"Assessing policy reforms for Italy using *ITEM* and *QUEST*"

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ROMA, 29-31 MAGGIO 2013

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The opinions expressed only reflect those of the authors

Motivation

- In the aftermath of the recent financial crisis, macroeconomic modelling for policy analysis has come under heavy criticism

- Commentators criticized macroeconomists for failing to predict the great recession for 2008-2009 or for failing to provide adequate warning

- Also, critics accused macroeconomists of relying too much only on a particular class of macroeconomic models (e.g. DGE models)

- The use of macroeconomic models in isolation is unlikely to provide enough reliability on the assessment of policy prescriptions (see the debate on fiscal multipliers in Romer and Bernstein 2009)

Gains for using more than one tool

- This paper proposes a comparative exercise for policy analysis relying on two different modelling approaches. In assessing possible policy interventions we use: ITEM, the Econometric Model of the Italian Economy and QUEST (DGE methodology), recently made available from the European Commission and calibrated for Italy

- Policy recommendations should be robust to model uncertainty: the joint consideration of the two models can improve our understanding of how the assessment of policy interventions is likely to be affected by the uncertainty surrounding model-based evaluation

- Relying on two complementary quantitative tools allows to broaden our view on the national economy and also to pin down shortfalls or inadequacies of a single model

Main References

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Quick overview of ITEM (i)

- ITEM is a medium-large scale traditional macroeconometric model. It is designed properly for:

  1. Forecasting/projections in the medium run conditioned on the hypotheses on exogenous variables

  2. Analysis of alternative scenarios based on different profiles of some relevant variables

  3. Estimation of effects of some fiscal policy measures and structural reforms

- It is a quarterly model and includes 34 behavioral equations and 190 identities

- The equation specification is of Error Correction Model (ECM) type

Quick overview of ITEM (ii)

In a nutshell, the main features are:

- Factors on the demand side are predominant in shaping the output movements in the short run. The impact of demand shocks is temporary while in the long run, supply side factors are key determinants of the output level (see Cicinelli et al., Economic Modeling, 2009)

- Y equals the sum of market and non market value added and indirect taxes: $Y = VAM + VANM + TAXIND$

- Market value added is determined by a Cobb-Douglas production function (potential output): $VAM = TFP \times L^\alpha \times K^{1-\alpha}$

- The model is closed by inventories:
  $\Delta INV = Y - (C + G + I + X - M)$

- Measured TFP is pro-cyclical because data on L and K fall short of capturing the intensity of factor utilization (factor hoarding: Burnside-Eichenbaum, 1996; Basu-Fernald-Kimball, 2006)
- The production function can be written as:
  $VAM = TFP^* \times (U \times L)^{\alpha} \times (U \times K)^{1-\alpha}$ where U is the intensity of factor utilization and TFP^* is technical progress: $TFP = TFP^* \times U$ and $log(U) = log(TFP) - log(TFP^*)$
- TFP^* is exogenous and is calculated using the HP filter
- U depends on cyclical components and is explained by the equation (demand condition): $\Delta TFP - \Delta TFP^* = \beta \Delta Dem - \varepsilon ASAD_{-1}$, where: ΔDem is the variation of aggregate demand and $ASAD$ is the ratio between supply and demand
- An increase of $ASAD$ corresponds to an accumulation of inventories

- A demand impulse creates a positive discrepancy between output and potential output affecting directly U
- The increase of demand will not be immediately matched by an equivalent increase in production but by a rundown of inventories.
- In the following period this mismatch will increase the procyclical component of TFP. This yields a parallel increase of output restoring the equilibrium between supply and demand and letting inventories revert towards the "normal" pre-shock level
- Policy rules (e.g., public finance rules) can speed up the process

Quick overview of QUEST (i)

- QUEST (Quartely European Simulation Tool: Italian version) is a large-scale Dynamic General Equilibrium (DGE) model
- It is a simulation tool mainly employed to analyze the effects of structural reforms and the response of the economy to a variety of shocks (recently used for assessing structural reforms in Italy (see Annicchiarico et al. 2013)
- The calibrated (or estimated) parameters represent deep structural parameters and are thus independent of the conduct of monetary and fiscal policy (not subject to the Lucas 1976 critique)
- It is a version augmented with endogenous growth. This version of QUEST III is augmented with R&D (see Roeger and al., 2008)

Quick overview of QUEST (ii)

- By including several nominal and real frictions, modelling markets as imperfectly competitive, the model can be used to study the effects of competition-enhancing policy

- Distinction of employment in three skill categories (low, medium and high) allows to analyze the effects of specific labor market policies like increasing the social benefits for low-skilled workers, changing the skill composition of the labour force, promoting high skilled immigration policies and subsidizing employment of the high-skilled workers in the R&D sector

- Optimising households (non liquidity constrained households) and hand-to-mouth consumers (differentiation is necessary to reproduce empirically relevant Keynesian effects of fiscal policy)

Quick overview of QUEST (iii)

- Trade unions set wages charging a wage mark-up over the reservation wage
- Imperfect competition in the final goods market impinges on prices which are equal to a markup over marginal costs
- The intermediate sector is made of monopolistically competitive firms which have entered the market by licensing a design from domestic households
- Final-goods producers manufacture a variety of the domestic good which is an imperfect substitute for the varieties produced by other firms by using labor and intermediate inputs
- Monetary policy is described by a Taylor rule

Simulations (i)

- For each reform scenario we evaluate the simulation results of the two models, trying to compare the main transmission channels and identify the key sources of differences on the main macroeconomic variables

- Several differences in the short as well as in the long run can be explained on the ground of specific features of the two models and on the different emphasis put on data and theory in the two approaches to macroeconomic modelling

- In the long run, outcomes are driven by supply side and the quantitative differences will depend on aspects related to technology and on the evolution recorded in the factors of production

- In the short run, outcomes are mainly determined by aggregate demand conditions and a relevant element underlying the different response to shocks, especially for consumption, is arguably the forward-looking nature of QUEST compared to ITEM

Simulations (ii)

- In addition, in order to disentangle forward-looking component in shaping the response of the economy in QUEST III we also report the simulation results under the assumption that the policy changes are perceived as being temporary during the first ten-years of the simulation (up to the tenth year)

- Actually we assume that up to the tenth year agents perceive the policy intervention as being an unexpected, one-period only policy shift.

- On the contrary, since the eleventh year onwards, agents realize that the policy shift is permanent and in fact they face a structural break induced by the policy regime change

Simulations (iii)

- This means that we offset the impact of forward looking component of policy interventions on the current variables

- In the standard case a permanent intervention on θ entails a current and expected effect on the variable X: $X_t = X(\theta_t, X_{t+1}^e(\theta_{t+1}^e))$

- In the case of no forward looking behaviour we have: $X_t = X(\theta_t, X_0(\theta_0))$

- In this way the future path of variables is not affected by the policy change and thus expected policy shift have no effect on the current decisions made by households and firms during the first ten years of the simulation

Permanent increase in public consumption of 1%
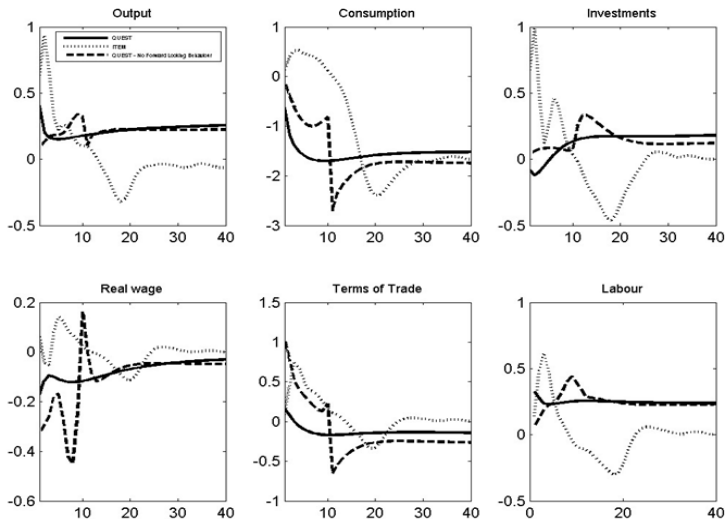
Permanent increase in public consumption of 1%

- In the short run effects on output consumption and investment greatly differ between the two models while in the long run they experienced similar effects
- In ITEM fiscal multiplier does not exceed unity reflecting a strong increase of import (mainly driven by investments expansion)
- In ITEM The sharp fall of aggregate consumption and investment in long-run period reflects the crowding-out effect connected with the decline of household financial wealth (higher prices) and higher tax burden connected to higher government spending
- In QUEST private consumption exhibits a permanent fall, reflecting a rise of labour supply due to the negative wealth effect
- In QUEST consumption under non-forward looking assumption declines much less than in the standard case, narrowing the gap with respect the response attained with ITEM
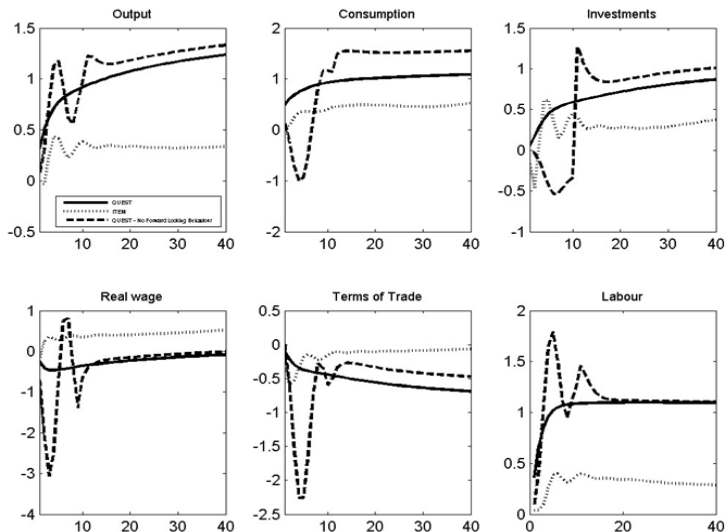
Exogenous productivity shock of 1%
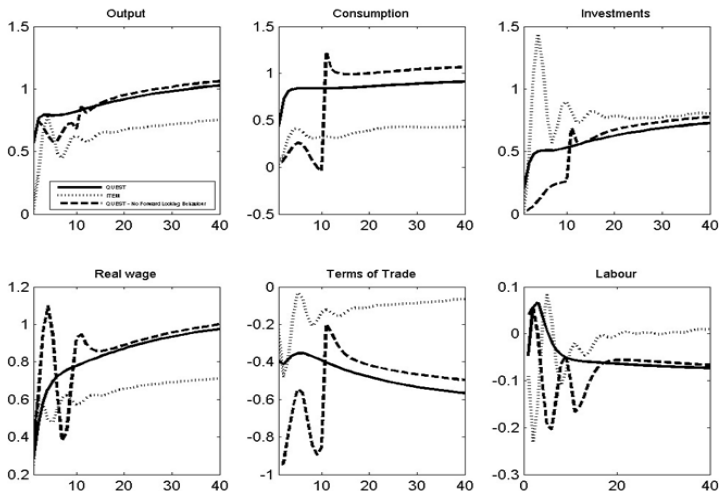
Exogenous productivity shock of 1%

- This shock gives rise to a permanent positive effects on output, consumption and investment
- The effect on output is amplified in QUEST with respect to ITEM because of the endogenous R&D response to a productivity shock
- In the short run technical progress has a negative impact on labour. In QUEST, because of price rigidities, firms do not fully adjust their prices downward to the new lower level of marginal costs
- In QUEST the long-run positive effect on consumption (fostered by the wage increase) is twice as large as the one in ITEM

Tax shift from labor to consumption of 1%

- Shifting the burden of taxation from labor to consumption reduces disincentives and distortions in the labor market giving rise to an increase in the level of employment and output.

- In QUEST the positive effect on employment and output of the tax shift is enhanced by the endogenous growth mechanism and for this reason the beneficial effects of this policy reform continue to materialize 40 years after

- This expansionary effect on employment of the tax shift is due to the decline of the tax wedge on labor

- A note of caution associated with this exercise is that ITEM is not a suitable framework for analyzing redistributive policies

Conclusions

- In QUEST we observe smoother dynamic responses of variables to structural changes (due to the sluggishness and rigidities of the model)

- The endogenous growth mechanism operative in QUEST contributes to explain part of the differences across the two models in the size of the level effect of shocks on many variables. Also, behind each shock in QUEST we observe changes in the composition of the employed workforce

- The forward looking nature of QUEST contributes to widen the gap with ITEM mainly in consumption and investment decisions

- Many thanks for your kind attention