

The Italian Statistical Institute

Macroeconometric Model - MEMo-It

Fabio Bacchini, Cristina Brandimarte, Piero Crivelli, Roberta De Santis, Marco Fioramanti, Alessandro Girardi, Cecilia Jona-Lasinio, Massimo Mancini, Carmine Pappalardo, Daniela Rossi, Marco Ventura, Claudio Vicarelli and Roberto Golinelli

Abstract In this paper we provide a brief description of the Macro-Econometric Model (MEMo-It) recently developed by the ISTAT Econometric Forecasting Division.

1 Introduction

The Macro-Econometric Model (MEMo-It) recently developed by the ISTAT is designed mainly for forecast purpose after Istat has handed on the projection activity of Isae. The model has an annual frequency and includes 53 stochastic equations and 78 accounting identities. MEMo-It is a medium size econometric model describing the functioning of the Italian economy through a set of behavioral equations for the typical economic agents: households, firms, governments and rest of the world.

The theoretical framework of the model refers to the new-keynesian economics where the supply side of the economy plays a central role. Accordingly, the key assumption of the model is that short run economic growth is mainly driven by the demand side, while in the long run the economic system converges to the potential output modeled by a traditional production function. Prices react to unemployment (NAIRU) as well as to output gaps thus guaranteeing a transmission between aggregate supply and demand.

Our methodology moves from the traditional approach proposed by the Cowles Commission for Research in Economics ([8], [3]) and takes into account the developments in integrated and cointegrated time series analysis ([1], [2], [10]) and

F. Bacchini, C. Brandimarte, P. Crivelli, R. De Santis, M. Fioramanti, A. Girardi, C. Jona-Lasinio, M. Mancini, C. Pappalardo, D. Rossi, M. Ventura, C. Vicarelli
Istat, Econometric Studies and Economic Forecasting Division, e-mail: bacchini@istat.it

R. Golinelli
University of Bologna, Economic Department and CIDE e-mail: roberto.golinelli@unibo.it

[7]). Further, the model is specified by means of instrumental variables ([5], [6]) and dynamic equation specification ([4], [9]).

MEMo-It is structured into six sections: supply and demand sides, prices, labor market, trade block and the foreign sector and public finance. Causality for each behavioral equation and identity is defined a priori. The estimation and specification of the model is organized into the following steps. First, we performe integration and cointegration analysis and we test for weak exogeneity test of the relevant behavioral equations. Second we evaluate endogeneity and measurement errors of the explanatory variables by means of two stage least squares estimation. Finally, we merge together equations and sections of the model are then merged together and their parameters are estimated by three stage least squares.

After documenting the model structure and the estimation results, we turn both to the outcomes of model simulation in sample and to out-of sample simulation for 5 scenario (public expenditure, interest rate, world growth, exchange rate and petrol price). All out-of sample simulations covered a five year period. The exercise will report the most important differences between the scenario and the baseline.

The paper is organized as follows. Section two deals with the structure of the model and its basic behavioral equations. The following section presents the model properties, with a focus on both model validation and the simulation properties with 5 scenario.

Key words: Macroeconometric models, Forecasting

References

1. Dickey, D. A., W. A. Fuller: Distribution of the Estimators for Autoregressive Time Series with a Unit Root. *Journal of the American Statistical Association* **74**, 427-431 (1979).
2. Engle, R. F., C. W. J. Granger: Co-integration and Error Correction: Representation, Estimation, and Testing. *Econometrica*, **55**, 251-276 (1987).
3. Fair, R. C.: *Estimating How the Macroeconomy Works*, Harvard University Press (2004).
4. Hendry, D.F., A.R. Pagan, J.D. Sargan: Dynamic specification. in Z. Griliches e M. D. Intriligator (eds.), *Handbook of Econometrics*, Vol. II, North Holland (1984).
5. Hsiao, C.: Statistical properties of the two-stage least squares estimator under cointegration. *Review of Economic Studies*, **64**, 385-398 (1997).
6. Hsiao, C.: Cointegration and dynamic simultaneous model. *Econometrica*. **65**, 647-670 (1997).
7. Johansen, S.: *Likelihood-based Inference in Cointegrated Vector Autoregressive Models*. Oxford University Press (1995).
8. Klein, L. R.: *Economic Fluctuations in the United States, 1921-1941*. Cowles Commission monograph, No. 14, John Wiley and Sons (1950).
9. Pesaran, M.H., Y. Shin, R. J. Smith: Bounds approaches to the analysis of level relationships. *Journal of Applied Econometrics*. **16**, 289-326 (2001).
10. Sims, C., J. Stock , M. Watson: Inference in linear time series models with some unit roots. *Econometrica*, **58**, 113-144 (1990).