Bank of Canada Economic Conference

Issues in Inflation Targeting

The Welfare Implications of Inflation versus Price-Level Targeting in a Two-Sector Small Open Economy Model

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I. Goals of the Paper

- Characterize *optimal simple* monetary policy reaction functions for *a small open economy*, in particular Canada.

- Using a two-sector, small-open-economy, dynamic-stochastic general equilibrium model, (*2S-SOE-DSGE* model) measure the level of household welfare under different simple Taylor-type rules

- Emphasize the comparison of welfare across monetary policies that can be characterized as *inflation targeting* versus *price-level targeting*.

IIa. Relationship to the Literature on Closed Economies

- Early and mid 1990s: vast literature on the question of inflation or price-level targeting
  - this literature mainly examines *Taylor-type rules* within the context of simple models that combine a *short-run Phillips curve* and an *ad hoc model of the authority's loss function*
  - much, but not all, of this literature seems to conclude that inflation targeting is preferable
- Svensson (1999): result depends on comparison of exogenously imposed policy rules (commitment)
  - endogenous choice of the rule without committment can reverse the results

IIb. Relationship to the Literature on Closed Economies ...

- Rotemberg & Woodford (1999), optimal simple interest rate rules in a linearized DSGE sticky price model

$$\hat{r}_t = a(\hat{\pi}_t \text{ or } \hat{P}_t) + b\hat{y}_t + c\hat{r}_{t-1}$$

  - welfare measure based on 2nd-order approximation to household utility
  - an interest rate smoothing version of the IT rule achieves best outcomes
  - the best PL rule comes close to the best IT rule
  - both rules are close to optimal state-contingent monetary policy

- Woodford, in his textbook, advocates, instead optimizing over a variety of linear policy rules in linearized DSGE models, with ad-hoc quadratic loss functions as the policy objective.

IIc. Relationship to the Literature on Closed Economies ...

- Williams (2003), studies the FRB/US model with an ad-hoc loss function
  - simple interest rate smoothing rules nearly as good as optimal policy
- Williams reviews the literature on the properties of simple rules in a variety of models. General conclusion: the best simple interest rate smoothing rules nearly as good as optimal policy
- Juillard, Karam, Laxton and Pesenti (2004): estimate a DSGE model for the US economy using the methods of Smets and Wouters (2003)
  - evaluate welfare using 2nd-order techniques, solving the model using perturbation methods
  - an optimized simple rule lies near the Taylor frontier

III. Relationship to the Recent Literature on Open Economies

- Kollman (2002), 2S-SOE-DSGE model, Taylor rules: $i_t = i + \alpha\hat{\pi}_t - \beta\hat{y}_t$
  - almost complete PPI stabilization (big α, small β) is optimal
  - model evaluation: calibrated model, welfare calculations are utility-based using 2nd-order approximation method of Sims
  - consistent with earlier results from the NOEM literature under perfect pass-through (Aoki; Devereux and Engel, Galí and Monacelli)
- Smets and Wouters (2002): use a DSGE model, and an ad hoc loss function. Under imperfect pass-through, optimal simple policy targets domestic *and* import price inflation
  - results reflect the analysis in Corsetti and Pesenti (2000) and Erceg, Henderson and Levin (2000)

IV. Relationship to the Literature (Methodology)

- Econometric methodology: close cousin of Smets and Wouters (2003 JEEA) paper
  - Bayesian methods are used to estimate all model parameters; diffuse priors are not used so the results are not equivalent to maximum likelihood
- DSGE Model: close cousin of both Kollman and Smets and Wouters, but with a much broader specification of multiple sectors
- Welfare measure: utility-based, evaluated using perturbation methods
- Simple rules

V. Results

- Rules of the form

$$\hat{R}_t = \theta \hat{R}_{t-1} + \alpha \hat{\pi}_t - \beta \hat{y}_t + \gamma \hat{\pi}_t^w$$

or

$$\hat{R}_t = \theta \hat{R}_{t-1} + \alpha \hat{P}_t - \beta \hat{y}_t + \gamma \hat{\pi}_t^w$$

- complete CPI inflation stabilization appears optimal; CPI level targeting achieves a closely approximate welfare level

- For rules of the form

$$\hat{R}_t = \theta \hat{R}_{t-1} + \rho_M \hat{\pi}_t^M + \rho^N \hat{\pi}_t^N + \rho^T \hat{\pi}_t^T$$

π^N-stabilization appears to raise welfare significantly compared to rules based on inflation, with inflation targeting looking significantly better than price level targeting

VI. What Do I Think?

One of the functions of theoretical economics is to provide fully articulated, artificial economic systems that can serve as labs in which policies that would be prohibitively expensive to experiment with in actual economies can be tested out at much lower cost.—Robert E. Lucas, Jr. "Methods and Problems in Business Cycle Theory"

- To me these exercises in policy evaluation are in the spirit of Lucas' suggestion.

- The recent literature, and this paper, estimate fully-articulated DGSE models, using state of the art econometric methods, and evaluate policies using appropriate welfare measures.

VI. What Do I Think? ...

At the same time, not all well-articulated models will be equally useful. Though we are interested in models because we believe they may help us to understand matters about which we are currently ignorant, we need to test them as useful imitations of reality by subjecting the to shocks for which we are fairly certain how actual economies, or parts of economies, would react.—Robert E. Lucas, Jr. "Methods and Problems in Business Cycle Theory"

- The paper does not go nearly far enough to convince us that the model is a good laboratory.
  - general business cycle properties of the model
  - open economy model with lots of sectors is estimated using only aggregate data

VII. Some Other Comments

- The results, in general, seem consistent with some of the previous findings in the literature, but not others, as there are inconsistencies in the literature.
  - More explanation for why such different conclusions can be drawn is needed, for these results to be digested by policy makers.
  - Most specifically, what explains the result that nontraded inflation, alone, should be targeted, relative to those papers finding that a weighted degree of targeting is warranted?
- The results on nontraded goods prices are tantalizing; but what is the operational analog to these prices?

VII. Some Other Comments ...

- The data are HP-filtered prior to model estimation
- The data should be analogous to the deviations of levels from a deterministic steady state.
- HP filtered data cannot be whitened by any parameterization of the model's state space representation.