Discussion of "Does a Big Bazooka Matter? Central Bank Balance-Sheet Policies and Exchange Rates"

Pengfei Wang

HKUST

October 2017

The Contribution

- This paper documenting the dynamic impact of central bank asset purchase on exchange rate over time
- It decomposes the importance of different transmission channels
  - Signalling channel contributes very little
  - Timing varying risk premium does not matter much
  - The deviations from covered interest rate parity is important

Main Finding

- An exogenous increase of ECB balance sheet relative to that of the federal reserve leads to
  - bare change in policy rate differential
  - persistent depreciates of Euro
  - significant decline in three month money market rate in Euro
  - little change in risk premium
  - a fall in CIP deviations, consistent with the notation that an expansion of ECB's balance sheet relative to that of the Federal Reserve lowers the cost of borrowing in euro money market

The Empirical Framework

The paper mainly exploit a modified uncovered interest rate parity equation

$$s_t = E_t(s_{t+1}) + r_t^E - r_t^\$ + \underbrace{\lambda_t}_{\text{deviation from CIP}} + \underbrace{p_t}_{\text{risk premium}}$$

Solving s_t forward yields

$$s_t = E_t s_{t+T} + E_t \sum_{j=0}^{T-1} \left[r_{t+j}^E - r_{t+j}^\$ + \lambda_{t+j} + p_{t+j} \right]$$

similarly

$$\begin{aligned} s_{t-1} &= E_{t-1} s_{t+T} + E_{t-1} \sum_{j=0}^{T-1} \left[r_{t+j}^E - r_{t+j}^\$ + \lambda_{t+j} + p_{t+j} \right] \\ &\quad + r_{t-1}^E - r_{t-1}^\$ + \lambda_{t-1} + p_{t-1} \end{aligned}$$

The Empirical Framework

Similarly

$$\begin{aligned} s_{t-1} &= E_{t-1}s_{t+T} + E_{t-1}\sum_{j=0}^{T-1}\left[r^E_{t+j} - r^\$_{t+j} + \lambda_{t+j} + p_{t+j}\right] \\ &\quad + r^E_{t-1} - r^\$_{t-1} + \lambda_{t-1} + p_{t-1} \end{aligned}$$

And hence we have

$$s_t - s_{t-1} = -\left[r^E_{t-1} - r^\$_{t-1} + \lambda_{t-1} + p_{t-1}\right] + \Gamma\varepsilon_t$$

where ε_t include policy shock. By construction, ε_t is independent of information available in period $t-1$.

The Empirical Framework

one of ε_t is linked the observable change relative balance sheet by assuming

$$\varepsilon_t = \underbrace{\eta_{t|t}}_{\text{unexpected}} + \underbrace{\eta_{t+1|t}}_{\text{anticipated}}$$

$$\Delta BS_t = \delta_0 + \eta_{t|t} + \underbrace{\eta_{t|t-1}} + control$$

$$\eta_{t+1|t} = \mu_1 \underbrace{a_t^{ECB}}_{\text{announcement dummy}} + \mu_2 \underbrace{a_t^{FED}}_{\text{announcement dummy}}$$

Overview

- Very interesting and timely
- Good guidance for future theoretical work
- Reduced-form single equation partial equilibrium regression

Comments

Back to the key equation

$$s_t = E_t(s_{t+1}) + r_t^E - r_t^\$ + \lambda_t + p_t$$

if one assume $p_t = \tilde{p}_t + \gamma s_t$, then she obtains

$$s_t = \frac{1}{1+\gamma} E_t(s_{t+1}) + \frac{1}{1+\gamma}\left[r_t^E - r_t^\$ + p_t\right]$$

This leads to

$$s_t - s_{t-1} = -\left[r_{t-1}^E - r_{t-1}^\$ + \lambda_{t-1} + p_{t-1}\right] + \Gamma\varepsilon_t$$

The error term will have serious correlation as it involves

$$\left(\frac{1}{1+\gamma}\right)^j E_t(x_{t+j}) - \left(\frac{1}{1+\gamma}\right)^{j+1} E_{t-1}(x_{t+j})$$

Comments

Without some theoretical restriction of the joint determination of s_t, r_t^E, λ_t, p_t, we can also solve s_t backward

$$s_t = s_{t-1} - \left[r_{t-1}^E - r_{t-1}^{\$} + \lambda_{t-1} + p_{t-1} \right] + \underbrace{s_t - E_{t-1}(s_t)}_{\Gamma \varepsilon_t}$$

But

$$s_{t+h} = s_{t-1} - \sum_{j=0}^{h} \left[r_{t-1+j}^E - r_{t-1+j}^{\$} + \lambda_{t-1+j} + p_{t-1+j} \right] + \Gamma \sum_{j=0}^{h} \varepsilon_{t+j}$$

Suggestion

Jointly estimate r_t^E, $r_t^\$$ and exchange. For example we can augmented the above model with the standard Calvo sticky price model, namely

$$
\begin{aligned}
r_t^E - r_t^\$ &= \phi(\pi_t^E - \pi_t^\$) + \phi_y(y_t^E - y_t^\$) + \underbrace{\eta_{t|t}}_{\text{unexpected}} + \underbrace{\eta_{t+1|t}}_{\text{anticipated}} \\
(y_t^E - y_t^\$) &= E_t(y_{t+1}^E - y_{t+1}^\$) - [r_t^E - r_t^\$ - (E_t\pi_{t+1}^E - E_t\pi_{t+1}^\$)] \\
(\pi_t^E - \pi_t^\$) &= \beta(E_t\pi_{t+1}^E - E_t\pi_{t+1}^\$) + \kappa(y_t^E - y_t^\$) \\
s_t &= E_t(s_{t+1}) + r_t^E - r_t^\$ + \lambda_t + p_t
\end{aligned}
$$