Foreign Exchange Intervention with UIP and CIP Deviations: The Case of Small Safe Haven Economies

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Outline

1. The main question
2. Literature review and contribution
3. Three comments

The main question

- A constrained international financial intermediary is the marginal investor in domestic and foreign assets

$$\mu_t = \mathbb{E}_t \left[\Lambda^*_{t+1} \left(\frac{e_t}{e_{t+1}} r_t - r^*_t \right) \right]$$

which implies

$$\underbrace{\frac{r_t}{r^*_t} \mathbb{E}_t \left[\frac{e_t}{e_{t+1}} \right] - 1}_{\text{UIP deviation}} = - \underbrace{r_t \mathbb{C}\mathrm{ov}_t \left[\Lambda^*_{t+1}, \frac{e_t}{e_{t+1}} \right]}_{\text{risk premium}} + \underbrace{\mu_t}_{\text{friction}}$$

- Are FX purchases (reserve accumulation) profitable or costly?

$$\mathbb{E}_t \left[\Lambda_{t+1} \left(\frac{e_{t+1}}{e_t} r^*_t - r_t \right) \right] = ?$$

- What is the correct proxy? Tipically used UIP deviation (Adler and Mano (2021))

FXI to "lean against the wind": Cavallino (2019), Fanelli and Straub (2021)

- An increase in foreign demand for Swiss assets appreciates the Franc

$$\mathbb{E}_t \left[\Lambda^*_{t+1} \left(\frac{e_t}{e_{t+1}} r_t - r^*_t \right) \right] = \mu_t < 0$$

- The central bank purchases FX to reduce μ_t
  - limit deviations of exchange rate from fundamentals
- FX purchases are profitable
  - Sandri (2023) provides empirical evidence for Brazil
- Foreign investors are risk-neutral so ΔUIP=ΔCIP

FXI as alternativel tool at ZLB: Amador et al. (2020)

- Suppose the central bank purchases FX to depreciate its currency

$$\mathbb{E}_t\left[\Lambda^*_{t+1}\left(\frac{e_t}{e_{t+1}}r_t - r^*_t\right)\right] = \mu_t > 0$$

- If domestic financial markets are complete, then $\Lambda_{t+1}\frac{e_{t+1}}{e_t} = \frac{\Lambda^*_{t+1}}{1+\mu_t}$ and thus

$$\begin{aligned}
\mathbb{E}_t\left[\Lambda_{t+1}\left(\frac{e_{t+1}}{e_t}r^*_t - r_t\right)\right] &= \mathbb{E}_t\left[\frac{\Lambda^*_{t+1}}{1+\mu_t}\left(r^*_t - \frac{e_t}{e_{t+1}}r_t\right)\right] \\
&= \frac{r^*_t\mathbb{E}_t\left[\Lambda^*_{t+1}\right] - r_t\mathbb{E}_t\left[\Lambda^*_{t+1}\frac{e_t}{e_{t+1}}\right]}{1+\mu_t} \\
&= \frac{1 - \frac{r_t}{r^*_t}\mathbb{E}_t\left[\frac{e_t}{e_{t+1}}\right] - r_t\mathbb{C}\mathrm{ov}_t\left[\Lambda^*_{t+1}, \frac{e_t}{e_{t+1}}\right]}{1+\mu_t} = -\frac{\mu_t}{1+\mu_t}
\end{aligned}$$

- FX purchases are costly and the cost is proprotional to CIP since

$$\mathbb{E}_t\left[\Lambda^*_{t+1}\left(\frac{1}{e_{t+1}} - \frac{1}{f_t}\right)\right] = 0 \implies \mu_t = \underbrace{\frac{r_t}{r^*_t}\frac{e_t}{f_t} - 1}_{\text{CIP deviation}}$$

FXI as alternativel tool at ZLB: Bacchetta et al. (2022)

- As before, but now without complete domestic financial markets. Assume

$$\Lambda_{t+1}\frac{e_{t+1}}{e_t} = \frac{\hat{\Lambda}_{t+1}}{1+\mu_t}$$

then

$$\mathbb{E}_t\left[\Lambda_{t+1}\left(\frac{e_{t+1}}{e_t}r_t^* - r_t\right)\right] = \mathbb{E}_t\left[\frac{\hat{\Lambda}_{t+1}}{1+\mu_t}\left(r_t^* - r_t\frac{e_t}{e_{t+1}}\right)\right] = \frac{1 - r_t\mathbb{E}_t\left[\hat{\Lambda}_{t+1}\frac{e_t}{e_{t+1}}\right]}{1+\mu_t}$$

$$= \frac{1 - \frac{r_t}{r_t^*}\mathbb{E}_t\left[\frac{e_t}{e_{t+1}}\right] - r_t\mathbb{C}\text{ov}_t\left[\hat{\Lambda}_{t+1}, \frac{e_t}{e_{t+1}}\right]}{1+\mu_t}$$

$$= \frac{-\mu_t + r_t\left(\mathbb{C}\text{ov}_t\left[\Lambda^*_{t+1}, \frac{e_t}{e_{t+1}}\right] - \mathbb{C}\text{ov}_t\left[\hat{\Lambda}_{t+1}, \frac{e_t}{e_{t+1}}\right]\right)}{1+\mu_t}$$

- FX purchases can be profitable if $\mathbb{C}\text{ov}_t\left[\Lambda^*_{t+1}, \frac{e_t}{e_{t+1}}\right] > \mathbb{C}\text{ov}_t\left[\hat{\Lambda}_{t+1}, \frac{e_t}{e_{t+1}}\right]$

- Their cost/benefit depends on both CIP and UIP deviations

FXI as alternativel tool at ZLB: Bacchetta et al. (2022)

- Interesting question and very topical issue!
  - SNB foreign-currency portfolio lost 140bn francs in 2022...
- Nice framework to try to tie UIP and CIP together
  - The two literatures have largely progressed in parallel
- But the paper needs to "focus". What's the main message?

Comment 1: A theory of reserve accumulation?

- CBs accumulate reserves to achieve policy objectives, not to "make money"
  - Better: for a given exchange rate policy, what's the cost?
- Profitability does matter, but why?
  - Central banks can operate with negative capital...
- If it's a political economy issue then
  - Large infrequent losses might be worse than small but frequent profits
  - Especially if realized when the CB is not delivering on its mandate...
- From this perspective, the optimal portfolio could be quite different!

Comment 2: What is the right SDF?

- You just need the domestic SDF, in fact

$$\mathbb{E}_t\left[\Lambda_{t+1}\left(\frac{e_{t+1}}{e_t}r_t^* - r_t\right)\right] = \frac{\overbrace{-\mu_t + r_t\mathbb{C}\mathrm{ov}_t\left[\Lambda^*_{t+1}, \frac{e_t}{e_{t+1}}\right]}^{\text{UIP deviation}} - r_t\mathbb{C}\mathrm{ov}_t\left[\hat{\Lambda}_{t+1}, \frac{e_t}{e_{t+1}}\right]}{1+\mu_t}$$

- No need to construct a proxy for Λ^*_{t+1}
  - Indeed $\mathbb{C}\mathrm{ov}_t\left[\Lambda^*_{t+1}, \frac{e_t}{e_{t+1}}\right]$ can be recovered as the CIP minus UIP deviations

- What is the right proxy for $\hat{\Lambda}_{t+1}$? If consumption-based then $\mathbb{C}\mathrm{ov}_t\left[\hat{\Lambda}_{t+1}, \frac{e_t}{e_{t+1}}\right] \simeq 0$
  - Back to square one! UIP is the correct proxy for the cost of FX reserves

Comment 3: What about the EUR?

- SNB holds equal shares of EUR and USD
  - 38% at end Q3 2022
  - 49% (EUR) and 28% (USD) in Q3 2012
- Are EUR and USD reserves equally profitable for the SNB?
- Do relative shares correlate with relative profitability?
- Can the model provide a theory of FX reserves composition?
  - The model already provides a lot of testable predictions...