Fiscal and monetary policy interactions in a low interest rate world

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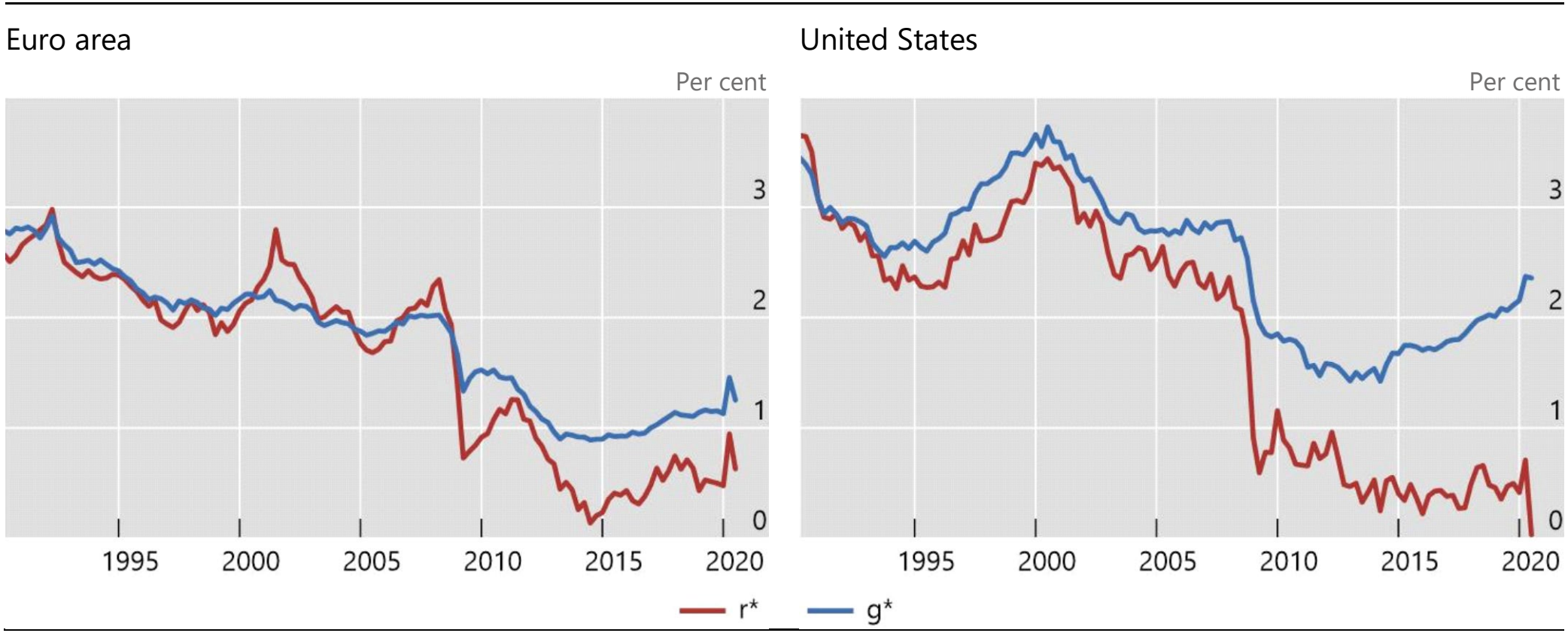
Background: Low r*



Source: Holston et al (2017)

Outline

Goal: Assess the interaction of monetary and fiscal policy in low r* environment

1. Implications of lower r* for conventional monetary policy (ZLB frequency)

2. Role of balance sheet policies at low r*
   - For macroeconomic stability and for public debt stability

3. Role of fiscal rules and debt aversion

Methodology

- Small-scale semi-structural model following and extending Orphanides and Williams (2007)

- Key features of the model:
  - Short- and long-term interest rates
  - Central bank bond purchases (QE)
  - Fiscal policy and public debt accumulation
  - Expectations formation under learning
    - Departure from rational expectations

- We examine fiscal-monetary interactions through
  - Stochastic simulations
  - Recession scenarios

The model

Phillips curve and IS curve

- **Phillips curve**: linking inflation to the unemployment rate gap

$$\pi_t = \phi_\pi \pi_{t-1} + (1-\phi_\pi) E(\pi_{t+1}) + \alpha_\pi (u_t - u^*) + e_{\pi,t}$$

- **IS curve**: linking the unemployment rate gap to long-term real rates and the primary fiscal balance

$$u_t = \phi_u u_{t-1} + (1-\phi_u) E(u_{t+1}) + \alpha_u (r_t^l - r^{l*}) + \alpha_f (pb_t - pb^*) + e_{u,t}$$

- **Long-term interest rates**: expected short-term rates plus term premium (5y maturity)

$$r_t^l = E\left(\frac{1}{L}\sum_{j=0}^{L} r_j^s\right) + \tau_t, \quad i_t^l = E\left(\frac{1}{L}\sum_{j=0}^{L} i_j\right) + \tau_t$$

- **Term premium**: increasing in net supply of debt to private investors

$$\tau_t = \tau^* + \alpha_\tau \left(\frac{b_t}{d_{t-1}} - \frac{b^*}{d^*}\right)$$

Monetary and fiscal policy

- **Conventional monetary policy**: Taylor rule with ZLB constraint

$$i_t = max[i_t^T, 0]$$

$$i_t^T = \theta_i i_{t-1} + (1-\theta_i)[r^* + \pi^* + \theta_\pi(\pi_{t-1} - \pi^*) + \theta_u(u_{t-1} - u^*)]$$

Unconventional monetary policy: Announced bond holding policy rule

$$b_t = \zeta_b b_{t-1} + (1-\zeta_b)b^* + \zeta_\pi(\pi_{t-1} - \pi^*) + \zeta_u(u_{t-1} - u^*)$$ when *i* is stuck at the ZLB

$$b_t = \zeta_b b_{t-1} + (1-\zeta_b)b^*$$ passive unwinding otherwise

- **Fiscal rule**: primary balance reacting to unemployment rate and to debt level

$$pb_t = \rho_{pb} pb_{t-1} + (1-\rho_{pb})pb^* + \psi(u_{t-1} - u^*) + \delta(d_{t-1} - d^*)$$

$$pb^* = (r^* + \tau^* - g^*)d^*$$

- **Government debt dynamics**:

$$d_t = \frac{100 + i_t^d}{100 + g_t + \pi_t} d_{t-1} - pb_t^r$$

Learning

- Expectations in the IS curve, Phillips curve and LT interest rate based on a 3-variable VAR
  - Inflation, unemployment, short-term rates
  - Constant-gain LS re-estimation in each period
  - Gain coefficient set to 0.02

- Starting values based on the reduced-form representation of the model solved under RE and absent ZLB constraints
  - So, agents are equipped with the model-consistent forecasting equations…
  - …but are allowed to deviate due to the effects of the ZLB

Simulation results

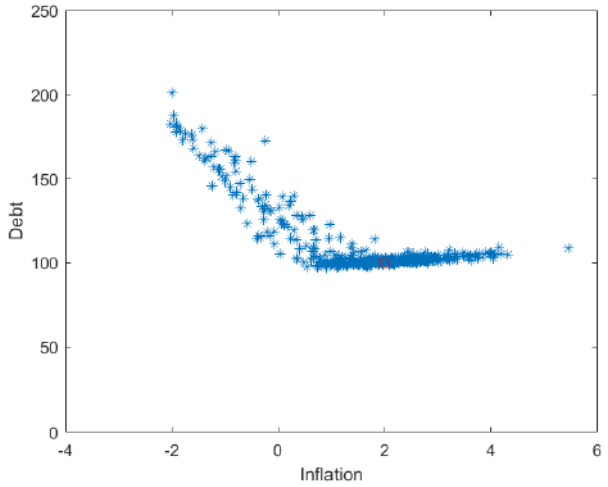
Lower r* makes the ZLB more binding

- *u*=4, π*=2, b*=10, d*=100*
- Benchmark fiscal rule
- Benchmark interest rate rule
- No QE

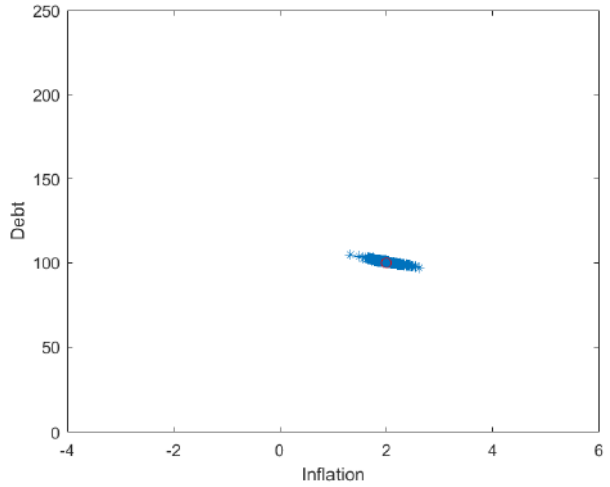
	u	π	d	pb	ZLB
$r^* = 0.5\%$					
Mean	4.52	1.64	109.66	0.36	0.16
Std	0.89	1.67	12.64	0.78	
$r^* = 0.5\%$ *without learning*					
Mean	4.01	2.00	100.59	0.04	0.01
Std	0.52	1.40	5.52	0.60	
$r^* = 0.5\%$ *without ZLB*					
Mean	4.02	2.03	100.51	0.03	0.00
Std	0.56	1.61	6.68	0.62	
$r^* = 2\%$					
Mean	4.02	2.04	100.27	1.51	0.01
Std	0.56	1.62	7.50	0.66	

Debt-deflation risk in a low rate world

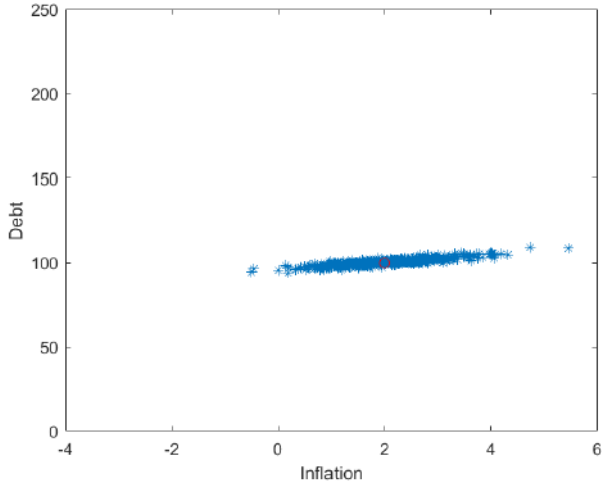
(a) r^*=0.5%



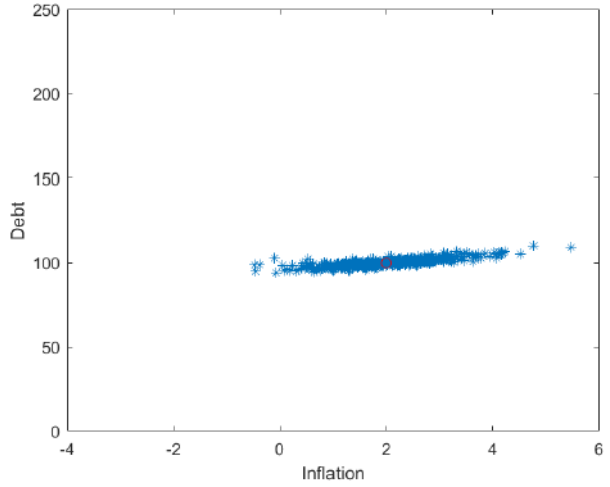
(b) r^*=0.5%, no learning



(c) r^*=0.5%, no ZLB



(d) r^*=2%



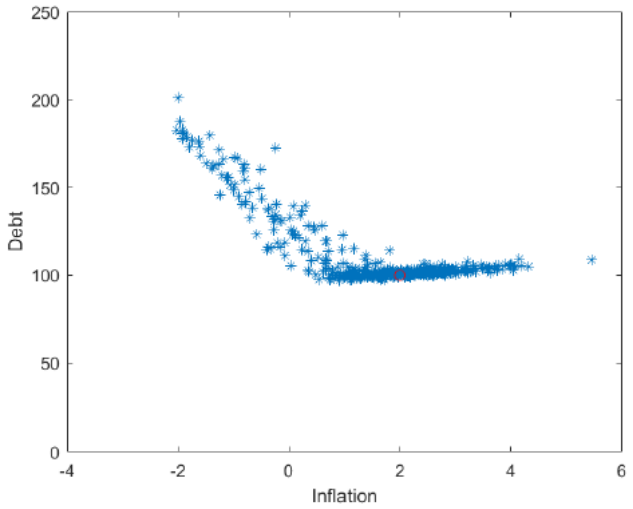
Balance sheet policies alleviate ZLB constraint

- *u*=4, π*=2, b*=10, d*=100*
- Benchmark fiscal rule
- Benchmark interest rate rule

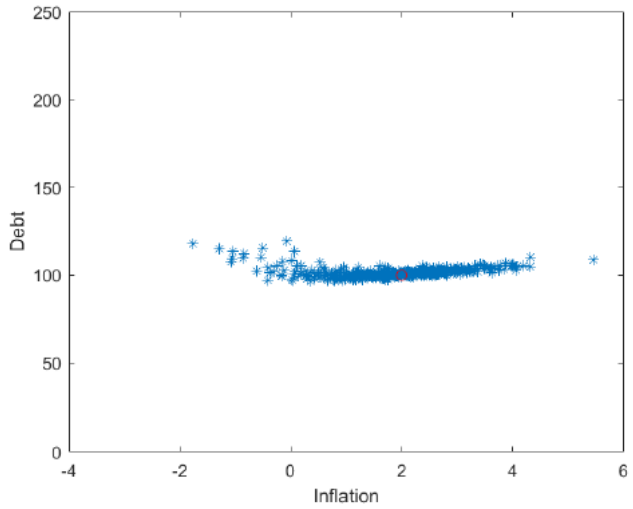
	u	π	d	pb	b	ZLB	$\tau < 0$
No QE, $\zeta_c = 0$							
Mean	4.52	1.64	109.66	0.36	10.00	0.16	0.00
Std	0.89	1.67	12.64	0.78	0.00		
Timid QE, $\zeta_c = 0.5$							
Mean	4.07	1.87	101.37	0.05	11.65	0.09	0.01
Std	0.57	1.64	7.08	0.62	2.36		
Baseline, $\zeta_c = 1$							
Mean	4.03	1.96	100.75	0.04	11.98	0.06	0.03
Std	0.56	1.63	6.99	0.62	3.68		
Aggressive QE, $\zeta_c = 2$							
Mean	4.01	2.02	100.44	0.03	12.76	0.04	0.04
Std	0.57	1.62	7.03	0.63	5.90		

Debt-deflation risk with balance sheet policies

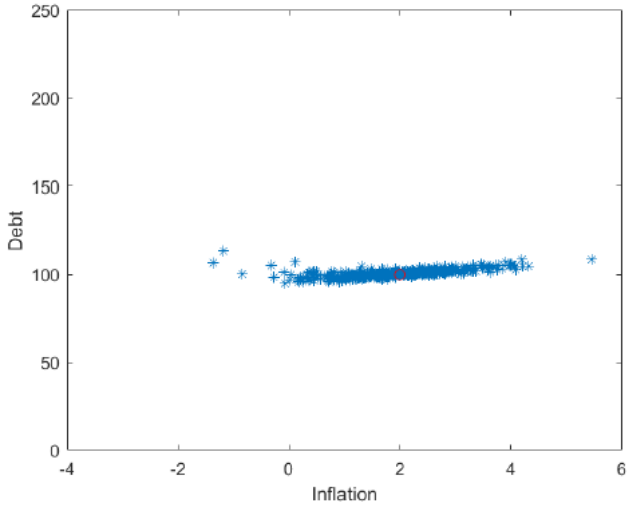
(a) No QE (ζ_c=0)



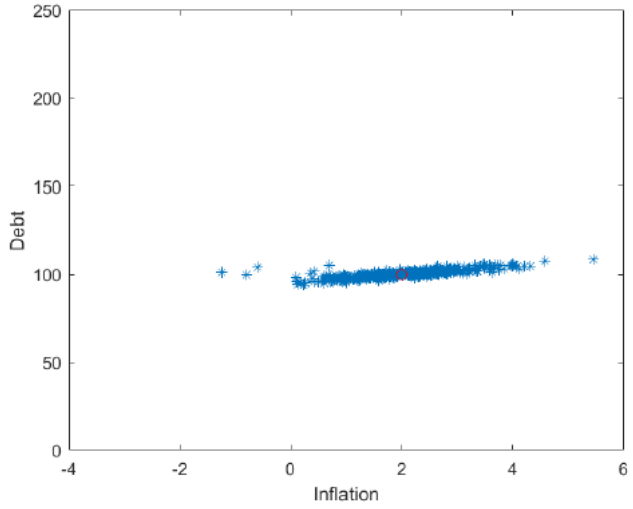
(b) Timid QE (ζ_c=0.5)



(c) Baseline QE (ζ_c=1.0)



(d) Aggressive QE (ζ_c=2.0)



Credible inflation target

- *u*=4, π*=2, b*=10, d*=100*
- No learning on *π**

	u	π	d	pb	b	ZLB	$\tau < 0$
Credible π^* without QE							
Mean	4.23	1.83	105.12	0.23	10.00	0.07	0.00
Std	0.72	1.60	10.06	0.75	0.00		
Credible π^* with QE							
Mean	4.01	1.97	100.51	0.03	11.04	0.03	0.01
Std	0.56	1.57	6.20	0.61	2.62		
Memo: Baseline							
Mean	4.03	1.96	100.75	0.04	11.98	0.06	0.03
Std	0.56	1.63	6.99	0.62	3.68		

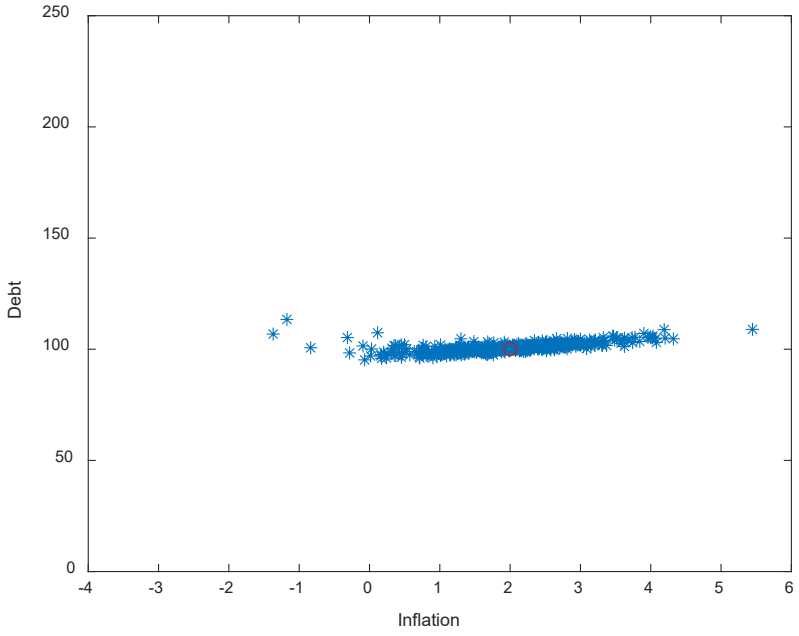
Alternative fiscal rules

- $u^*=4$, $\pi^*=2$, $b^*=10$, $d^*=100$
- Benchmark balance sheet rule
- Benchmark interest rate rule

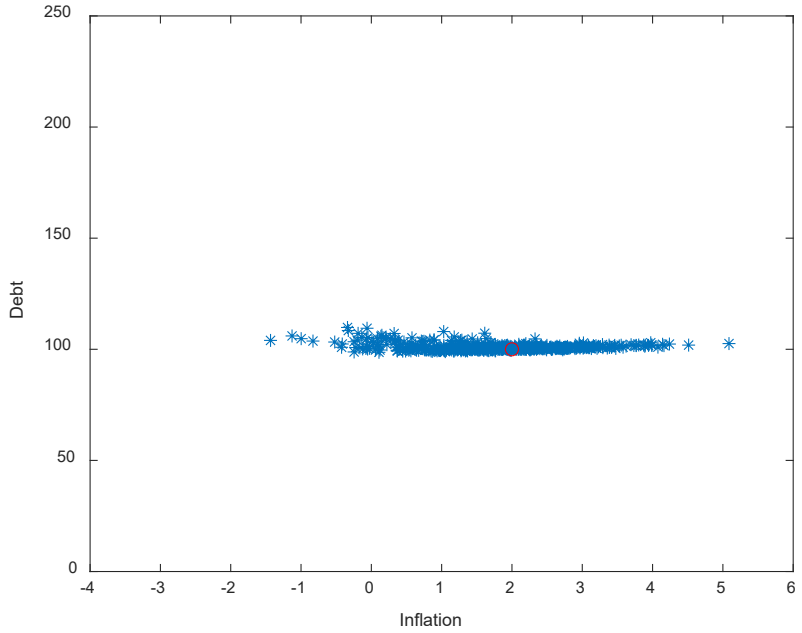
	u	π	d	pb	b	ZLB	$\tau < 0$
Debt averse fiscal rule							
Mean	4.17	1.80	101.03	0.11	16.67	0.13	0.10
Std	0.88	1.95	6.82	1.17	10.23		
More countercyclical							
Mean	4.03	1.96	101.33	0.04	12.15	0.06	0.04
Std	0.51	1.67	9.52	0.89	4.07		
Extra stimulus only at ZLB							
Mean	4.02	1.97	102.38	0.03	11.47	0.04	0.01
Std	0.58	1.59	7.56	0.62	2.69		
Memo: Baseline							
Mean	4.03	1.96	100.75	0.04	11.98	0.06	0.03
Std	0.56	1.63	6.99	0.62	3.68		

Debt-deflation risk under alternative fiscal rules

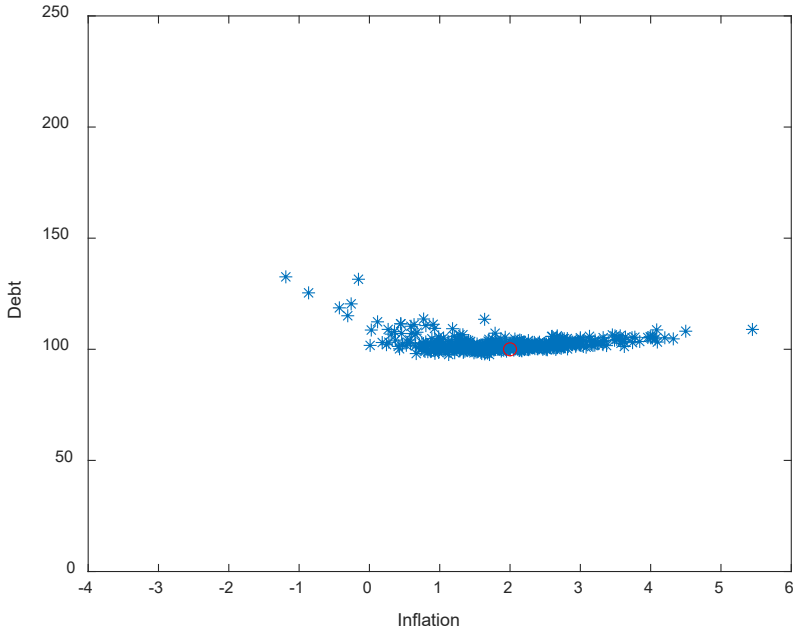
Baseline



More debt averse



Extra stimulus



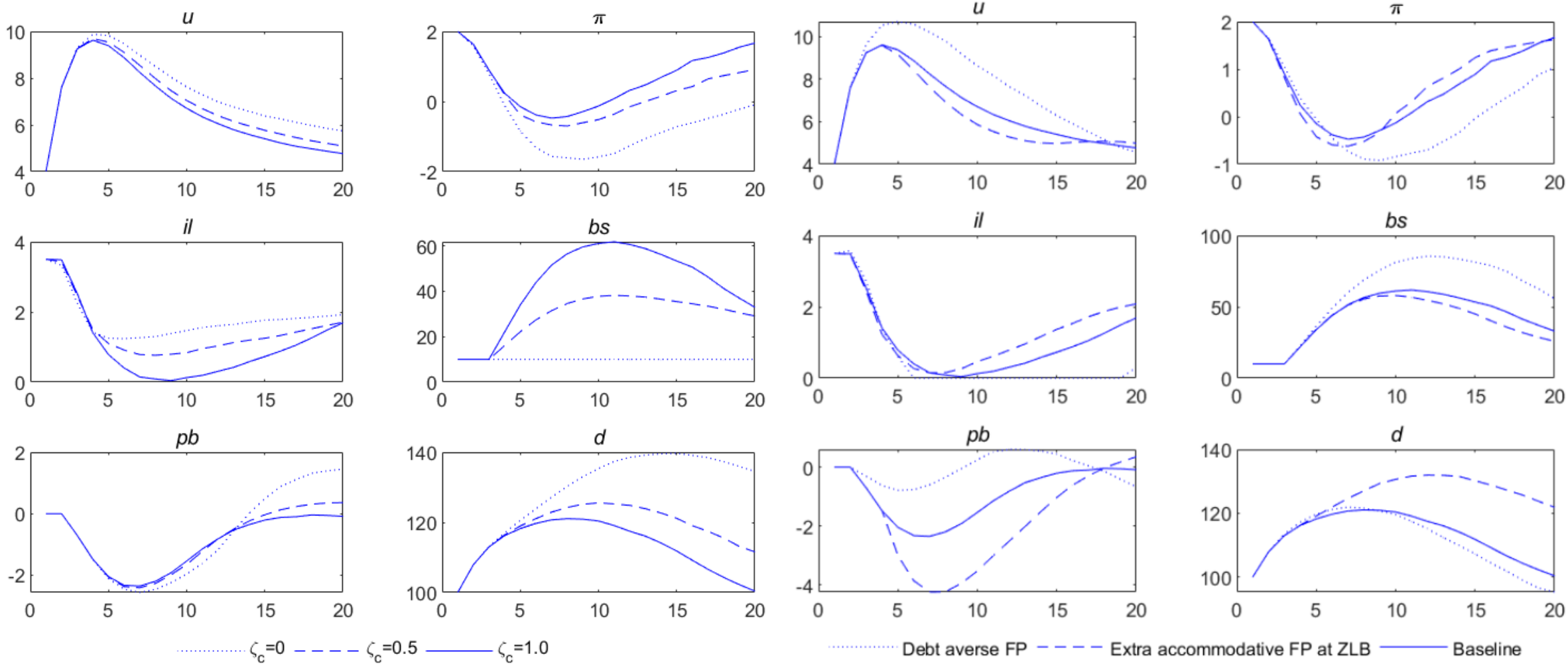
Recession scenarios

QE and fiscal rules in a deep recession

4 pp increase in unemployment rate, persistence 0.6

Balance sheet rule

Fiscal rule



Wrapping up

Key takeaways

- Low r* significantly constrains conventional monetary policy through the ZLB
  - Unemployment and inflation diverge from steady state levels
  - Greater risk of debt-deflation

- Balance sheet policies alleviate ZLB constraints
  - Unemployment and inflation stabilised around steady state levels
  - Stabilises public debt without explicitly aiming to do so

- Fiscal rules matter
  - Excessively debt-averse fiscal rules are counterproductive in a low r* world
  - More countercyclical fiscal policy helps in deep recessions

Thank you!