Sovereign risk and the effects of fiscal retrenchment in deep recessions

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The question (will it hurt?)

Fiscal situation deteriorated quite a bit (advanced economies)

- Average deficit: 9 percent (2009) of GDP, up from 1 percent (2007)
- By the end of 2010: government debt at about 100 percent (highest level in 50 years)

Fiscal adjustment under way, notably spending cuts (retrenchment)

What are the likely consequences for economic activity?

Fiscal multiplier

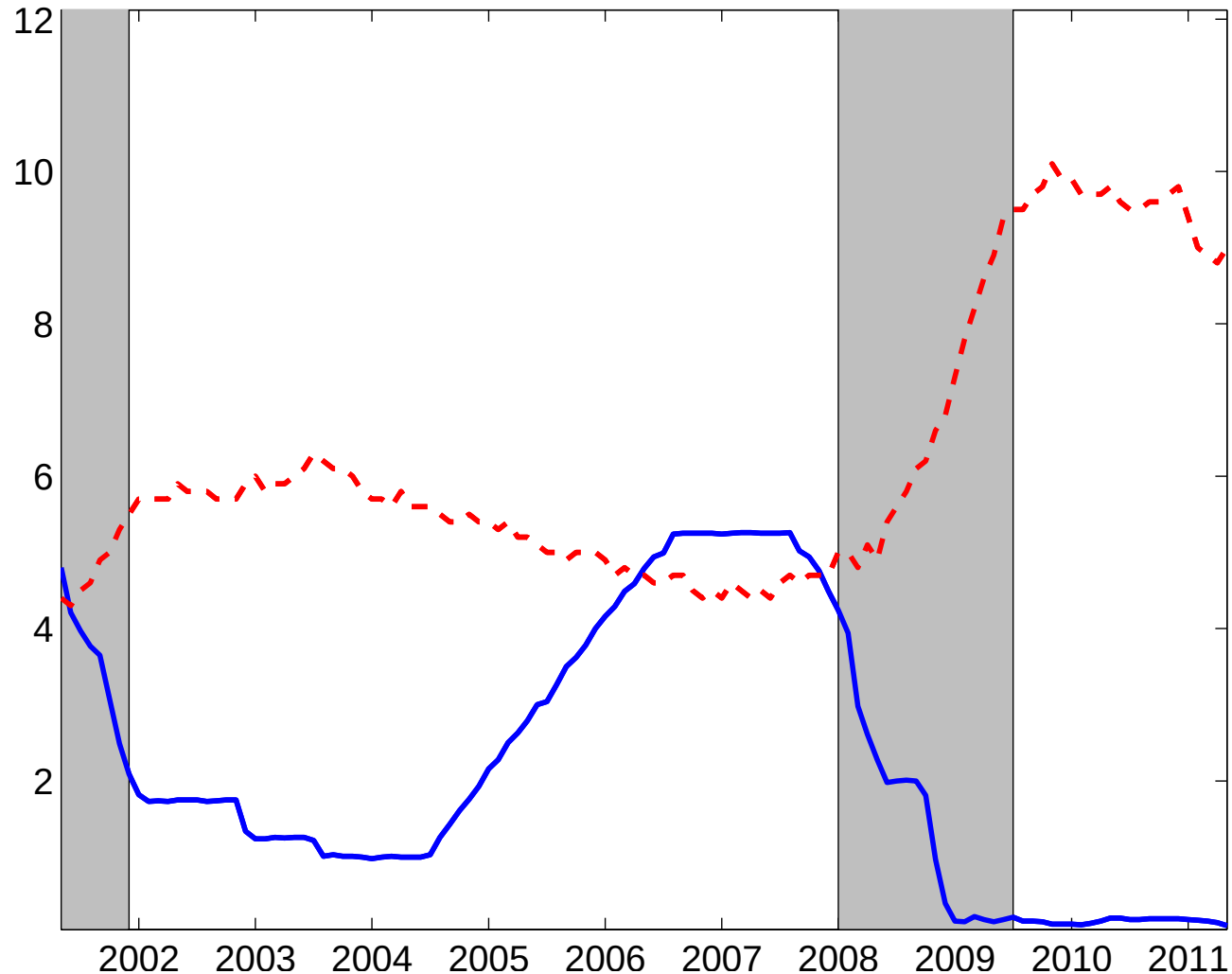
Government spending multiplier on output

- Standard general equilibrium models: up to one
- Time-series studies: 0.5-1.0

But multiplier larger during deep recessions

- Zero lower bound: Christiano/Eichenbaum/Rebelo 2010, Woodford 2011
- Evidence: Auerbach/Gorodnichenko 2010, Barro/Redlick 2010, Corsetti/Meier/Müller 2010

Fed funds and US unemployment rate



Consolidation under fiscal strain: less harmful?

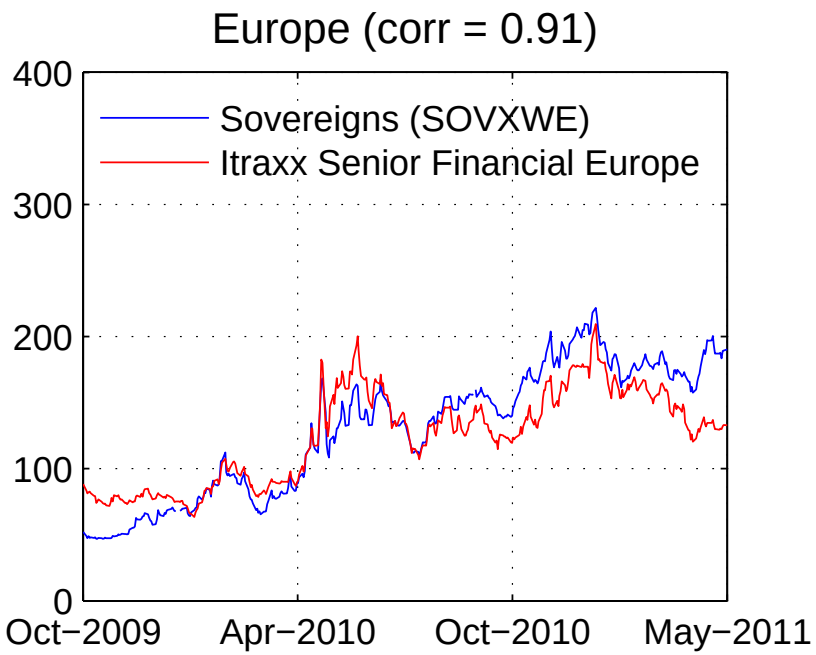
Classic case of Denmark and Ireland (Giavazzi/Pagano 1990)

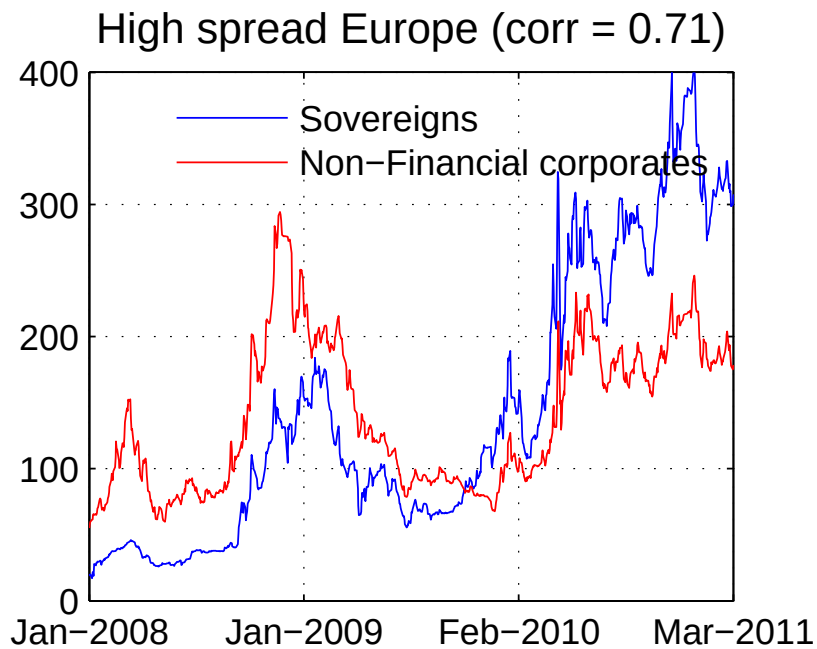
Evidence: Alesina/Perotti 1996, Perotti 1999 Alesina/Ardagna 2010

Theoretical analysis by Bertola/Drazen 1993 (endowment economy) and Sutherland 1997 (taxes)

More recently: suggestive evidence from Europe that sovereign risk threatens private sector funding conditions

The "sovereign-risk channel": Sovereign and private CDS spreads





This paper: effect of retrenchment in the presence of a sovereign-risk channel

New Keynesian model with sovereign risk

- Basic idea: sovereign risk impacts on economic performance through financial intermediation
- Analyze effect of retrenchment during and after ZLB-episode (our measure for the "severity of recession")

Results

- Beware of sovereign risk at the ZLB!
- Early consolidation typically quite recessionary, but can be expansionary if fiscal strain very severe **and** recession very deep
- Determinacy less likely (in the space of parameters). A rationale for early consolidation: anchor expectations.

Remainder of talk

Model

Analytical and quantitative results for simple model

Dynamic simulations

Conclusion

New Keynesian model with sovereign-risk channel

Curdia and Woodford (2009)

- Heterogeneity in non-financial private sector
- Costly financial intermediation drives spread between borrowing and lending rate
- "Savers" hold riskless government debt

Consider limiting case (allows to maintain canonical form)

- Probability of changing type/receiving transfer goes to zero
- Household heterogeneity inconsequential for aggregate supply (NKPC)

Our assumption regarding fiscal policy

Government debt is not riskless.

$$b_t = (1 - d_t)\frac{b_{t-1}R_{g,t-1}}{\Pi_t} + g_t - rev_t,$$

In case of default: $d_t > 0$.

Government diverts γd_t-fraction of repayment of borrowers (Mendoza/Yue 2010)

Distributional consequences neutralized through lump-sum transfers (Schabert/van Wijnbergen 2008)

$$\begin{aligned} rev_t &= const + \chi y_t + \gamma d_t \frac{b^p_{t-1}R_{p,t-1}}{\Pi_t} \\ &\quad - d_t\left(\frac{b_{t-1}R_{g,t-1}}{\Pi_t} + \gamma\frac{b^p_{t-1}R_{p,t-1}}{\Pi_t}\right) + \phi_{tax,b}b_{t-1} \end{aligned}$$

Implications

Actual default is neutral

$$b_t = \left(\frac{R_{g,t-1}}{\Pi_t} - \phi_{tax,b} \right) b_{t-1} + (g_t - const - \chi y_t)$$

As redistribution is not proportional to bond holdings, savers ask for risk premium (neutral up to first order)

Spill-over into financial intermediation

- Because of diverted repayment, financial intermediaries ask for spread
- Rises in probability of sovereign default (as reflected by sovereign-risk spread)

Canonical form (deviations from steady state)

NKPC standard

$$\widehat{\Pi}_t = \beta E_t \widehat{\Pi}_{t+1} + \kappa_y \tilde{y}_t - \kappa_g \tilde{g}_t, \tag{1}$$

Euler equation/IS curve with interest rate spread

$$\tilde{y}_t - \tilde{g}_t = E_t \tilde{y}_{t+1} - E_t \tilde{g}_{t+1} - \varrho \left[\widehat{R}_t + \widehat{\Delta}_t - E_t \widehat{\Pi}_{t+1} + \widetilde{\omega}_t \right] \tag{2}$$

Default probability depends on expected primary deficit

$$\widetilde{\omega}_t = \xi E_t (\tilde{g}_{t+1} - \chi \tilde{y}_{t+1}) \tag{3}$$

Monetary policy (accommodates spread if possible)

$$\widehat{R}_t = \max\{\phi \widehat{\Pi}_t - \widetilde{\omega}_t;\ -\log(R)\}, \quad \phi > 1 \tag{4}$$

Effect of spending cuts – basic mechanism

$$\tilde{y}_t = \tilde{g}_t - \varrho E_t \sum_{i=0}^{\infty} \left[\widehat{R}_{t+i} - \widehat{\Pi}_{t+1+i} + \widetilde{\omega}_{t+i} \right]$$

Delaying spending cuts off the ZLB: stimulate activity during recession (our earlier paper)

- Deflationary effect accommodated by monetary policy: lower future rates
- Affect long-term interest rate and demand today

Immediate spending cuts while economy at ZLB: ambiguous effect on activity

- Deflationary effect raises real interest rate
- But: lower deficit reduces interest rate spread (sovereign-risk channel)

Analytical results

Systematic analysis follows Christiano/Eichenbaum/Rebelo (2010) and Woodford (2011): discount factor shock pushes economy at ZLB and persists with probability μ (Markov-structure)

Results for economy with endogenous interest rate spread

- Risk of belief-driven equilibria
- Differently timed consolidation strategies affect government spending multiplier

Result 1: endogenous spread reduces determinacy region

In the ZLB phase, assume constant government spending; then the economy has a unique bounded equilibrium iff

$$\begin{aligned} & \text{(a) } \mu(1+\xi\chi\varrho) && < && 1/(\beta\mu) \\ \text{and} \quad & \text{(b) } (1-\beta\mu)(1-\mu(1+\xi\chi\varrho)) && > && \mu\varrho\kappa_y \end{aligned}$$

$\Rightarrow$ Determinacy region shrinks, as ξ rises

Self-fulfilling expectations

At ZLB, monetary policy cannot respond (by conventional policy measures) to adverse shift in expectations

Say, agents expect lower output for some non-fundamental reason

Lower output means higher fiscal deficit

Higher deficit means higher spreads, which, in turn, depresses output—thus validating initial expectations

$\Rightarrow$ Systematic, procyclical spending rule ($\tilde{g}_t = \varphi \tilde{y}_t$, with $\varphi > 0$) may anchor expectations (rationale for early consolidation)

Result 2: immediate retrenchment can by expansionary if sovereign-risk channel important (but typically is not)

Timing I: adjust government spending while ZLB binds (back to steady state afterwards)

With determinacy, government spending multiplier is positive if

$$(1-\mu) - \frac{\mu\kappa}{1-\beta\mu} > \mu\xi\tilde{\sigma}$$

- Given determinacy, multiplier positive in the absence of spreads ($\xi = 0$), regardless of the parameterization (Christiano et al. and Woodford)
- In principle, negative multiplier possible if $\xi >> 0$ (rationale for early consolidation)

Result 3: delayed retrenchment is typically expansionary

Timing II

- No spending cuts as long as ZLB binds
- Once it ceases to bind, $\tilde{g}_t = g_a < 0$, in the first period
- And subsequently with probability ν, otherwise $\tilde{g}_t = 0$ forever

Results

- In the absence of spreads, future austerity enhances activity today if persistent enough, i.e. $\nu > \frac{1+\phi(\beta\mu-1)}{\beta\mu}$
- Given this condition is satisfied, the effect is stronger the larger ζ
- Note: future output declines

Quantitative illustration

Generic OECD economy, rather than specific country

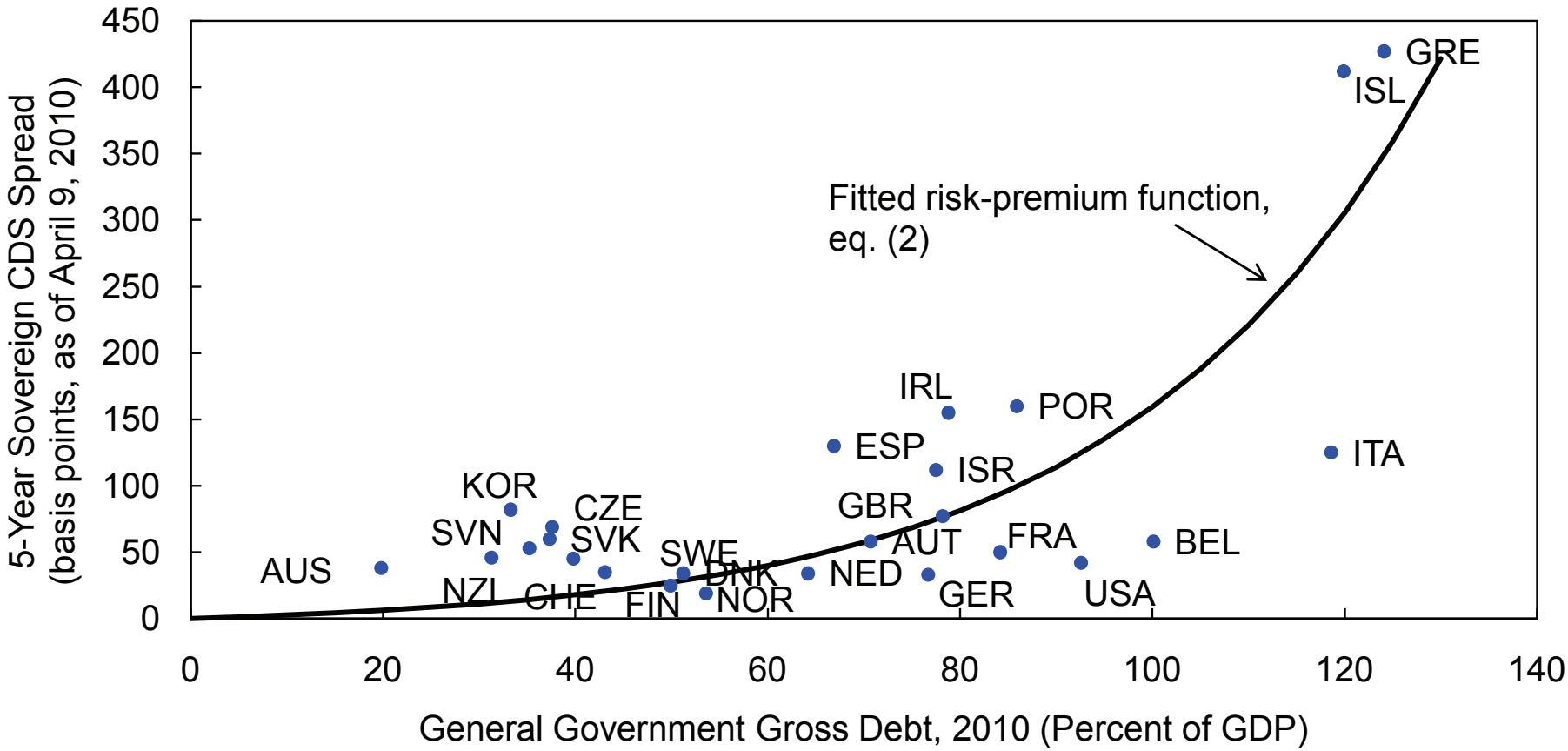
Most parameters standard values, e.g.:

- Output semi-elasticity of tax revenues (OECD): $\chi = 0.34$
- Price rigidities: $\theta = 0.9$
- Share of government spending: 20 percent
- Monetary policy: $\phi = 1.5$

Focus on role of

- Depth of recession: set μ so that ZLB period 4-8 quarters
- Fiscal strain: ξ

Spread depends non-linearly on the level of public debt



Empirically plausible values for ζ

Assume full spillover ($\alpha = 1$)

$$\widetilde{\omega}_t = E_t \left(\exp \left(\left[\frac{b_{t+1}}{4y} - \psi_1 \right] / \psi_2 \right) + \psi_3 \right) / 100, \tag{5}$$

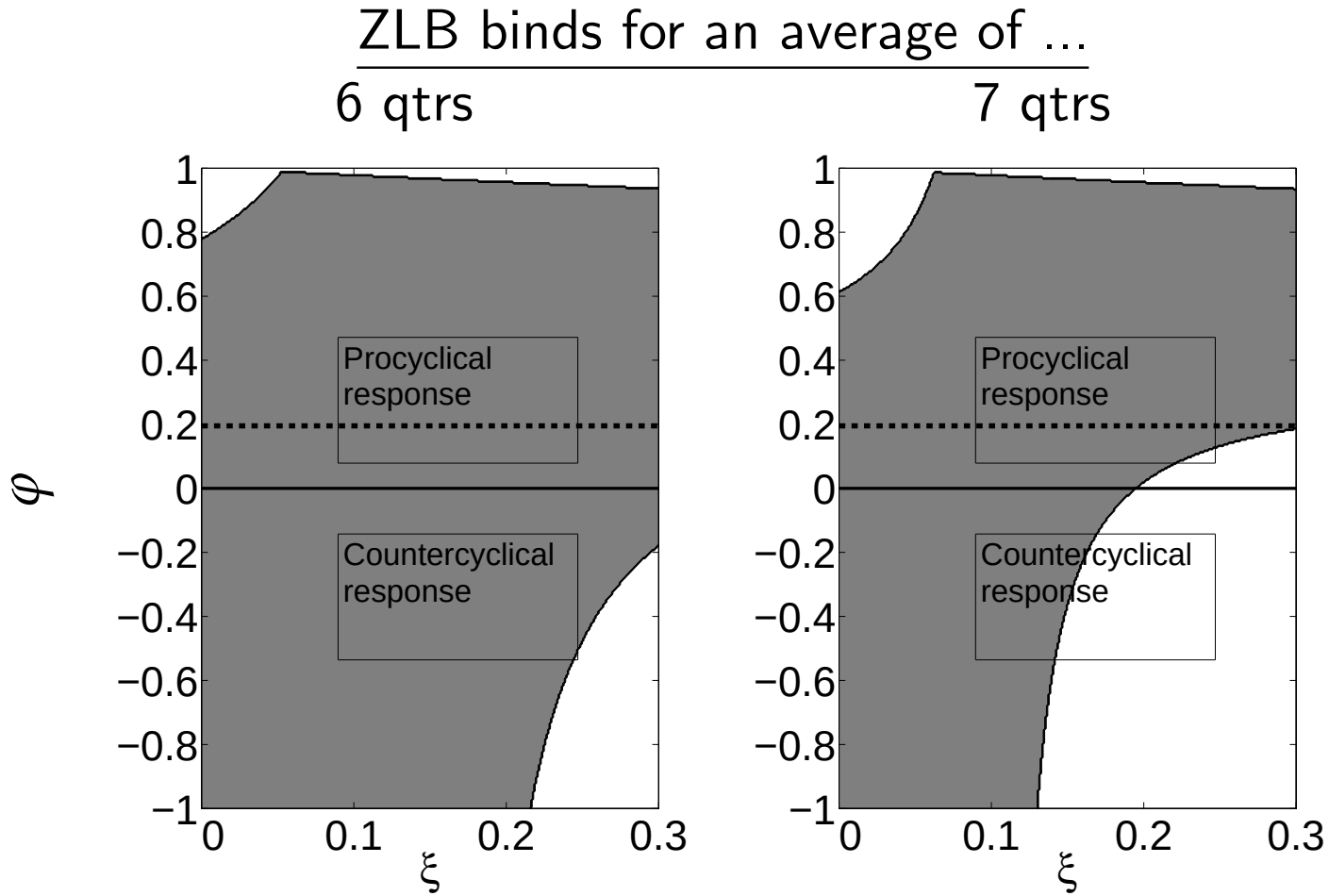
with $\psi_1 = 1.28$, $\psi_2 = 0.32$, and $\psi_3 = -0.02$

Parameter ζ should capture slope (increasing in the level of debt)

Accounting for accumulation of deficits over time: $\zeta = \frac{\partial \widetilde{\omega}}{\partial b} \frac{2-\mu}{1-\mu}$

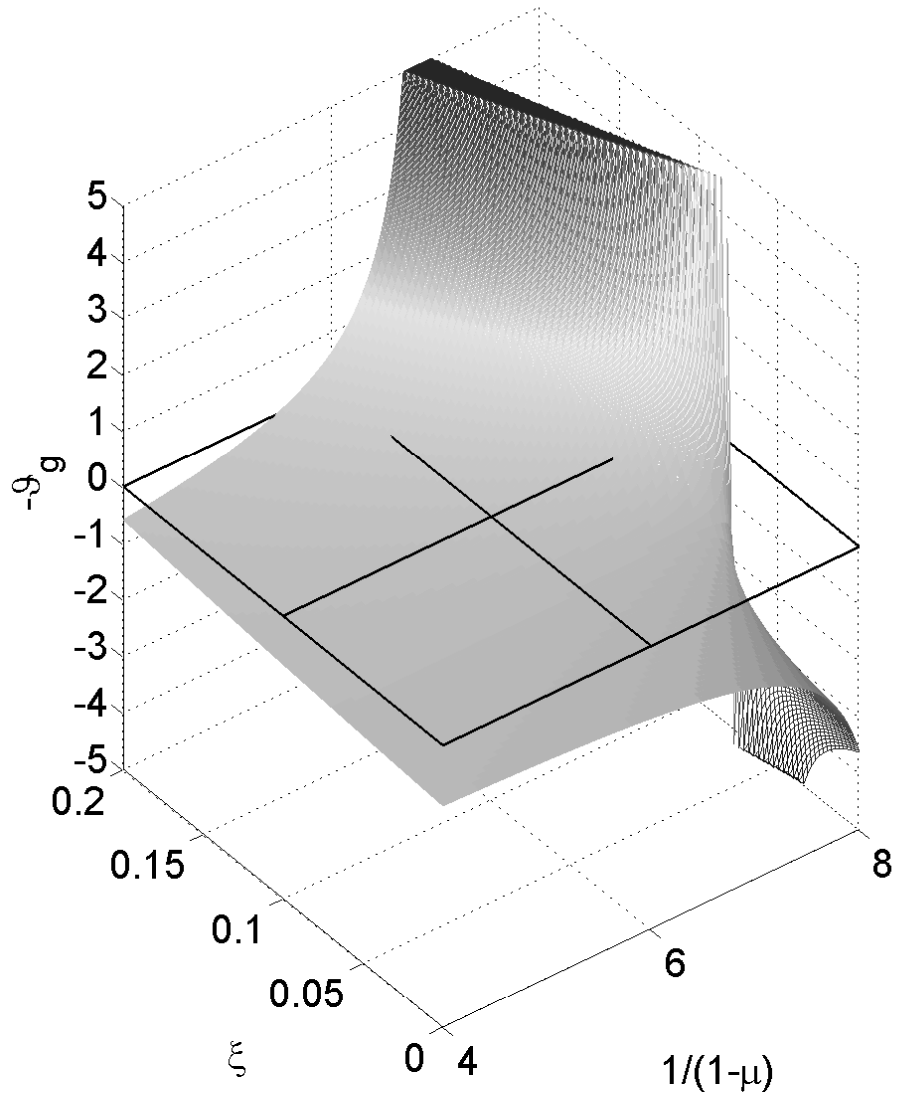
Assuming 8 quarter ZLB-period: $\zeta = 0.03$ for 100% debt-to-GDP ratio and $\zeta = 0.10$ for 140% debt-to-GDP ratio

Determinacy region (grey)



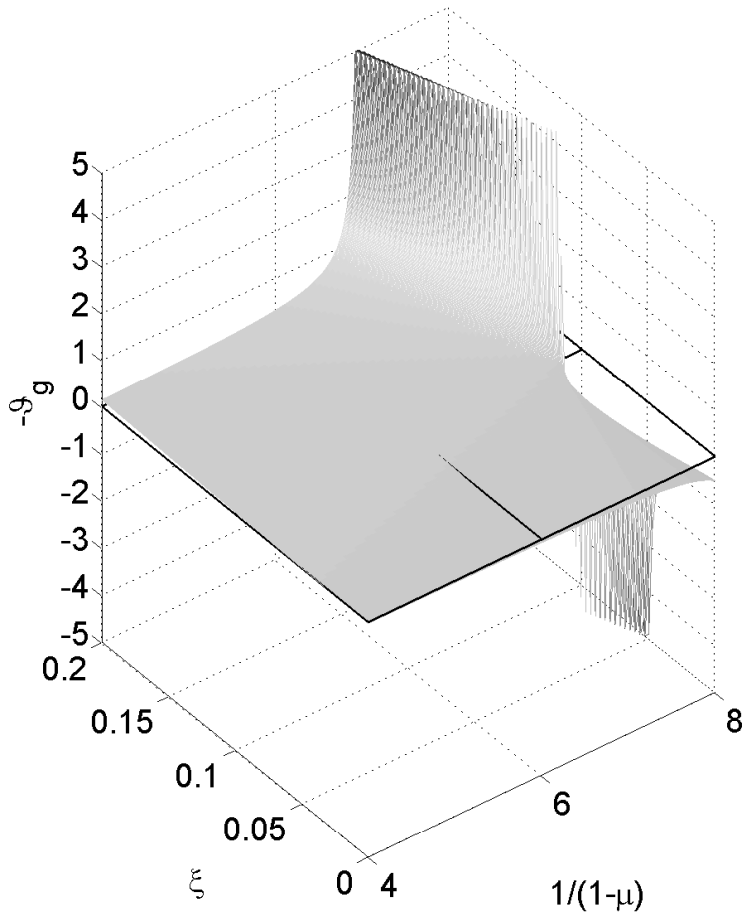
Spending rule: if ZLB binds, $\tilde{g}_t = \varphi \tilde{y}_t$

Response of current output to spending cut

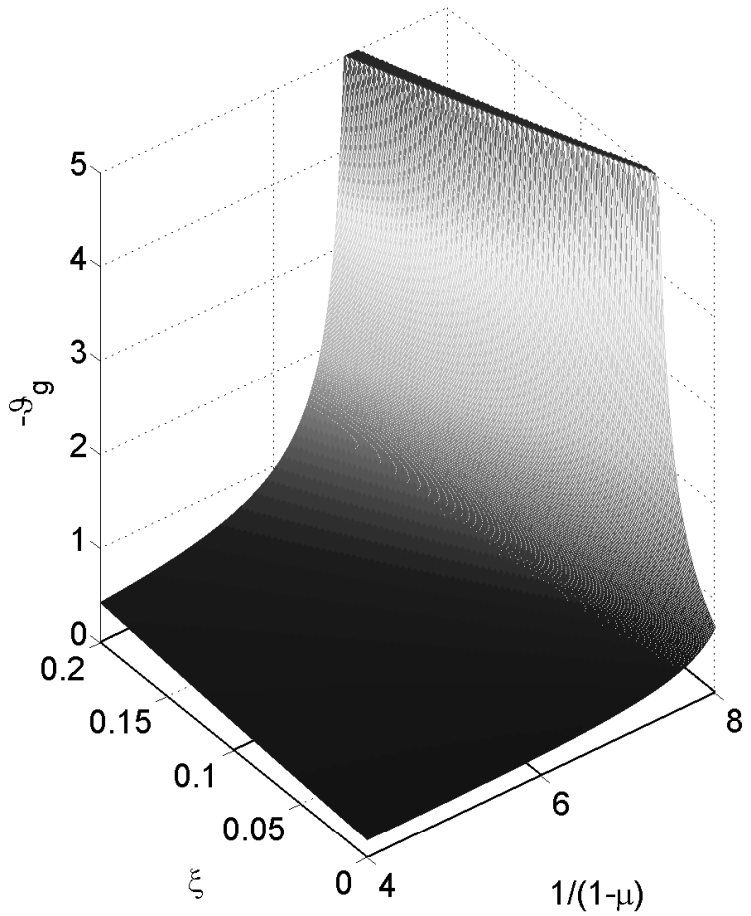


Response of current output to spending cut

$\nu = 0.5$



$\nu = 0.95$



Effect of differently timed austerity packages

Consider full model

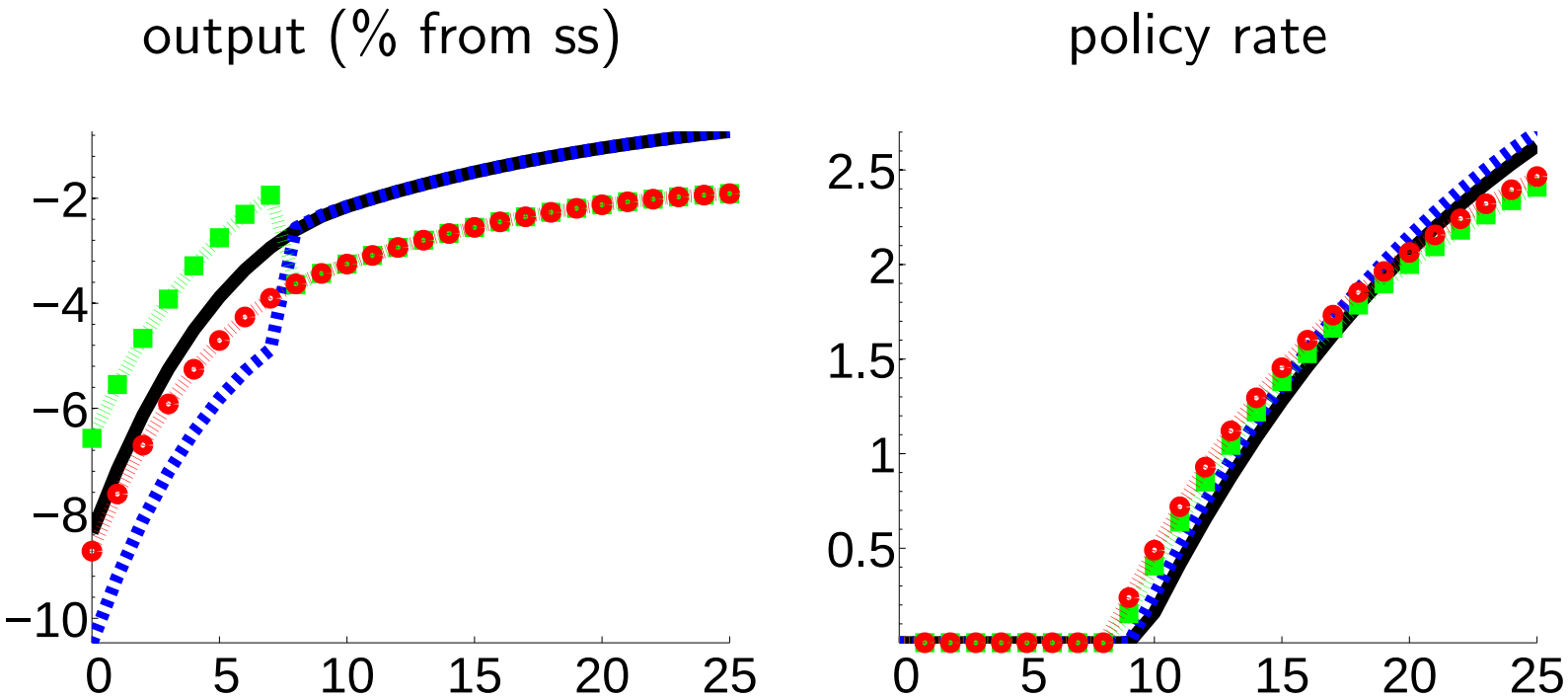
- Spread depends on public debt according to (5)
- Assume a large shock to discount rate, pushing policy rates to ZLB
- Exit from ZLB is endogenous

Consider initial conditions with public debt at 90 percent of GDP

Policy response: cut government spending by 2 percent of GDP

- Immediate retrenchment: cut for two years
- Delayed retrenchment: cut for 10 years, starting after two years
- Persistent retrenchment: cut for 12 years, starting immediately

Recession (black) and immediate (blue), delayed (green) and persistent (red) retrenchment



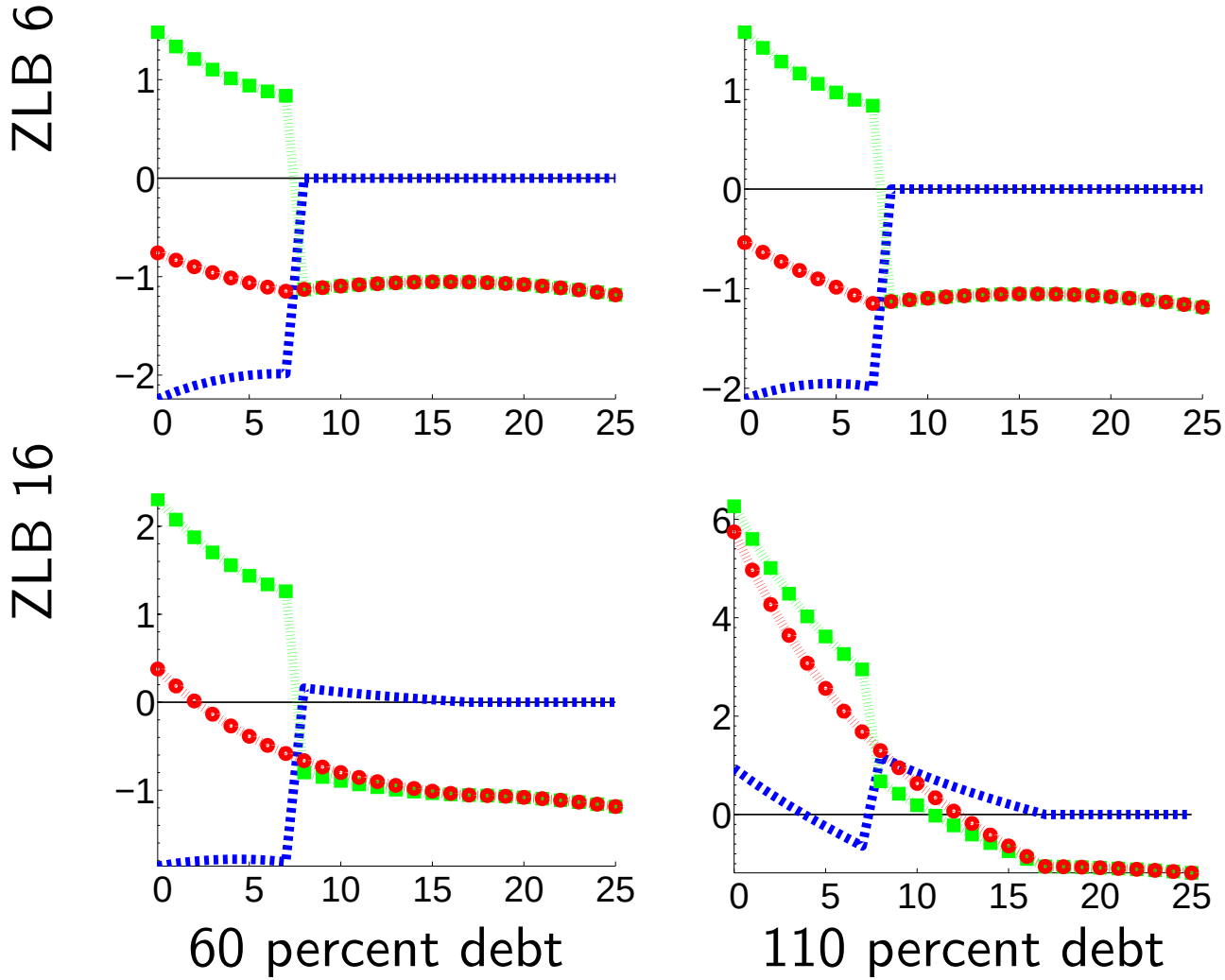
With 90 percent initial debt

- Immediate or persistent retrenchment reduces output
- Delayed retrenchment stimulates current activity

Initial debt level determines length of ZLB episode

- To isolate effect of ZLB and fiscal strain: rescale initial shock
- Consider different debt levels and 6 vs 16 quarters for ZLB episode
- Output response relative to no-retrenchment scenario

Output effect of immediate, delayed and persistent retrenchment



Conclusion

Spending cuts have ambiguous effect on real rates at ZLB (when monetary policy is constrained)

- Deflationary effect, all else equal, raises rates
- Consolidation, all else equal, lowers spreads and lowers real rates

Key determinants

- Depth of recession (expected duration of ZLB episode)
- State of public finances (response of spread to fiscal stress)

Quantitative explorations

- Delaying retrenchment beneficial
- Except if fiscal strain is very strong **and** recession (ZLB episode) long-lasting

Conclusion – cont'd

Rationale for immediate retrenchment: anchor expectations

If fiscal strain ex ante

- For given shock: recession likely to be more severe
- Sovereign-risk channel likely to be important
- Immediate retrenchment beneficial

Extension: small open economy in monetary union

- Policy rate constant; interest rate spread unaccommodated
- Spending cut has moderate output effects (relative to ZLB period), because PPP (initially: deflation, future inflation) ensures that long-rates fall (see Corsetti, Kuester, Müller 2011)
- Stronger case for immediate retrenchment