



# Delegating optimal monetary policy inertia<sup>☆</sup>



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## ABSTRACT

In a forward-looking business cycle model, central banks can achieve the (timeless) optimal commitment equilibrium even in the absence of a commitment technology, if they are delegated with an objective function that is different from the societal one. The paper develops a general linear-quadratic method to solve for the optimal delegation parameters that generate the optimal amount of inertia in a Markov-perfect equilibrium, and studies the optimal design of some policy regimes that are nested within this framework: the (squared) optimal targeting rule; inflation, output-gap growth and nominal income growth targeting; and inflation and output-gap contracts.

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## 1. Introduction

What are the appropriate objectives of a central bank trying to act in the best interest of its society? The widespread adoption of “flexible” inflation targeting regimes in many countries around the world suggests that a consensus has emerged: independent central banks have clear mandates to minimize the variability of inflation and real activity around well-defined targets. Such developments on the policy front have undoubtedly both been informed by and influenced an important stream of academic research that seeks to find an answer to the very same question. Modern monetary policy analysis (exhaustively summarized by [Woodford, 2003b](#)) has shown how such a quadratic objective function of inflation and output gap can be derived as an approximation of the utility function of a representative agent in a variety of microfounded,

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dynamic forward looking models with sticky prices (often labeled as “New Keynesian” following the celebrated article by Clarida et al., 1999).

However, the same literature has shown that this is likely not to be the appropriate objective of the central bank, for the following reason: a central bank minimizing the welfare-based loss function under *discretion*, i.e. without taking into account the effect of its choices on private sector expectations, will achieve a suboptimal outcome relative to the first-best case in which the central bank has access to a commitment technology.<sup>1</sup> More precisely, discretionary policymaking in a forward-looking New Keynesian model features a “stabilization bias” in response to *cost-push* shocks that generate a trade-off between inflation and output gap stabilization.<sup>2</sup> Faced with a one-time cost-push shock, a central bank acting under discretion engineers an inflation increase and output gap contraction on impact, but also brings the variables back to their steady-state levels immediately thereafter. This response is suboptimal because if the central bank had the technology to commit with respect to the private sector, it could achieve a better outcome if it let the contraction persist into the future. As explained in detail below, this feature, coined by Woodford (2003a) *optimal monetary policy inertia*, occurs because in the New Keynesian model current inflation depends upon future expected inflation. If the contraction is expected to persist, expected inflation falls and so current inflation also falls. In other words, the central bank that has the ability to commit faces a better trade-off between output gap and inflation stabilization.

This paper shows that the commitment equilibrium outcome can nevertheless be exactly implemented by a central bank acting under discretion, if the central bank is assigned a different objective function from the societal one. To the best of my knowledge, this focus on exact implementation in a forward-looking New Keynesian model is novel.<sup>3</sup> Specifically, I study a general method to find the appropriate loss function to be assigned to the central bank, and a few policy regimes that this method encompasses: an inflation target, an output gap growth target, a nominal income growth target and an inflation contract. Therefore, this paper’s answer to the question posed at the outset is that the objectives assigned to the central bank should be quite different from those that are optimal *prima facie* from a societal viewpoint.

To be sure, a recent and growing literature has studied the virtues of monetary policy delegation in forward-looking New Keynesian models, drawing on the pioneering work by Thompson (1981), Barro and Gordon (1983, footnote 19), Rogoff (1985), and Canzoneri (1985); In particular, Woodford (1999, 2003a), Jensen (2002), Walsh (2003) and Vestin (2006) have argued that various delegation schemes (interest rate smoothing, nominal income growth, output gap growth and price level targeting, respectively) can induce inertia and hence *improve upon* the discretionary equilibrium. However, no solution has hitherto been proposed that leads to the *exact* implementation of the timeless-optimal commitment policy when the central bank acts discretionarily (and hence *completely eliminates* the stabilization bias).<sup>4</sup>

This is what this paper does. We draw on the literature that studied delegation as a way to solve other distortions, present in an earlier class of models of monetary policy analysis of the Barro–Gordon type (based on a Lucas supply function). These distortions include the average inflation bias present when the central bank targets a level of output that is higher than the socially desirable one; the state-contingent inflation bias occurring when a lagged term appears in the supply function to capture output (employment) persistence (Lockwood, 1997; Svensson, 1997); and the stabilization bias also present in those earlier models, that refer to the suboptimal reaction to supply shocks in the discretionary equilibrium.<sup>5</sup> Within that earlier class of models, a variety of delegation schemes have been proposed that exactly implement the commitment optimum when the central bank operates under discretion. This includes performance contracts (Walsh, 1995; Persson and Tabellini, 1993), inflation targeting (Svensson, 1997), and nominal income growth targeting (Beetsma and Jensen, 1999).

While the idea is rather similar, this paper is fundamentally different from earlier “optimal delegation” papers as follows. First, it focuses on a very different distortion (lack of inertia and stabilization bias induced by forward-looking behavior) that is simply absent in models of the previous generation. Second, in Barro–Gordon-type models delegation is purported to act

<sup>1</sup> Clarida et al. (1999) and Woodford (2003b), i.a., provide an exhaustive exposition of recent sticky-price models used for monetary policy analysis in general and of the distinction between commitment and discretionary equilibria in that framework.

<sup>2</sup> Cost-push shocks are important in recent monetary policy models insofar as they help explain specific historical episodes like the ‘Great Stagflation’ (inflation coupled with recessions) of the 1970s, and more generally play a prominent role in explaining macroeconomic fluctuations in rich, empirically estimated dynamic stochastic general equilibrium models of the type used e.g. by Smets and Wouters (2007).

<sup>3</sup> Svensson and Woodford (2005) study the design of an optimal ‘inflation forecast targeting’ regime in a related model, in which inflation and output are determined one period in advance and hence policy only aims to influence their forecastable components. They show that the optimal amount of inertia can be obtained if the central bank can commit to internalize the cost of deviating from its past forecasts. In order to implement this policy, they propose a policy regime of “commitment to continuity and predictability” that consists of adding to the loss function linear term penalizing deviations from the bank’s past inflation forecasts. The optimal marginal penalty, however, is a time-dependent Lagrange multiplier that, as the authors themselves appreciate “is perhaps a somewhat abstract consideration for the purposes of practical policymaking”; in addition, such an approach to policy would also be less transparent. Our results could be extended to such a model with predetermined variables that create a scope for forecast targeting, without suffering from these practical difficulties.

<sup>4</sup> Earlier studies have found that the timeless-optimal commitment equilibrium can be implemented by delegation in special cases. Namely, output gap growth targeting works if the central bank is fully myopic (its discount factor is zero, Walsh, 2003), interest rate smoothing if the slope of the Phillips curve is zero (Woodford, 1999) and price-level targeting if shocks have zero persistence (Vestin, 2006). This paper makes none of these assumptions.

<sup>5</sup> It should be noticed that despite this (perhaps unfortunate) coincidence of labels, the stabilization bias emphasized by that earlier literature pertains to volatilities of inflation and output and is very different from the stabilization bias present in forward-looking models described above. Most notably, the stabilization bias in backward-looking models refers to the fact that in the discretionary equilibrium output volatility is too low, whereas inflation volatility is too high, relative to the commitment case. Instead, the stabilization bias in forward-looking models pertains most prominently to the lack of inertia induced by the policy response under discretionary policymaking.

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