



Contents lists available at ScienceDirect

North American Journal of Economics and Finance



Gains from interest-rate smoothing in a small open economy with zero-bound aversion

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ARTICLE INFO

Article history:

Received 4 August 2008

Received in revised form 15 December 2008

Accepted 9 January 2009

Available online 21 February 2009

JEL classification:

E32

E52

F41

Keywords:

Optimal monetary policy

Zero-bound aversion

Small open economy

Stabilization bias

ABSTRACT

We extend the Monacelli [Monacelli, T. (2005). Monetary policy in a low pass-through environment. *Journal of Money, Credit and Banking*, 37(6), 1047–1066] model to allow for a central bank that penalizes nominal interest rate paths that are too close to the zero lower bound. We analytically derive the optimal interest-rate policy rule in each equilibrium under four policy regimes: (i) benchmark commitment to an ex-ante optimal monetary-policy plan; (ii) benchmark discretionary policy; (iii) optimal delegation to a discretionary policy maker with similar preferences to society; and (iv) optimal delegation to a discretionary policy maker with an additional taste for interest-rate smoothing. Under the commitment benchmark, the optimal interest-rate rule is proved to be intrinsically inertial, whereas this property is non-existent under discretionary policy. In the absence of commitment, there are gains to delegating policy to an interest-rate smoothing central banker. We show that while the endogenous law of one price gap in the model exacerbates the optimal policy trade-off that arises under discretionary policy, the latter feature of interest-rate smoothing acts to weaken it, by mimicking intrinsic inertia under the commitment policy.

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1. Introduction

Empirically, the level of nominal interest rates for many industrialized small open economies tend to be highly and positively autocorrelated. For example, Espinosa-Vega and Rebucci (2003) document first-order autocorrelations for nominal interest rates in these countries that are near random walk. Furthermore, these rates are perfectly correlated with the respective countries' monetary policy rates.

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Often this feature is rationalized as central banks' preference for interest-rate smoothing. It may also be the case that such persistence in policy rates arise naturally out of monetary policy that is *ex-ante* optimal, without any explicit desire for smoothing policy (see Woodford, 1999, 2003b). The former hypothesis then raises the question of whether, and when, such explicit preference for interest rate smoothing has any gain for society in a small open economy.

In a closed economy model without any endogenous monetary policy trade off, Woodford (1999) showed there are gains to society for an explicit interest-rate smoothing objective to be incorporated into the central bank's objective when it cannot commit to an *ex-ante* optimal monetary policy plan. This is because the interest rate smoothing component of the objective in the latter regime induces an optimal policy that approximates the commitment policy more closely. While Rogoff (1985) considered the delegation of monetary policy to a conservative central banker as a solution to the well-known average inflation bias problem, Woodford (1999) advocated hiring an interest-rate-smoothing central bank delegate as a solution to the stabilization bias problem which arises from lack of commitment by the policy maker. This latter result will be conveniently labeled as the *Woodford proposition* below.

In this paper, we extend the Monacelli (2005) model to consider the case where the monetary policy maker penalizes domestic nominal interest rate paths that are too close (from above) to zero. This not unrealistic assumption, as in Woodford (2003b, see Chapter 4.2), is used as a reduced-form way of bounding the stochastic paths of the interest rate above zero. This has an interpretation of aversion to the zero-interest-rate lower bound by policy makers.¹ While we could explicitly model occasionally binding zero-lower-bound constraints (see e.g. Adam & Billi, 2006, 2007) that is not the purpose here in this paper. Instead, we apply the approach of Woodford (2003b) which allows us to analytically derive the optimal interest-rate policy rule in the equilibria for four policy regimes.

To that end, we consider notions of optimal policy under the following policy regimes: (i) benchmark commitment to an *ex-ante* optimal monetary-policy plan; (ii) discretion, or *ex-post* lack of commitment to (i); and a Rogoff-style delegation of discretionary policy to an independent policy maker that either (iii) shares the same family of loss functions as society, or (iv) has an additional interest-rate smoothing term in its objective function. Under the commitment benchmark, the optimal interest-rate rule is proved to be intrinsically inertial, whereas this property is non-existent under discretionary policy. Analytical and numerical results show that under discretion, there are gains to delegating policy to an interest-rate smoothing central banker. Specifically, we show that in this Monacelli (2005) economy, endogenous deviations from the law of one price exacerbates the optimal CPI inflation and output-gap trade-off in discretionary monetary policy. However, we also show that by delegating policy to an explicit interest-rate smoothing policy maker, this trade-off can be weakened. This weakening of the trade-off can be interpreted as a forced encoding of history dependence in the policy decision that approximates policy under commitment. Our result is robust to alternative degrees of exchange rate pass through, the types of shocks impinging the natural rate, and minor departures from optimal pricing behavior.

One might expect the important insight on the value of interest-rate smoothing of Woodford (1999) to carry through to small-open-economy monetary theory and policy. This would indeed be true in the case of typical small-open-economy models with complete exchange-rate pass through in the style of Clarida, Galí, and Gertler, (2001) and Galí and Monacelli (2002). Clarida et al. (2001) showed that the small-open-economy optimal monetary policy rule and resulting equilibrium is qualitatively the same as its closed economy counterpart.² However, such a conclusion may not be warranted in many small open economies that experience incomplete exchange rate pass through, and this question has not been theoretically analyzed for such economies. In fact, Monacelli (2005) shows that because of incomplete pass through, monetary policy via the interest rate path also affects the paths of CPI inflation (i.e. both domestic and imported goods price inflation) and output gap via the channel of the exchange rate and the deviation from the law of one price. Monacelli (2005) showed that it is no

¹ We thank an anonymous referee for refining this point.

² Intuitively, with perfect exchange-rate pass through, any volatility in the exchange rate gets transmitted to aggregate demand immediately via the terms of trade and is thus captured in the output-gap stabilization objective of the central bank. Meanwhile, nominal rigidity in domestic goods prices can be dealt with by domestic-goods inflation targeting.

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