



Dipartimento
del Tesoro

WHAT'S THE IMPACT OF STRUCTURAL REFORMS ON THE ITALIAN ECONOMY? A COMPARATIVE MODEL-BASED SIMULATION ANALYSIS USING QUEST III AND IGM

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Motivation

- ▶ In the Italian NRPs model-based assessment of structural reforms
- ▶ Impact of economic reforms surrounded by uncertainty
- ▶ Tool choice a delicate issue - models false by definition
 - ▶ Simulation tool chosen on the basis of the policy area and given the nature of the analysis (e.g. intertemporal and/or sector-based)
 - ▶ Danger of relying on a single tool, methodology or paradigm
 - ▶ Policymakers need to have input from various theoretical perspectives and from a range of empirical approaches

Aims

- ▶ To understand the implications of the model choice and the robustness of the estimates of structural reforms
- ▶ To gauge the quantitative impact of reforms in the light of the chosen model and isolate the different (possibly complementary) model-specific economic mechanisms
- ▶ To enhance transparency
- ▶ To provide answers to policy makers' typical questions, such as: What is the plausible range of uncertainty related to the model choice? Are results qualitatively and quantitatively robust? Which are the interlinkages between reform areas under different modelling assumptions?

Tools of Analysis

- ▶ DGE models at the Italian Department of Treasury (used in conjunction with the Italian Treasury Econometric Model - ITEM)
 - ▶ QUEST III with R&D adapted to Italy - 2012 version - (see Roeger et al. 2009; Roeger et al. 2013, Varga and in't Veld, 2014) [▶ more](#)
 - ▶ IGEN - Italian General Equilibrium Model (Annicchiarico et al. 2013, 2015) [▶ more](#)
- ▶ Main differences: QUEST III with R&D embeds an endogenous growth mechanism; IGEN embodies a dual labour market with a fringe of workers very reactive to exogenous shocks

Model Comparison Methodology

- ▶ Construct a level-playing field on which the two models can compete
- ▶ Model-specific equations stay unchanged
- ▶ Identify common comparable variables, parameters and shocks and augment models if needed
- ▶ Model-specific policy rules are replaced with common policy rules that express policy variables as functions of common variables and parameters - Here: very same interest-rate rule as in QUEST III - Italy, fiscal rule switched off

Areas of Intervention

Policy areas consistent with 2015 NRP:

- ▶ Competition
- ▶ Public administration and simplification
- ▶ Labour market
- ▶ Taxation

Mapping

Translation of measures

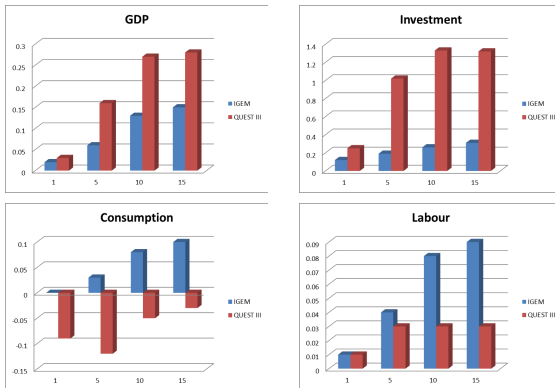
- ▶ Competition: price markup in the manufacturing sector
- ▶ Labour market: wage markup
- ▶ Public administration and simplification: overhead labour cost
- ▶ Taxation: tax shift for direct to indirect taxation

Size and Timing

- ▶ Sizes inspired to 2015 NRP
 - ▶ Product market - price markup in the manufacturing sector: -1p.p.
 - ▶ Labour market - wage markup: -10%
 - ▶ Public Administration and Simplification - overhead labour cost: -15%
 - ▶ Taxation - tax shift for direct to indirect taxation: 0.1% of GDP
- ▶ Timing: different speeds of implementation
- ▶ Full credibility of reform plan

Results - Product Market

Figure 1: Macroeconomic Impact of 1pp Reduction of the Price Markup
(% deviations from the baseline)



Timing: phasing-in 10 years

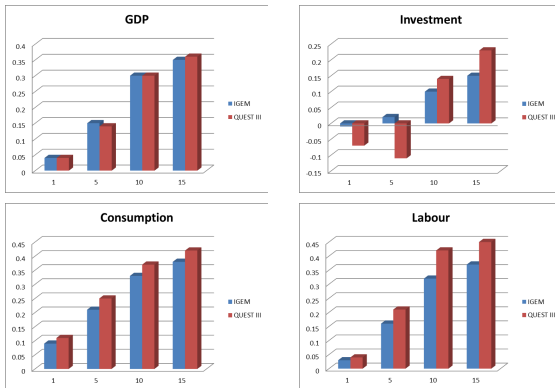
► 5 years

Results - Competition

- ▶ Main differences
 - ▶ In QUEST III stronger response of GPD, investment and labour
 - ▶ In QUEST III negative effect on consumption (households postpone consumption decisions)
- ▶ Possible explanation
 - ▶ In QUEST III intermediate good sector capital intensive, increase in the scale of output of incumbents, but less entry → minor technological progress
 - ▶ At early stages of the reform plan non-liquidity constrained households find it optimal to save more (higher investment and future price reduction)
 - ▶ In IGEM the income effect prevails on the (intertemporal) substitution effect
- ▶ If we cut markup in the final good sector, the differences between the two models are magnified (endogenous growth effects → higher demand for capital → entry of new firms → increase in R&D)

Results - Labour Market

Figure 2: Macroeconomic Impact of 10% Reduction of the Wage Markup
(% deviations from the baseline)



Timing: phasing-in 10 years

► 5 years

Results - Labour Market

► Remarks

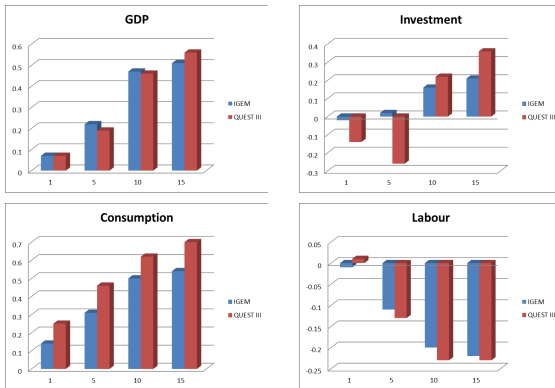
- Very similar overall effects on GDP
- Initial negative effect on investment especially in QUEST III

► Possible explanation

- Lower wage markup increases employment (especially of low-skilled workers) while temporarily decreasing the use of capital in IGEM and of the capital-intensive intermediate-good inputs in QUEST III

Results - Public Administration and Simplification

Figure 3: Macroeconomic Impact of 15% Reduction of the Overhead Labour Cost
(% deviations from the baseline)



Timing: phasing-in 10 years

► 5 years

Results - Public Administration and Simplification

- ▶ Remarks

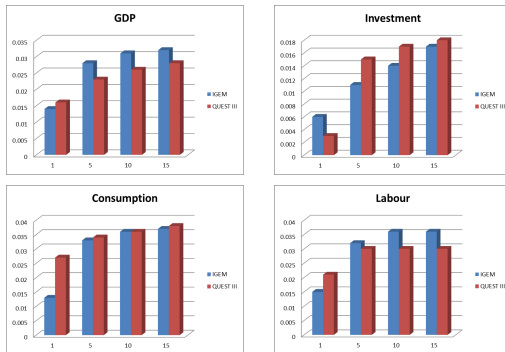
- ▶ Very similar overall effects on GDP and labour
- ▶ Initial negative effect on investment especially in QUEST III

- ▶ Possible explanation

- ▶ Average production cost decreases, less labour is needed for producing the same level of output.
- ▶ The slow implementation of the reform explains the reduction of investment: in the medium run the higher profitability induces a higher demand for capital and capital-intensive goods, but in the short run tendency to postpone investment decisions.

Results - Taxation

Figure 4: Macroeconomic Impact of a 0.1% Tax Shift from Labour to Consumption
(% deviations from the baseline)

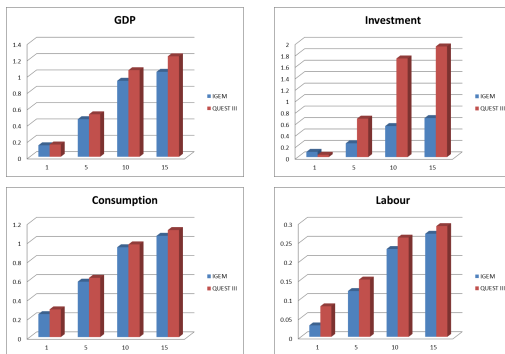


Results - Taxation

- ▶ Remarks
 - ▶ Slightly larger effects on GDP in IGEM
- ▶ Possible explanation
 - ▶ Strong increase in the employment of workers involved in more flexible labour patterns (more reactive to changes in their after-tax labour income)

Results - Overall Impact

Figure 5: Macroeconomic Impact of All Reforms
(% deviations from the baseline)



Timing: phasing-in 10 years

Results - Impact of the Reforms and Model Uncertainty

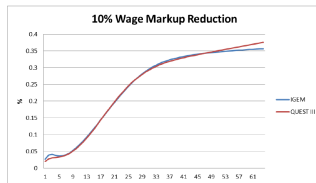
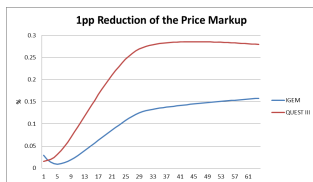
Table 1: Overall Impact on GDP and Timing
(% deviations from the baseline)

year	QUEST III		IGEM	
	10 years	5 years	10 years	5 years
1	0.15	0.31	0.14	0.30
2	0.23	0.49	0.17	0.32
3	0.31	0.66	0.25	0.49
4	0.41	0.84	0.35	0.69
5	0.52	0.98	0.46	0.83
10	1.06	1.23	0.93	1.01
15	1.23	1.33	1.04	1.06

Timing: phasing-in 5 and 10 years [▶ interlinkages](#)

Results - Understanding the Reaction to Announced Reforms

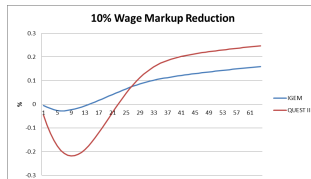
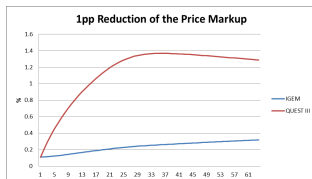
Figure 6: Impact on GDP
(% deviations from the baseline)



Timing: pre-announced two years in advance, phasing-in: 5 years

Results - Understanding the Reaction to Announced Reforms

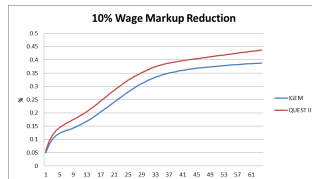
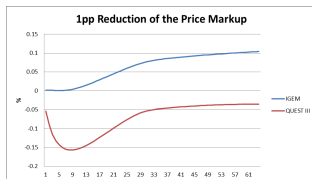
Figure 7: Impact on Investment
(% deviations from the baseline)



Timing: pre-announced two years in advance, phasing-in: 5 years

Results - Understanding the Reaction to Announced Reforms

Figure 8: Impact on Consumption
(% deviations from the baseline)



Timing: pre-announced two years in advance, phasing-in: 5 years

Model Comparison - Fiscal Multipliers

Table 2: Response of Output and Consumption to a Permanent Reduction of Government Consumption (-1 percent of GDP)
(% deviations from the baseline)

	Impact		1 year		5 years		10 years	
	QUEST III	IGEM	QUEST III	IGEM	QUEST III	IGEM	QUEST III	IGEM
Output	-0.62	-0.71	-0.30	-0.45	-0.24	-0.31	-0.27	-0.34
Consumption	0.22	0.26	0.64	0.74	0.71	0.82	0.69	0.80

Model Comparison - Fiscal Multipliers

- ▶ Remarks
 - ▶ Smaller multipliers in QUEST III
- ▶ Possible explanation
 - ▶ Reduction of public consumption \rightarrow lower demand \rightarrow lower output BUT more resources for private investment \rightarrow endogenous growth mechanism enhances the positive (partially offsetting) effect

Model Comparison - Fiscal Multipliers

Table 3: Response of Output and Consumption to a Permanent Reduction of Government Consumption and of Labour Income Tax (-1 percent of GDP)
(% deviations from the baseline)

	Impact		1 year		5 years		10 years	
	QUEST III	IGEM	QUEST III	IGEM	QUEST III	IGEM	QUEST III	IGEM
Output	-0.38	-0.55	0.02	0.16	0.21	0.22	0.22	0.24
Consumption	0.94	0.60	1.60	1.61	1.94	2.04	1.95	2.06

Model Comparison - Fiscal Multipliers

► Remarks

- already after one year: negative effect of government consumption on output now fully compensated by the lower tax wedge on labour
- faster positive reaction of IGEM
- in the medium and long run only slightly larger effects on IGEM

► Possible explanation

- in IGEM labour market more reactive to changes in the after-tax labour income; in QUEST III the endogenous growth forces take time to materialize

Main Findings and Conclusions

- ▶ We have proposed a comparative approach to the study of the impact of structural reforms
- ▶ The qualitative impact on output of structural reform is robust to model choice
- ▶ The endogenous growth structure of QUEST III tends to enhance the overall positive effects and to induce an over-reaction of investment
- ▶ The strong distortions and the asymmetry characterizing the labour markets of IGEM tends to enhance the positive effects of tax reforms

Main Findings and Conclusions

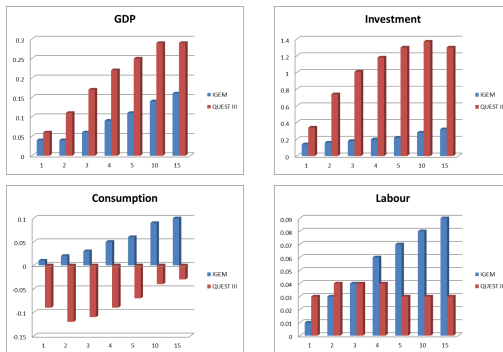
- ▶ Model comparison as a valuable tool for
 - ▶ increasing our understanding of the functioning of the simulation tools in hand
 - ▶ fostering transparency
 - ▶ increasing the robustness of policy recommendations
- ▶ Given model uncertainty policy analysis needs to take into account a range of models and possibly of competing modelling paradigms

References

- ▶ Annicchiarico, B., Di Dio, F., Felici, F., Nucci F. (2014). "Assessing Policy Reforms for Italy Using ITEM and QUEST III," *Rivista di Politica Economica*, SIPI Spa, issue 3, pages 211-244, July-Sept.
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- ▶ Roeger, W., Varga, J., & in't Veld, J. (2008). *Structural Reforms in the EU: A Simulation-Based Analysis Using the QUEST Model with Endogenous Growth*, *European Economy – Economic Paper no. 351*.
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- ▶ Varga, J., & in't Veld, J. (2014). "The potential growth impact of structural reforms in the EU. A benchmarking exercise," *European Economy - Economic Papers 541*, Directorate General Economic and Financial Affairs (DG ECFIN), European Commission.

Results - Competition

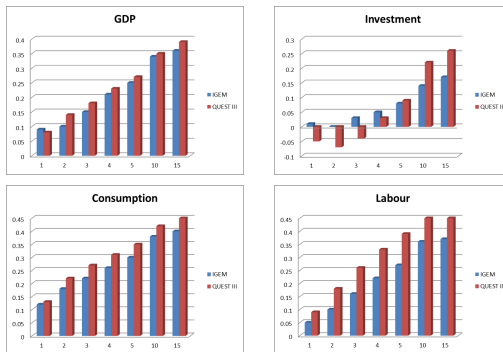
Figure 1A: Macroeconomic Impact of 1pp Reduction of the Markup
(% deviations from the baseline)



Timing: phasing-in 5 years ▶ Figure 1

Results - Labour Market

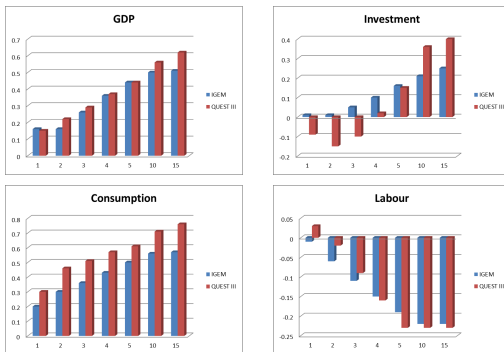
Figure 2A: Macroeconomic Impact of 10% Reduction of the Wage Markup
(% deviations from the baseline)



Timing: phasing-in 5 years ▶ Figure 2

Results - Public Administration and Simplification

Figure 3A: Macroeconomic Impact of 15% Reduction of the Overhead Labour Cost
(% deviations from the baseline)



Timing: phasing-in 10 years ▶ Figure 3

Results - Overall Impact and Model Interlinkages

Table 1A: Overall Impact on GDP and Model Interlinkages
(% deviations from the baseline)

year	QUEST III		IGEM	
	disjoint	simultaneous	disjoint	simultaneous
1	0.15	0.16	0.14	0.14
2	0.23	0.23	0.17	0.17
3	0.31	0.31	0.25	0.26
4	0.41	0.41	0.35	0.35
5	0.52	0.51	0.46	0.46
10	1.06	1.06	0.93	0.93
15	1.23	1.23	1.04	1.04

Timing: phasing-in 10 years [▶ Table 1](#)

QUEST III with R&D - Italy

► Country-specific features

- high (low) share of low (high) skilled workers
- high share of LC households
- lower employment rate
- high fixed entry costs
- poor R&D intensity and low contribution of R&D labour to knowledge creation
- heavy taxation on labour income and a high share of transfers as a percentage of GDP

► Tools

IGEM - Labour Market Structure

- ▶ Try to capture the dualism
 - ▶ primary sector with higher protection, better working conditions, superior opportunities for promotion, higher pays
 - ▶ secondary sector with poor protection, limited promotion opportunities, lower pays
- ▶ Three different categories of workers:
 - (i) employees (skilled and unskilled) with stable contract of employment and strong protection (differentiated labour inputs)
 - (ii) self-employed workers and professionals who supply work under contracts for services (differentiated labour inputs)
 - (iii) atypical workers with flexible working patterns and weak employment protection