Macroeconomic effects of simultaneous implementation of reforms after the crisis

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Banca d'Italia

Banco de España-Banque de France
Research Conference
”Structural Reforms in the wake of recovery: Where do we stand?”
Madrid, 18-19 June 2015

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“Fiscal consolidation should be designed in a growth friendly manner while structural reforms will boost potential growth”

— ECB President M. Draghi, Hearing at the Committee on Economic and Monetary Affairs of the European Parliament, Brussels, 3 March 2014
Overview

- Two main legacies of the crisis for European economy: high public debt and persistently weak economic performance
- Growth-friendly fiscal consolidation: as ↓ in the debt-to-GDP ratio progresses, new fiscal room is created to ↓ tax rates in the long-run
- Structural reforms: expansion in economic activity increases tax base, thus favoring less (distortionary) fiscal pressure
- This paper: assess possible synergies across policies, by evaluating the effects of simultaneous implementation of growth-friendly fiscal consolidation and competition-friendly reforms in one European country
Motivation

- **Crisis**: challenges for aggregate demand-management tools in euro area. New limits to fiscal and monetary policy (fiscal compact, zero lower bound)
- **Supply-side**: historically poor performance in some countries
- **Room for new policy mix**: permanent reduction in public debt and increase in competition in services sector, jointly implemented
Contribution

- Study macroeconomic effects of simultaneously implementing growth-friendly fiscal consolidation and pro-competition reforms in one European country

- Use a 3-region large-scale New Keynesian dynamic general equilibrium model of one country in the euro area (Home), the rest of the euro area (REA) and the rest of the world (RW) economy, akin to the Eurosystsem EAGLE (Gomes et al., 2010)
Results preview

- Long run: positive effects of debt reduction (↓ interest payment, fiscal room for ↓ taxes). GDP increases by 0.3% (1.2%) in case of labor (capital) tax-based consolidation
- Service sector reform: positive long-run effects, GDP ↑ by 1.3%
- Joint implementation of consolidation and liberalization: more than additive effects
- Structural reforms allow for ↓ taxes for given public debt-to-GDP ratio. Increase in GDP: 2.3% (4.9%) if services reform implemented with labor (capital) tax based consolidation
- Short and medium-term costs of fiscal consolidation can be partially mitigated by joint implementation of reforms
Related literature

- Macroeconomic effects of structural reforms in euro area: Forni et al. (2010a), Gomes et al. (2013), Cacciatore and Fiori (2013), Lusinyan and Muir (2013)
- Structural reforms under tight financial conditions: Andrés et al. (2014)
- Fiscal consolidation: Forni et al. (2010b)
- Synergies: Fiori et al. (2012), product and labor market liberalisation
- This paper: joint implementation of reforms after the crisis, explore possible synergies
Road map

- Model setup: main features
- Simulation results
- Long run
- Short run, transition dynamics
A 3-region DSGE Model (1)

- A 3-region open-economy model: Home (H), rest of the monetary union (RMU) and rest of the world (RW)
- Standard New Keynesian open-economy features, nominal and real rigidities
- Perfectly competitive firms produce two final goods (consumption and investment)
- Monopolistic firms produce intermediate goods
- Intermediate tradable and nontradable goods produced with domestic capital and labor, mobile across sectors. Intermediate tradable goods can be sold also abroad
A 3-region DSGE Model (2)

- Government: 3 sources of revenues (taxes on labour, capital, and consumption) and 3 spending items (govt consumption, govt labour, and transfers)
- Fiscal rule to stabilise the debt-to-GDP ratio at desired level $\bar{b}_g$
- Monetary authority: move short-term policy rate $R$ according to a Taylor rule (responding to euro-area variables)
Simulated scenarios: setup

- **Fiscal consolidation**: exogenous reduction in Home $\bar{b}^g$ such that $b_t^g \downarrow$ by 10 p.p. in 12 years. Tax rates initially ↑, then ↓.
Simulated scenarios: setup

- **Fiscal consolidation**: exogenous reduction in Home $b^g$ such that $b^g_t \downarrow$ by 10 p.p. in 12 years. Tax rates initially $\uparrow$, then $\downarrow$
  - $\tau^K$ affects steady-state investment:

$$r^K \left(1 - \tau^K\right) = \frac{1 - \beta (1 - \delta)}{\beta} P_I$$
Simulated scenarios: setup

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    $$\frac{W}{P} \left(1 - \tau^\ell\right) = \frac{\theta_L}{\theta_L - 1} C^\sigma L^\tau$$
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  - $\tau^K$ affects steady-state investment:
    \[
    r^K \left(1 - \tau^K\right) = \frac{1 - \beta (1 - \delta)}{\beta} P_l
    \]
  - $\tau^\ell$ affects steady-state labor supply:
    \[
    \frac{W}{P} \left(1 - \tau^\ell\right) = \frac{\theta_L}{\theta_L - 1} C^\sigma L^\pi
    \]
- **Structural reforms**: $\downarrow$ Home services markup by 5 p.p. in 10 years
Simulated scenarios: setup

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**Structural reforms**: $\downarrow$ Home services markup by 5 p.p. in 10 years

- Elasticity of substitution among goods pins down steady-state markup:
  \[
  \frac{P_N}{P} = \frac{\theta_N}{\theta_N - 1} \frac{MC_N}{P}
  \]
Simulated scenarios: setup

- **Fiscal consolidation**: exogenous reduction in Home $\bar{b}^g$ such that $b^g_t$ ↓ by 10 p.p. in 12 years. Tax rates initially ↑, then ↓
  - $\tau^K$ affects steady-state investment:
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    r^K \left(1 - \tau^K\right) = \frac{1 - \beta (1 - \delta)}{\beta} P_I
    \]
  - $\tau^\ell$ affects steady-state labor supply:
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    \]

- **Structural reforms**: ↓ Home services markup by 5 p.p. in 10 years
  - Elasticity of substitution among goods pins down steady-state markup:
    \[
    \frac{P_N}{P} = \frac{\theta_N}{\theta_N - 1} \frac{MC_N}{P}
    \]
  - Higher substitutability $\implies$ lower markup $\implies$ higher production (for given price)
Long-run effects

- **Fiscal consolidation:** \( \downarrow \) interest payment \( \implies \downarrow \tau \) (permanently)
  - \( \downarrow \tau^L \): \( \uparrow L^s \implies \uparrow \) capital productivity \( \implies \uparrow C, I, L, Y \)
  - \( \downarrow \tau^K \): qualitatively similar, \( \uparrow I \) larger than before, \( \uparrow L^s \) smaller, as investment is now cheaper than labor

- **Services reform:** firms \( \uparrow \) demand for \( K \) and \( L \); households \( \uparrow C \), as prices \( \downarrow \)
  - \( \uparrow C, I, L, Y \); exports and imports both \( \uparrow \)
  - Terms of trade deterioration, driven by \( \uparrow \) price of tradables (complementarity in consumption)
  - Small spillovers to REA

- **Joint implementation:** more than additive expansionary effects. Increase in competition \( \implies \uparrow \) in tax base. As \( b_t^g \downarrow \), larger fiscal room for tax reductions. Overall sizeable effects on GDP (2.3% and 4.9%)
Short-run effects

- **Fiscal consolidation**: initial ↑ in tax rates, to permanently reduce public debt-to-GDP ratio

- $\tau^l$: GDP ↓ below baseline for 10 years; $C, I, L$ all ↓. Return to steady state once $b_{g,t}$ reduced and labor tax ↓

- $\tau^K$: similar pattern

- Tax-based consolidation: substantial short-run macroeconomic costs, to be compared with long-run benefits (large and permanent)
Short-run effects

- **Services reform:**
  - GDP: slight ↓ in 1st year (reflecting ↓ in C), then ↑, driven by I growth
  - Excess supply of services ⇔ RER depreciation, exports ↑
  - Gradual effects: expansionary effects arise 2 years after reform process starts; inflation below baseline for longer
Simulated scenarios: synergies

- Fiscal consolidation: initial $\uparrow \tau$ has prolonged recessionary effects
- Medium term: $\downarrow$ in public debt and interest payment allows for permanent $\downarrow \tau$. Expansionary effects via labor supply and investment increases
- Service sector reform: markup reduction $\implies \downarrow$ price of intermediate nontradable goods $\implies \downarrow$ price of final goods. $\uparrow C, I$
- Implied medium-term output expansion is the source of synergy:
- Medium-term increase in tax rates is lower
- Long-run decrease in tax rates is higher
Short-run effects: simultaneous implementation

- Short-run gains from implementing structural reforms during fiscal consolidation: extra output from services reforms used to reduce taxes earlier and more than before
- Increase in Home GDP due to reform favours the increase in tax base $\Rightarrow$ smaller $\uparrow$ in the tax rate is needed to reduce public debt
- Path of tax rates is monotonically declining after initial rise, due to monotonic $\uparrow$ GDP, generated by services reforms
- Similar message if labor or capital tax based consolidation is considered
- Simultaneous implementation of reforms can benefit Home also in the short and medium term, by limiting initial $\uparrow \tau$ and implied recessionary effects
Conclusions

- Higher competition in services sector + fiscal consolidation $\implies$ higher GDP in the long run
- Transition costs of fiscal consolidation are substantial, but can be reduced by simultaneous implementation of structural reforms
- Synergies: increase in tax base due to higher competition allows for (i) smaller increases in tax rates in the short-term and (ii) larger tax reduction in the long-run
- Further issues and possible extensions: labor market reforms and joint implementation with fiscal consolidation, role of financial conditions
Thanks
A 3-region DSGE Model: fiscal authority

Government budget constraint:

\[
\frac{B_{t+1}^g}{R_t} - B_t^g \leq (1 + \tau_c) P_{N,t} C_t^g + Tr_t - T_t
\]

where \(B_t^g \geq 0\) is nominal public debt, \(C_t^g\) government purchases, \(Tr_t > 0 (< 0)\) are lump-sum transfers. Total government revenues \(T_t\):

\[
T_t \equiv \tau^\ell W_t L_t + \tau^k R_t^k K_{t-1} (j) + \frac{\Pi^P_t}{s} + \tau^c P_t C_t - \tau^c P_{N,t} C_t^g
\]

where \(\tau^\ell, \tau^k\) and \(\tau^c\) are tax rates on labor, capital and consumption. Debt-stabilizing fiscal rule:

\[
\frac{i_t}{i_{t-1}} = \left( \frac{b_t^g}{b^g} \right)^{\phi_1} \left( \frac{b_t^g}{b_{t-1}^g} \right)^{\phi_2}
\]

where \(i_t\) is one of the six fiscal instruments \((\tau^\ell_t, \tau^k_t, \tau^c_t, C_t^g, Tr_t)\)
A 3-region DSGE Model: monetary authority

Set short-term policy rate $R_t$ according to a Taylor rule:

$$
\left( \frac{R_t}{\bar{R}} \right) = \left( \frac{R_{t-1}}{\bar{R}} \right)^{\rho_R} \left( \Pi_{EA,t} \right)^{(1-\rho_R)\rho_\pi} \left( \frac{GDP_{EA,t}}{GDP_{EA,t-1}} \right)^{(1-\rho_R)\rho_{GDP}}
$$

CPI inflation rate is a geometric average of CPI inflation rates in Italy and the REA (respectively $\Pi_t$ and $\Pi^*_t$) with weights equal to the correspondent country size (as a share of the EA):

$$
\Pi_{EA,t} \equiv (\Pi_t)_{\frac{s}{s+S}} (\Pi^*_t)_{\frac{S}{s+S}}
$$

EA GDP, $GDP_{EA,t}$, is the sum of the Italian and REA GDPS (respectively $GDP_t$ and $GDP^*_t$):

$$
GDP_{EA,t} \equiv GDP_t + rer_t \times GDP^*_t
$$
Fiscal consolidation

- Labor income tax rate (p.p. dev. from initial s.s.)

- Public debt-to-annualized GDP ratio (p.p.)

- Capital income tax rate (p.p. dev. from initial s.s.)

- Public debt-to-annualized GDP ratio (p.p.)
## Simulated scenarios: Long-run effects

### Long-run effects of fiscal and competition reforms. Main macroeconomic variables

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<th>(b)</th>
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<td>$\tau^L$</td>
<td>$\tau^K$</td>
<td>services</td>
<td>services $+\tau^L$</td>
<td>services $+\tau^K$</td>
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<td>Home</td>
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<td>GDP</td>
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<td>Investment</td>
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<td>2.64</td>
<td>1.97</td>
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<td>Exports</td>
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<td>Imports</td>
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<td>Labor</td>
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<td>0.60</td>
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<td>Real exch. rate (vis-à-vis REA)</td>
<td>0.17</td>
<td>0.69</td>
<td>1.57</td>
<td>2.11</td>
<td>3.73</td>
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<tr>
<td>Real exch. rate (vis-à-vis RW)</td>
<td>0.17</td>
<td>0.68</td>
<td>1.56</td>
<td>2.10</td>
<td>3.71</td>
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<td>Terms of trade (vis-à-vis REA)</td>
<td>0.23</td>
<td>1.00</td>
<td>0.37</td>
<td>1.11</td>
<td>3.50</td>
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<td>Terms of trade (vis-à-vis RW)</td>
<td>0.23</td>
<td>0.98</td>
<td>0.36</td>
<td>1.10</td>
<td>3.43</td>
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<td>Rest of euro area</td>
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<td>GDP</td>
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<td>0.03</td>
<td>0.01</td>
<td>0.01</td>
<td>0.04</td>
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</tbody>
</table>

Note: % deviations from initial steady state. For real exchange rate, $+=depreciation$, for terms of trade $+=deterioration$. 

[Back]
Fiscal consolidation: labor income tax

Real GDP (percent dev. from initial s.s.)

Consumption (percent dev. from initial s.s.)

Investment (percent dev. from initial s.s.)

Exports and Imports (percent dev. from initial s.s.)

Labor (percent dev. from initial s.s.)

Inflation (annualized p.p dev. from initial s.s.)
Fiscal consolidation: capital income tax
Services reform

- Real GDP (percent dev. from initial s.s.)
- Consumption (percent dev. from initial s.s.)
- Investment (percent dev. from initial s.s.)
- Exports and Imports (percent dev. from initial s.s.)
- Labor (percent dev. from initial s.s.)
- Inflation (annualized p.p. dev. from initial s.s.)
Simultaneous implementation of reforms

- Labor income tax rate (p.p. dev. from initial s.s.)
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Simultaneous implementation of reforms
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- Real GDP (percent deviation from initial steady state)
- Consumption (percent deviation from initial steady state)
- Investment (percent deviation from initial steady state)
- Labor (percent deviation from initial steady state)