Advanced Macroeconomics II

Fiscal Policy

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Dimensions of Fiscal Policy

(a) Expenditures

- purchases of goods and services (e.g. administration, public goods)
- transfers: redistribution (e.g. unemployment benefits, pensions)
- subsidies: incentives (externalities)
- interest expenses (on public debt)

(b) Revenues (taxes)

- financing of public expenditures
- discourage/punish certain activities

Difference between (a) and (b): deficit/surplus

→ issuance of debt/accumulation of assets

→ seignorage

Fiscal policy and economic fluctuations

→ stabilization tool

→ independent source of fluctuations

Fiscal Policy in the Basic RBC Model

Government budget constraint in period t:

$$G_t + (1 + r_{t-1})B^g_{t-1} = \tau^n_t W_t N_t + T_t + B^g_t$$

Household's budget constraint in period t:

$$C_t + B_t = (1 - \tau^n_t)W_t N_t + (1 + r_{t-1})B_{t-1} + D_t - T_t$$

Definitions:

G_t: public consumption
B^G_t: government debt
τ^n_t: labor income tax
T_t: lump-sum tax (non-distorting).

Modified intratemporal optimality condition:

$$U_{n,t} + (1 - \tau_t^n) W_t U_{c,t} = 0$$

for $t = 0, 1, 2, ...$

Example + log-linear version:

$$w_t = \sigma c_t + \varphi n_t - \log(1 - \tau_t^n)$$

Equilibrium

- Goods market

$$Y_t = C_t + G_t$$

  Log-linear version (ignoring constants):

$$y_t = (1 - s_g)c_t + s_g g_t$$

  where $s_g \equiv G/Y$.

- Labor market

$$\sigma c_t + \varphi n_t - \log(1 - \tau_t^n) = a_t - \alpha n_t + \log(1 - \alpha)$$

- Asset market

$$b_t = b_t^g$$

$$c_t = E_t\{c_{t+1}\} - \frac{1}{\sigma}(r_t - \rho)$$

- Technology

$$y_t = a_t + (1 - \alpha)n_t$$

- *Equilibrium values* (ignoring constants and using $\log(1-\tau_t^n) \simeq -\tau_t^n$):

$$n_t = \frac{(1-s_g-\sigma)a_t - (1-s_g)\tau_t^n + \sigma s_g g_t}{\sigma(1-\alpha)+(1-s_g)(\alpha+\varphi)}$$

$$y_t = \frac{(1+\varphi)(1-s_g)a_t - (1-\alpha)(1-s_g)\tau_t^n + (1-\alpha)\sigma s_g g_t}{\sigma(1-\alpha)+(1-s_g)(\alpha+\varphi)}$$

$$c_t = \frac{(1+\varphi)a_t - (1-\alpha)\tau_t^n - s_g(\alpha+\varphi)g_t}{\sigma(1-\alpha)+(1-s_g)(\alpha+\varphi)}$$

$$w_t = \frac{[\sigma+\varphi(1-s_g)]a_t + \alpha(1-s_g)\tau_t^n - \alpha\sigma s_g g_t}{\sigma(1-\alpha)+(1-s_g)(\alpha+\varphi)}$$

$$r_t = \rho + \sigma E_t\{\Delta c_{t+1}\}$$

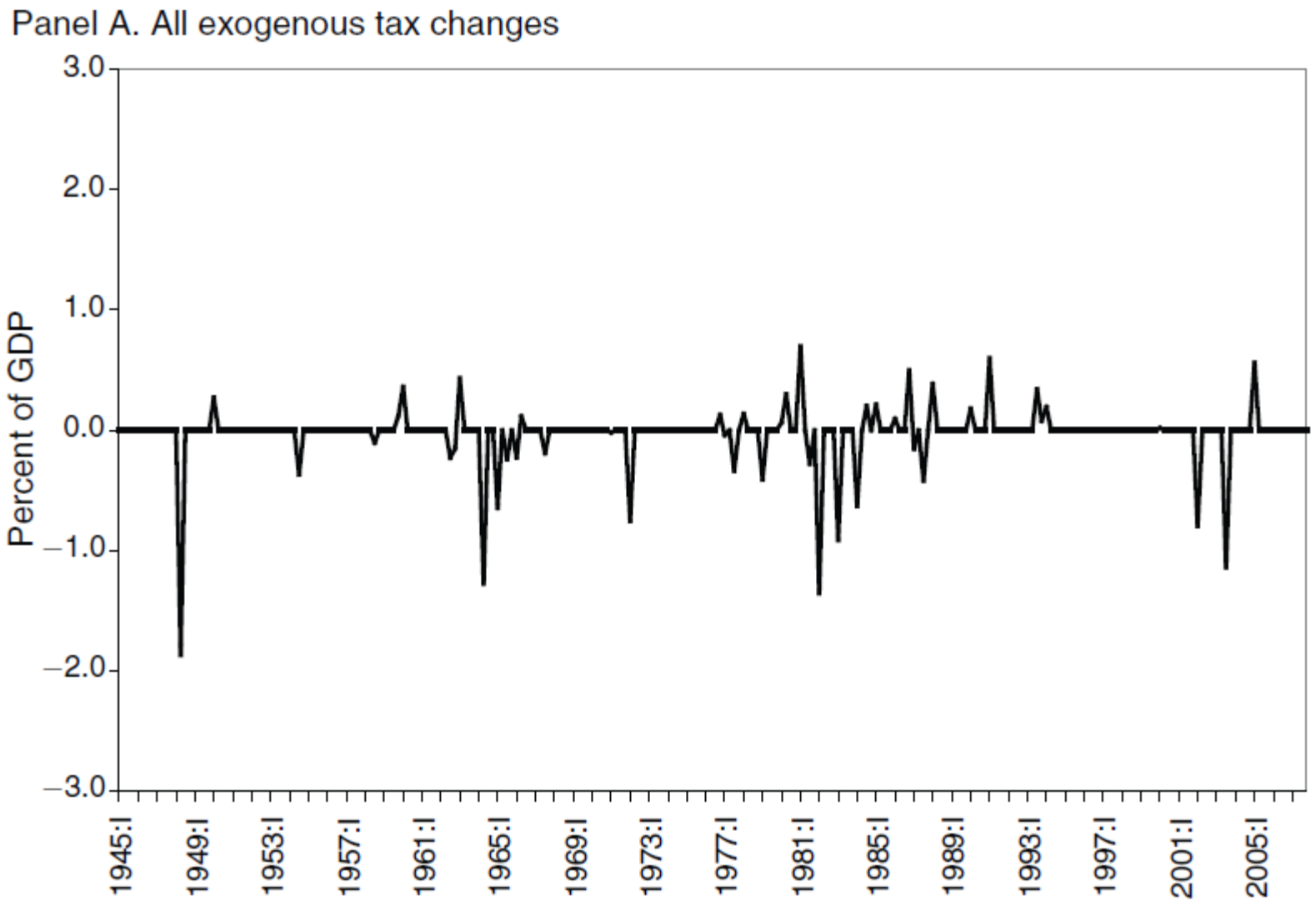
- Discussion
  - Fiscal shocks (τ_t^n, g_t)
  - Ricardian equivalence
  - Countercyclical policies

Empirical Evidence on the Effects of Fiscal Shocks

- The "identification problem"
- Effects of tax changes: Romer & Romer (AER 2010)
  - "narrative" approach
  - focus on *exogenous* tax changes:
    - · legislative action (not automatic)
    - · motivated by:
      - need to reduce inherited debt/deficit
      - long term goals
  - estimated equations:

$$\Delta y_t = \alpha + \sum_{k=0}^{K} \beta_k \Delta T_{t-k} + u_t$$

$$\Delta y_t = \alpha + \sum_{k=0}^{K} \beta_k \Delta T^a_{t-k} + \sum_{k=0}^{K} \gamma_k \Delta T^i_{t-k} + u_t$$



Source: Romer and Romer AER 2010

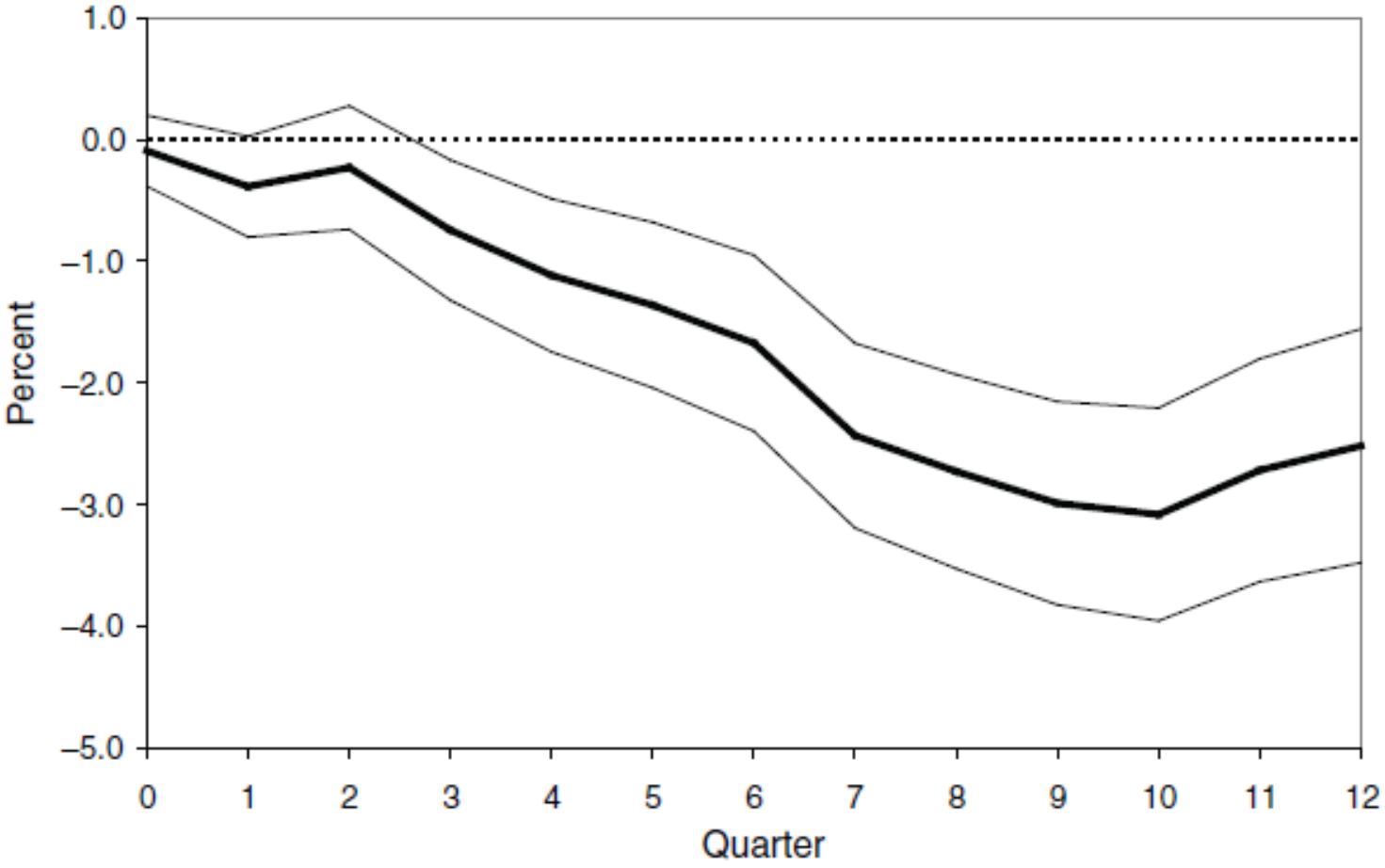


FIGURE 4. ESTIMATED IMPACT OF AN EXOGENOUS TAX INCREASE OF 1 PERCENT OF GDP ON GDP
(*Single equation, no controls*)

Source: Romer and Romer AER 2010

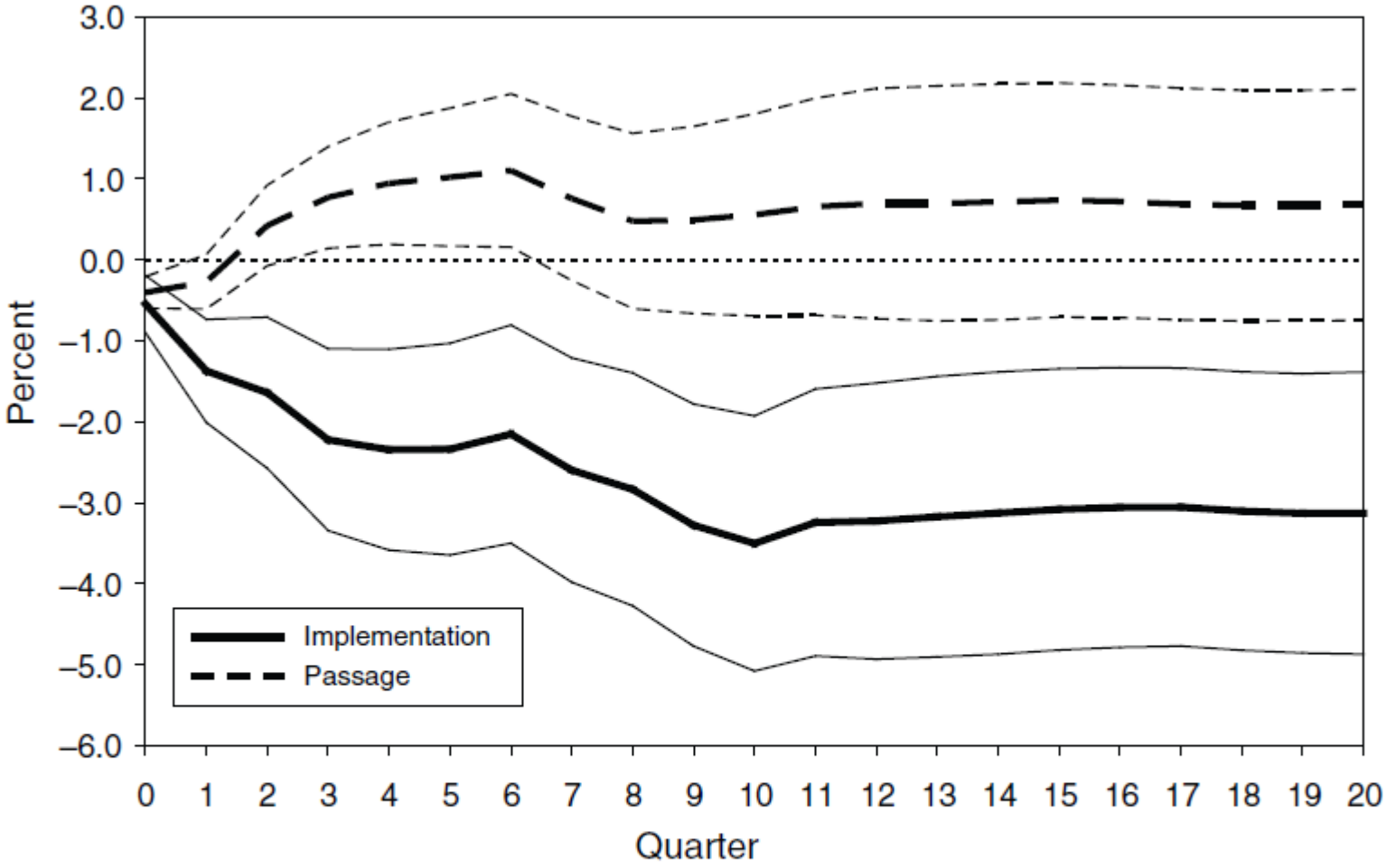


FIGURE 12. ESTIMATED IMPACT OF AN EXOGENOUS TAX INCREASE OF 1 PERCENT OF GDP ON GDP, INCLUDING TAX CHANGES DATED AT BOTH TIME OF IMPLEMENTATION AND TIME OF PASSAGE
(*Single equation, controlling for lagged GDP growth*)

Source: Romer and Romer AER 2010

- Effects of government purchases: Galí, López-Salido and Vallés (JEEA 2007)
  - fiscal policy rule:

$$g_t = \sum_{k=1}^{K} \boldsymbol{\phi}_k' \mathbf{x}_{t-k} + \varepsilon_t^g$$

  - macroeconomic effects:

$$z_t = \sum_{k=0}^{K} \beta_k \varepsilon_{t-k}^g + u_t$$

- Effects of fiscal consolidations: IMF WEO (Oct. 2010)
  - 15 countries, 1980-2009
  - 173 fiscal consolidations (aimed at deficit reduction)
  - estimated equations:

$$z_t = \alpha + \sum_{k=0}^{K} \beta_k f_{t-k} + u_t$$

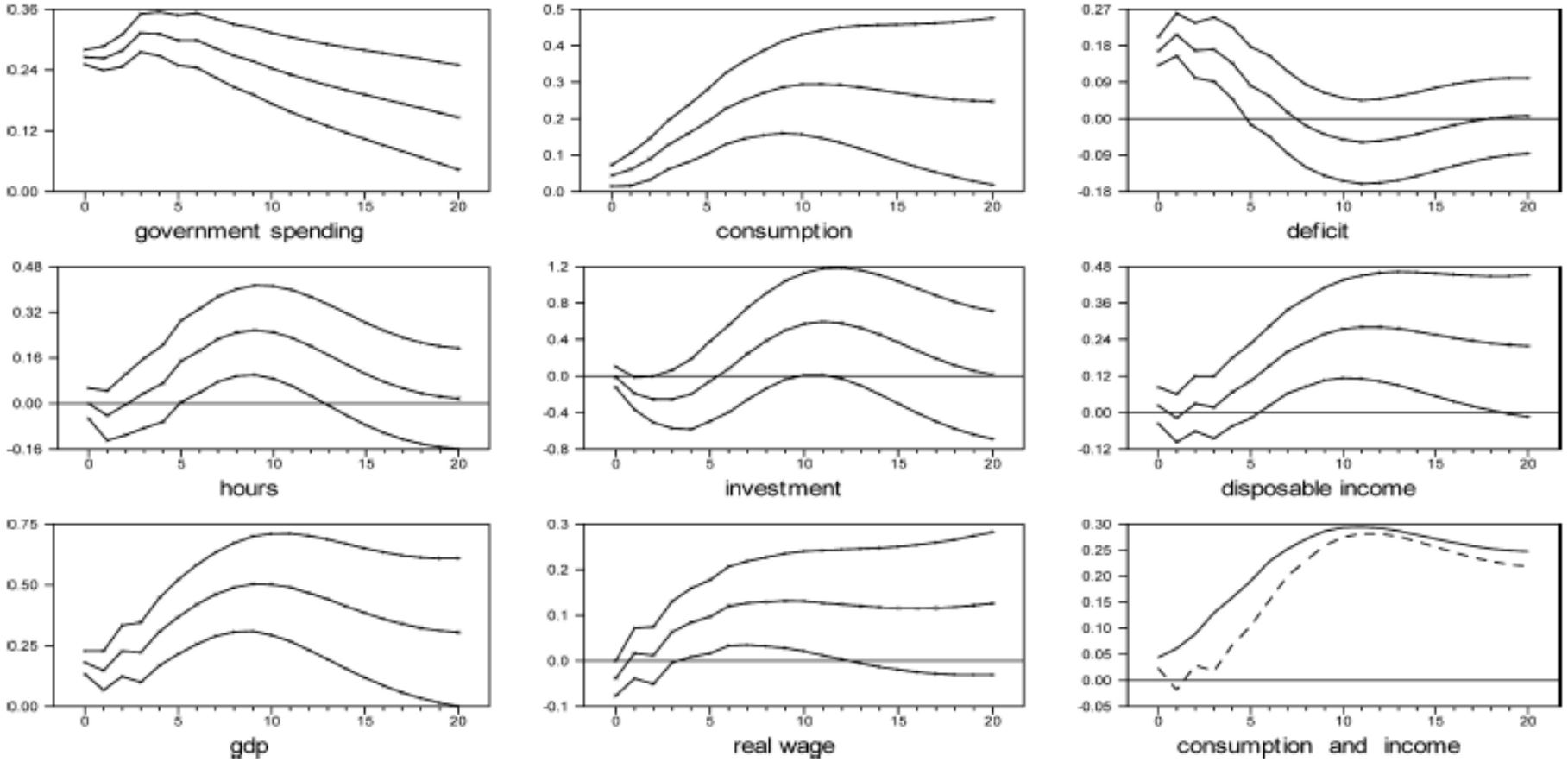
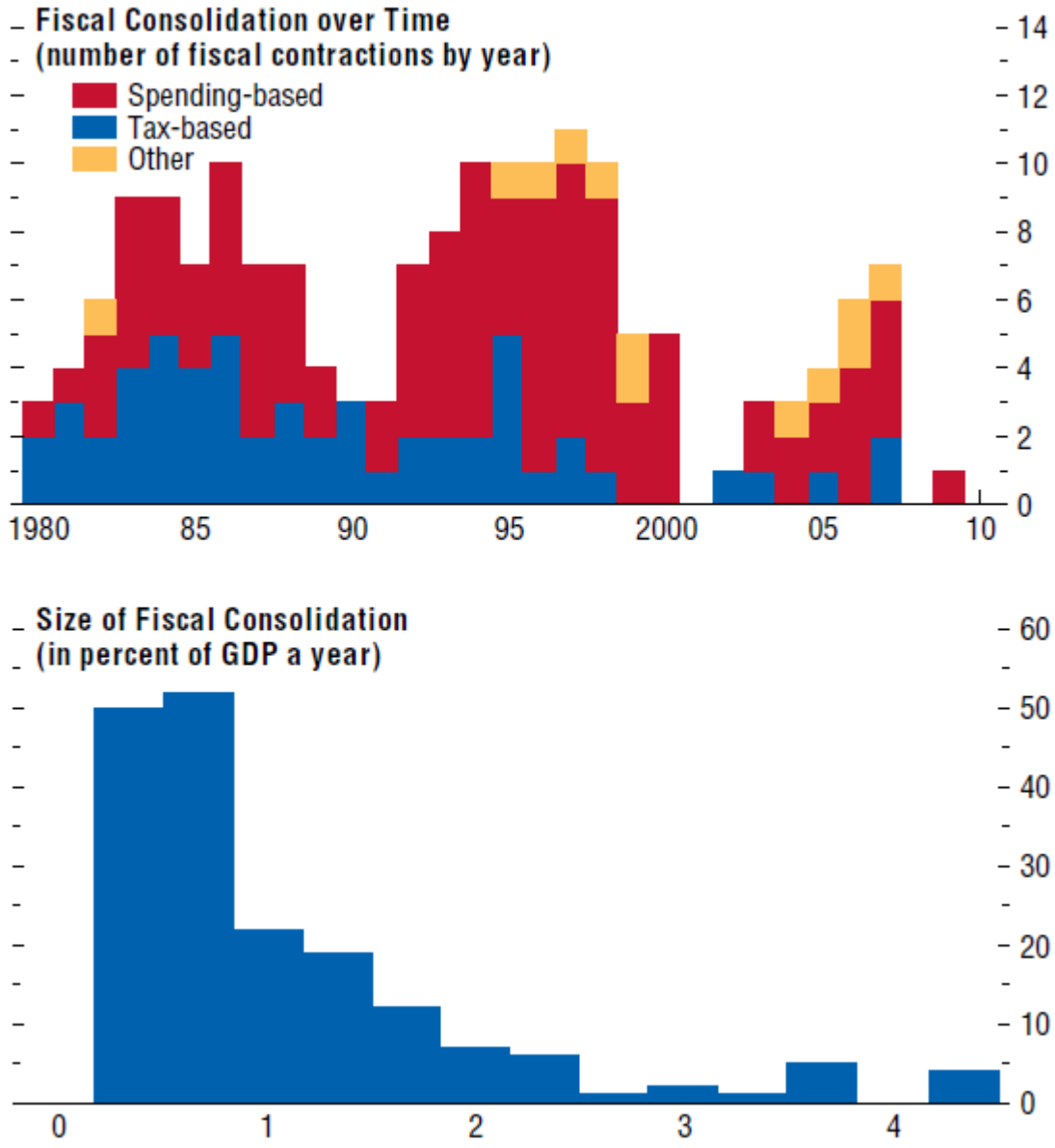


FIGURE 1. The dynamic effects of a government spending shock.

Note: Estimated impulse responses to a government spending shock in the large VAR. Sample Period 1954:I–2003:IV.

Source: Galí, López-Salido and Vallés, JEEA 2007

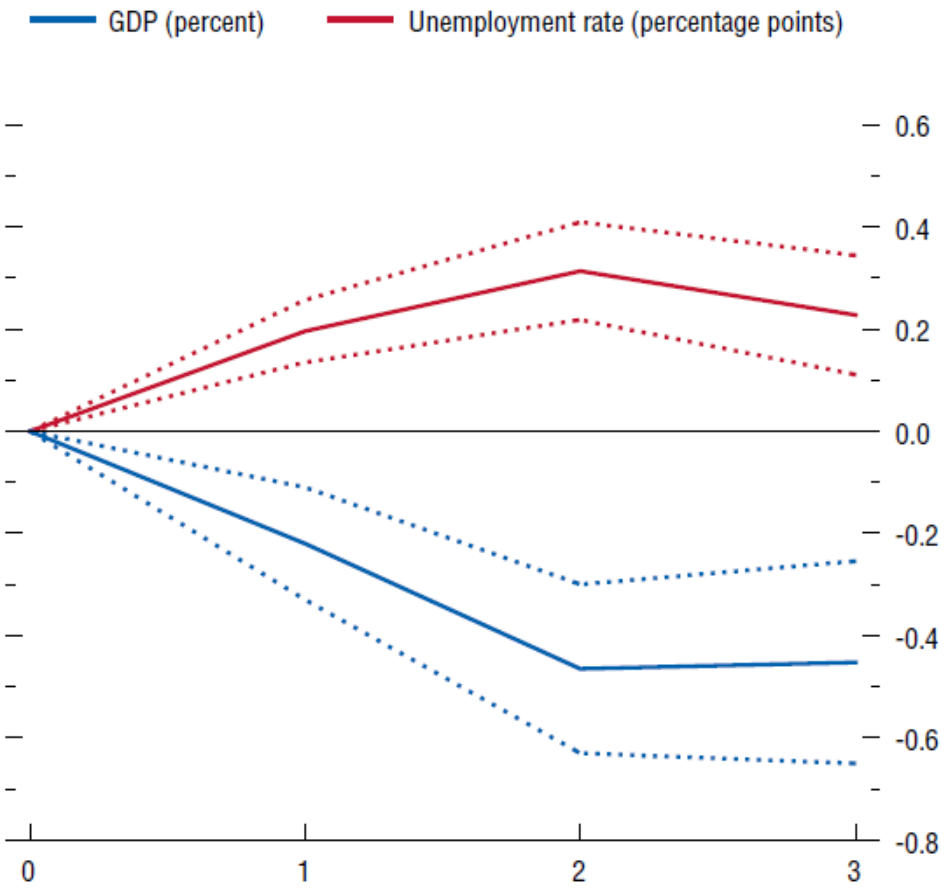
Figure 3.1. Action-Based Fiscal Consolidation



Source: IMF WEO, October 2010

Figure 3.2. Impact of a 1 Percent of GDP Fiscal Consolidation on GDP and Unemployment

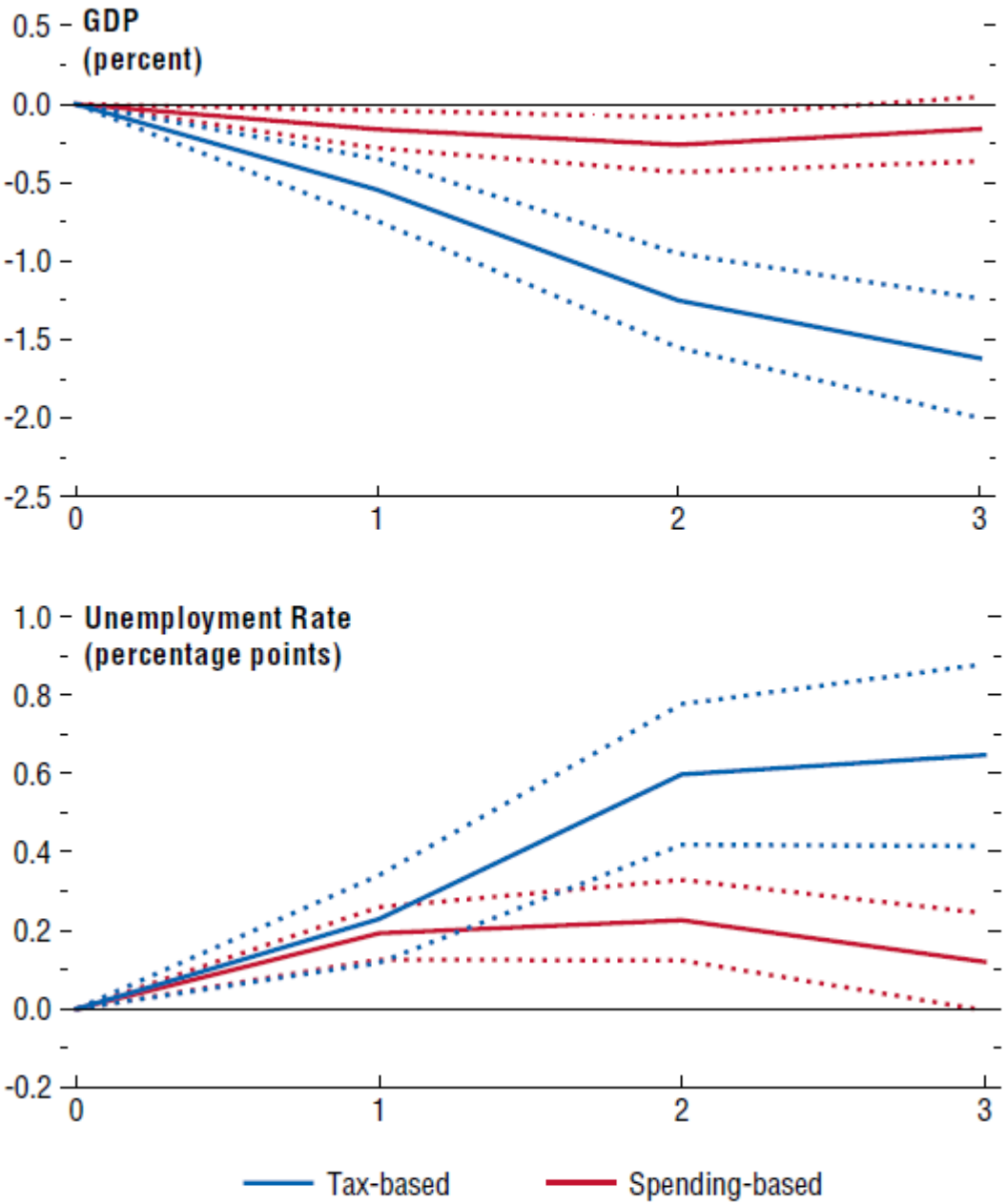
Fiscal consolidation is normally contractionary. A fiscal consolidation equal to 1 percent of GDP typically reduces real GDP by about 0.5 percent and raises the unemployment rate by about 0.3 percentage point.



Source: IMF staff calculations.
Note: $t = 1$ denotes the year of consolidation. Dotted lines equal one standard error bands.

Source: IMF WEO, October 2010

Figure 3.5. Impact of a 1 Percent of GDP Fiscal Consolidation: Taxes versus Spending

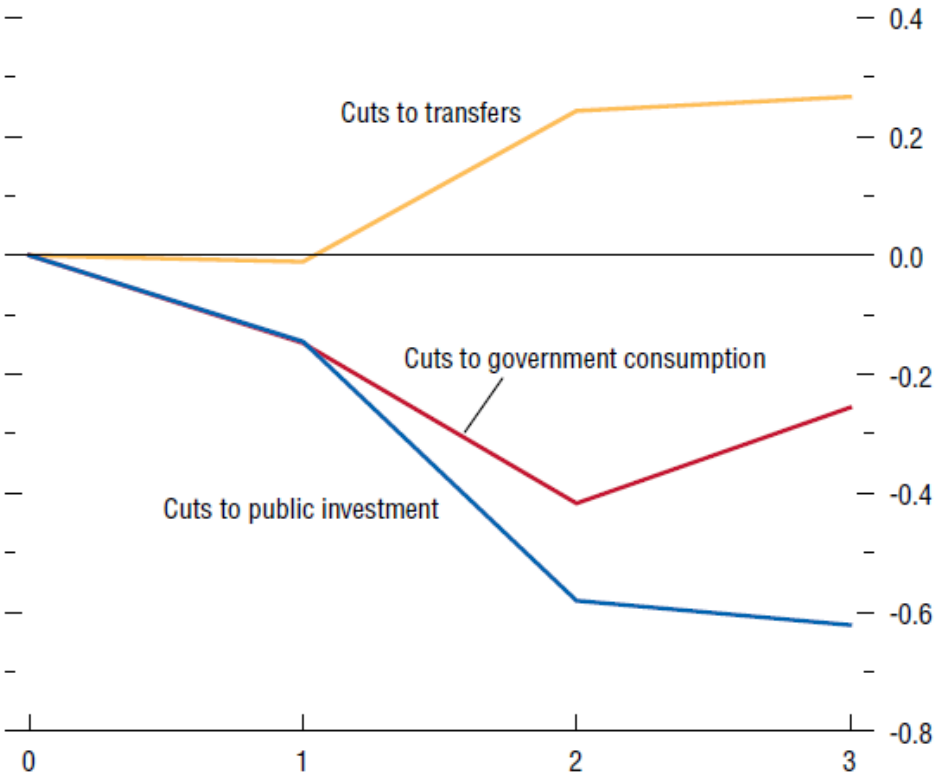


Source: IMF WEO, October 2010

Figure 3.8. Impact on GDP of a 1 Percent of GDP Spending-Based Consolidation

(Percent)

Fiscal consolidation based on cuts to government transfers is less contractionary than that based on cuts to government consumption or government investment. But the differences between the three spending types are within the margin of error.



Source: IMF staff calculations.

Note: The three lines indicate consolidation in which most of the spending cuts fell on government transfers, government consumption, and public investment, respectively. $t = 1$ denotes the year of consolidation.

Source: IMF WEO, October 2010

Debt and Deficit Dynamics

- Government budget constraint:

$$B_t^g = (1 + r_{t-1})B_{t-1}^g + G_t - T_t$$

- Deficit

$$DEF_t \equiv r_{t-1}B_{t-1}^g + G_t - T_t$$

- Primary deficit

$$DEF_t^p \equiv G_t - T_t$$

- Structural (or cyclically adjusted) deficit

$$DEF_t^* \equiv r_{t-1}B_{t-1}^g + G(Y_t^*) - T(Y_t^*)$$

- Structural primary deficit

$$DEF_t^{p,*} \equiv G(Y_t^*) - T(Y_t^*)$$

Debt Dynamics:

$$B_t^g = (1 + r_{t-1})B_{t-1}^g + DEF_t^p$$

$$b_t^g = \left(\frac{1 + r_{t-1}}{1 + \mathfrak{g}_t}\right) b_{t-1}^g + def_t^p$$

where $b_t^g \equiv B_t^g / Y_t$, $def_t^p \equiv DEF_t^p / Y_t$ and $\mathfrak{g}_t \equiv (Y_t - Y_{t-1})/Y_{t-1}$

$$\Delta b_t^g = \left(\frac{r_{t-1} - \mathfrak{g}_t}{1 + \mathfrak{g}_t}\right) b_{t-1}^g + def_t^p$$

Stationary case:

$$\Delta b_t^g = \left(\frac{r - \mathfrak{g}}{1 + \mathfrak{g}}\right) b_{t-1}^g + def^p$$

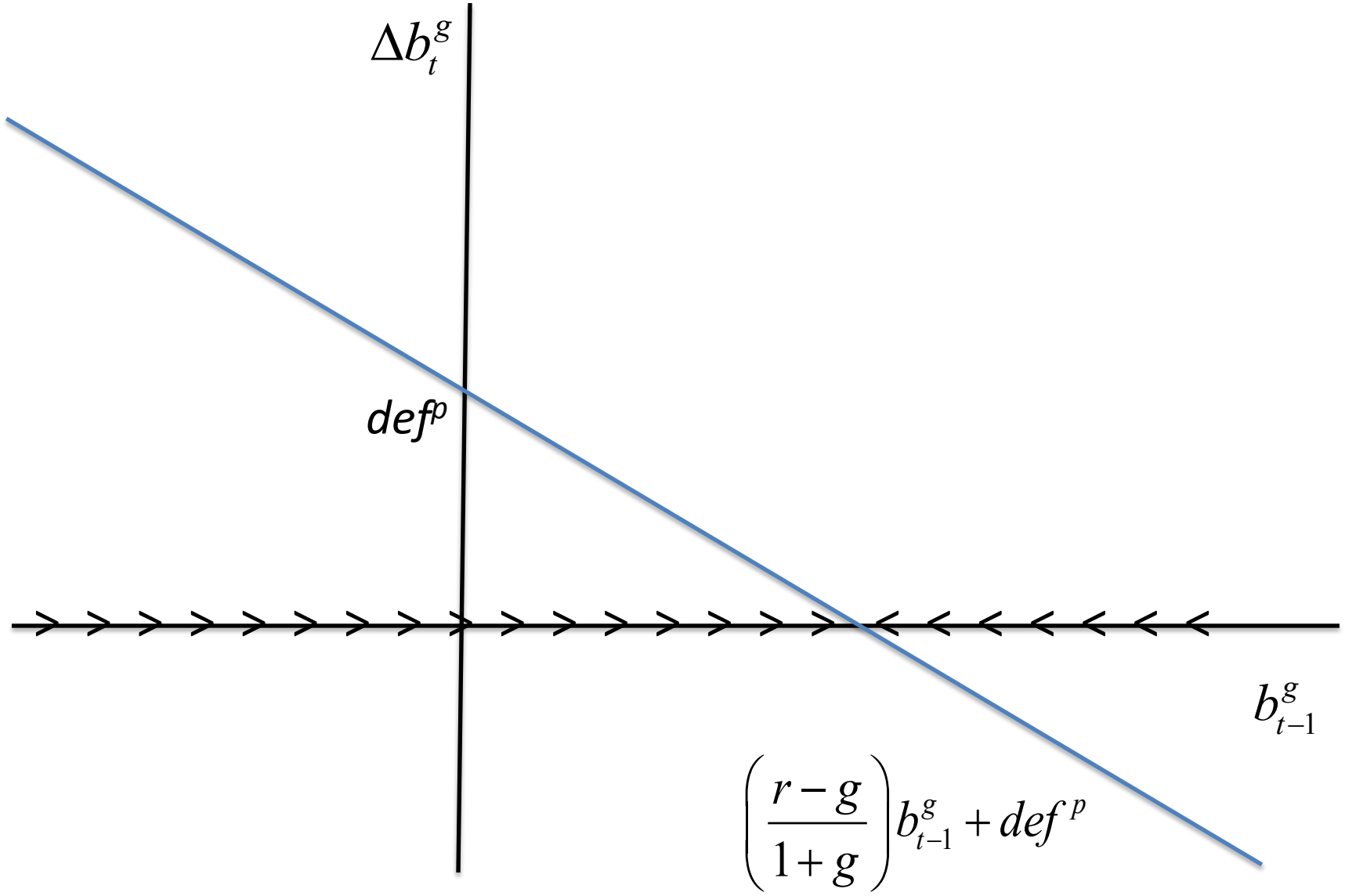
Stability condition:

$$r < \mathfrak{g}$$

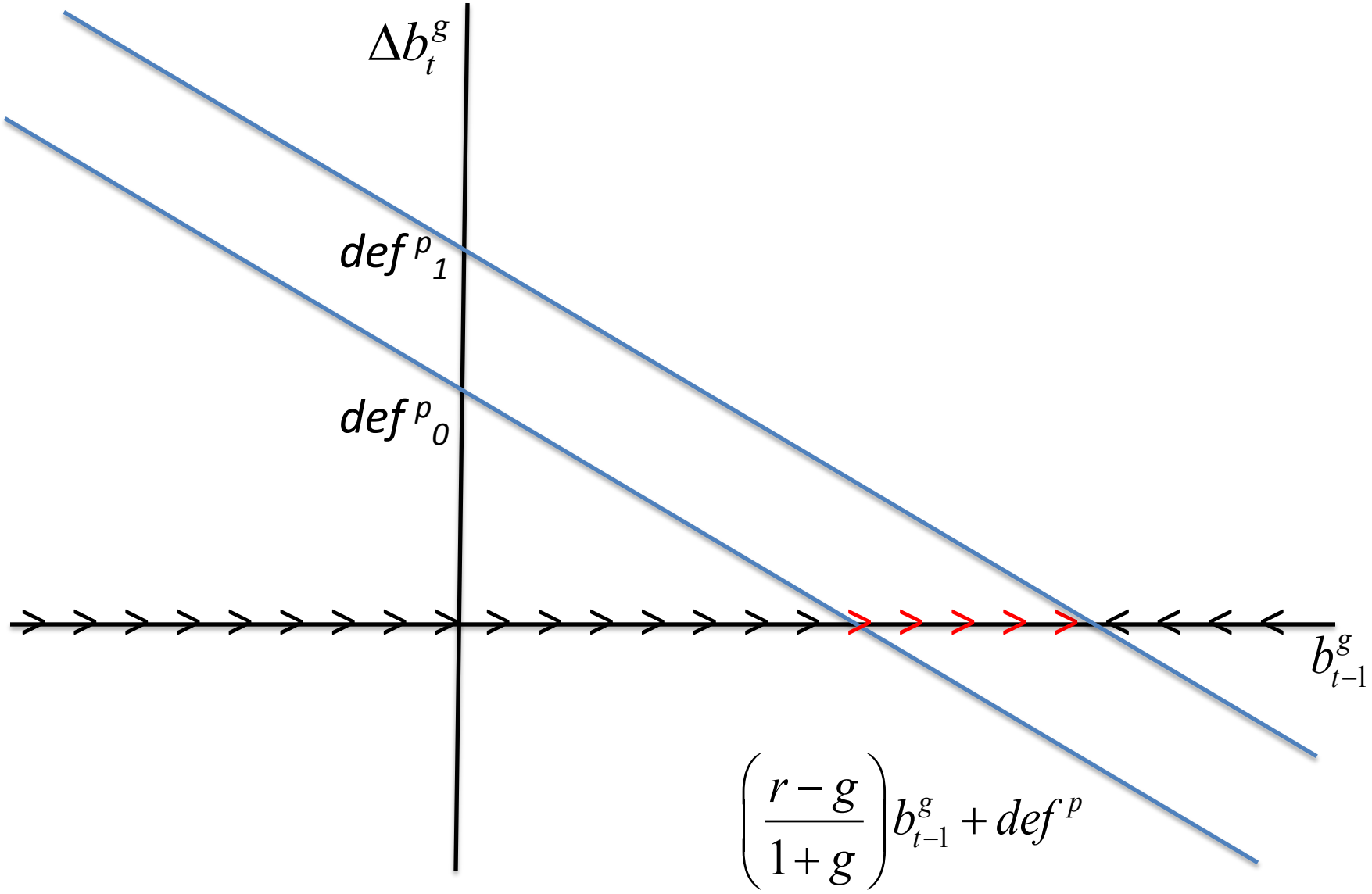
Steady state debt ratio:

$$b^g = \frac{1 + \mathfrak{g}}{\mathfrak{g} - r}\, def^p$$

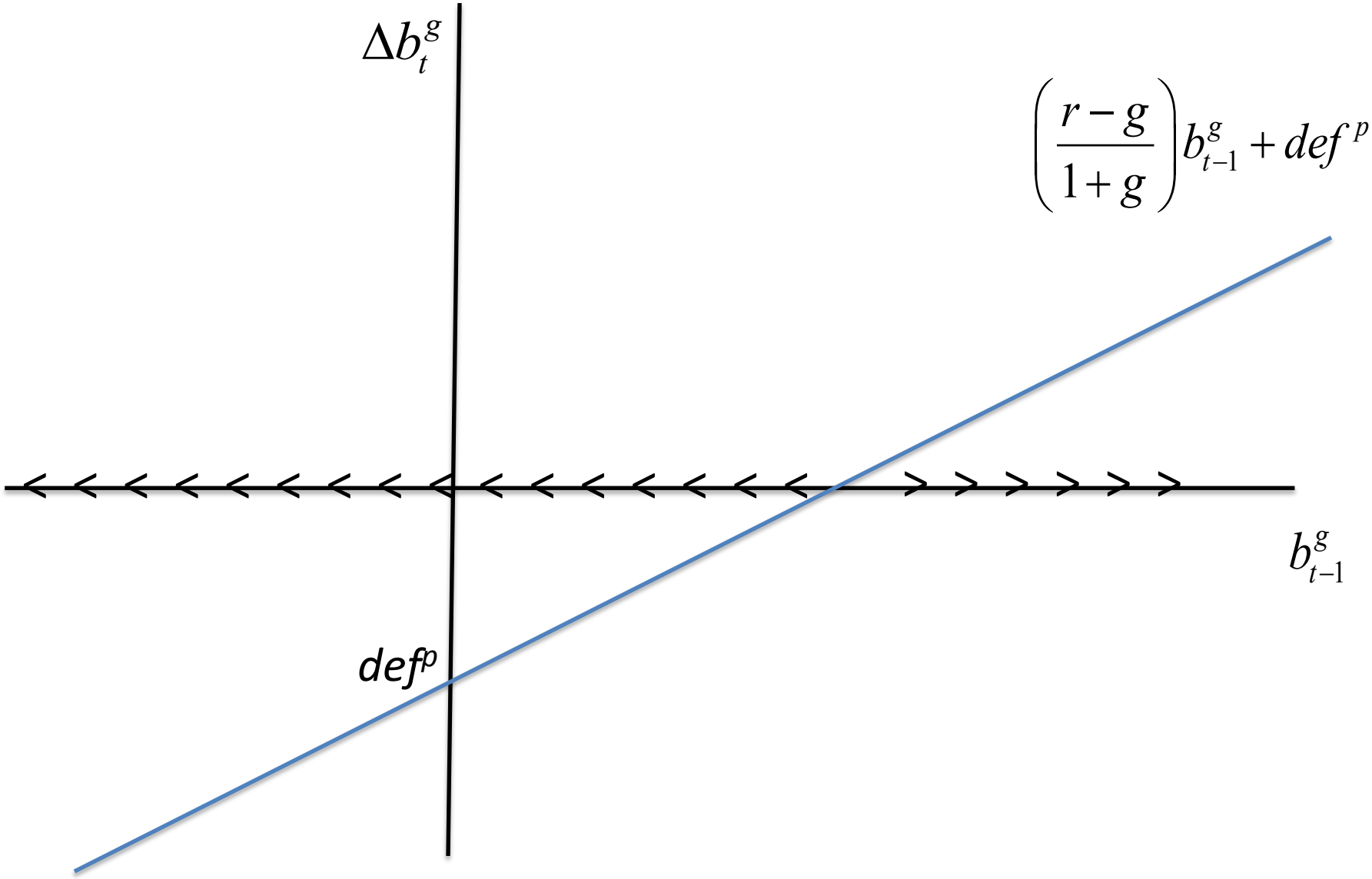
Primary Deficit and Debt Dynamics: *r<g*



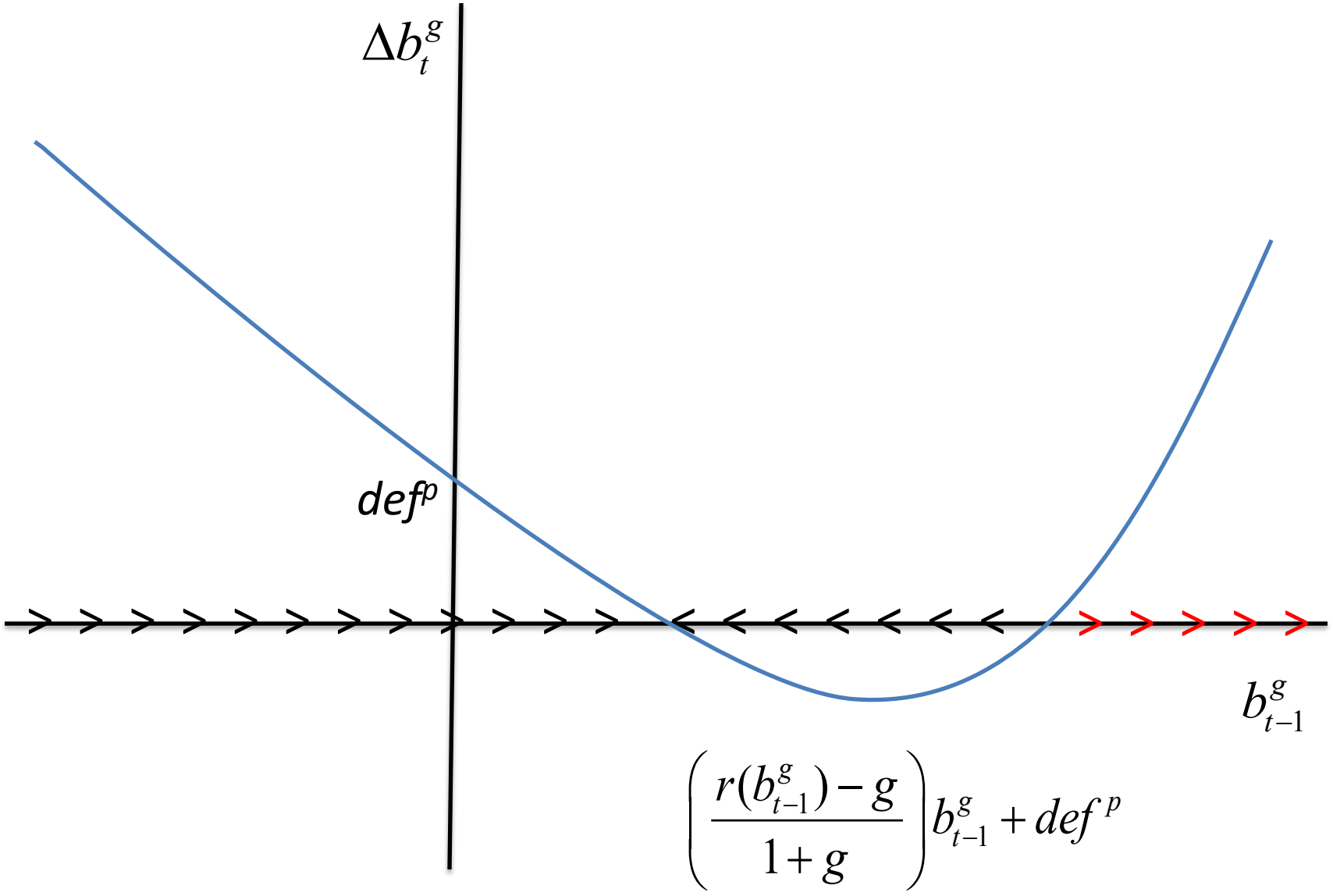
Primary Deficit and Debt Dynamics: *r<g*



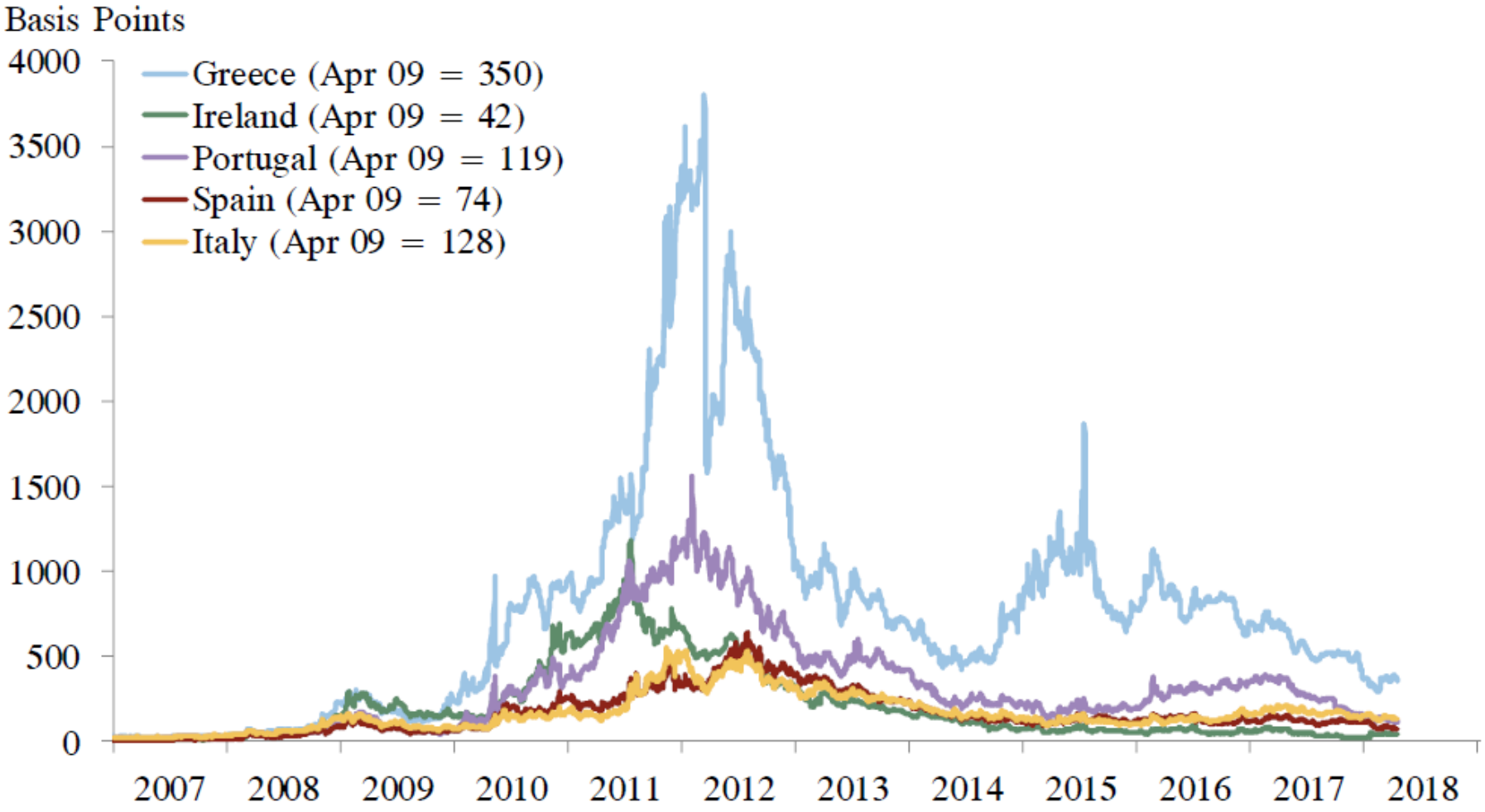
Primary Deficit and Debt Dynamics: *r>g*



Primary Deficit and Debt Dynamics: $r(b_{t-1}^g)$



Euro Area Government Bond Spreads



NOTE: The chart shows the spread, or difference, in interest rates between 10-year government bonds for various countries and German 10-year government bonds.

Debt Reduction Strategies

- Lower primary deficit
- Higher growth
- Default or debt restructuring (or inflation)
- Financial repression
- Sale of public assets (privatization)

Fiscal Rules in Europe

- EU treaty:

- "no bail out" clause
- "no monetization" clause
- limits to deficits and debt ratios (3/30);

- Stability and Growth Pact (1997):

- "preventive branch": fiscal balance or surplus in the medium-term (stability and convergence programs)
- "corrective branch": excessive deficit procedure (EDP): correction in 2 years, sanctions (0.2% of GDP)
- 2005 Reform: focus on "structural deficit" (<1% medium term; 0.5% correction per year); more exceptions.

- Euro Plus Pact (May 2011):

- strengthening of sanctions (inverted qualified majority)
- EDP for excessive debt (>60%); annual correction of 1/20
- ceiling on government spending growth (= medium term GDP growth)

• Fiscal Compact (March 2012)

- need for national "fiscal stability laws"
- maximum structural deficit = 0.5%

• October 2012: European Stability Mechanism starts operating

• Spain

- September 2011: Constitutional amendment (Art 135)
- April 2012 "Ley Estabilidad Presupuestaria": structural deficit<0%, 0.8% adjustment until 2020

Bailouts

- Greece I (May 2010), 110bn
- Ireland (November 2010), 85bn
- Portugal (May 2011), 78bn
- Greece II (March 2012), with restructuring, 130bn
- Spain (June 2012), bank capitalization, 100bn
- Cyprus (April 2013), 10bn
- Greece III (August 2015), 86bn

Source: IMF WEO, April 2018

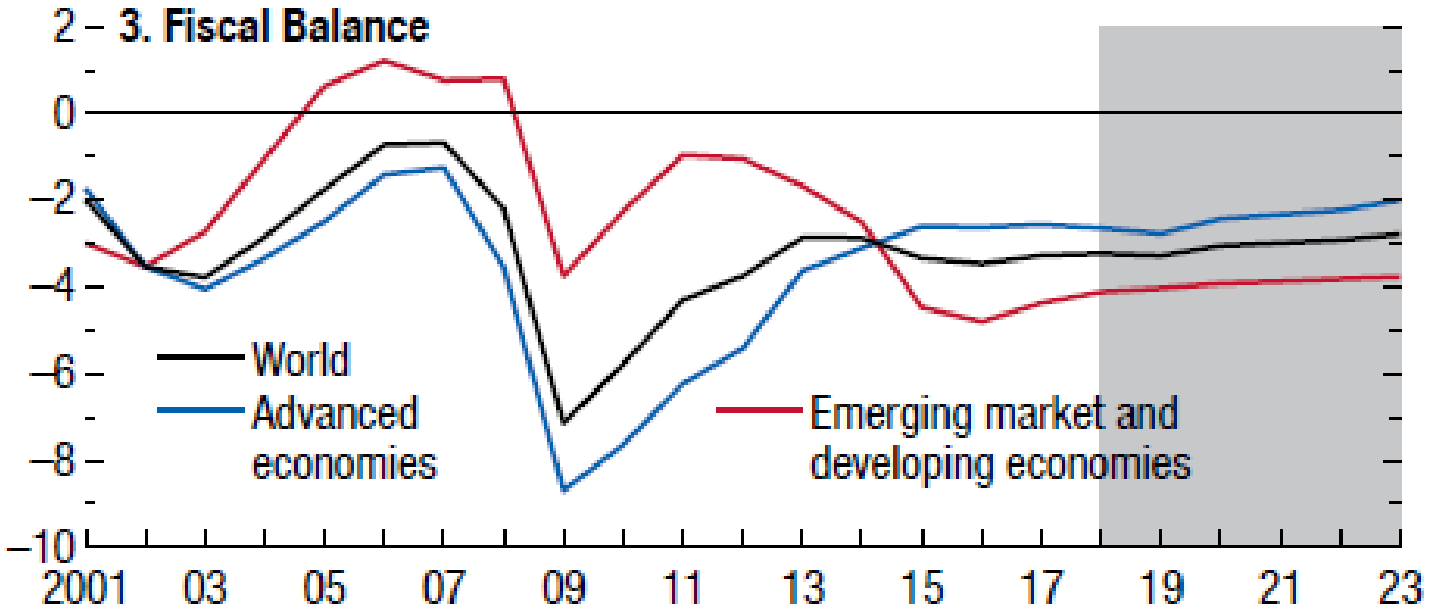


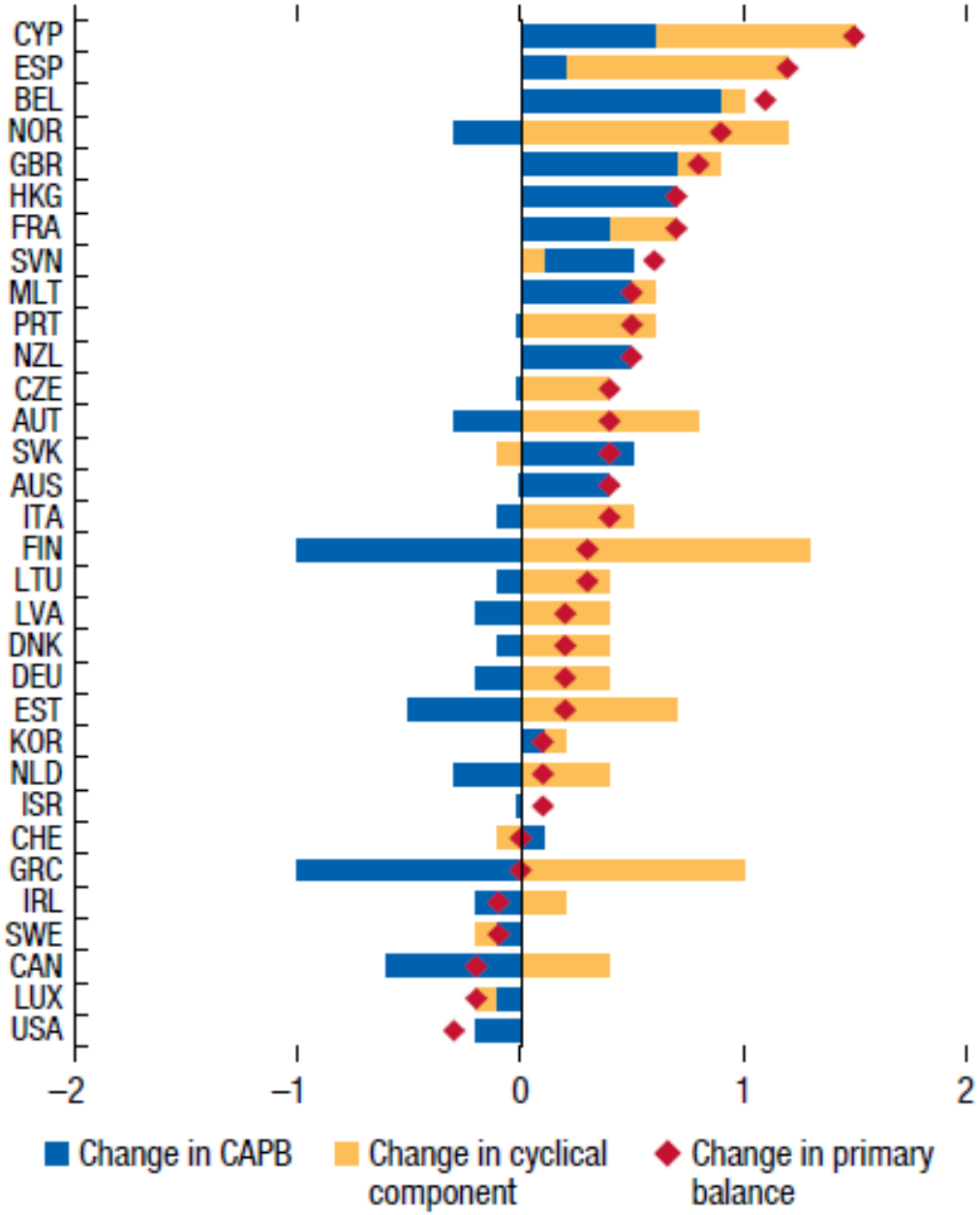
Table 1.5. General Government Fiscal Balance, 2012–23: Overall Balance

(Percent of GDP)

Source: Fiscal Monitor, April 2018

							Projections					
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
World	**–3.7**	**–2.9**	**–2.9**	**–3.3**	**–3.5**	**–3.3**	**–3.2**	**–3.3**	**–3.0**	**–3.0**	**–2.9**	**–2.8**
Advanced Economies	**–5.5**	**–3.7**	**–3.1**	**–2.6**	**–2.6**	**–2.6**	**–2.7**	**–2.8**	**–2.4**	**–2.3**	**–2.3**	**–2.0**
United States[1]	–7.9	–4.4	–4.0	–3.5	–4.2	–4.6	–5.3	–5.9	–5.5	–5.5	–5.4	–5.0
Euro Area	–3.6	–3.0	–2.6	–2.1	–1.5	–0.9	–0.6	–0.5	–0.2	–0.1	0.0	0.1
France	–4.8	–4.0	–3.9	–3.6	–3.4	–2.6	–2.4	–3.1	–2.0	–1.5	–1.0	–0.3
Germany	0.0	–0.1	0.3	0.6	0.8	1.1	1.5	1.7	1.6	1.5	1.5	1.4
Italy	–2.9	–2.9	–3.0	–2.6	–2.5	–1.9	–1.6	–0.9	–0.3	0.0	0.0	0.0
Spain[2]	–10.5	–7.0	–6.0	–5.3	–4.5	–3.1	–2.5	–2.1	–2.1	–2.1	–2.1	–2.2
Japan	–8.6	–7.9	–5.6	–3.8	–3.7	–4.2	–3.4	–2.8	–2.2	–2.1	–2.0	–2.0
United Kingdom	–7.6	–5.4	–5.4	–4.3	–3.0	–2.3	–1.8	–1.5	–1.3	–1.1	–0.7	–0.6
Canada	–2.5	–1.5	0.2	–0.1	–1.1	–1.0	–0.8	–0.8	–0.7	–0.7	–0.7	–0.7
Others	0.5	0.2	0.2	0.1	0.6	1.0	0.6	0.6	0.8	0.9	0.9	0.9

2. Change in Primary Balance, by Country, 2017



Source: Fiscal Monitor, April 2018

Figure 1.1. General Government Debt
(Percent of GDP)

Source: IMF Fiscal Monitor, April 2018

Average debt-to-GDP ratios are at historic highs.

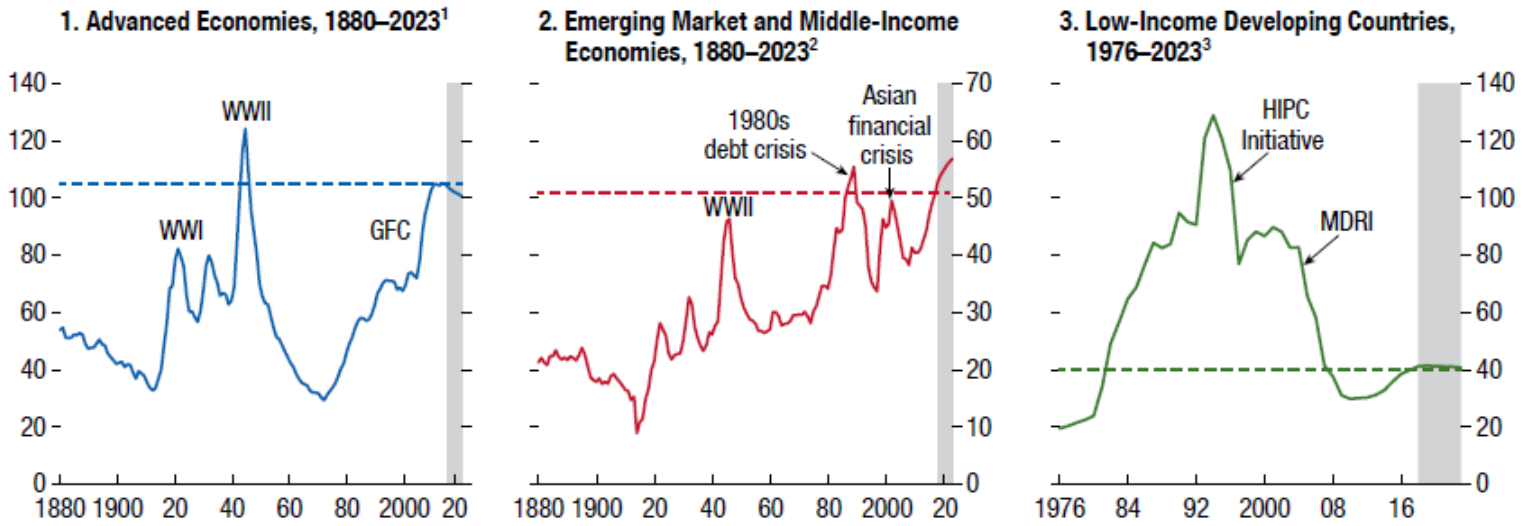


Figure 1.4. General Government Debt Levels in 2017 and Debt Ceilings under Fiscal Rules
(Percent of GDP)

In several countries, debt is close to or above debt ceilings defined under the fiscal rule.

Table 1.3. Selected Advanced Economies: Gross Financing Need, 2018–20

(Percent of GDP)

	2018			2019			2020		
	Maturing Debt	Budget Deficit	Total Financing Need	Maturing Debt[1]	Budget Deficit	Total Financing Need	Maturing Debt[1]	Budget Deficit	Total Financing Need
Australia	1.6	1.7	3.3	2.3	1.1	3.3	3.1	0.1	3.2
Austria	5.9	0.3	6.2	7.2	0.2	7.4	5.4	0.2	5.6
Belgium	17.0	1.3	18.3	16.7	1.3	18.0	16.4	1.3	17.6
Canada	8.5	0.8	9.4	10.2	0.8	10.9	8.4	0.7	9.1
Czech Republic	7.5	–1.1	6.4	4.4	–1.0	3.4	3.1	–0.5	2.6
Denmark	4.0	0.8	4.8	5.0	0.5	5.5	2.7	0.3	3.1
Finland	6.3	1.4	7.7	6.6	0.9	7.4	8.6	0.2	8.8
France	10.4	2.4	12.8	11.5	3.1	14.5	11.8	2.0	13.8
Germany	5.0	–1.5	3.5	4.3	–1.7	2.7	3.4	–1.6	1.8
Iceland	3.2	–1.2	1.9	2.9	–1.1	1.8	3.9	–1.2	2.7
Ireland	6.6	0.2	6.7	7.3	0.1	7.4	8.5	–0.2	8.4
Italy	20.6	1.6	22.2	21.2	0.9	22.1	20.8	0.3	21.1
Japan	37.2	3.4	40.7	36.8	2.8	39.6	32.4	2.2	34.6
Korea	2.6	–2.0	0.6	2.6	–1.9	0.6	2.9	–1.8	1.1
Lithuania	6.9	–0.7	6.2	3.4	–0.8	2.6	3.5	–0.9	2.6
Malta	4.7	–1.6	3.2	4.8	–1.1	3.7	4.7	–0.7	4.0
Netherlands	7.4	–0.6	6.8	6.0	–0.7	5.3	5.8	–0.8	5.0
New Zealand	1.4	–1.1	0.3	5.0	–1.1	3.9	3.5	–2.0	1.5
Portugal	12.7	1.0	13.7	13.7	0.9	14.6	12.8	0.8	13.7
Slovak Republic	7.5	0.9	8.4	4.1	0.4	4.5	2.3	0.2	2.5
Slovenia	5.2	0.0	5.2	6.1	0.3	6.4	4.2	0.4	4.6
Spain[2]	15.9	2.5	18.4	14.5	2.1	16.6	14.4	2.1	16.5
Sweden	4.1	–1.1	3.0	5.4	–0.7	4.7	4.8	–0.6	4.2
Switzerland	2.1	–0.4	1.6	1.9	–0.4	1.5	1.6	–0.3	1.3
United Kingdom	6.7	1.8	8.5	8.3	1.5	9.8	7.5	1.3	8.8
United States[3]	18.7	5.3	24.0	18.1	5.9	24.0	15.3	5.5	20.9
Average	15.5	2.8	18.4	15.4	2.9	18.3	13.5	2.6	16.1

Source: Fiscal Monitor, April 2018