International Economic Spillovers and the Liquidity Trap
by
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Official interest rates

- US fed funds target rate
- Uncollateralized overnight call rate, Japan
- United Kingdom: repo rate
- Sweden Repo rate
- Eurosystem: minimum bid rate in the main refinancing operations

Source: Bloomberg.
Literature


• Risk of hitting the ZLB

• Policy option at the ZLB
  – CB may buy long-term bonds or private equities: Lavoie and Murchison (2007)

• International spillovers with the ZLB
The Main Goals of the Paper

• To analyse a simple new Keynesian model in order to get some theoretical results

• To examine the properties of Bank of Finland’s two-country model (comprising “EA+U.S.”)

• To quantify the effects of possible liquidity traps on the transmission of shocks and policy
A simple two-country model

Aggregate demand equation

\[ y_t - E_t y_{t+1} = \alpha_1 (\rho - r_t) + \alpha_2 (g_t - E_t g_{t+1}) + \alpha_3 (y_t^f - E_t y_{t+1}^f) + \alpha_4 (q_t - E_t q_{t+1}) \]

New Keynesian Phillips curve

\[ \pi_t = \beta E_t \pi_{t+1} + \lambda y_t + \varepsilon_t \]

Real interest rate

\[ r_t = i_t - E_t \pi_{t+1} \]

Taylor rule

\[ i_t = \max[0, \rho + \bar{\pi} + \omega (\pi_t - \bar{\pi}) + \theta y_t + \eta_t] \]

Uncovered interest rate parity condition

\[ r_t = r_t^f + E_t q_{t+1} - q_t \]
A simple two-country model

- Assigning plausible values to coefficients:
  \( \alpha_1 = 0.25, \ \alpha_2 = 1.667, \ \alpha_3 = 1.667, \ \alpha_4 = 0.50, \ \lambda = 0.15, \ \omega = 0.5, \ \theta = 0.5 \)

- Gives the following solution:

\[(14)\] \[ y_i \approx 0.122 \cdot g_i + 0.041 \cdot g_i^f - 0.424 \cdot \eta_i + 0.178 \cdot \eta_i^f - 0.637 \cdot \varepsilon_i + 0.267 \cdot \varepsilon_i^f \]
\[(15)\] \[ \pi_i \approx \bar{\pi} + 0.018 \cdot g_i + 0.006 \cdot g_i^f - 0.063 \cdot \eta_i + 0.026 \cdot \eta_i^f + 0.904 \cdot \varepsilon_i + 0.040 \cdot \varepsilon_i^f \]
\[(16)\] \[ r_i \approx \rho + 0.088 \cdot g_i + 0.030 \cdot g_i^f + 0.692 \cdot \eta_i + 0.129 \cdot \eta_i^f + 1.038 \cdot \varepsilon_i + 0.193 \cdot \varepsilon_i^f \]
\[(17)\] \[ q_i \approx 0.058 \cdot g_i^f - 0.058 \cdot g_i + 0.562 \cdot \eta_i^f - 0.562 \cdot \eta_i + 0.844 \cdot \varepsilon_i^f - 0.844 \cdot \varepsilon_i \]
\[(18)\] \[ y_i^f \approx 0.122 \cdot g_i^f + 0.041 \cdot g_i - 0.424 \cdot \eta_i^f + 0.178 \cdot \eta_i - 0.637 \cdot \varepsilon_i^f + 0.267 \cdot \varepsilon_i \]
\[(19)\] \[ \pi_i^f \approx \bar{\pi}^f + 0.018 \cdot g_i^f + 0.006 \cdot g_i - 0.063 \cdot \eta_i^f + 0.026 \cdot \eta_i + 0.904 \cdot \varepsilon_i^f + 0.040 \cdot \varepsilon_i \]
\[(20)\] \[ r_i^f \approx \rho + 0.088 \cdot g_i^f + 0.030 \cdot g_i + 0.692 \cdot \eta_i^f + 0.129 \cdot \eta_i + 1.038 \cdot \varepsilon_i^f + 0.193 \cdot \varepsilon_i \]
A simple two-country model

- One of the economies is locally constrained by the zero bound:

\[ y_t \approx 0.114 \cdot g_t + 0.019 \cdot g^f_t - 0.687 \cdot \varepsilon_t - 0.458 \cdot \eta_t - 0.257 \cdot (\rho + \bar{\pi}^f) \] (23)

\[ \pi_t \approx \bar{\pi} + 0.017 \cdot g_t + 0.002 \cdot g^f_t + 0.896 \cdot \varepsilon_t - 0.068 \cdot \eta_t - 0.038 \cdot (\rho + \bar{\pi}^f) \] (24)

\[ r_t \approx \rho + 0.083 \cdot g_t + 0.013 \cdot g^f_t + \varepsilon_t + 0.667 \cdot \eta_t - 0.186 \cdot (\rho + \bar{\pi}^f) \] (25)

\[ q_t \approx -0.083 \cdot g_t - 0.013 \cdot g^f_t - \varepsilon_t - 0.667 \cdot \eta_t - 0.813 \cdot (\rho + \bar{\pi}^f) \] (26)

\[ y_t^f \approx 0.176 \cdot g^f_t + 0.060 \cdot g_t + 0.386 \cdot \varepsilon_t + 0.257 \cdot \eta_t + 0.613 \cdot (\rho - \bar{\pi}^f) \] (27)

\[ \pi_t^f \approx 1.092 \cdot \bar{\pi}^f + 0.026 \cdot g^f_t + 0.009 \cdot g_t + \varepsilon_t^f + 0.057 \cdot \varepsilon_t + 0.038 \cdot \eta_t + 0.092 \cdot \rho \] (28)

\[ r_t^f = -\bar{\pi}^f \] (29)

Foreign inflation expectations have real effects.

Inflation target in ZLB country has real effects.

Cost-push shocks of ZLB country disappear.

Amplified.
The Two-Country Simulation Model

Euro area Dynamic General Equilibrium model EDGE
• Kortelainen (2002), Bank of Finland, E23.

• A fully forward-looking New Keynesian model:
  – Blanchard’s stochastic lifetime approach
  – Price & wage rigidities
  – Real rigidities via adjustment costs
  – Forward-looking asset pricing (also for the exch. rate)
  – Monetary policy included through a Taylor rule
  – NFAs cumulated from CAs.

• Calibrated to Euro area and U.S. Data
The Two-Country Simulation Experiments

- ZLB on the short rate inserted into the Taylor rules
- Two baselines which differ in terms of the interest rate
  - a standard baseline (1) with inflation = 0 and interest rate = 1
  - an asymmetric liquidity trap baseline (2) with temporary deflation in the U.S. and the U.S. interest rate = 0; Euro area as before
- Temporary liquidity traps last for 5 years
- Fiscal policy shock. Government consumption in ”the Euro area” increased by 0.5 per cent of GDP permanently. Financed initially by bonds, in the medium term (5 years) by income taxes. Over all baselines
The Two-Country Simulation Experiments

Figure: Temporary (1Y) increase of 1% of real GDP in public consumption in USA

(Deviation from control)

Real GDP

CPI inflation

Nominal exchange rate

Nominal interest rate
Our findings

In the liquidity trap

1) Aggregate demand shocks are not transmitted to large degree

2) The effect of domestic fiscal policy is amplified

3) The effects of supply shocks are changed

4) The neutrality of inflation target to real activity is destroyed