Successful Austerity in the United States, Europe and Japan

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The views expressed here do not necessarily represent those of the IMF or the ECB.
Outline

1. Motivation
2. Bottomline upfront
3. Methodology
4. Results from TVAR
5. Results from debt simulations
6. Key policy implications
7. Conclusions
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1 Motivation
2 Bottomline upfront
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Motivation

- Great recession + sizeable fiscal stimuli = historical levels of public debts of the US, Europe and Japan.

- Market perceptions of debt non-sustainability → United States and several members of the euro area can no longer postpone consolidation indefinitely.

- A large and sustained adjustment will most likely weaken aggregate demand.

**Trade-off:**

(i) If consolidations are delayed → risk of debt downgrades or defaults;

(ii) If consolidations are frontloaded → recoveries could come to a halt, hindering the same fiscal adjustment or making it too costly in terms of jobs and output.
Research questions:

How large is this trade-off?

Can we make consolidations successful by exploiting efficiently this trade-off?

Ingredients for crafting an answer:

(1) fiscal multipliers for various stages of the business cycle;

(2) a mechanism that endogenizes the regimes of the business cycle themselves;

(3) a machinery that takes monetary policy into account;

(4) a tool to quantify the likelihood that a fiscal consolidation (of a given size) taking place in a certain regime is capable of driving the economy to another regime.
Relation with the literature

**Paper closest to ours:** Auerbach and Gorodnichenko (2011a; 2011b).

**Main differences:**

1. conditional on monetary policy;
2. regimes are endogenous;
3. estimates of the probability with which fiscal shocks can push the economy into a different regime;
4. wider country coverage that allows us to condition on group-specific features.
Outline

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3 Methodology
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Fiscal multipliers are much larger in downturns.

Confidence effects small.

Expenditure multipliers are significantly larger than tax multipliers in downturns.

Monetary policy cushioning effect weak.

A fiscal consolidation initiated in a downturn is twice as likely to deepen or extend the downturn.
“Strong” consolidations are more likely to trigger or extend downturns.

The exact size of the 1-year cumulative fiscal multiplier ranges in our sample countries (in downturns) between 1.6 and 2.6 for expenditure shocks, and 0.16 and 0.35 for tax shocks.

The peak effect on output within year 1.

Frontloaded consolidations do not accelerate the reduction in debt to GDP ratio but exacerbate output loss relative to gradual ones.
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TVAR model (1/3)

Threshold VAR as in Balke (2000):

\[ Y_t = \mathbb{I}_{\{c_t - d \leq \gamma\}} \left[ A^1 Y_t + B^1(L) Y_{t-1} \right] + \mathbb{I}_{\{c_t - d > \gamma\}} \left[ A^2 Y_t + B^2(L) Y_{t-1} \right] + U_t \]

In our specification:

\[ Y_t = (g_t \ y_t \ \tau_t \ r_t)^T \] (\(g_t\), \(y_t\) and \(\tau_t\) in log real per-capita terms);

\(c_t = 100 \times (y_t - y_{t-1})\);

\(d = 1\);

\(\gamma = 0\);

\(B^1(L)\) and \(B^2(L)\): lag polynomial matrices;

\(U_t\): structural disturbances;

\(A^1(L)\) and \(A^2(L)\): lower-triangular matrices.
TVAR model (2/3)

After testing for the threshold structure of the VAR, we:

- derive non-linear impulse responses;
- compute regime-dependent fiscal multipliers that incorporate the endogenous evolution of regimes;
- run stochastic simulations to compute recession probabilities.

Due to the nonlinear structure, MA representation of the VAR is nonlinear in the shocks. Hence, IRFs are conditional on (i) past history of the variables, (ii) size, and (iii) direction of the shocks:

\[ IRF_{t+k} = E[Y_{t+k}|\Omega_{t-1}, u_t] - E[Y_{t+k}|\Omega_{t-1}] \]

where: \( \Omega_{t-1} \) is an initial condition and \( u_t \) is a given realization of \( U_t \).

The two conditional expectations are obtained by running stochastic simulations.
Tests for threshold VAR with \( \gamma = 0 \)

<table>
<thead>
<tr>
<th>Country</th>
<th>Likelihood ratio ( \chi )-square test statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Euro area</td>
<td>132.15 (0.000)</td>
</tr>
<tr>
<td>France</td>
<td>200.27 (0.000)</td>
</tr>
<tr>
<td>Italy</td>
<td>114.13 (0.000)</td>
</tr>
<tr>
<td>Japan</td>
<td>127.70 (0.000)</td>
</tr>
<tr>
<td>United States</td>
<td>213.16 (0.000)</td>
</tr>
</tbody>
</table>

Notes: Frequency is quarterly. Lag length is 4. Test statistic constructed as in Doornik and Hendry (1997). Null hypothesis of a VAR against alternative of a TVAR. \( P \)-values are reported in parenthesis.
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Results from TVAR (1/4)

Italy

Average responses to shocks to government spending

**Expansion regime**

Real output

**Recession regime**

Real output

Average responses to shocks to net taxes

**Expansion regime**

Real output

**Recession regime**

Real output

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Results from TVAR (2/4)

Italy

Average responses to shocks to government spending

*Expansion regime*

Real interest rate

Average responses to shocks to net taxes

*Expansion regime*

Real interest rate

*Recession regime*

Real interest rate

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## Results from TVAR (3/4)

### Average cumulative fiscal multipliers

#### EURO AREA

<table>
<thead>
<tr>
<th>Horizon</th>
<th>Expenditure cut</th>
<th>Tax hike</th>
<th>Expenditure cut</th>
<th>Tax hike</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 quarter</td>
<td>-2.06</td>
<td>-0.18</td>
<td>-0.41</td>
<td>0.10</td>
</tr>
<tr>
<td>1 year</td>
<td>-2.56</td>
<td>-0.35</td>
<td>-0.43</td>
<td>0.20</td>
</tr>
<tr>
<td>2 years</td>
<td>-2.49</td>
<td>-0.35</td>
<td>-0.07</td>
<td>0.06</td>
</tr>
</tbody>
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#### UNITED STATES

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</thead>
<tbody>
<tr>
<td>1 quarter</td>
<td>-1.96</td>
<td>0.03</td>
<td>-0.95</td>
<td>0.04</td>
</tr>
<tr>
<td>1 year</td>
<td>-2.18</td>
<td>-0.16</td>
<td>-0.33</td>
<td>-0.15</td>
</tr>
<tr>
<td>2 years</td>
<td>-2.17</td>
<td>-0.65</td>
<td>0.49</td>
<td>-0.72</td>
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#### ITALY

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<tr>
<td>1 quarter</td>
<td>-1.42</td>
<td>-0.12</td>
<td>-0.25</td>
<td>-0.07</td>
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<tr>
<td>1 year</td>
<td>-1.57</td>
<td>-0.17</td>
<td>-0.41</td>
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<tr>
<td>2 years</td>
<td>-1.78</td>
<td>-0.17</td>
<td>-0.46</td>
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## Results from TVAR (4/4)

### Recession probabilities

#### EURO AREA

<table>
<thead>
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<th>Expenditure cut</th>
<th>Simulations starting during recessions</th>
<th>Simulations starting during expansions</th>
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<tr>
<td>Horizon</td>
<td>Probability of a recession</td>
<td>Probability of a recession</td>
</tr>
<tr>
<td></td>
<td>No consolidation</td>
<td>&quot;Mild&quot; Consolidation (-1 SD)</td>
</tr>
<tr>
<td>1 quarter</td>
<td>0.44</td>
<td>0.52</td>
</tr>
<tr>
<td>1 year</td>
<td>0.31</td>
<td>0.32</td>
</tr>
<tr>
<td>2 years</td>
<td>0.33</td>
<td>0.33</td>
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<tr>
<td>1 quarter</td>
<td>0.51</td>
<td>0.60</td>
</tr>
<tr>
<td>1 year</td>
<td>0.35</td>
<td>0.34</td>
</tr>
<tr>
<td>2 years</td>
<td>0.30</td>
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<tr>
<td>1 quarter</td>
<td>0.35</td>
<td>0.35</td>
</tr>
<tr>
<td>1 year</td>
<td>0.38</td>
<td>0.38</td>
</tr>
<tr>
<td>2 years</td>
<td>0.37</td>
<td>0.36</td>
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Debt simulations

\[ y_t = y_{t-1} \left( 1 + y_t^P - \theta_1 \text{gap}_t + \theta_2 (i_t - i_t^{RF}) \right) \left( 1 + d_t^{EX} - d_{t-1}^{EX} \right) \]

\[ \Delta d_t = \frac{i - g}{1 + g} d_{t-1} - pb_t \]

\[ pb_t = spb_t + cpb_t \]

\[ cpb_t = \gamma \times \text{gap}_t \]

\[ y_t^S = y_t (1 + \text{timp}_t)(1 + \text{gimp}_t) \]

\[ \text{timp}_t = \alpha_t \text{timp}_t^R + (1 - \alpha_t) \text{timp}_t^E \]

\[ \text{gimp}_t = \alpha_t \text{gimp}_t^R + (1 - \alpha_t) \text{gimp}_t^E \]
Results from debt simulations (1/4)

**Baseline Scenario:** Potential q-o-q 0.4, annual growth 1.8, demand shock? gap = 3pp in 4 qtrs. Debt-to-GDP=120 pc of GDP, primary balance, snowball effect =0 (interest rate=risk-free).

**Scenario 1:** 1/4 pp of GDP adjustment every quarter for 5 years (20 qtrs) delivering a total structural consolidation of about 5 pp of GDP. Equally distributed over G and T.

**Scenario 2:** Same adjustment as Scenario 1 but in 6 quarters. Equally distributed over G and T.
Results from debt simulations (2/4)

Debt-to-GDP ratio - Difference between frontloaded and smooth fiscal consolidation

Debt-to-GDP ratio - Difference between frontloaded (spending-cuts-only based) and smooth fiscal consolidation
Results from debt simulations (3/4)

Scenario 1

Scenario 2

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Results from debt simulations (4/4)

Debt-to-GDP ratio - Difference between frontloaded (spending-cuts-only based) and smooth fiscal consolidation with exogenous risk premium of 0.5 percent per quarter

Debt-to-GDP ratio - Difference between frontloaded (spending-cuts-only based) and smooth fiscal consolidation with endogenous risk premium

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Successful Austerity
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Key policy implications

- Implementing fiscal consolidations during upturns reduces significantly the impact on output.
- If consolidations need to be implemented during downturns (for instance, to regain market confidence), they should prioritize increases in net taxes (defined as taxes minus transfers).
- If consolidations have to occur during downturns and prioritize expenditure cuts, they should at least be smooth and gradual.
- Monetary policy should be used more proactively to mitigate the output costs of consolidations.
- More empirical research is needed to understand the size and regime-dependency of multipliers of subcomponents of expenditure and the role of debt levels.
- These results might be less pertinent in situations featuring high risks of liquidity crises (high spreads and outflow of capital), in which confidence effects could be larger than usual.
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- Withdrawing fiscal stimuli too quickly in economies where output is already contracting can prolong their recessions without generating the expected fiscal saving. This is particularly true if the consolidation is centred around cuts to public expenditure and/or large.

- Particularly important to design withdrawal well at times of low confidence in the sovereign given snowball effects.