Fiscal Consolidation During a Depression

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Introduction

- With no consolidation plans, debt in many EU economies would be on an unsustainable path.
- Timing of fiscal programme matters
  - Consolidation is always contractionary
  - During a depression, negative impacts are amplified
- Presentation extends paper on the UK to consider synchronised consolidation across Europe
  - What is the economic impact?
  - Is it self-defeating?
  - How important are fiscal spillovers?
Outline of presentation

- Analysis based on simulation using the National Institute Global Econometric Model (NiGEM)
  - Overview of key features of NiGEM model
- What determines the fiscal multiplier?
- Does the state of the economy affect the multiplier?
- How does the fiscal position affect sovereign bond yields?
- Assessment of planned fiscal consolidation programmes, 2011-2013 for 12 EU economies
NiGEM Overview

- NiGEM is a large-scale structural econometric model of the world economy
  - Discrete models for 40 countries and 6 regional blocks for the remaining countries

- Country Linkages
  - trade and competitiveness
  - interacting financial markets
  - international stocks of assets

- Endogenous policy rules for interest rates and fiscal solvency

- Rational expectations options
  - Financial markets
    - Exchange rates
    - Long rates
    - Equity prices
  - Labour markets
  - Consumption

- Exogenous labour force

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GDP

- In the short- to medium-term, GDP is driven by the demand side

\[ Y = C + I + GC + GI + XVOL - MVOL \]

- In the longer term, GDP is governed by the supply side

\[ YCAP = \gamma [\delta K^{-\rho} + (1 - \delta) (Le^{\lambda_{techl}})^{-\rho} ]^{-(1-\alpha)/\rho} M^{\alpha} \]
Consumption

- Consumption depends on (a dynamic adjustment path around) real personal disposable income and wealth.

\[ d \ln(C_t) = \lambda \{ \ln(C_{t-1}) - [a + b_0 \ln(TAW_{t-1}) + (1 - b_0)\ln(RPDI_{t-1})] \} + b_1 d \ln(RPDI_t) + b_2 d \ln(NW_t) + b_3 d \ln(HW_t) \]

- Short-term income elasticity of consumption \((b_1)\) captures liquidity constraints

- RPDI depends on TAX

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Government sector

- Government sector has 3 revenue sources and 4 expenditure categories:
  - $BUD = (GC + GI) \times PY + TRAN + GIP - TAX - CTAX - MTAX$
    - Income tax (TAX)
    - Corporate tax (CTAX)
    - Indirect tax/VAT (MTAX)
    - Consumption (GC)
    - Investment (GI)
    - Social transfers to households (TRAN)
    - Interest payments (GIP)

- The deficit flows onto the debt stock, after allowing for money finance:
  - $DEBT = DEBT_{t-1} - BUD - \Delta M$
Interest rate setting

- Short-term interest rates set by a central bank
  - Feedback rules depend on (+T for Target)
    - Inflation (INFL), Output gap (Y/YCAP),
    - Price level (PL), Nominal Aggregate (NOM)

- Two Pillar Strategy
  - Interest rate \(= c^* (INFL-INFLT) + d^* (NOM-NOMT)\)

- Long-term interest rates are forward looking – the forward convolution of expected short rates
What determines the size of the fiscal multiplier?

- Multipliers differ across countries
  - Openness
  - Access to liquidity
  - Size
  - Independent monetary policy?
  - Speed of adjustment in labour market
  - Inflation anchor

- Multipliers differ within countries
  - Instrument
  - Monetary policy response
  - Expectation formation
Interpretation of baseline multipliers

Why are multipliers generally less than 1?

- Import leakages
- Looser monetary policy, exchange rate
- Consumption/investment channels adjusts gradually and offset through savings
### Table 2. Key factors determining cross-country differences in multipliers

<table>
<thead>
<tr>
<th></th>
<th>Temporary spending multiplier</th>
<th>Temporary income tax multiplier</th>
<th>Import penetration</th>
<th>Income elasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>-0.52</td>
<td>-0.13</td>
<td>0.50</td>
<td>0.23</td>
</tr>
<tr>
<td>Belgium</td>
<td>-0.62</td>
<td>-0.12</td>
<td>0.80</td>
<td>0.17</td>
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<tr>
<td>Finland</td>
<td>-0.61</td>
<td>-0.06</td>
<td>0.39</td>
<td>0.00</td>
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<td>France</td>
<td>-0.67</td>
<td>-0.27</td>
<td>0.30</td>
<td>0.51</td>
</tr>
<tr>
<td>Germany</td>
<td>-0.48</td>
<td>-0.26</td>
<td>0.39</td>
<td>0.68</td>
</tr>
<tr>
<td>Greece</td>
<td>-1.35</td>
<td>-0.53</td>
<td>0.34</td>
<td>0.48</td>
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<td>Ireland</td>
<td>-0.36</td>
<td>-0.08</td>
<td>0.72</td>
<td>0.17</td>
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<td>Italy</td>
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<td>-0.13</td>
<td>0.27</td>
<td>0.14</td>
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<td>-0.20</td>
<td>0.70</td>
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<td>-0.11</td>
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<td>Spain</td>
<td>-0.81</td>
<td>-0.11</td>
<td>0.37</td>
<td>0.00</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>-0.54</td>
<td>-0.09</td>
<td>0.29</td>
<td>0.17</td>
</tr>
<tr>
<td>United States</td>
<td>-0.92</td>
<td>-0.19</td>
<td>0.16</td>
<td>0.15</td>
</tr>
<tr>
<td>Spending correlation</td>
<td></td>
<td></td>
<td>0.43</td>
<td>-0.12</td>
</tr>
<tr>
<td>Tax correlation</td>
<td></td>
<td></td>
<td>0.22</td>
<td>-0.73</td>
</tr>
</tbody>
</table>
Assumptions underlying baseline multipliers

- Innovations are temporary
- Central bank sets interest rates to stabilise inflation (no boundary issues)
- Financial markets are “rational”
  - Long-term interest rates
  - Equity prices
  - Exchange rates
- Consumers are myopic
- Liquidity constraints/propensity to save are “normal”
- Government borrowing premium is exogenous
Recent studies suggest multipliers may be more pronounced when the economy has suffered a prolonged downturn

– Delong and Summers (2012), Auerbach and Gorodnichenko (2012), IMF (2012), and others

Channels of transmission?

– Interest rates and the zero lower bound
– Impaired banks and heightened liquidity constraints
– Hysteresis (not covered in this presentation)
Impaired interest rate channel

Figure 3. Impact of an impaired interest rate adjustment on GDP

Notes: Impact on the level of GDP of a 1% of GDP fiscal spending consolidation (permanent) in the UK, with and without an interest rate response.
Heightened liquidity constraints

\[ d \ln(C_t) = \lambda \left\{ \ln(C_{t-1}) - [a + b_0 \ln(TAW_{t-1}) + (1 - b_0)\ln(RPDI_{t-1})] \right\} \\
- b_1 d \ln(RPDI_t) + b_2 d \ln(NW_t) + b_3 d \ln(HW_t) \]

Table 3. Impact of consolidation programme (tax rise) on UK GDP, under different short-term income elasticities of consumption

<table>
<thead>
<tr>
<th>Model</th>
<th>Short-run income elasticity of consumption (b_1)</th>
<th>First year multiplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>-0.01</td>
</tr>
<tr>
<td>2</td>
<td>0.1</td>
<td>-0.06</td>
</tr>
<tr>
<td>3</td>
<td>0.2</td>
<td>-0.11</td>
</tr>
<tr>
<td>4</td>
<td>0.3</td>
<td>-0.15</td>
</tr>
<tr>
<td>5</td>
<td>0.4</td>
<td>-0.20</td>
</tr>
<tr>
<td>6</td>
<td>0.5</td>
<td>-0.25</td>
</tr>
<tr>
<td>7</td>
<td>0.6</td>
<td>-0.31</td>
</tr>
<tr>
<td>8</td>
<td>0.7</td>
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<tr>
<td>9</td>
<td>0.8</td>
<td>-0.41</td>
</tr>
<tr>
<td>10</td>
<td>0.9</td>
<td>-0.47</td>
</tr>
<tr>
<td>11</td>
<td>1</td>
<td>-0.52</td>
</tr>
</tbody>
</table>
**Government borrowing premia**

- Several studies look at links between fiscal position and government borrowing rates
- GPREM may depend on BUD/GDP and/or DEBT/GDP
- Budget balance improves following a fiscal consolidation innovation
- Government debt/GDP may deteriorate in short-term

### Table 4. Empirical relationship between government borrowing premia and fiscal variables

<table>
<thead>
<tr>
<th></th>
<th>Spread (t-1)</th>
<th>Debt to GDP ratio</th>
<th>Fiscal balance to GDP ratio</th>
<th>Implied long-run</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arghyrou and Kontonikas (2011)</td>
<td>0.74</td>
<td></td>
<td>-2.0 (t+1)</td>
<td>-7.7</td>
</tr>
<tr>
<td>Attinasi et al (2009)</td>
<td>0.97</td>
<td></td>
<td>-1.6 (t+1)</td>
<td>-54.9</td>
</tr>
<tr>
<td>Bernoth and Erdogan (2012)</td>
<td></td>
<td>2.2</td>
<td>-16 (t+1)</td>
<td></td>
</tr>
<tr>
<td>De Grauwe and Ji (2012)</td>
<td></td>
<td>-6.12(t) +0.08(t)^2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schuknect et al (2010)</td>
<td></td>
<td>1.25</td>
<td>-12.64</td>
<td></td>
</tr>
</tbody>
</table>

Note: Spread is defined as the 10-year government bond yield over that in Germany, expressed in basis points. (t+1) indicated expectations 1 year ahead. (t)^2 indicates the current debt to GDP ratio squared.
Endogenous government borrowing premium

Let $\text{GPREM} = 0.04 \times \text{DEBT/GDP}$

Figure 4. Impact of 1% of GDP fiscal consolidation in the UK on long-term interest rates
### Ex-ante Net Fiscal impulses 2011-2013, as announced by governments

<table>
<thead>
<tr>
<th>Country</th>
<th>2011</th>
<th></th>
<th></th>
<th>2012</th>
<th></th>
<th></th>
<th>2013</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Fiscal impulse (% of 2011 GDP)</td>
<td>of which tax based</td>
<td>of which spending based</td>
<td>Fiscal impulse (% of 2011 GDP)</td>
<td>of which tax based</td>
<td>of which spending based</td>
<td>Fiscal impulse (% of 2011 GDP)</td>
<td>of which tax based</td>
</tr>
<tr>
<td>Austria</td>
<td>-0.9</td>
<td>-0.4</td>
<td>-0.5</td>
<td>-0.4</td>
<td>-0.2</td>
<td>-0.3</td>
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<tr>
<td>Belgium</td>
<td>-0.7</td>
<td>0</td>
<td>-0.7</td>
<td>-1.2</td>
<td>-0.5</td>
<td>-0.7</td>
<td>-1.3</td>
<td>-0.4</td>
</tr>
<tr>
<td>Finland</td>
<td>-0.3</td>
<td>-0.3</td>
<td>-0.1</td>
<td>-0.6</td>
<td>-0.5</td>
<td>-0.1</td>
<td>-0.1</td>
<td>0</td>
</tr>
<tr>
<td>France</td>
<td>-1.4</td>
<td>-1.1</td>
<td>-0.3</td>
<td>-1.7</td>
<td>-1.1</td>
<td>-0.6</td>
<td>-1.7</td>
<td>-0.8</td>
</tr>
<tr>
<td>Germany</td>
<td>-0.5</td>
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<td>-0.3</td>
<td>-0.2</td>
<td>0</td>
<td>-0.2</td>
<td>-0.1</td>
<td>-0.1</td>
</tr>
<tr>
<td>Greece</td>
<td>-2.7</td>
<td>-1.2</td>
<td>-1.5</td>
<td>-5.1</td>
<td>-3.5</td>
<td>-1.6</td>
<td>-2</td>
<td>-0.9</td>
</tr>
<tr>
<td>Ireland</td>
<td>-3.4</td>
<td>-0.9</td>
<td>-2.5</td>
<td>-2.4</td>
<td>-1</td>
<td>-1.4</td>
<td>-2.1</td>
<td>0.7</td>
</tr>
<tr>
<td>Italy</td>
<td>-0.5</td>
<td>-0.3</td>
<td>-0.2</td>
<td>-3</td>
<td>-2.4</td>
<td>-0.6</td>
<td>-1.5</td>
<td>-0.6</td>
</tr>
<tr>
<td>Netherlands</td>
<td>-0.8</td>
<td>-0.3</td>
<td>-0.5</td>
<td>-0.6</td>
<td>-0.5</td>
<td>-0.1</td>
<td>-0.6</td>
<td>-0.45</td>
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<td>Portugal</td>
<td>-5.9</td>
<td>-2.7</td>
<td>-3.2</td>
<td>-2.1</td>
<td>0</td>
<td>-2.1</td>
<td>-1.9</td>
<td>-0.5</td>
</tr>
<tr>
<td>Spain</td>
<td>-2.5</td>
<td>-0.5</td>
<td>-2</td>
<td>-2.1</td>
<td>-0.4</td>
<td>-1.7</td>
<td>-1.4</td>
<td>-0.3</td>
</tr>
<tr>
<td>UK</td>
<td>-2.1</td>
<td>-1.1</td>
<td>-1</td>
<td>-1.8</td>
<td>-0.2</td>
<td>-1.6</td>
<td>-1</td>
<td>0</td>
</tr>
</tbody>
</table>

**Source:** Euroframe (2012). Does not include fiscal plans introduced after January 2012.
Two scenarios

- **Scenario 1** – impact of consolidation programme based on default assumptions underlying baseline multipliers
- **Scenario 2** – modified assumptions to allow for:
  - Impaired interest rate channel
  - Heightened liquidity constraints
How high are liquidity constraints?

- As a proxy, use bond spreads over Germany to calibrate relative stress in banking systems

- 10-year government bond spreads over Germany, Sept 2012

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## Expected impact of programmes on level of GDP

Table 6. Impact of consolidation programmes on GDP

<table>
<thead>
<tr>
<th>Country</th>
<th>2011 Scenario 1</th>
<th>2011 Scenario 2</th>
<th>2012 Scenario 1</th>
<th>2012 Scenario 2</th>
<th>2013 Scenario 1</th>
<th>2013 Scenario 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>-0.2</td>
<td>-1.0</td>
<td>-0.2</td>
<td>-2.1</td>
<td>-0.3</td>
<td>-2.9</td>
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<td>Belgium</td>
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<td>-2.2</td>
<td>-0.7</td>
<td>-4.3</td>
<td>-1.6</td>
<td>-5.2</td>
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<tr>
<td>Finland</td>
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<td>0.1</td>
<td>-1.8</td>
<td>-0.1</td>
<td>-2.2</td>
</tr>
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<td>France</td>
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<td>-1.1</td>
<td>-2.9</td>
<td>-2.0</td>
<td>-4.0</td>
</tr>
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<td>Germany</td>
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<td>0.0</td>
<td>-1.9</td>
<td>-0.1</td>
<td>-2.2</td>
</tr>
<tr>
<td>Greece</td>
<td>-2.4</td>
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<td>-6.7</td>
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<td>Ireland</td>
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<td>-6.7</td>
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<td>Euro Area</td>
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<td>-3.1</td>
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<td>-4.0</td>
</tr>
</tbody>
</table>

Note: Per cent difference from base in level of real GDP
Output declines nearly double in most countries due to impaired interest rates/credit.

Impact of consolidation programmes on level of GDP, 2013

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Fiscal balances improve, but not as much when output declines deepen

Impact of programmes on government budget balance, 2013

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Perverse impact on Debt/GDP ratio with impaired transmission

Impact of programmes on Government Debt/GDP, 2013

- Feedbacks on government borrowing premia??

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How much of decline due to spillovers from simultaneous consolidation?

Impact of joint policy action relative to unilateral action

Percentage point difference

2011 2012 2013

Austria  Belgium  Finland  France  Germany  Greece  Ireland  Italy  Netherlands  Portugal  Spain  UK

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Key conclusions

- Little prospect for growth in Europe given the ongoing fiscal adjustment
- The effectiveness of consolidation measures likely to be diminished at present
- Impaired transmission mechanisms exacerbate effects on output
- Fiscal consolidation may be ‘self-defeating’ at present
- Consolidation in all countries at the same time significantly aggravates the impact
  - on average output declines by 2% by 2013 due to spillovers
Thank you