

The FGB model: an innovative tool for the analysis of jobs and skills needs in Italy

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Abstract

The FGB econometric model is a tool for the analysis and forecasting of the Italian economy, with a specific focus on the labour market. The model allows a representation of the Italian labour market in terms of stocks and flows, producing forecasts of employment by sector and profession, at the national and regional level.

The model strategy can be classified in the class of 'hybrid' approaches, whose main characteristic is the combination of a formal structure entailing solid theoretical bases with good estimation and forecasting properties. This aim is reached by nesting a 'pilot' model defined by micro-founded behavioural equations and a 'satellite' structure defined by empirical relationships, able to minimize the estimation and forecasting errors (for a detailed description of the model, see Giuli and Tancioni, 2009¹ and Riggi and Tancioni, 2010²).

Specifically, the 'pilot' structure is based on a dynamic stochastic general equilibrium model with New-Keynesian assumptions (NK-DSGE). The basic relationships which describe the dynamics of the economy and of employment at the aggregate level are derived from the solution of constrained maximization problems by firms and households, under fully-specified theoretical hypotheses concerning the market structure, the production technology, individual preferences and the labour market functioning. The main peculiarity, necessary for the aim of the model, is the representation of the labour market, which is modelled according to the Mortensen-Pissarides (1994)³ approach, recently introduced in a NK-DSGE perspective by Blanchard and Gali (2009)⁴.

The detailed relationships of the 'satellite' structure are instead defined by statistical relations, valid by definition, and by estimated systems of equations. They define the disaggregation by region, sector, occupation and age of the employment stocks and flows. The 'satellite' model is situated in a post-recursive position with respect to the structural equations of the 'pilot' model. The consistency among different blocks, for the representation of the relationships among stocks and flows, is guaranteed by the utilisation of an equivalent methodological set-up in the two blocks (given that the second one just defines a decomposition of figures generated by the first one), as well as by the imposition of constraints to insure the consistency among aggregated and disaggregated variables.

As concerns the estimation methodology, for the pilot model the systems Generalized Method of Moments (GMM) is used, while the blocks of equations which define the empirical relationships are estimated through the SURE (Seemingly Unrelated Regression Equations) estimator.

¹ Giuli, F. and Tancioni, M. (2009). "Il nuovo modello di previsione dei flussi del mercato del lavoro FGB-MDL: aspetti di metodo e di struttura", *Economia & Lavoro*, 43, 3, pp. 29-50.

² Riggi, M. and Tancioni, M. (2010). "Nominal v. Real Wage Rigidities in New Keynesian Models with Unemployment: A Bayesian Evaluation", *Journal of Economic Dynamics and Control*, 34, 7, pp. 1305-1324.

³ Mortensen, D.T. and Pissarides, C. (1994). "Job Creation and Job Destruction in the Theory of Unemployment", *Review of Economic Studies*, 61, 3, pp. 397-415.

⁴ Blanchard, O. and Gali, J. (2010). "Labor Markets and Monetary Policy: A New-Keynesian Model with Unemployment," *American Economic Journal: Macroeconomics*, 2, 2, pp. 1-30.

Considering data, the estimation and the functioning of the 'pilot' model uses time series of the main macroeconomic aggregates, easily available through official data sources. In detail, the model uses quarterly time series of gross domestic product, private and public consumption, private gross investment, real wages, consumption deflator, population in active age and its official medium-to-long term forecast, labour force, total employment and unemployment rate. As for the second block, the level of disaggregation produced by its equations requires the utilisation and the elaboration of territorial national accounts data and of quarterly LFS microdata, with the aim of defining the different modalities of exit from the labour force (e.g. (firing, retirement, end of a fixed-term contract, etc.)), through which transition rates (specific by region, sector and cohort) are estimated.

The main objective of the model is thus to produce simulation and forecasting of the variables which characterize labour market dynamics, namely inflows and outflows, at a high level of disaggregation. For each of the macroeconomic variables included in the 'pilot' structure (except for the nominal interest rate) the disaggregation at regional and sectoral level is provided. The variables which characterize the dynamics of the labour market, namely employment stocks and flows (hirings), are subject to further disaggregations. In detail, employment stocks, outflows from employment (according to the different causes considered), employment inflows (hiring) and unemployment are simulated and projected in a decomposition by cohort (age) and profession.

The model has been tested with success in countries different from Italy, namely Bulgaria, Czech Republic and Spain, in the framework of a EU-funded research project.