The Effects of Foreign Exchange Intervention Using Intraday Data: Evidence from Peru
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Ud’A
Overview

Contribution: Provide analysis of CB intervention in Peruvian FX spot market.

★ Describe the local FX market structure.
★ Discuss mechanisms and motives of FX intervention.
★ Propose estimation of VAR model for FX intervention and exchange rate dynamics.

Comments: Paper interesting (analysis and results are clear)

★ The identification restrictions for the VAR model are strong.
★ Alternative ways to deal with reverse causality are available.
★ Asymmetry of FX intervention needs analysis: could it suggest a different reaction function?
The Peruvian FX Market and CB Intervention

- FX market:
  - Small size, most transactions are spot.
  - Electronic limit book trading platform: trades are anonymous.

- Intervention is fully sterilized and aimed at reducing exchange rate volatility.

- Intervention is announced; details are published ex-post.

- Questions/Comments:
  - What is the timing of sterilization? Could it suggest a different frequency for the analysis?
  - What is the accuracy of the timing of the intervention data?
  - Are intervention and market operations kept distinct?
  - What about some descriptive statistics?
The Econometric Analysis

- Three-variate VAR model of spot return, $r_t$, purchase, $P_t$, and sale interventions, $S_t$:

  $$\text{for } z_t \equiv (r_t, P_t, S_t)' \quad Az_t = B(L) z_{t-1} + \epsilon_t.$$

- The VMA representation, $z_t = \sum_{i=0}^{\infty} \Phi(i) \epsilon_{t-i}$, is identified by imposing long-run restrictions, among which:

  - Purchase intervention innovations, $\epsilon_P^t$, have no permanent impact on the spot rate, $\sum_{i=0}^{\infty} \phi_{1,2}(i) = 0$.
  - Sale intervention innovations, $\epsilon_S^t$, have no permanent impact on the spot rate, $\sum_{i=0}^{\infty} \phi_{1,3}(i) = 0$. 
Results

- Coefficients are as expected:
  - Intervention innovations, $e_t^P$ and $e_t^S$, have a significant impact on the spot rate.
  - Sale interventions have a larger impact on the spot rate than purchase interventions.
  - CB leans against the wind: a positive (negative) spot rate innovation, $e_t^r > 0$ ($e_t^r < 0$), generates official sales of USDs.

- Questions/Comments:
  - What is the estimated impact of sale and purchase interventions on the spot rate?
  - What about testing the individual long-run restrictions?
Portfolio-balance Effect and Signaling Channel

- Long-run restrictions contradict the **portfolio-balance effect** and **signaling** channels of transmission of FX intervention.

- Assume \( e_t = E[ e_{t+1} | \Omega_t ] + (i_t - i^*_t) + \rho_t \).

- As the information set contains intervention data, \( I_t \),

\[
e_t = \sum_{j=0}^{T-1} E[(i_{t+j} - i^*_{t+j}) + \rho_{t+j} | I_t] + E[e_T | I_t].
\]

- If domestic and foreign assets are imperfect substitutes larger risk premia, \( \rho_{t+j} \), are imposed to absorb FX purchases.

- If assets are perfect substitutes, FX intervention can signal future interest rates, \( i_{t+j} - i^*_{t+j} \), or long-run spot rates, \( e_T \).
Dominguez and Frankel (1993a) and Gosh (1992) show that FX intervention presents a significant impact on risk-premia.

Breedon and Vitale (2011) show that the strong contemporaneous correlation between order flow and exchange rates in the inter-dealer FX market is due to the portfolio-balance effect.

The dimension of the Peruvian financial markets could mean the portfolio-balance effect is sizeable for the USD/PEN cross.
Payne and Vitale (2003) show that intervention operations have a much bigger impact on spot rates than market operations.

Dominguez and Frankel (1993c) show that intervention operations affect market expectations of future spot rates.

Lewis (1995), Kaminsky and Lewis (1996) show that intervention operations convey information on future monetary policy.

Because of high frequency, simultaneity less of an issue.

Apply an event study approach:

\[ r_t = \alpha + \sum_{i=-k}^{k} \beta_i l_{t-j} + \sum_{i=1}^{m} \gamma_i r_{t-i} + \epsilon_t. \]

★ Main advantage: the absence of identification restrictions.

★ Main drawback: the reverse causality from \( r_t \) to \( l_t \) which may bias downward the estimated impact of FX intervention.
Because of high frequency, reverse causality only via lag terms.

Identify the VAR model, \( A z_t = B(L)z_{t-1} + \epsilon_t \), via Hasbrouck restrictions: \( a_{2,1} = a_{3,1} = 0 \) and \( \text{Var}[\epsilon_t] \) diagonal.

- Main advantage: no long-run restrictions are required.
- Main drawback: the timing of intervention may be triggered by short-term spot rate movements.

Hasbrouck’s identification is appropriate for tick-by-tick data.

To capture the contemporaneous feedback effect of \( r_t \) to \( l_t \) one should use instruments (Danielsson and Love (2006)).
A Structural Model à la Kearns and Rigobon (2005)

- Define a **threshold** model for FX intervention:

  \[ r_t = \beta I_t + \gamma y_t + \epsilon_t^r, \]
  \[ I_t = I(\mid I_t^* \mid > \bar{I}) I_t^*, \]
  \[ I_t^* = \lambda r_t + \theta y_t + \epsilon_t^l. \]

- Identify it by assuming that the intervention reaction function shifts between *two regimes* (such as low and high \( \bar{I} \)):

  \[ I_t = \begin{cases} 
  (\mid I_t^* \mid > \bar{I}_l) I_t^* & t < \tau \\
  (\mid I_t^* \mid > \bar{I}_h) I_t^* & t \geq \tau 
  \end{cases}. \]

- Could it be the case for Peru?
A model à la Kearns and Rigobon (2005) for Peru?

Does the CB policy shift from pure lean-against-the-wind (vis-a-vis a reference rate of 3) to a stabilizing one in the Spring of 2009?