On Central Bank Interventions in the Mexican Peso-Dollar Exchange Rate Market

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BANCO DE MÉXICO

CAVEAT

The opinions expressed in this presentation and its associated paper are those of the authors and do not necessarily reflect the point of view of Banco de México.

Outline

1	**The Exchange Rate Market**

2	**Interventions**

3	**Model and Estimations**

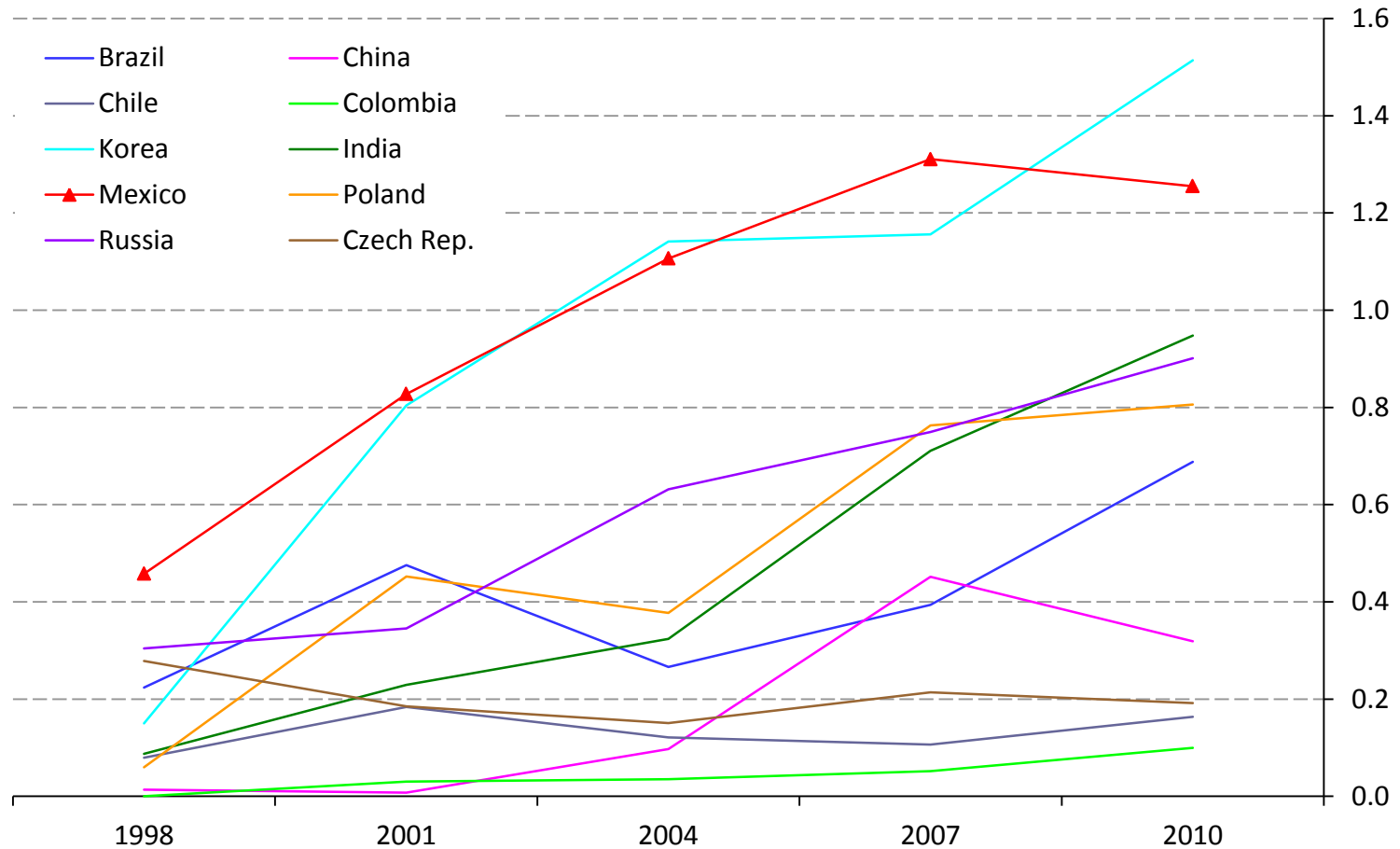| 4	**Final Remarks**

The Exchange Rate Market

- The Mexican peso market has advanced along various dimensions in recent years. Specifically, it has developed in terms of depth, liquidity, and settlement risk.

  - ✓ *It is the 13th most operated currency in the world, according to the last BIS survey.*

  - ✓ *Its trading volumes in the spot and related markets are comparable to other currencies' markets from countries with developed financial markets.*

  - ✓ *Since May 2008, the Mexican peso joined the Continuous Linked Settlement (CLS). Thus, the peso's window of operation has been extended to 24 hours.*

  - ✓ *Also, the swaps market accounts for the bulk of the average daily operation turnover. The most common mean of operating the Mexican peso is through chats, followed by electronic and voice brokers.*

Volume of operations in the Global FX Market for Selected Currencies[1,2]

% Daily Average Operated Volume

1/ Any transaction involves two currencies, thus the totals add up to 200%.
2/ Each datum is with respect to April of each year.
Source: Bank of International Settlements.

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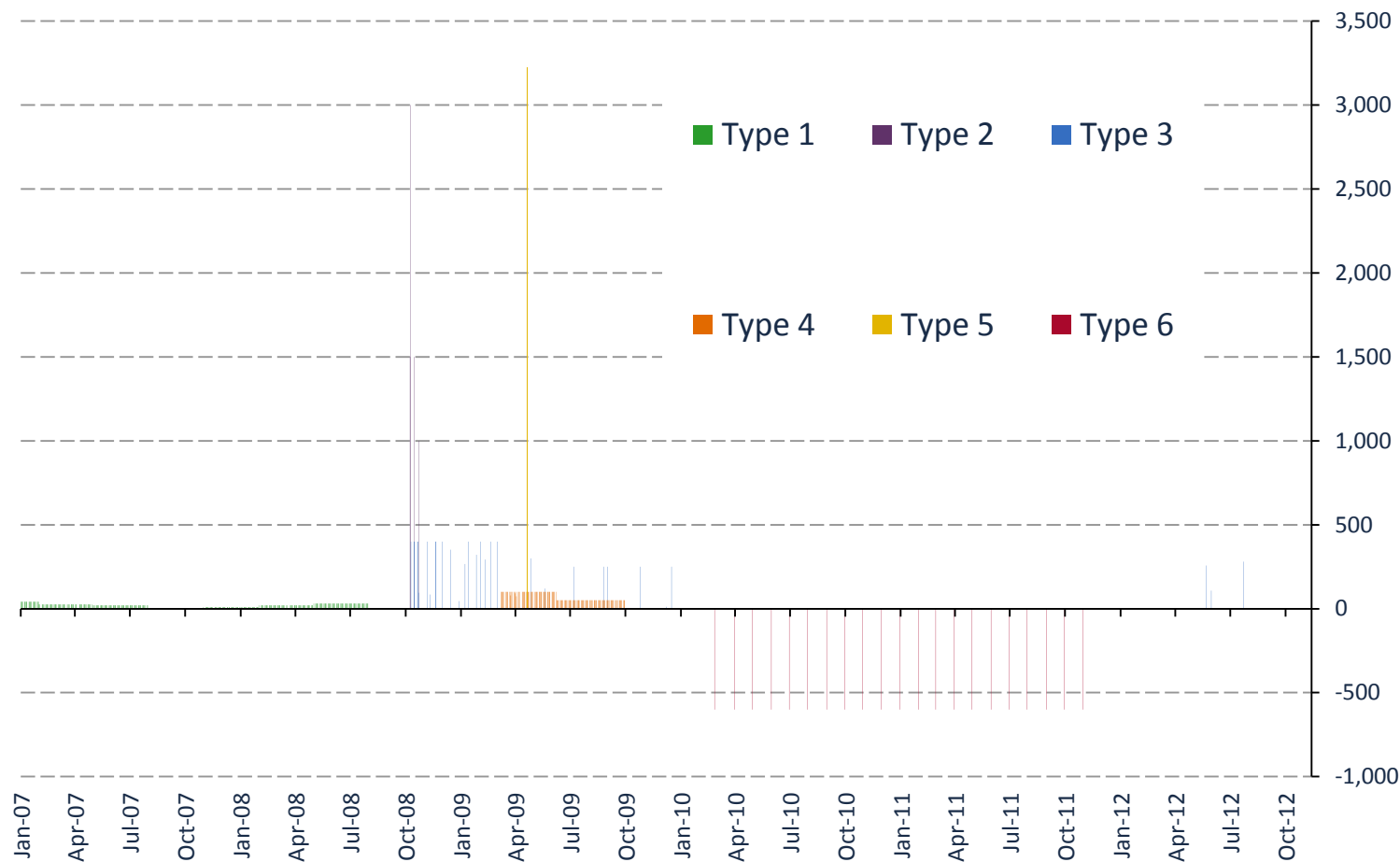| 4	Final Remarks

Interventions

- The entity responsible for deciding the interventions' design in the exchange rate market is the Foreign Exchange Commission (*Comisión de Cambios*).

  - ✓ *It is formed by the Secretary and two Undersecretaries from the Secretariat of Finance and Public Credit (SHCP), and the Governor and two Deputy Governors from Banco de México.*

  - ✓ *Yet, operationally the Central Bank is in charge of implementing the interventions.*

- In recent years, Banco de México has intervened, except for one case, using a rules-based approach. Typical goals have been to:

  - ✓ *Provide liquidity,*

  - ✓ *Promote orderly conditions,*

  - ✓ *Reduce the volatility in the foreign exchange market,*

  - ✓ *Change the rate of reserves accumulation, among others.*

Calendar of Interventions by Types and Allocated Quantities

USD million

Source: Banco de México.

Interventions

- Banco de México has implemented seven different types of interventions. Nonetheless, we focus on two specific ones.

  - ✓ *Intervention Type 3: Auction with a minimum price.*

    - o Its objective is <u>to provide the necessary liquidity to meet the conditions of uncertainty and lack of liquidity</u> in the foreign exchange market.

    - o This intervention was initially active from October 9, 2008 to April 9, 2010. It was reinstalled as of November 30, 2011. (It has been recently call off as of April 9, 2013.)

    - o In our sample, the auctions take place three times during the day: at 9:30 hrs., 11:30 hrs., and 13:00 hrs., lasting for 5 minutes each.

    - o Also, there is a bound to the <u>daily</u> amount of dollars that can be allocated.

  - ✓ <u>*Its auction is triggered if the spot price is above an increment of two percent with respect to an average price of the previous day.*</u> *This determines the minimum price.*

Interventions

✓ *Intervention Type 4: Auction without a minimum price.*

- o It has as an objective <u>to promote orderly conditions</u> in the foreign exchange market. It was established as a mechanism to sell a significant portion of the projected accumulation of international reserves in the exchange market.

- o The period of the associated auctions took place goes from March 9, 2009 to September 30, 2009.

- o The timestamp for this intervention is 9:10 am, lasting for 5 minutes.

- o Similarly, there is a bound to the quantity of dollars that can be allocated.

✓ *<u>Intervention Type 4 also differs from Type 3 by not having a minimum price and, thus, not having a triggering rule. In effect, the associated auction is called every working day.</u>*

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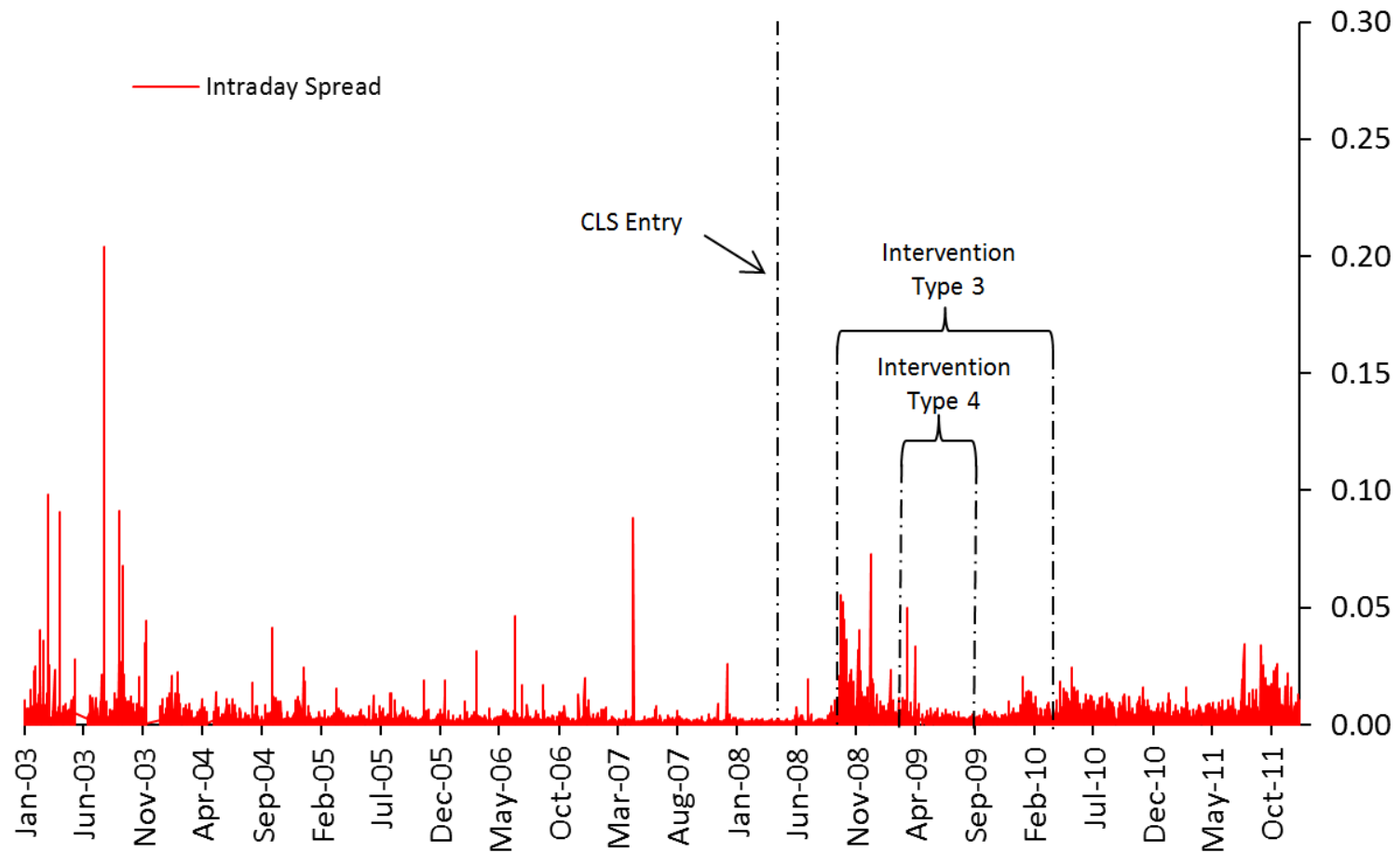| 3	Model and Estimations

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Model and Estimations

Data

- The exchange rate data is from Reuters, the underlying assumption in the analysis is that this sample is representative of all the transactions taking place worldwide.

- We have data for the bids and asks, and thus are able to obtain the spread. We transform the raw data into 5-minute equidistant intervals prices as in Dominguez (2003).

- <u>We use the bid-ask spread as a yardstick to measure the effects of both interventions</u>.

  - ✓ *Thus, we associate a reduction in the bid-ask spread as an improvement in liquidity and in the conditions in the foreign exchange rate market.*

Peso Dollar Bid-Ask Spread[1]

1/ Period January 2003-December 2011.
Source: Reuters.

Model and Estimations

The model

- We consider a linear regression that aims to characterize the behavior of the bid-ask spread when an intervention takes place.

$$S_{t,i+m} = c + \Sigma_m \beta_m^{(3)} D_{t,i+m}^{(3)} + \Sigma_m \beta_m^{(4)} D_{t,i+m}^{(4)} + \Sigma_a \Sigma_m \gamma_{a,m} \, DN_{a,t,i+m} + \gamma_{vix} VIX_t + \varepsilon_{t,i+m}$$

where:

- $S_{t,i}$ is the bid ask spread on day t and at time i.

- $D_{t,i,m}^k$ is the intervention k variable, k = Type 3 or 4.
   - ✓ *It can be a dummy or a standardized quantity.*
   - ✓ *m determines the lag or lead with respect to the intervention time-stamp, i.e. m goes from -20 minutes to + 20 minutes, in 5 minute intervals.*

- $DN_{a,t,i+m}$ stands for the macroeconomic variables, a = 1,...,12.
   - ✓ *It can be a dummy or a standardized quantity.*
   - ✓ *m determines the lag or lead with respect to the the intervention time-stamp.*

Model and Estimations

Estimation Sample

- The study sample includes those days where intervention Type 3 mechanism was active, which contains days where intervention Type 4 was active as well.

- The estimation sample only includes the spreads in the time windows surrounding the timestamps where the interventions occurred.

- The estimation sample is divided into two, namely, non-intervention (control) and the intervention (treatment) samples.

  - ✓ *The non intervention sample contains the observations on the days where no dollars were allocated but when either intervention was active.*

  - ✓ *The intervention sample contains the rest of the observations.*

Model and Estimations

■ Bloomberg provides information about the market's expectations in the form of surveys. The survey asks forecasting professionals what is their prediction on the variable at hand. Using these data, we construct surprises as follows:

$$DN_{a,t} \equiv \begin{cases} 1 \ \ if \ SD_{a,t-1} < \left| Ind_{a,t} - Med\_Survey_{a,t-1} Med\_Survey_{a,t-1} \right| \\ 0 \ otherwise \end{cases}$$

Or as

$$DN_{a,t} \equiv \left| \frac{Ind_{a,t} - Med\_Survey_{a,t-1}}{SD_{a,t-1}} \right|$$

✓ $DN_{a,t}$ is a variable that identifies a surprise event at time t.

✓ $Ind_{a,t}$ is the macroeconomic announcement a, at the time of its release t.

✓ $Med\_survey_{a,t-1}$ is the median value of the survey associated to the announcement of one of the macroeconomic variables, known at time t-1.

✓ $SD_{a,t-1}$ is the standard deviation, which is approximated by taking the difference between the maximum value and the minimum value of the survey, divided by six. This is known at time t-1.
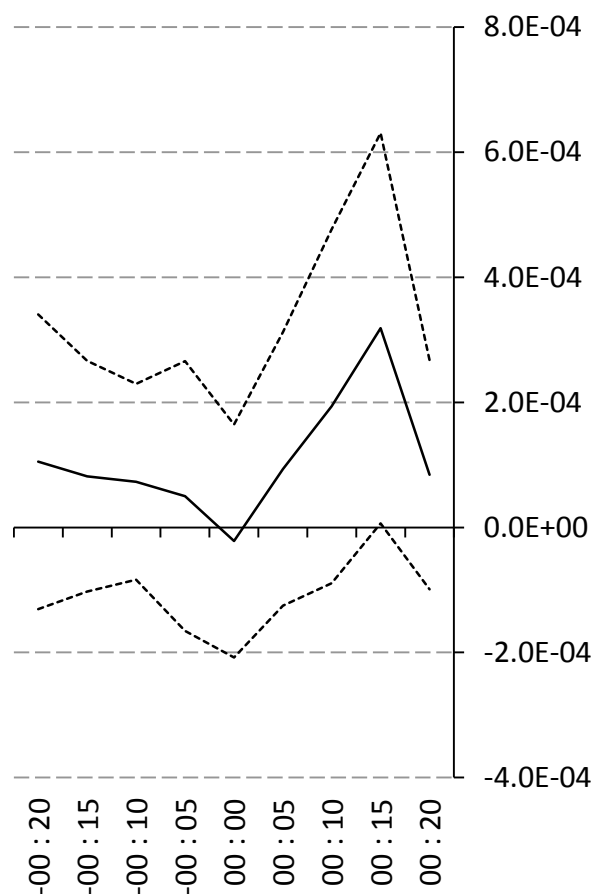
Model and Estimations

- We use 12 US macroeconomic indicators as control variables. These try to capture unexpected changes in the economic environment. The macroeconomics variables considered are:

  - ✓ *Consumer Confidence.*
  - ✓ *Consumer Price Index (CPI).*
  - ✓ *Durable Goods.*
  - ✓ *Housing.*
  - ✓ *Industrial Production.*
  - ✓ *Producer Price Index (PPI).*
  - ✓ *National Association of Purchasing Managers Index (NAPM).*
  - ✓ *Retail Sales.*
  - ✓ *GDP.*
  - ✓ *Unemployment.*
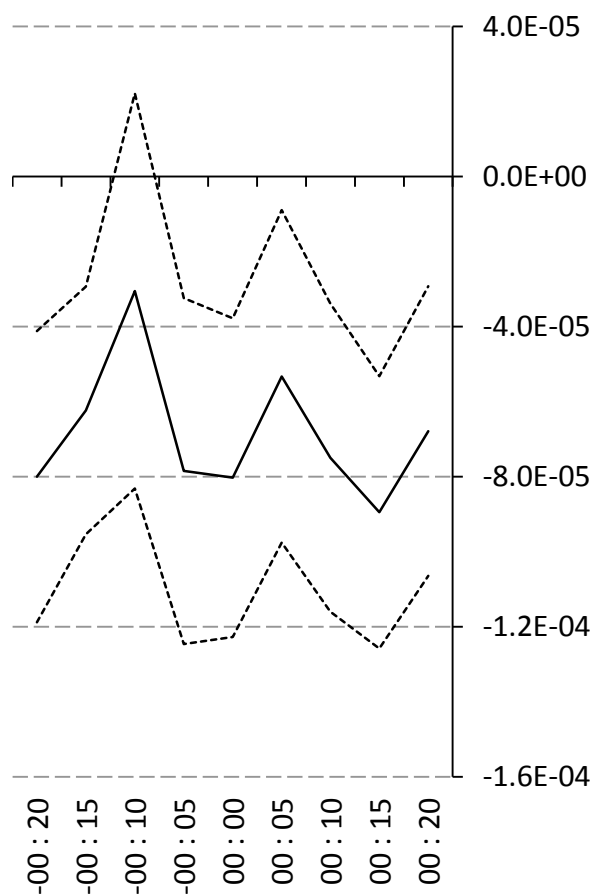 - ✓ *Trade Balance.*
  - ✓ *Federal Funds Rate.*

Responses to Interventions and Macroeconomic Announcements

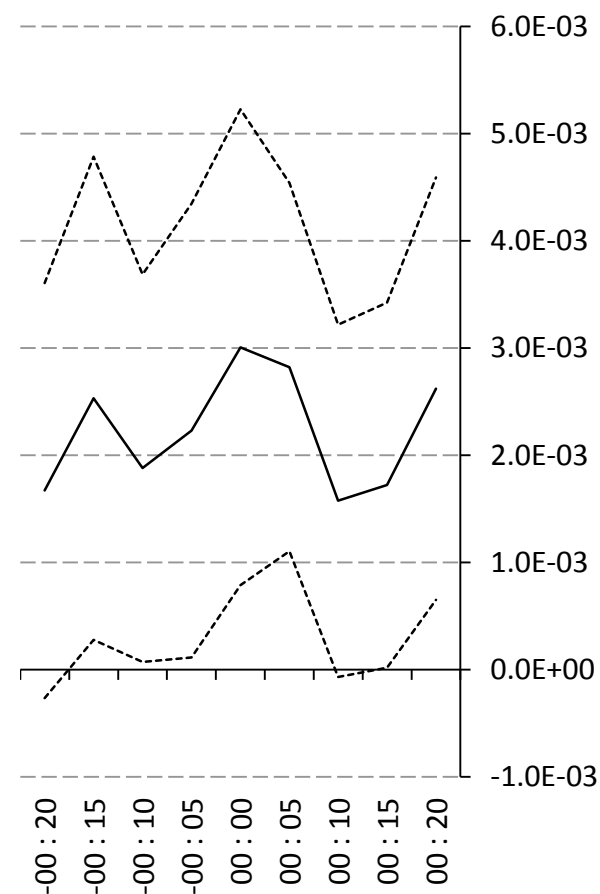## Intervention and Announcements Dummies, using the VIX as a control

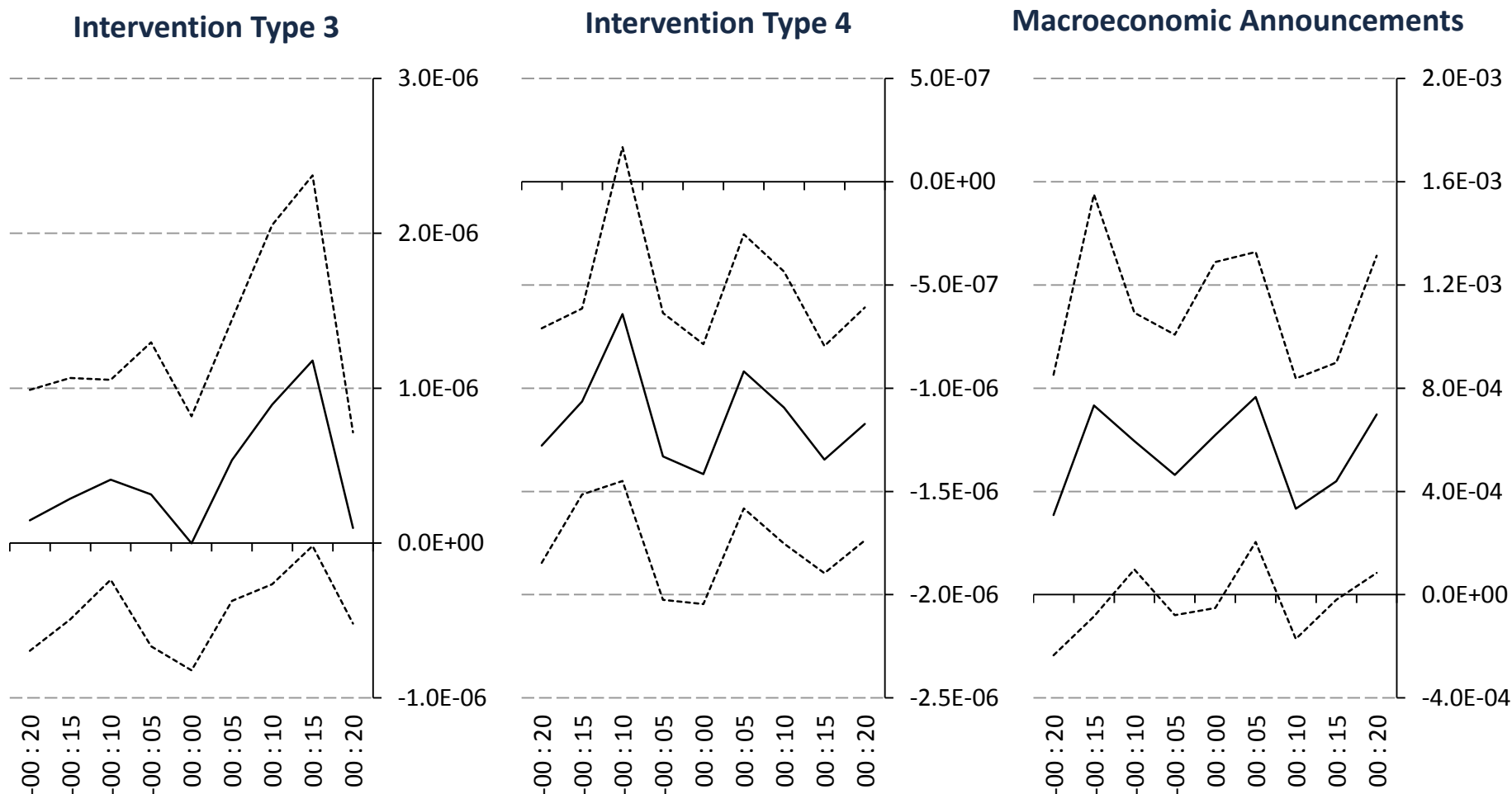**Intervention Type 3**

Intervention Type 4

Macroeconomic Announcements

Responses to Interventions and Macroeconomic Announcements

Intervention Amounts and Standardized Announcements, using the VIX as a control

Intervention Type 3

Intervention Type 4

Macroeconomic Announcements

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Final Remarks

- As measured by the bid ask spread, our results show no indication of an effect in the opposite direction from the one we assume is intended for intervention type 3.

- This might be possibly due to some simultaneity present in the regression, as the rule triggering the auction depends on the behavior of the exchange rate.

- Our results are fairly conclusive regarding a significant reduction in the bid ask spread for intervention type 4.

- In the latter case there is no triggering rule. Thus, the auction takes place regardless of the behavior of the exchange rate, mitigating a possible simultaneity issue.

- The auction design might have relevant implications regarding the intervention's effects.

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