beta\gamma_2+\lambda)}{1+\alpha^2(\beta\gamma_2+\lambda)}\right)$. The $\gamma_i^{\prime}s$ the undetermined coefficients can be derived by making use of the Envelope theorem. Eq.(3.5) is the optimal feedback rule for inflation under discretion when the effect of the shock on the position of the Phillips curve trade-off is nonlinear. Following Svensson (1997) the state-dependent inflation bias in Eq.(3.5) can be removed by choosing appropriate values for the $\tau_i^{\prime}s$. What we have discovered is that our proxy for the nonlinearity of the Phillips curve, a nonlinear effect of the shock on the position of the Phillips curve trade-off, yields along with adaptive expectations an optimally opportunistic inflation response. In other words Eq.(3.5) has the same form as Eq.(2.7) i.e., when there is a positive supply shock the inflation is adjusted downwards while it stays put when we have negative supply shocks.

How strong is the justification for these assumptions? On the one hand, the assumption of adaptive expectations is presumably to be justified as an approximation to rational learning (Friedman, 1979). On the other hand, it is not clear why learning should take this form during an episode of inflation stabilisation when inflation is already moderate and policymakers have credibility (such as one might argue is the case today in most OECD countries). Secondly, as we noted above, there is a long history of defending and finding nonlinearity in the Phillips curve although the theoretical and empirical evidence for such nonlinearities are mixed.[11] Furthermore, one also needs that the shock be nonlinear in its shift effect. This nonlinear shift effect implies that supply shocks have larger effects on inflation when negative than when positive; this specific requirement is plainly a source of potential non-robustness. In sum, the empirical basis for these assumptions is mixed.

IV Conclusion

This paper offers an alternative rationalization for opportunistic behaviour i.e., a gradual disinflation strategy where policymakers react asymmetrically to supply shocks, opting to disinflate only in recessionary period. Under rational expectations with a standard (linear) Phillips curve, such policies can be shown to be suboptimal (see

[11] Gordon (1997) maintains that in the US the Phillips curve is linear while Laxton et al., (1999) have presented evidence suggesting a convex shape.

Minford and Srinivasan, 2003). Thus opportunism poses a theoretical puzzle, which this paper attempts to resolve by finding a set of sufficient conditions under which it is optimal. We showed that adaptive expectations combined with asymmetry in the Phillips curve of a specific sort (i.e., a nonlinear effect of the shock on the position of the Phillips curve trade-off) together provide an optimising justification for opportunism. Although the set of conditions examined are theoretically feasible the empirical basis for these in the current low-inflation context of most OECD countries remains however to be established.

References

[1] Blinder, A.S., (1997) 'What Central Bankers Can Learn from Academics - and Vice Versa,' Journal of Economic Perspectives, pp. 3–19.

[2] Bomfim, A. and G.D. Rudebusch, (2000) 'Opportunistic and Deliberate Disinflation Under Imperfect Credibility.' Journal of Money, Credit, and Banking 32 (November) pp. 707–721.

[3] Cukierman, A. and V.A. Muscatelli, (2003) "Do Central Banks have Precautionary Demands for Expansions and for Price Stability? — A New Keynesian Approach ", mimeo, Tel Aviv University.

[4] Friedman, B.M., (1979) 'Optimal expectations and the extreme information assumptions of rational expectations models', Journal of Monetary Economics, 5(1), 23–42.

[5] Gordon, R., (1997) 'The time-varying NAIRU and its implications for economic policy', Journal of Economic Perspectives, pp. 11–32.

[6] Laxton, D, Rose, D, Tambakis, D, (1999) 'The U.S. Phillips curve: The case for asymmetry', Journal of Economic Dynamics and Control, 23, pp. 1459–85.

[7] Meyer, L.H., (1996) 'Monetary policy objectives and strategy' speech at the National Association of Business Economists 38th Annual Meeting, Boston, Massachusetts, September.

[8] Minford, P., and N. Srinivasan, (2003) 'Understanding the Opportunistic Approach to Disinflation', CEPR Discussion Paper No:3938, Centre for Economic Policy Research , London.

[9] Rotemberg, J.J., and M. Woodford, (1999) 'Interest Rate Rules in an Estimated Sticky Price Model', in J.B. Taylor (ed), 'Monetary Policy Rules', University of Chicago Press, Chicago.

[10] Svensson, L.E.O., (1997) 'Optimal Inflation Targets, 'Conservative' Central banks, and Linear Inflation Contracts,' American Economic Review, 87, 98–114.

[11] Orphanides, A., and V. Wieland, (2000) 'Inflation Zone Targeting.' European Economic Review, 44 (7), 1351–87.

[12] Orphanides, A., and D. Wilcox, (2002) 'The opportunistic approach to disinflation.' International Finance, vol. 5(1), pp. 47–71.

[13] Walsh, C.E., (1995) 'Optimal contracts for central bankers.' American Economic Review 85, 150–67.