The effects of foreign exchange market operations in Latin America

BIS CCA Research Network Closing Conference on the Effects of Foreign Exchange Market Operations in Latin America

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Introduction: Project Background and Objectives

- This is the first project of a regional central bank research network on capital flows and related policy responses.
- Implemented under the auspices of the BIS Consultative Council for the Americas (central bank governors from the Americas) which provides guidance to the BIS on its work programme in region.
- In line with BIS mandate of promoting central bank cooperation

Introduction: Project Background and Objectives

- Project goal: Understand the impact of operations in FX markets given varying motives for and approaches used in such operations.
- Joint paper by 4 central banks using intraday data and five individual central bank papers.
- Features (i) reliance on central bank expertise and access to data on foreign exchange markets and intervention; (ii) includes a joint project of central banks, coordinated by BIS, using a common methodology recommended by academic adviser (similar arrangements in ECB research networks); (iii) collaboration of research and operations departments within central banks; (iv) can address new questions regarding central bank operations in Latin American FX markets.

Motives for intervention since early 2000s

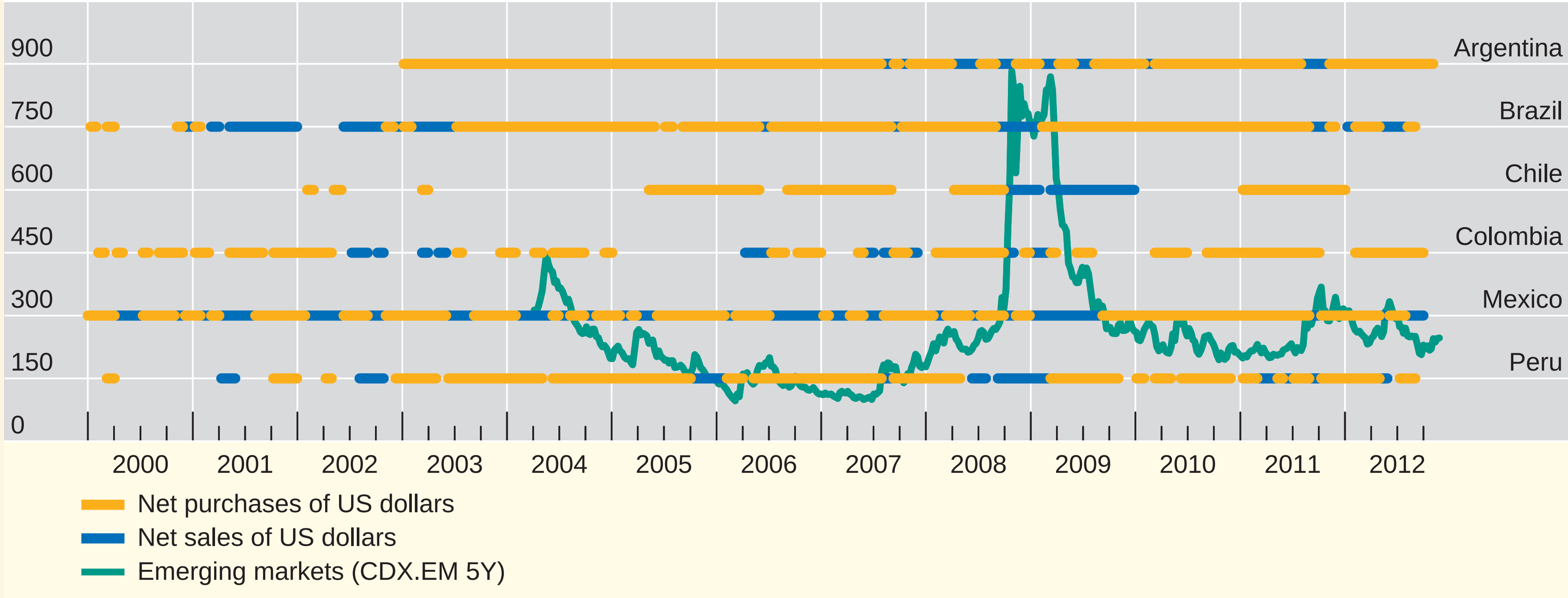
Motives	Accumulate Foreign Reserves	Provide foreign currency to markets	Influence exchange rate (dampen volatility, reduce misalignment)
Brazil	Yes		Yes
Chile	14.04.2008 – 29.09.2008, 03.01.2011-16.12.2011	16.08.01 – 31.12.01; 30.09.08 (currency swaps), 10.10.08-10.04.09 (currency swap and repos). 01.01.09-31.12.09 (credit line accepting government bonds and bank deposits as collateral)	Yes
Colombia	*Put Options*: 12/99-4/02, 7/03-9/04, 4/08-6/08. *Spot Auctions*: (i) 24-Jun-08 to 06-Oct-08, (ii) 03-Mar-10 to 30-Jun-10, and (iii) 15-Sep-10 to 30-Sep-11.		*Volatility* (call and put options): 3/03, 5/03, 4/06-12/06, 5/07-3/08, 10/08-7/09. *Misalignment*: 9/04-3/06, 3-9/10.
Mexico	2/2010-11/2011 (*Auction sales of US dollar options*). Direct central bank operations with government (see right) lead to accumulation	*Auction sales of dollars* (minimum price) 8/10/08-9/4/10	Direct sales: 2/4-6, 20, 23, 27, 2009; Auction of dollars (no minimum price) 9/3/09-30/9/209. Recurrent *direct* central bank purchases of foreign currency from government (eg Pemex).
Peru	2007-2008		Yes
Source:	Central bank questionnaire responses or papers		

Motives for intervention

- Accumulate foreign reserves (to occasionally deploy them)
  - Accumulate foreign currency claims when global financing conditions easy, decumulate when conditions tighten (Graph)
- Influence exchange rate
  - Generally do not target exchange rate
  - Dampen volatility
  - Reduce misalignment

Central bank operations in the foreign exchange market and related actions

Billions of US dollars[1] r



[1] "Net purchases": FX operations on balance involve the acquisition of central bank claims in foreign currency in spot or derivative markets (or engages in US dollar-linked transactions that have a similar effect). "Net sales" are the reverse.

Source: National data; JP Morgan.

Approaches to intervention

- Rule/formula based (Chile, Colombia, Mexico) versus discretionary (Brazil, Peru)
- Spot versus derivatives markets
  - Project focuses on spot market transactions

What this project adds

- Each of the participating countries had their own objectives for intervention and used different operational approaches, which provides rich cross-sectional variation
- Previous studies of the efficacy of interventions in developing countries have typically focused on longer-term effects, this project specifically focuses on operations after 2008 at the intra-day and daily frequencies allowing us to analyse how traders observed, interpreted, and ultimately reacted to interventions.

What this project adds - effects of interventions

- Joint Project:
  - Intra-day impact of intervention operations on exchange rate returns and volatility;
  - Comparative intra-day effects of US macro announcements and other control variables;
  - Examination of whether different motives/types of intervention affect impact.
- Individual CB Projects:
  - Impact of intervention operations on order flow (Brazil)
  - Effects of interventions on inflation expectations (Chile)
  - Effects of secret vs. pre-announced operations (Colombia)
  - Impact of intervention operations on market liquidity (Mexico)
  - Effects of interventions in an SVAR framework (Peru)

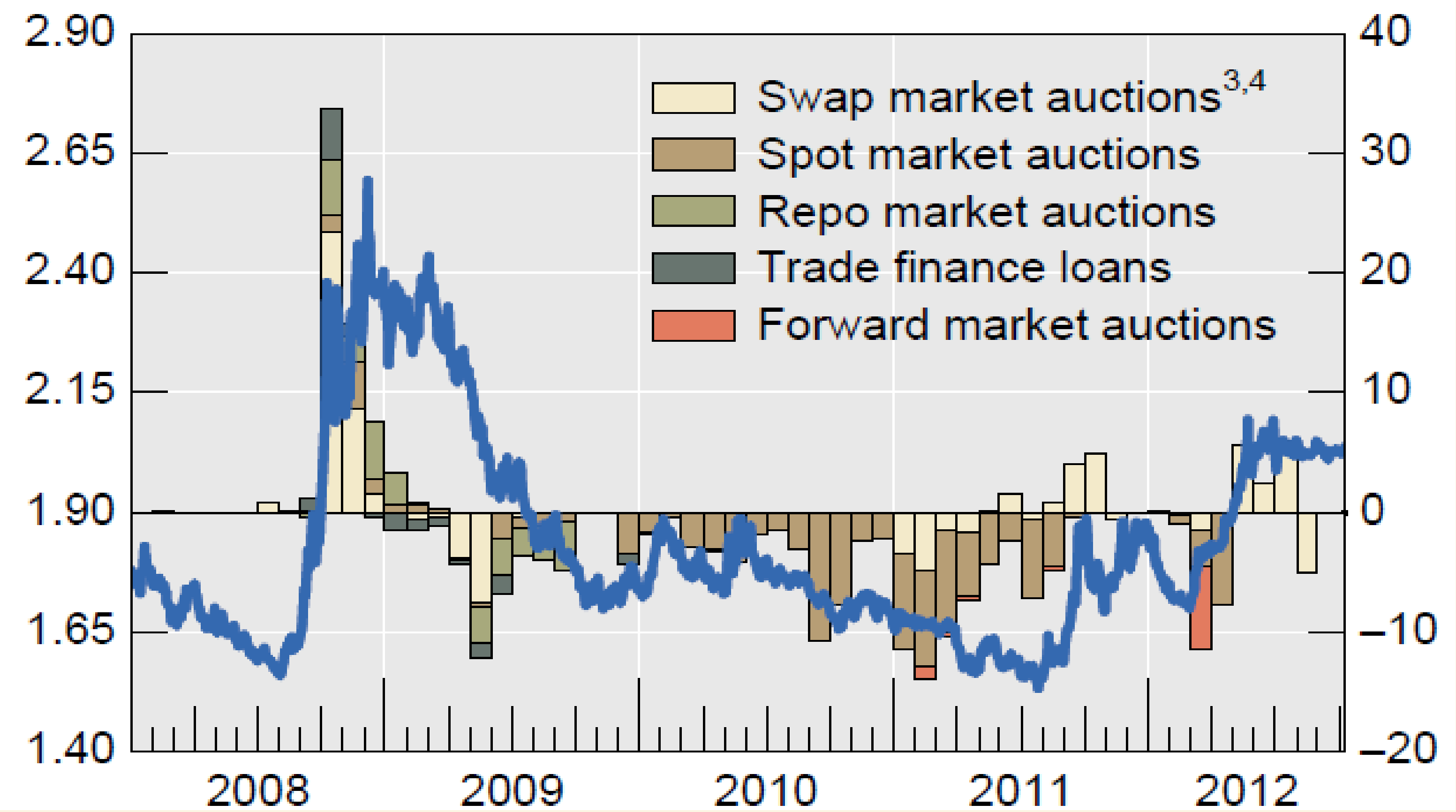
Transparency of Intervention Operations

- Brazil: discretionary operations, reported on BCB's website one week after the operation since Sept 2008
- Chile: pre-announced daily dollar purchases of USD 50m (discretionary intra-day timing)
- Colombia: 3-minute Dutch auctions of dollars, sales of USD 20m per day, discretionary timing: auctions announced 2 minutes in advance, unsold dollars are carried forward to the next day
- Mexico: auctions of dollars with a minimum price (type 3), 3 times daily at pre-announced times and daily amounts, bids made public at the end of each auction (auctions last 5min)
- Peru: discretionary operations, announced at start of intervention trades, amounts published daily at market close.

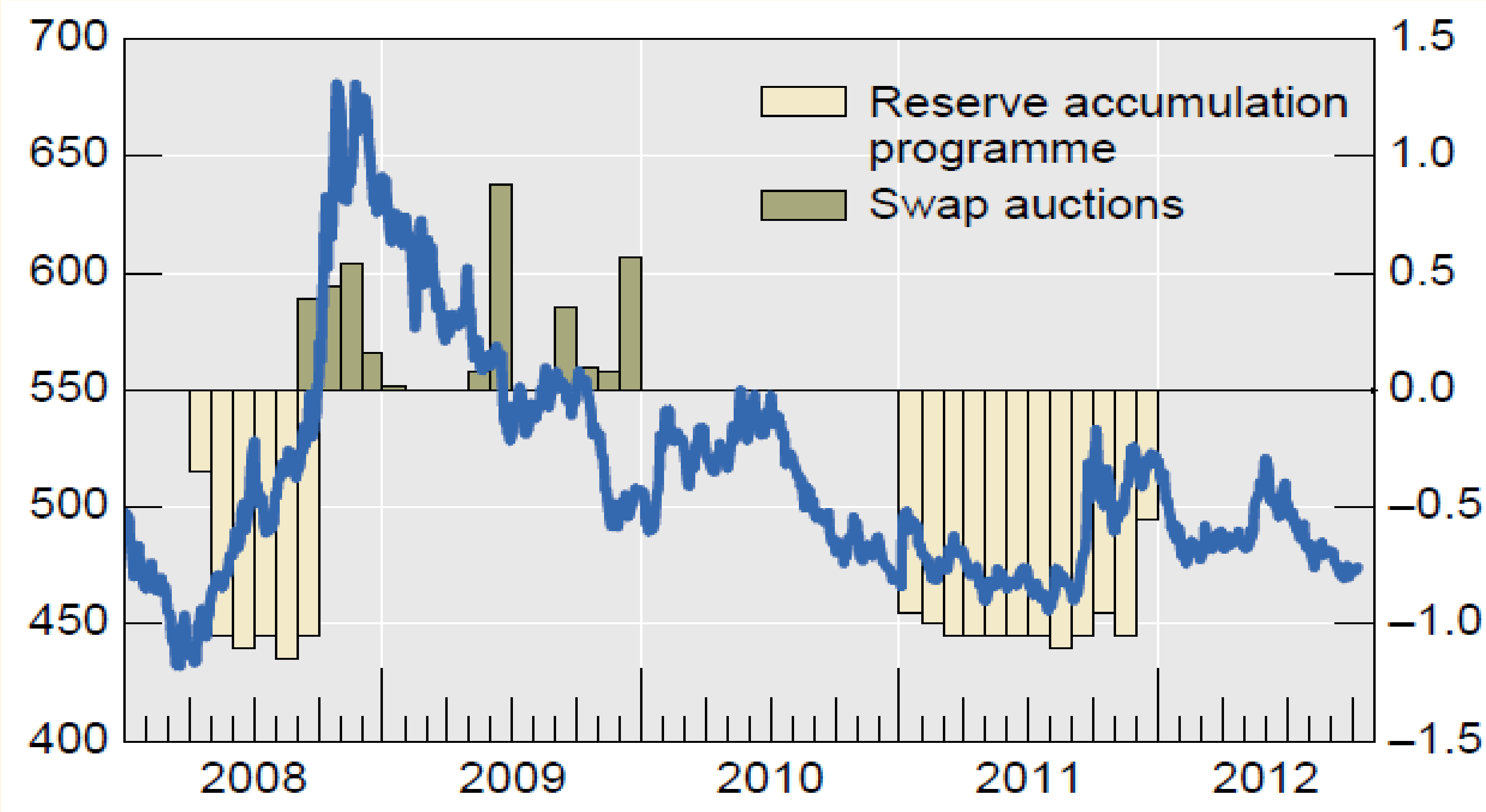
Exchange Rate Data

- Brazil: daily order flow data (disaggregated financial and non-financial customers) from SISBACEN 2002-20011
- Chile: intra-day spot interbank trades, prices and volume
- Colombia: intra-day wholesale spot interbank trades from SET-FX, prices and volume
- Mexico: Reuters intra-day peso/dollar bids, asks and transactions
- Peru: spot transaction trades from private electronic trading platform operated by DATATEC

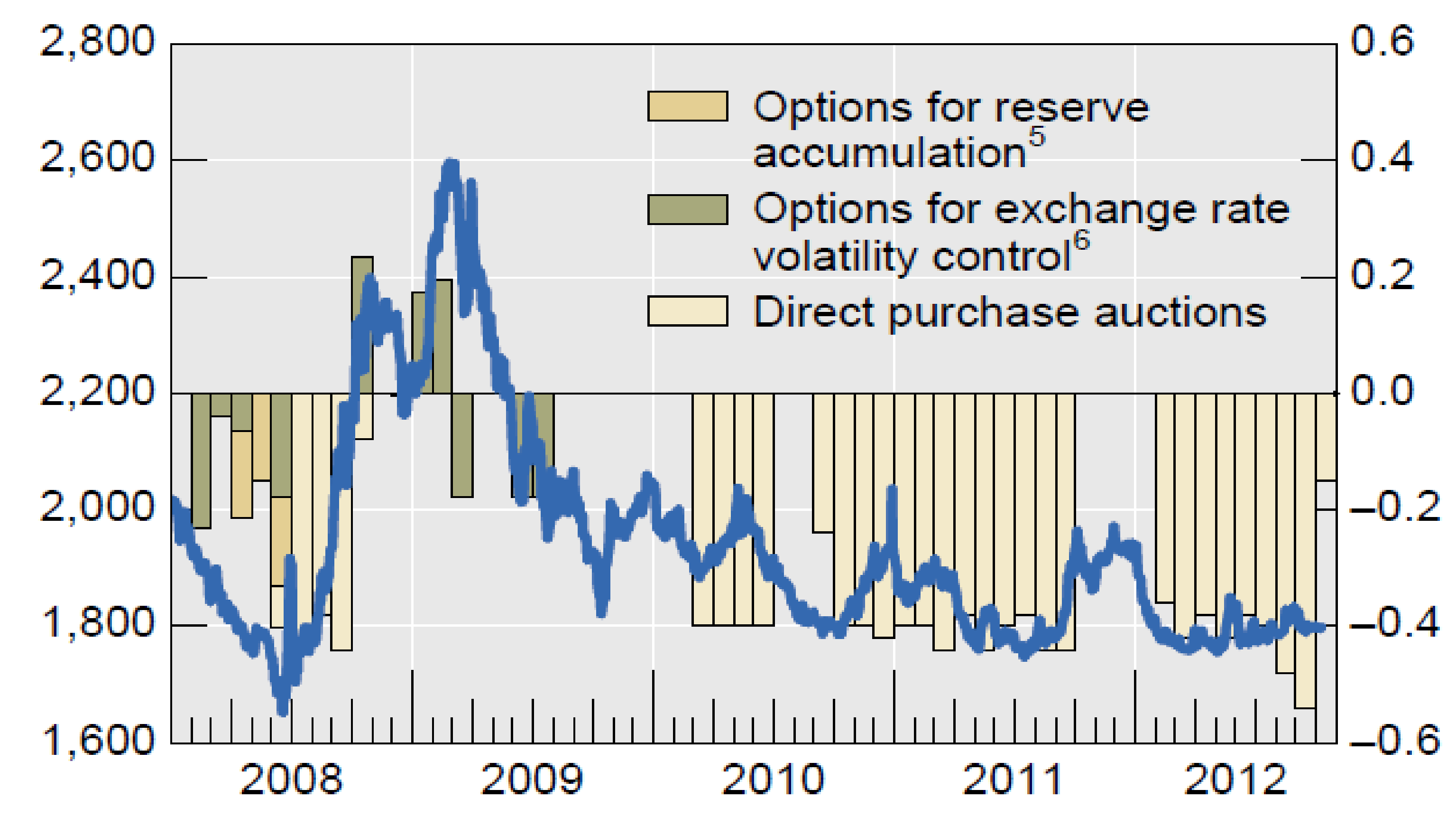
FX Operations: Instruments
Brazil



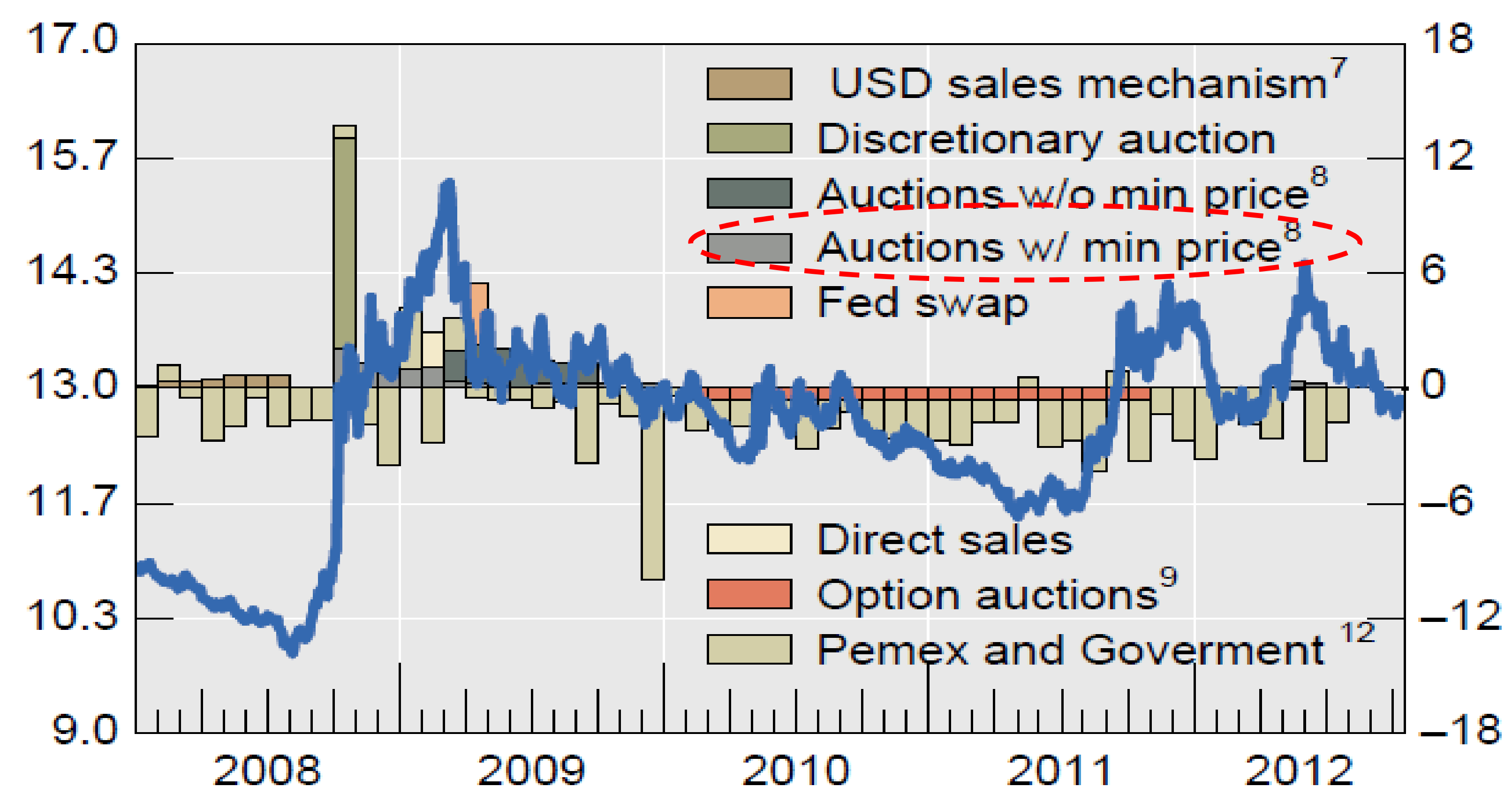
FX Operations: Instruments
Chile



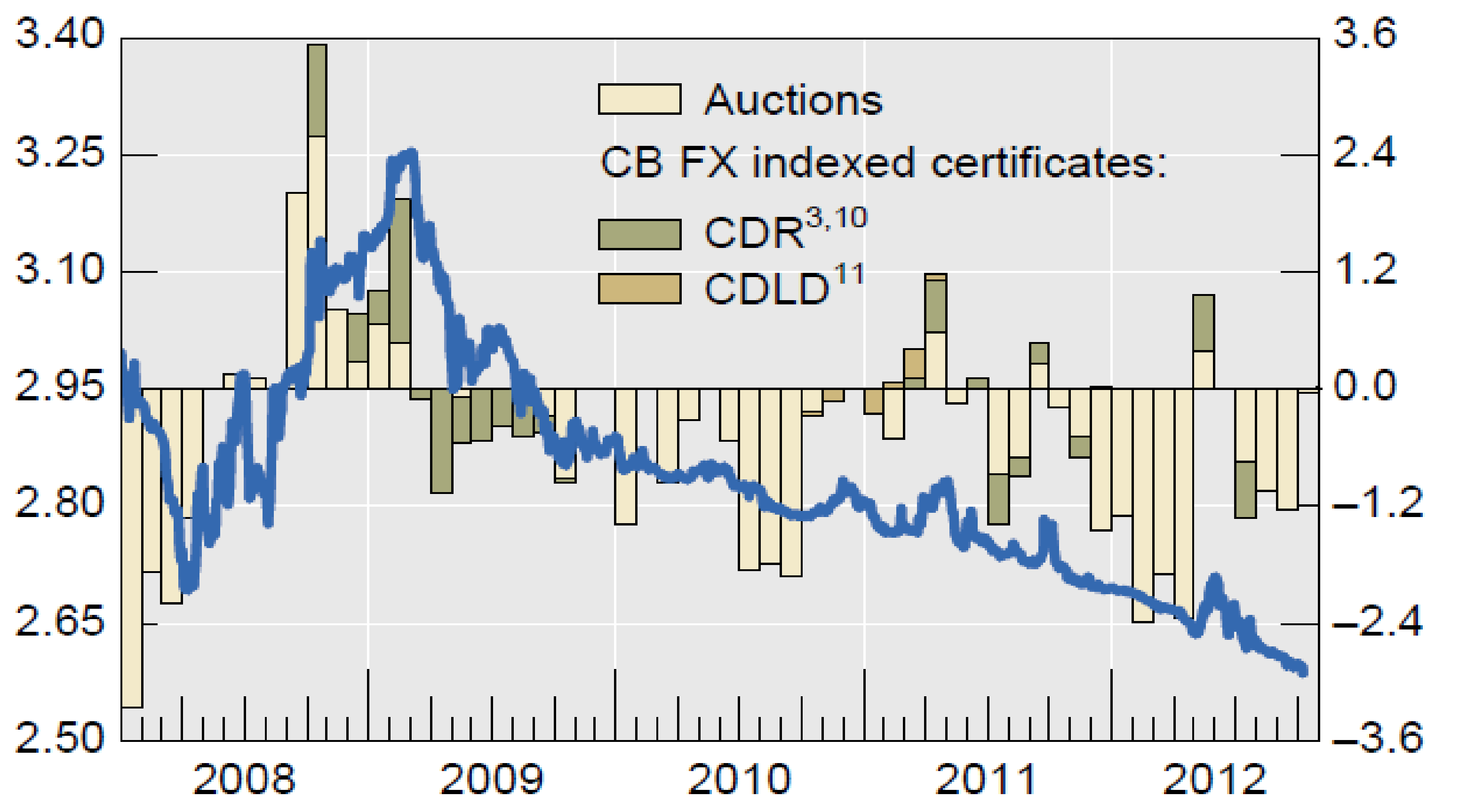
FX Operations: Instruments Colombia



FX Operations: Instruments
Mexico



FX Operations: Instruments
Peru



Microstructure Effects of Interventions: Portfolio Balance Channel

- Interventions need not convey information
- Change in relative supply of domestic and foreign assets held by the public leads to a change in the risk premium
  - example: CB purchases of foreign assets for domestic assets leads to a higher risk premium on domestic assets and a depreciation, or dampening of home appreciation.
- Empirical Implications:
  - level effects: depend on the size of the risk premium (relative risk characteristics of domestic vs. foreign assets) and the magnitude of the operation
  - volatility effects: short-run increase until dealer inventories have fully absorbed the resulting liquidity shock

Microstructure Effects of Interventions: Signaling Channel

- Operative if intervention operations are observed and traders believe that they convey price-relevant information, or information that allows them to distinguish more accurately between "fundamental" and "non-fundamental" news.
- Empirical Implications:
  - Level effects: depend on the "news" content
  - Short-run volatility effects: none unless information content of intervention operations is not well understood, in which case operations may initially lead to an increase in volatility;
  - Longer-run volatility effects: if interventions serve to resolve market uncertainty, we should observe a decline in post-intervention volatility relative to pre-intervention conditions.

Previous Studies of intra-day effects of Interventions

- In contrast to studies of longer-term effects of (sterilized) central bank interventions, studies examining intra-daily effects of interventions generally find strong evidence of impact effects, especially on volatility.
  - Dominguez (2003, 2006): G3 operations
  - Cai et al. (2001) and Chang and Taylor (1998): BOJ operations
  - Fischer and Zurlinden (1999), Fischer (2003), and Payne and Vitale (2003): SNB operations
- Few studies exist of intra-day effects of intervention in developing countries
  - Dominguez and Fatum (2012): Czech National Bank operations 2004-7;
  - Melvin, Menkhoff and Schmeling (2010): Russian operations over 5 days in 2002

Effects of Intervention: Brazil

- Intervention objectives: reduce exchange rate volatility, accumulation of reserves, increase market liquidity
- Instrument Used: daily BCB purchases and sales of USD (which occurred on 56% of trading days), also (to a lesser extent) auctions linked to the concession of credit lines to the export sector, USD sales with repurchase agreements ("*leilões de linha*") and currency swaps (to offer more hedging opportunities)
- Empirical Test: Compare the relationship between order-flow and exchange rate changes on days with and without intervention operations (controlling for other macroeconomic and financial news)
- Findings: the effect of dollar sales by traders on the BRL/USD is stronger on days in which the BCB did *not* intervene indicating that interventions dampened the price impact of a private trades.

Effects of Intervention: Chile

- Intervention Objective: 2001-2 to counter-act depreciation of domestic currency against USD; 2008-11 to accumulate reserves and to increase market liquidity
- Instruments Used: direct purchases of dollars, the issue of Central Bank bonds payable in US dollars (in the 2001-2 operations), and currency swaps
- Empirical Tests: do intervention operations undermine inflation-targeting monetary policy? Do interventions granger-cause inflation expectations?
- Findings: positive evidence of granger-causality lasting around 6-months for one-year and two-year ahead inflation forecasts

Effects of Intervention: Colombia

- Intervention Objective: exchange rate stabilization, accumulation and sales of reserves, reduction in exchange rate volatility
- Instrument Used: both discretionary/secret operations and daily pre-announced operations (put/call options sold using a Dutch auction mechanism)
- Empirical Tests: first-stage CB reaction function and second-stage intervention impact equation (daily frequency); event-study non-parametric tests
- Findings: The impact of daily pre-announced operations has larger effects on the exchange rate than did the discretionary operations prior to 2008

Effects of Intervention: Mexico

- Intervention Objective: provide liquidity to the peso dollar market
- Instrument Used: minimum price auction of dollars (from Oct 2008 to April 2010, Nov 2011-present) three pre-announced times daily, lasting for 5 minutes each, maximum daily dollar amount also pre-announced and bids revealed at end of each auction.
- Empirical Test: do intra-day bid-ask spreads narrow after intervention auctions, taking into account macro controls and the intra-day seasonal (estimated using non-intervention days)?
- Findings: interventions (whose daily volume is around 20% of daily turnover in the peso dollar market) seem to have minimal influence on returns or volatility, though they are found to reduce the bid-ask spread, indicating that they are effective at increasing market liquidity.

Effects of Intervention: Peru

- Intervention Objective: reduce excessive volatility
- Instrument Used: purchases and sales of USD
- Empirical Test: structural VAR model of the interbank exchange rate and intervention purchases and sales; identifying assumption is that interventions have no long-run effects on the level of the exchange rate.
- Findings: interventions influence the intra-day interbank exchange rate, with larger impacts coming from dollar purchases

Possible research agenda looking ahead

- Role of market structure
  - Country-specific fx market structures might suggest different intervention approaches/instruments to enhance effectiveness.
  - For example, in Brazil some shocks may be transmitted through forward markets (eg hedging transactions, derivatives markets) and actions involving forward market/swap contracts (these are not strictly foreign exchange market operations but are similar to fx market intervention and could influence the exchange rate)
- Role of different auction procedures (Dutch vs. min price auctions)
- Role of objectives: reserve accumulation vs. exchange rate stabilization
- Role of operations in other markets (if other countries are also intervening does this enhance or dilute effectiveness?)
- Longer-term effects of operations (beyond the day)