Foreign Exchange Interventions and Intermediary Constraints

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Foreign Exchange Interventions and Intermediary Constraints

Is FXI more impactful when intermediaries are financially constrained?

- Recent work emphasizes the crucial role of intermediaries in FX markets
- In theory, constrained intermediaries supply less cross-country intermediation ...
- ... and exchange rates become more responsive to cross-country imbalances
- Can CBs alleviate intermediary constraints through a **dollar intermediation channel**?

Remarks:

- New, comprehensive database of Brazilian Central Bank (BCB) FXI 1999–2023
- Tick-by-tick spot and futures rates and order flow from B3 exchange for one year
- 5-minute interval spot and forward quotes from Thomson Reuters for 1999-2023
- We view the dollar intermediation channel as a type of portfolio balance channel

Key Contributions

Part 1: Theory

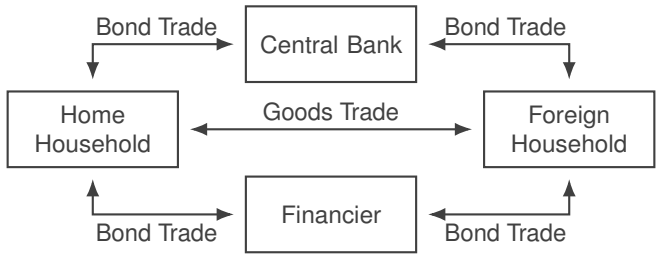
- Extension of the Basic Gamma Model of Gabaix and Maggiori (2015)
- Gamma-Eta Model adds spot vs swap and anticipated vs unanticipated FXI
- Captures interplay between FXI type, anticipation, and financial constraints

Part 2: Empirics

- Local projections model with high-frequency identification strategy
- Tests of the FXI dollar intermediation channel using CIP deviations
- Conditioning on balance sheet constraints of global EM FX dealer banks

Foreign Exchange Interventions and Intermediary Constraints

The Gamma-Eta Model: three-period, two-country DSGE



Remarks:

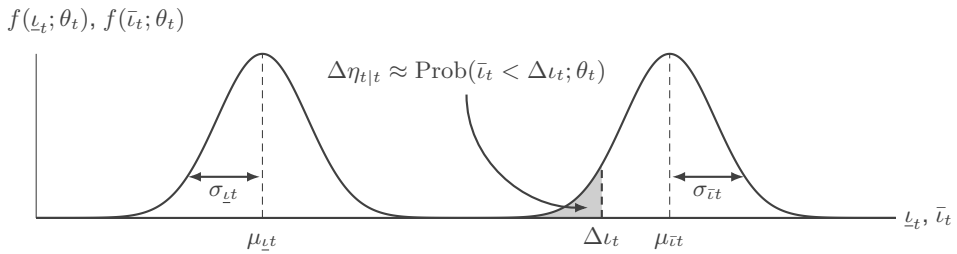
- Four decision makers: Home and Foreign Households, Financier, and Central Bank
- Decision makers transact in markets for Home and Foreign goods and bonds
- Households hold domestic bonds only; Financier intermediates across countries
- Financier faces **financial constraints** that interfere with optimal intermediation

Timing assumptions allow us to introduce policy anticipation

Remarks:

1. Trade shocks are realized, the fundamental source of uncertainty in our model
2. CB announces intervention threshold distributions after trade shocks are observed
3. Households and Financier form plans before the final intervention decision revealed
4. CB announces its true intervention thresholds and decides whether to intervene
5. Equilibrium exchange rate realized, depends on actual and **anticipated intervention**

Intervention thresholds allow central bank to manage anticipation



Remarks:

- Central bank intervenes if trade shock $\Delta\iota_t$ lies above or below thresholds $\underline{\iota}_t$ and $\bar{\iota}_t$
- Normal density functions $f(\underline{\iota}_t;\theta_t),\ f(\bar{\iota}_t;\theta_t)$ for CB intervention thresholds $\underline{\iota}_t$ and $\bar{\iota}_t$
- Distributions communicated before Households and Financier form plans in period t
- Shaded region $\Delta\eta_{t|t}$: intervention probability perceived by Household and Financier

The model makes qualitative predictions that we test empirically

Prediction 1: USD spot sales strengthen BRL while spot purchases weaken it

Prediction 2: Unanticipated FXI has greater impact than anticipated FXI

Prediction 3: Long-lived spot FXI has greater impact than short-lived swap FXI

Prediction 4: Spot sales reduce amount of private intermediation and narrow CIP

Prediction 5: FXI has greater impact when intermediaries face tighter constraints

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Remarks:

- The model's closed-form real exchange rate solutions yield these predictions
- In the paper, we provide more rigorous prediction statements with derivations
- The stylized three-period model's predictions are qualitative — let's test them!

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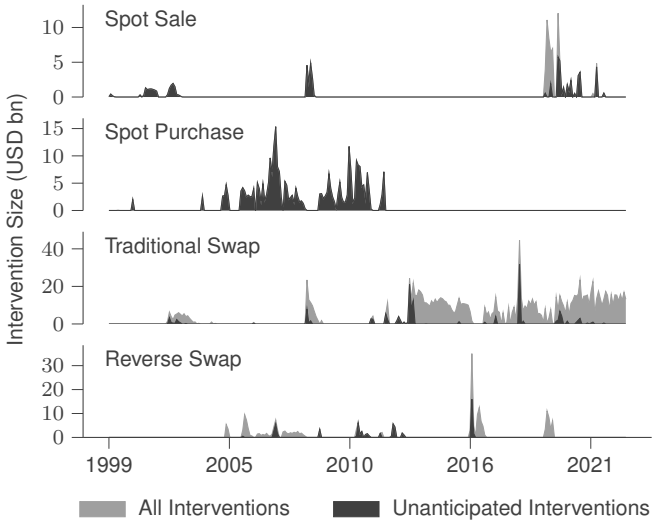
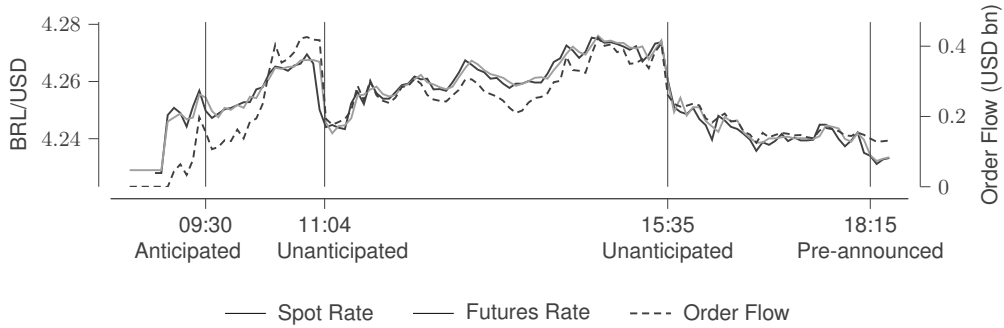
Brazilian Central Bank interventions by type, 1999–2023



Remarks:

- Shows BCB FXI amounts in USD billions at monthly frequency
- Light shade shows all FXI; dark shade shows unanticipated FXI
- Spot purchase FXI is all unanticipated, not pre-announced
- Two distinct periods of FXI: 2005–2012 and 2012–2023
- 2005–2012: lean against capital flows, accumulate reserves
- 2012–2023: providing USD liquidity to intermediaries

Case Study: 26 Nov. 2019, BCB sells USD to strengthen BRL



Remarks:

- High-frequency B3 data shows instantaneous impact of FXI on select dates in 2019
- 26 Nov 2019, BCB conducted one anticipated and two unanticipated spot sales of USD
- Case study suggests that unanticipated USD sales are an effective tool for the BCB

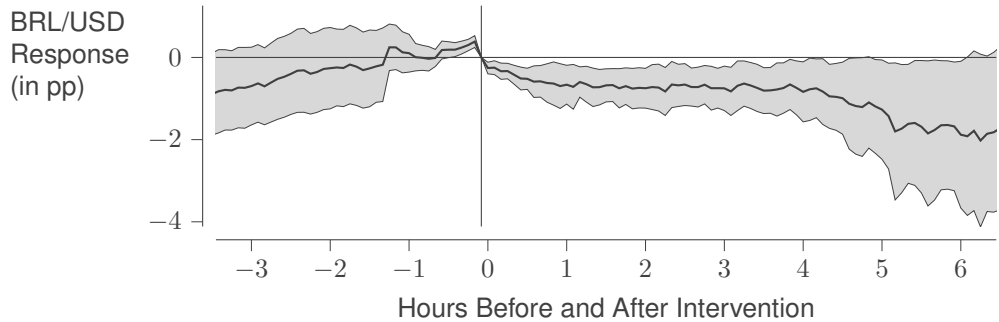
Local projections specification for outcome variable y_{t+h}

$$y_{t+h} - y_{t-1} = \beta_h^z INT_t^z \times SAD_{t+h} + \gamma_h^z INT_t^z \times (1 - SAD_{t+h})$$
$$+ SAD_{t+h} + HKM_t + \text{Daily-Freq Controls}_t + \text{High-Freq Controls}_t + u_{t+h}$$

Notation and remarks:

- INT_t^z Intervention amount for intervention type $z \in \{\text{spot buy/sell, trad/rev swap}\}$
- SAD_{t+h} Indicator taking a value of one if t and $t+h$ are on the same calendar day
- HKM_t Intermediary capital ratio of He et al. (2017), measures financial constraints
- Outcome variables are BRL/USD spot prices, forward premia, CIP violations
- Daily-freq ctrls: interest rates, term spread, spot market volatility, and more...
- High-freq ctrls: outcome variable lags, spot rate bid-ask spread lags (up to 10)

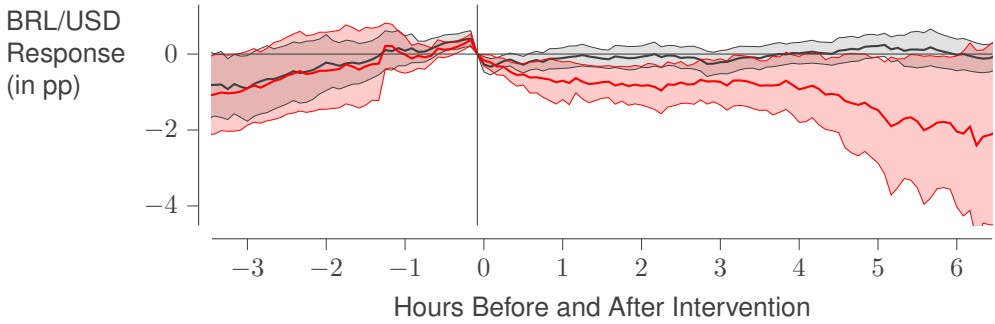
BRL strengthens in response to BCB USD spot sale interventions



Remarks:

- BRL/USD exchange rate drops 100 bp over 3 hrs after BCB spot sale interventions
- Estimated from 385 unexpected BCB spot sales interventions from 1999–2023
- Shading indicates a 95% confidence interval using robust standard errors

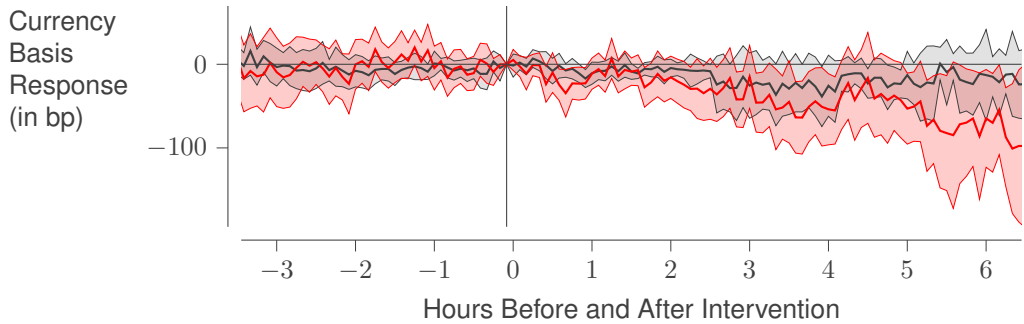
BCB spot sale FXI is more impactful when FX dealers are constrained



Remarks:

- Gray indicates loose constraints, defined as periods with HKM_t in upper 50%
- Red indicates tight constraints, defined as periods with HKM_t in lower 50%
- BCB interventions more impactful when intermediary capital low and USD scarce

BCB spot sale FXI lowers CIP deviations, improving USD liquidity



Remarks:

- Currency basis: $x_{t,t+h} \approx r^{*BRL}_{t,t+h} - r^{USD}_{t,t+h} + \rho_{t,t+h}$, where $\rho_{t,t+h}$ is the forward premium
- Positive CIP deviation: high costs to obtain dollars in FX forward and swap market
- Negative local projection coefficient indicates lower USD funding cost in FX markets

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Conclusion

Contributions: We extend the Basic Gamma model to accommodate spot and swap FXI with anticipation and estimate FXI effects using local projections, BCB interventions 1999–2023, and high-frequency exchange rate data.

Findings: Unanticipated BCB spot sales of USD strengthen BRL by 100 bp and reduce CIP deviations by 50 bp within three hours of intervention when FX intermediaries are financially constrained.

Mechanism: The so-called dollar intermediation channel of BCB FXI plays an important role, improving USD liquidity, lowering USD borrowing costs, and enhancing market efficiency.

Policy Implications: Central banks will be most effective when conducting unanticipated spot FXI operations, in particular when USD liquidity is low and intermediaries are constrained.