Fiscal and monetary policy interactions in a low interest rate world

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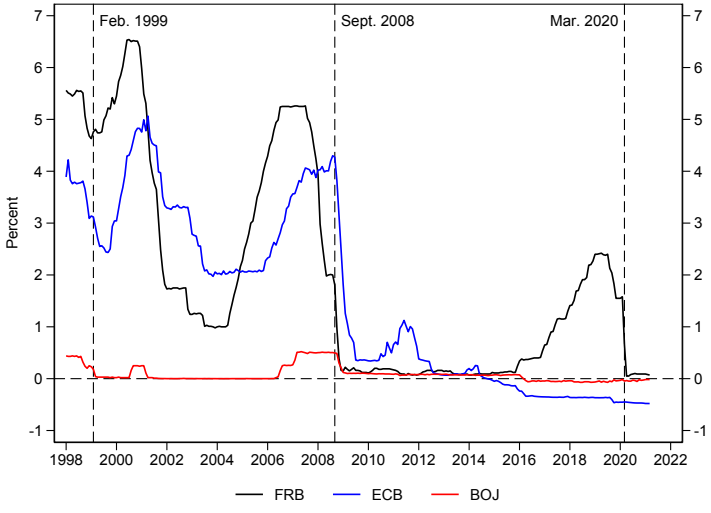
*The views expressed are my own and not necessarily the views of my co-authors or of the BIS

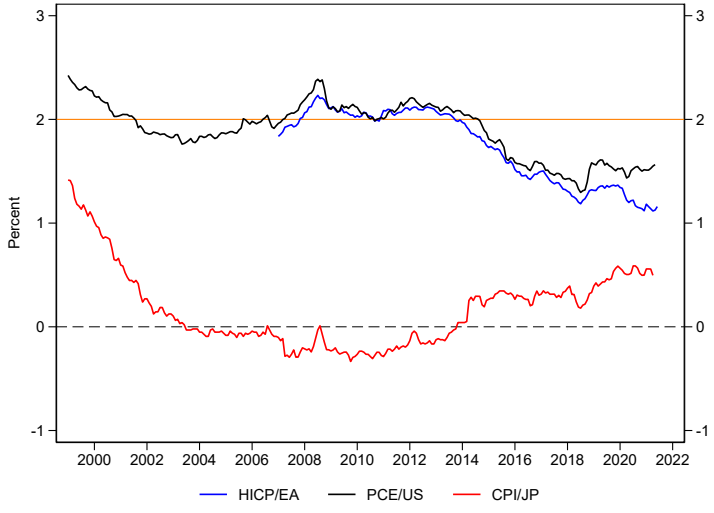
Background: Low r^* and constraints on interest rate policy



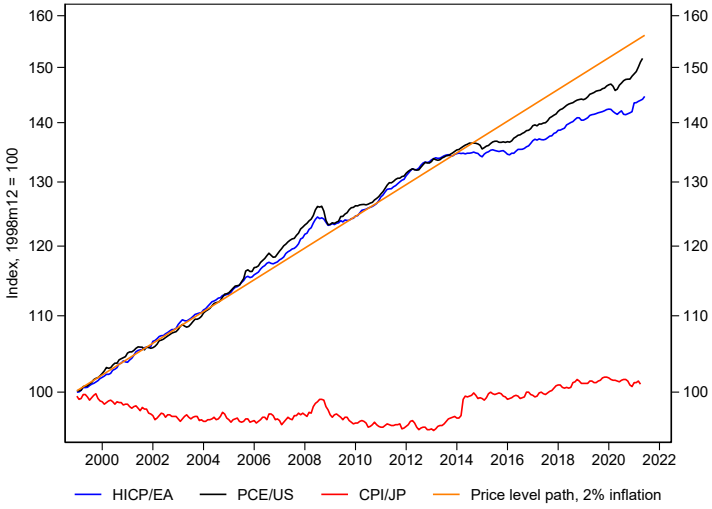
Three encounters with the Zero Lower Bound

- February 1999: The BOJ's ZIRP.
- October 2008: The GFC.
- March 2020: The Covid-19 pandemic.

Inflation (10-year average)



Price level compared to a steady 2% inflation path

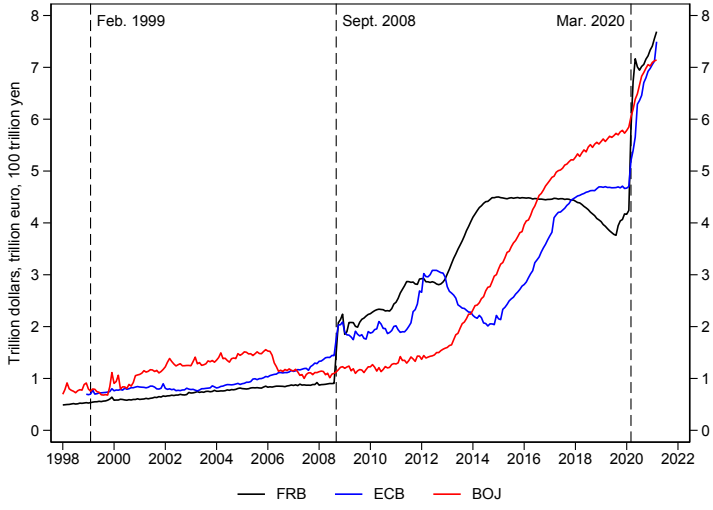


The "lowflation" challenge

"There is the emerging risk of what I call 'low-flation,' particularly in the Euro Area. A potentially prolonged period of low inflation can suppress demand and output–and suppress growth and jobs. More monetary easing, including through unconventional measures, is needed in the Euro Area to raise the prospects of achieving the ECB's price stability objective. The Bank of Japan also should persist with its quantitative easing policy."

IMF Managing Director Christine Lagarde, 2 April 2014.

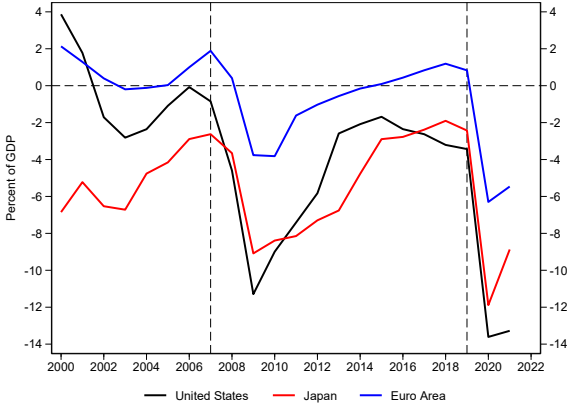
Quantitative easing



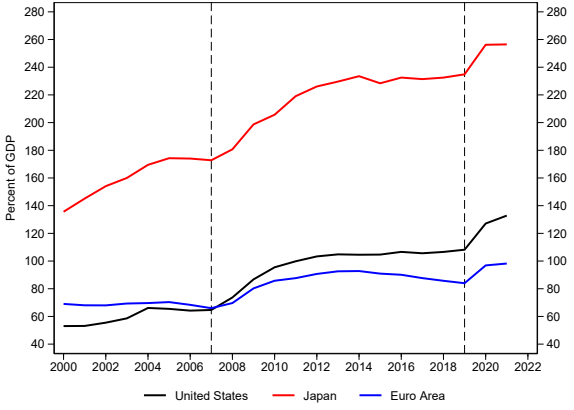
Size of central bank balance sheet.

Fiscal policy and debt ratios

Primary balance ratio



Government debt ratio



IMF WEO, April 2021. Vertical lines denote year before each of three ZLB episodes.

The ZLB challenge

- With a low r^*, the ZLB hampers interest rate policy.
- In the face of a recessionary shock, the available interest-rate easing is insufficient to promote a rapid recovery.
- If not counteracted with other policies, such as quantitative easing, the economy is at risk of persistent low inflation and subpar growth.
- Persistent low inflation raises the risk of disanchoring inflation expectations, and depresses nominal growth, leading to a deterioration of debt dynamics.
- Without a prompt and decisive response, a ZLB episode can lead to prolonged stagnation and debt deflation.

This study

- Start with a small-scale, semi-structural calibrated model of the economy, employed to study interest-rate monetary policy.
- Extend the model to capture fiscal-monetary policy interactions/government debt dynamics, with and without the introduction of QE policies.
- Show how the systematic use of QE can counteract the ZLB and guard against the risks of stagnation and debt-deflation.
- Assess the role of fiscal policy and negative interest rates to improve stability and to limit the need for QE at the ZLB.
- Assess the role of a credible inflation goal to keep inflation expectations better anchored and limit the need for QE.

The model economy

Phillips curve:

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

Aggregate demand:

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

Interest rates:

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

The ZLB:

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

Interest rate policy

Taylor rule:

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

Countercyclical component of Taylor rule:

$$cc_t = \theta_\pi(\pi_{t-1} - \pi^*) + \theta_u(u_{t-1} - u^*)$$

Fiscal policy and public debt dynamics

Fiscal policy rule:

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

Debt dynamics:

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

Okun's law:

$$g_t = g^* - \alpha_{OL}(u_t - u_{t-1})$$

Expectations: Perpetual learning

- Expectations formed based on a VAR(1) model estimated recursively with constant-gain least squares.

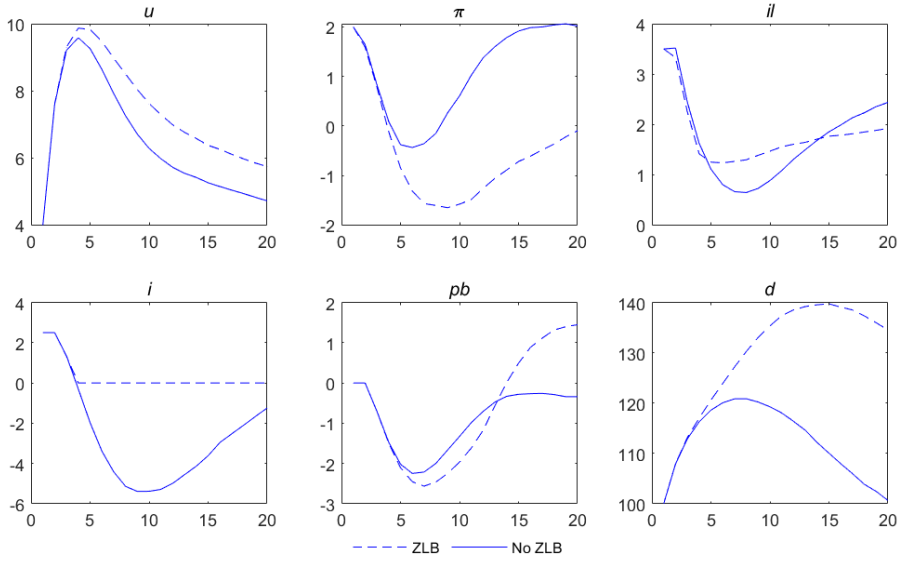
- Let c_t be the 4 x 3 vector of coefficients of the forecasting model. Using data through period t, the least squares regression parameters for the forecasting model can be written in recursive form:

$$c_t = c_{t-1} + \kappa_t R_t^{-1} X_t (Y_t - X_t' c_{t-1}),$$

$$R_t = R_{t-1} + \kappa_t (X_t X_t' - R_{t-1})$$

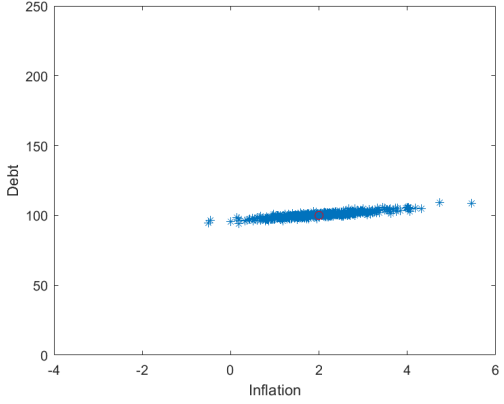
where $Y_t = (\pi_t, u_t, i_t)$ and $X_t = (1, \pi_{t-1}, u_{t-1}, i_{t-1})$.

The ZLB in a deep recession (without QE)

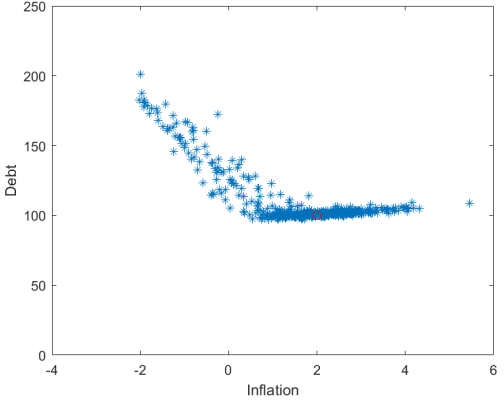


The ZLB and the debt-deflation risk (without QE)

Without ZLB



With ZLB



Average outcomes for inflation and debt.

QE and the term premium

Balance sheet policy:

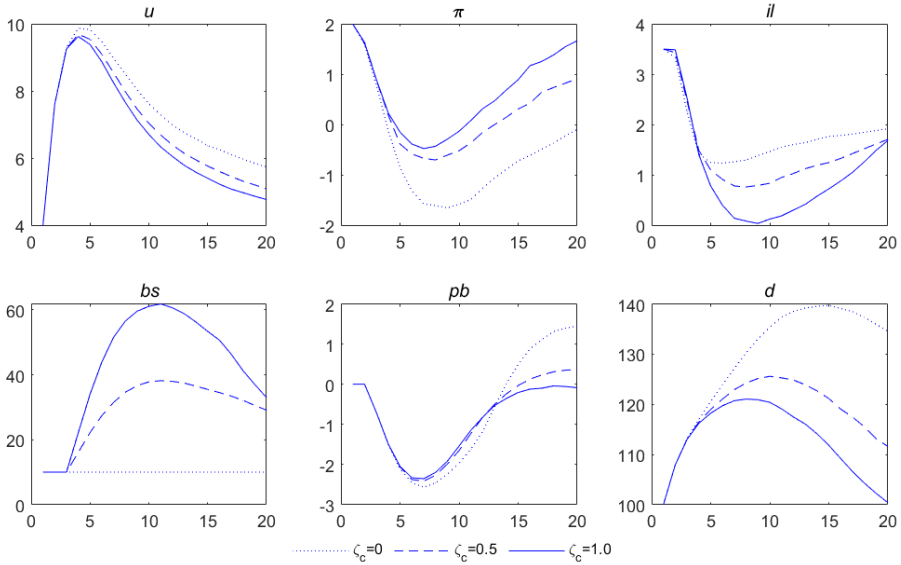
$$b_t = \begin{cases} \zeta_b b_{t-1} + (1-\zeta_b) b^* + \zeta_c cc_t & \text{if } i_t = 0 \\ \zeta_b b_{t-1} + (1-\zeta_b) b^* & \text{otherwise} \end{cases}$$

where ζ_c the intensity of QE countercyclical response at ZLB.

Term premium:

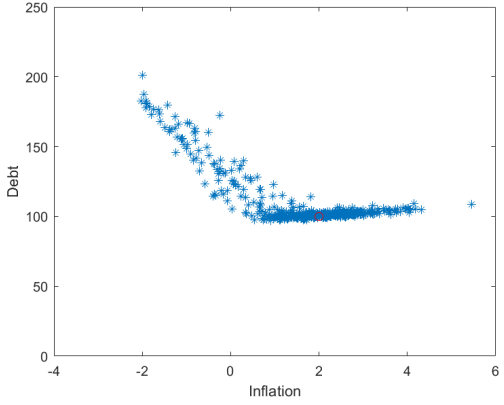
$$\tau_t = \tau^* + \alpha_\tau \left(\frac{b_t}{d_{t-1}} - \frac{b^*}{d^*} \right)$$

The role of QE in counteracting a deep recession

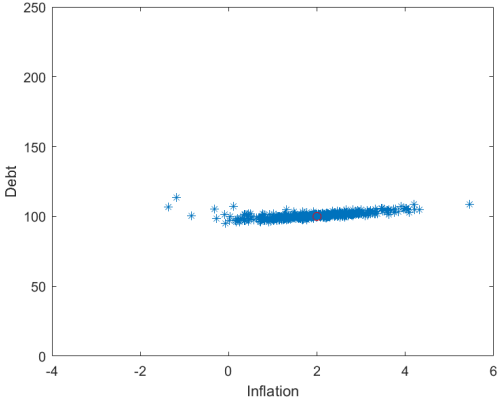


The role of QE in counteracting debt-deflation risk.

Without QE



With QE



Average outcomes for inflation and debt.

The mechanics: Direct easing with QE

- QE can partially substitute for interest rate easing by reducing long-term yields, i^l, and boosting other asset prices.

$$i^l_{n,t} = \frac{1}{n}\sum_{i=0}^{n-1} i^e_{t+i} + \tau_{n,t}$$

- Even when current and expected short term rates, i, are constrained, QE reduces long-term interest rates by compressing the term premium, τ.

$i^l_{n,t}$ long term yield (n-period zero-coupon yield)

i_t short term nominal interest rate (one period)

$\tau_{n,t}$ term premium

Simplified debt dynamics

- Debt dynamics:

$$\Delta d_t = (r + \tau - g) d_{t-1} + pb_t$$

- g: Output growth.
- r: Real short-term interest rate.
- τ: Term premium.
- d: Debt ratio.
- pb: Primary balance ratio.

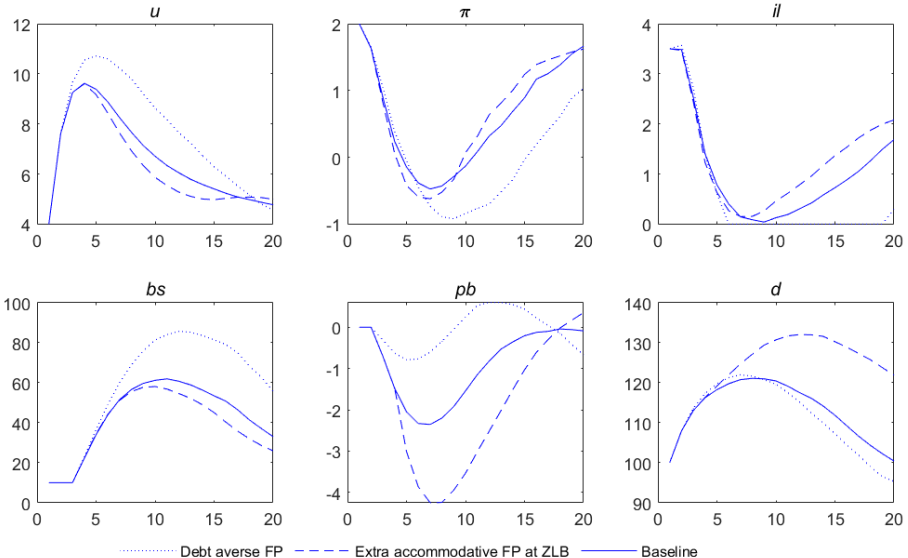
Fiscal-monetary interactions: Indirect easing with QE

- By compressing the term premium, τ, QE also reduces the cost of refinancing government debt and increases fiscal space.
- QE can thus provide *indirect* easing by facilitating extraordinary fiscal expansion at the ZLB.
- When r^* is low, this indirect channel for monetary policy easing becomes critical for counteracting a slump or deflationary shock.
- At the ZLB, fiscal-monetary coordination (implicit or explicit) is needed to protect against debt-deflation risk.

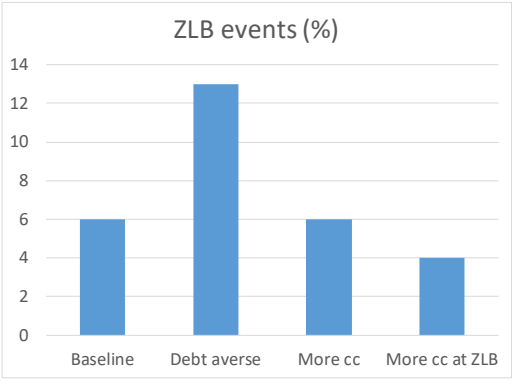
The role of alternative policies at the ZLB

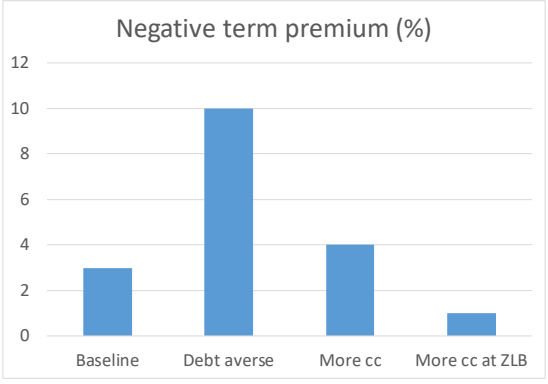
- Role of negative interest rates.
- Role of extra stimulus at ZLB.
- Role of a debt averse fiscal rule.
- Role of a credible inflation target.

The role of alternative fiscal policies

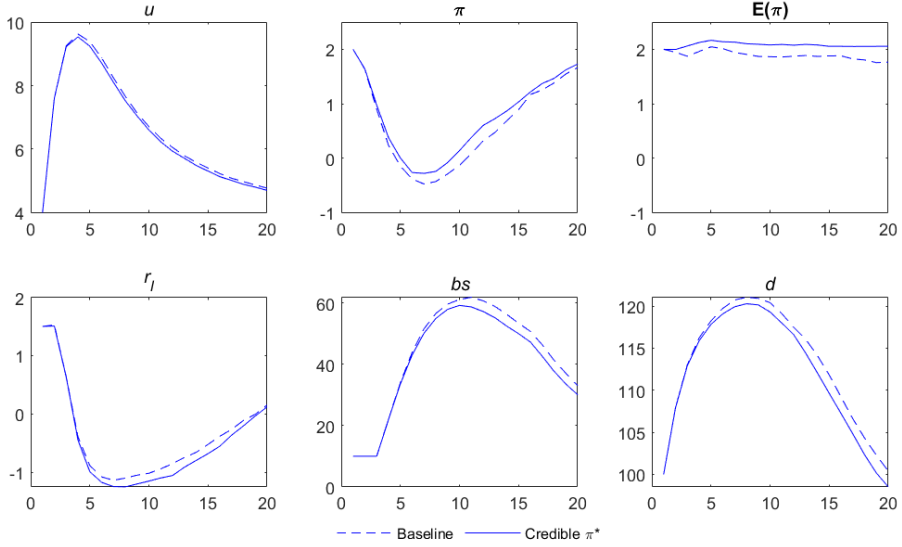


The role of alternative fiscal policies





The role of a credible inflation target



Summary

- Low r^* hampers conventional monetary policy.
- QE protects against deep recessions and debt-deflation risk at the cost of large CB balance sheets and occasional episodes of negative term premiums.
- Negative interest rates reduce need for QE.
- Excessively debt averse fiscal rules are counterproductive.
- A credible inflation target helps keep inflation expectations better anchored, and improves macroeconomic stability while reducing the need for QE.
- The ZLB makes fiscal-monetary policy interactions more pronounced and coordination more critical for maintaining good economic performance.