Managing Capital Outflows: The Role of Foreign Exchange Intervention

Suman S. Basu  
IMF

Atish R. Ghosh  
IMF

Jonathan D. Ostry  
IMF

Pablo E. Winant  
Bank of England

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How should EME central banks conduct FX intervention when faced with capital outflows?

Sterilized FX intervention increasingly accepted during inflow episodes
(Ghosh, Ostry, and Chamon, 2016; Gabaix and Maggiori, 2015; Blanchard et al., 2015)

▶ Exchange rates can transmit financial shocks
(Jeanne and Rose, 2002; Gabaix and Maggiori, 2015)

▶ FX intervention has traction on the exchange rate and can therefore cushion such shocks
(Blanchard, Adler and Filho, 2015; Chamon, Garcia and Souza, 2015)
How should EME central banks conduct FX intervention when faced with capital outflows?

But outflow shocks are different

- Stock of reserves may be depleted
- Size and persistence of outflows strongly tied to financial frictions
- Possibility of panic by unsophisticated investors

So in practice, even for managed floats, reluctant to recommend intervention except to counter severe market dysfunction

- Reserves deemed "wasted" if exchange rate eventually depreciates
- Fear of "counterproductive" interventions: central bank may invite speculative attacks and worsen the depreciation
Central bank behavior has been heterogeneous

Russia 2008
Large and temporary shock ⇒ Intervention and depreciation

Brazil 2013
Small but potentially persistent shock ⇒ Intervention rule

China 2014
Moderate shock with some panic ⇒ Large intervention
Message of this paper

Characterize the optimal FX intervention policy in response to capital outflows for a simple model with imperfect capital mobility

- Zero lower bound on reserves
- Persistence of the shock
- Unsophisticated investors in the FX market
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Characterize the optimal FX intervention policy in response to capital outflows for a simple model with imperfect capital mobility

▶ Zero lower bound on reserves
▶ Persistence of the shock
▶ Unsophisticated investors in the FX market

Three key insights:

▶ Time consistency problem, which reduces intervention and worsens exchange rate stabilization — especially when reserves are low and the shock is persistent
▶ Temporary pegs and volume intervention rules can improve welfare
▶ Existence of unsophisticated investors alters the optimal policy
  • “Counterproductive interventions” not possible with speculators only, but are possible if investors panic when reserves decline;
  • Investors who panic when the exchange rate depreciates can improve welfare by enhancing the central bank’s commitment power
Structure of this talk

1. The central bank’s optimization problem

2. Full-commitment solution
   ▶ Promise of sustained future intervention and gradual depreciation

3. Time-consistent solution
   ▶ Low intervention and large immediate depreciation

4. Simple intervention rules
   ▶ Can improve welfare above discretion

5. Panic by unsophisticated investors
   ▶ Can generate “counterproductive interventions”
   ▶ Or enhance the central bank’s commitment power
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The central bank’s optimization problem

Choose sequence of FX intervention \( \{ f_t \}_{t=0}^{\infty} \) to minimize:

\[
E_0 \sum_{t=0}^{\infty} \beta^t \frac{(e_t - e^*)^2}{2}
\]

subject to the constraints

\[
e_t = \frac{1}{a + c} \left[ z_t - f_t + ae_{t+1} \right]
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f_t = R_t - R_{t+1} \in [0, R_t] \quad \text{and} \quad \sum_{t=0}^{\infty} f_t \leq R_0
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The target \( e^* \) may differ from the pure float exchange rate

Environment where a depreciation is destabilizing

- Inefficient path of domestic terms of trade (Cavallino, 2015)
- Balance sheets of FX borrowers (Aghion, Bacchetta, and Banerjee, 2001)
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Imperfect capital mobility with portfolio balance shocks

- Capital outflows: \( k_t = a (E_t e_{t+1} - e_t) + z_t \)
- Market clearing: \( k_t \equiv ce_t + f_t \)

Exchange rate is affected by intervention today and in the future

Full commitment: Credibly promise \( e_{t+1} \); Time consistency: Cannot
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Zero lower bound on reserves

- Not a standard linear-quadratic problem!
- Model’s simplicity makes time-consistent case solvable
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Full-commitment solution

Marginal value of intervention

Solution in the absence of shocks

FX intervention

Exchange rate
Full-commitment solution

Consider shock \( z_t = \bar{z} > 0 \)

Marginal value of intervention

\[ \Gamma_t \]

FX intervention

\[ f_t \]

Exchange rate

\[ \bar{e} = \frac{\bar{z}}{c} \]
Full-commitment solution

Consider shock $z_t = \bar{z} > 0$

Promise of future intervention appreciates exchange rates in earlier periods

Marginal value of intervention

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Exchange rate
Full-commitment solution

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Promise of future intervention appreciates exchange rates in earlier periods, but is discounted

\( \Rightarrow \) Promise sustained future intervention until reserves run out

### Marginal value of intervention

\[
\Gamma_t
\]

### FX intervention

\[
f_t
\]

Reserves run out

### Exchange rate

\[
e_t
\]

\[
e = \frac{\bar{z}}{c}
\]

\[
e^*
\]

\[
t_1 \quad t_2
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Time-consistent solution

Central bank re-optimizes in every period, ignoring past promises
⇒ Investors’ expectations \( e_{t+1}(R_{t+1}) \) depend only on reserves
⇒ Can only influence investors’ expectations by keeping reserves for tomorrow

FX intervention

Reserves run out

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⇒ Not credible to use up all reserves
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FX intervention

Exchange rate

\[ e^* \]

\[ f_t \]

\[ e_t \]

\[ 0 \]

\[ \bar{z} \]

\[ t_1 \]

\[ t_2 \]
Time-consistent solution

The time consistency problem is more severe

- For low to moderate reserves
- For persistent shocks

\[ e = \bar{z} \]

\[ f_t \]

FX intervention

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Partial commitment is useful after persistent shocks

Temporary peg or volume intervention rules

- Are worse than the full-commitment solution
- But can improve on the time-consistent solution because they prevent the large immediate depreciation

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Panic when reserves decline

New speculators and higher $a \Rightarrow “Counterproductive interventions”$

“Counterproductive interventions” possible with new unsophisticated investors

$$k_t^{Panic} = \frac{(R_t - R_{t+1})^2}{2\theta}$$

$\Rightarrow$ Large interventions can be counterproductive

$\Rightarrow$ Limit intervention to prevent FX market panic

$\Rightarrow$ Exchange rate becomes destabilized even under full commitment

Full commitment

![Full commitment diagram]

Time consistency

![Time consistency diagram]
Panic when reserves decline

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Panic when exchange rate depreciates

Cost $\Delta$ when $e_t > e^\ast$

- Hurts welfare under full commitment
- But can improve on the time-consistent solution by providing commitment to maintain a temporary peg

$\Rightarrow$ Imperfection of panic offsets imperfection of lack of commitment
Panic when exchange rate depreciates

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Conclusion

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