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Journal of Monetary Economics 54 (2007) 1256–1270
Journal of MONETARY ECONOMICS
www.elsevier.com/locate/jme

Information variables for monetary policy in an estimated structural model of the euro area ☆

Francesco Lippi[a], Stefano Neri[b,*]

[a]*Bank of Italy and CEPR, Research Department, Via Nazionale 91, 00184 Rome, Italy*
[b]*Bank of Italy, Italy*

Received 7 October 2005; received in revised form 9 May 2006; accepted 13 May 2006
Available online 24 October 2006

Abstract

A small scale new keynesian model for the euro area is estimated with maximum likelihood under the assumptions of imperfect information and discretionary monetary policy. The estimated parametrization of this widely used dynamic stochastic model unveils the monetary authorities' objectives and the information content of two indicator variables: monetary aggregates and real unit labour costs. The results highlight a significant policy concern about interest-rate smoothing and inflation; almost no concern for output gap stabilization emerges. Regarding indicator variables, unit labour costs provide information on potential output that is helpful for stabilization policy; no useful information role emerges for monetary aggregates.

JEL classification: E4; E5

Keywords: Monetary policy; Indicator variables; DSGE models; Kalman filter

☆We are grateful to the Editor, Robert G. King, and an anonymous referee for their constructive criticism. We also thank Lars Svensson for a stimulating discussion at the Sveriges Riksbank conference "Small Structural Models for Monetary Policy Analysis. Progress, Puzzles and Opportunities", and Fabio Canova, Mike Woodford and seminar participants at the Banca d'Italia, the Banco de España and the Nederlandsche Bank for helpful comments. All data and programs used in this research are available from the authors upon request. The views are personal and do not involve the responsibility of the institutions with which we are affiliated.
*Corresponding author.
E-mail address: stefano.neri@bancaditalia.it (S. Neri).

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doi:10.1016/j.jmoneco.2006.05.014

1. Introduction

Dynamic stochastic models of the new keynesian variety have acquired a solid position in the analysis of monetary policy.[1] Only recently, though, economists have attempted to estimate the structural parameters of these models, a key step for the credibility of the policy advice they were ultimately designed for. This paper applies a solution method by Svensson and Woodford (2003) to solve and estimate a new keynesian model for the euro area under the assumptions of discretionary monetary policy and imperfect information. To the best of our knowledge, this is the first attempt at simultaneously estimating the economic structure, the preference weights and the information structure within a new keynesian framework. The results contribute to this branch of the literature along three dimensions.

First, previous quantitative analyses dealing with imperfect information in new keynesian models proceed by separating the estimation of the structural and information model parameters into two sequential stages (e.g. Ehrmann and Smets, 2003; Coenen et al., 2005). Such a separation is in principle problematic because, as shown by Svensson and Woodford (2003), the dynamics of all the variables depend on both sets of parameters when information is imperfect. An advantage of the maximum likelihood (ML) method pursued here is that it allows us to estimate the economy's structural and information parameters simultaneously, as predicated by the underlying economic theory. A comparison of results highlights important differences between our approach and the two-stage procedure.

Second, the analysis provides an estimate of the weights attached by the monetary authority to policy objectives (the volatility of inflation, the output gap and interest rate adjustments). This distinguishes the paper from previous estimation exercises, e.g. Ireland (2004b) for the United States or Smets and Wouters (2003) for the euro area, in which a "simple" instrument rule is used to describe monetary policy. The results quantify the relevance of the various objectives and illustrate the extent to which actual policy can be described in terms of these targets.

Finally, the incomplete information framework is used to assess the usefulness of two indicator variables often discussed in the practice of monetary policy: monetary aggregates and real unit labour costs.

The paper is organized as follows. The next section introduces a dynamic stochastic monetary policy model and describes the imperfect information problem. Section 3 estimates the model following a method proposed by Sargent (1989), McGrattan (1994) and Ireland (2004a, b). Section 4 discusses the main differences with respect to a two-stage estimation method. The model implications concerning the optimal policy rule and the usefulness of indicator variables are the subject of Section 5. The main findings are summarized in a concluding section.

[1]Variants of these models, following Yun (1996) and Rotemberg and Woodford (1997), have proved useful to analyze the properties of monetary rules (Jensen, 2002), to quantify the welfare effects of simple versus optimal policy (Dennis and Söderström, 2005) and to examine the effects of imperfect information (Ehrmann and Smets, 2003; Cukierman and Lippi, 2005). Many central banks employ them as a guide to policy analysis.