Monetary Policy Effects in Mexico

Pavel Solís

Banco de México

September 2025

A Tale of Two Papers

- "Does the Exchange Rate Respond to Monetary Policy in Mexico? Solving an Exchange Rate Puzzle in Emerging Markets," *Journal of Money, Credit and Banking*, 2023
- "Do Central Bank Words Matter in Emerging Markets? Evidence from Mexico," *Journal of Macroeconomics*, 2023

Does the Exchange Rate Respond to Monetary Policy in Mexico? Solving an Exchange Rate Puzzle in Emerging Markets

Introduction

- Open question: Exchange rate response to monetary policy in emerging markets
- In standard models: policy rate increase $\rightarrow$ currency appreciates
- Counterintuitive early evidence for advanced economies $\rightarrow$ **FX puzzle**
  - Puzzle due to identification assumptions for monetary policy surprises (VARs)
  - Event studies with intraday and daily data in line with standard models
- For emerging markets, low or nonexistent response $\rightarrow$ **High-frequency** FX puzzle
  - Based on event studies with **daily** data

This Paper

- Do central banks in emerging markets influence their own currencies? Yes
  - New dataset of **intraday** changes in asset prices for Mexico
  - Tightening: currency **appreciates**, yield curve **flattens**
- Is there an exchange rate puzzle in emerging markets? No
  - Exchange rate response is **sensitive** to data frequency
  - 'Puzzle' explained by **wide** event windows and **omitted variables**

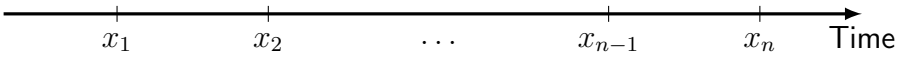
Roadmap

- Identification of policy rate surprises
- Effects of policy rate surprises
  - Exchange rate and yield curve
- Solving the 'high-frequency' exchange rate puzzle
  - Intraday vs. daily

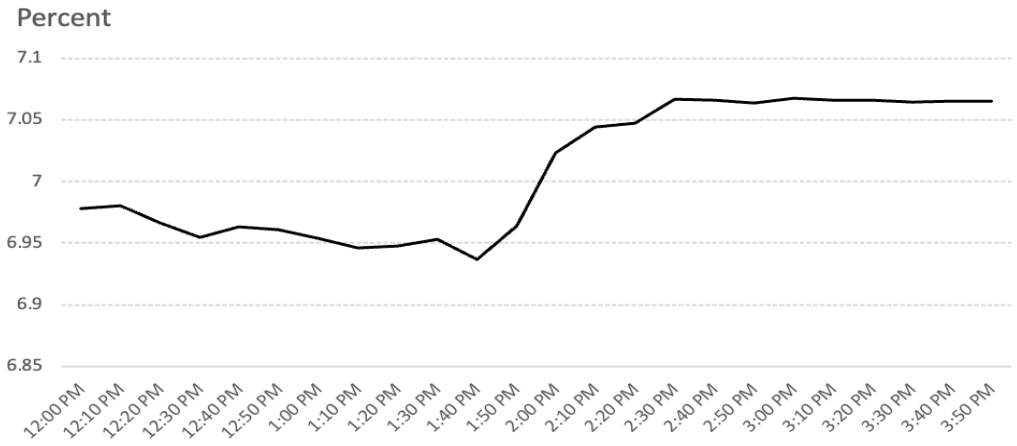
Identification of Policy Rate Surprises

Monetary Policy Surprises

- Monetary policy intrinsically endogenous
  - Key to focus on 'surprises' in policy decisions
- Event studies with high-frequency data isolate surprise component of decisions
  - **Strategy**: Intraday changes in asset prices around monetary policy events
  - **Assumption**: Changes in market expectations induced by policy announcements
  - **Outcome**: Clean and model-free (yet small) monetary policy surprises



10-Year Yield on June 24, 2021



Monetary Policy in Mexico

- Banxico implements monetary policy through a five-member Governing Board
- 2001: Inflation targeting formally adopted $\rightarrow$ Target set at $3\% \pm 1\%$
- 2003: **Calendar** of monetary policy meetings released
- 2008: Overnight interbank interest rate adopted as **policy rate**
- 2015: Change in **time** of announcements (Fridays 9 am CT to Thursdays 1 pm CT)

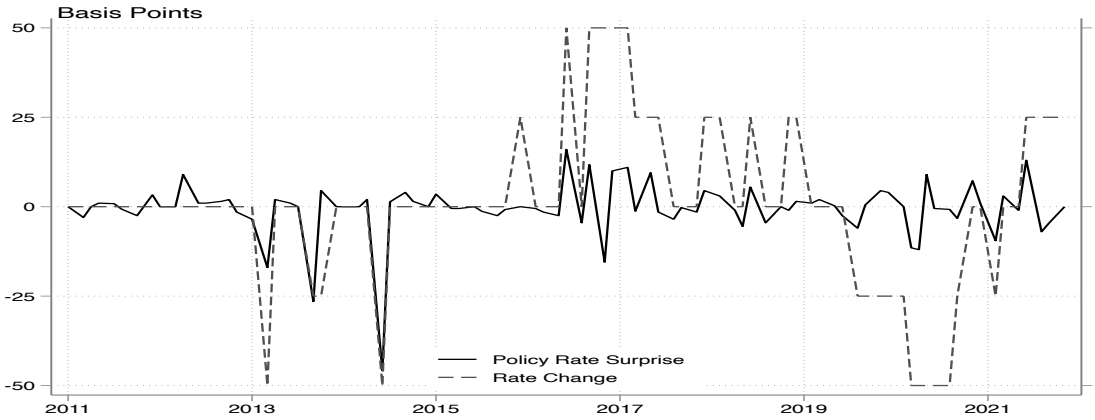
Policy Rate Surprises in Mexico

- Elsewhere, futures or overnight indexed swaps (OIS) on policy rate
- In Mexico, swap market references TIIE28D
- **3M swap**: Most liquid with shortest maturity and longest history
  - Trades **within** the day
  - Good measure of monetary stance in short run
- **Policy rate surprises** based on changes in 3M swap rate

Dataset

- Asset price changes in **30-minute** windows around **regular** policy announcements
  - **Policy rate surprises**: 3M swap rate
  - **Effects**: Exchange rate (pesos per U.S. dollar), bond yields (2Y, 5Y, 10Y, 30Y)
- Sample period: January 2004 (daily) or January 2011 (intraday) to November 2021
- Source: Bloomberg
- **Robustness**: 50-minute windows, survey-based surprises

Policy Rate in Mexico: Change vs. Surprises



Effects of Policy Rate Surprises on Asset Prices

Quantifying Effects of Policy Rate Surprises on Asset Prices

$$\Delta y_t = \beta_0 + \beta_1 \Delta x_t + \varepsilon_t,$$

- Δy_t: Change in exchange rate returns or bond yields
- Δx_t: Policy rate surprises (i.e. change in 3M swap rate)
- ε_t: Variations in dependent variable unrelated to shocks in policy rate

- Frequency is key to satisfy **exogeneity** assumption and give **causal** interpretation
  - Intraday vs. Daily vs. Monthly vs. Quartely

Response of Asset Prices to PRS: **Intraday** Data

	Δ FX		Δ 2Y Yield		Δ 5Y Yield		Δ 10Y Yield		Δ 30Y Yield	
PR Surprise	-2.22**	-2.22**	0.68***	0.68***	0.54***	0.54***	0.44***	0.45***	0.31***	0.32***
	(0.94)	(0.93)	(0.08)	(0.08)	(0.14)	(0.14)	(0.07)	(0.07)	(0.07)	(0.07)
PR Expected		0.0087		-0.032		-0.031		-0.033		-0.041*
		(0.24)		(0.02)		(0.02)		(0.02)		(0.02)
Observations	86	86	70	70	55	55	70	70	70	70
R-squared	0.23	0.23	0.73	0.74	0.38	0.41	0.55	0.57	0.38	0.42

Notes: Robust standard errors are shown in parentheses. *, **, *** asterisks respectively indicate significance at the 10%, 5% and 1% level.

Response of Asset Prices to PRS: **Daily** Data

	Δ FX		Δ 2Y Yield		Δ 5Y Yield		Δ 10Y Yield		Δ 30Y Yield	
PR Surprise	–0.61	0.06	0.70***	0.50***	0.77***	0.53***	0.56***	0.45***	0.35**	0.40***
	(1.35)	(0.54)	(0.09)	(0.07)	(0.24)	(0.09)	(0.12)	(0.07)	(0.15)	(0.08)
Obs. since 2011	86		70		55		70		70	
Obs. since 2004		189		189		189		189		134
R-squared	0.00	0.00	0.54	0.37	0.35	0.34	0.41	0.26	0.18	0.22

Notes: Robust standard errors are shown in parentheses. *, **, *** asterisks respectively indicate significance at the 10%, 5% and 1% level.

Persistence of Effects

- Not only initial reaction but persistence of response
- Local projections:

$$y_{t+h} - y_{t-1} = \alpha_h + \gamma_h \Delta x_t + u_{t+h},$$

- For announcement on day t, changes from $t-1$ to $t+h$ with $h = 0, 1, \ldots, 10$ in:
  - Exchange rate ▸ FX
  - Bond yields ▸ Yields

Conclusions

Conclusions

- Significant effects of policy rate surprises on asset prices
  - Tightening: currency **appreciates**, yield curve **flattens**
- Exchange rate puzzle in emerging markets
  - Explained by wide event windows and **omitted** variables
  - Solved with **intraday** data

Do Central Bank Words Matter in Emerging Markets?

Evidence from Mexico

Introduction

- Asset prices react to different types of information in policy statements
- Monetary policy in **AEs** has **multiple** dimensions
  - Effects assessed on asset prices
  - Spillover effects on EMs
- But not yet clear whether monetary policy in **EMs** has more than one dimension
  - EMs not constrained by ZLB

This Paper

- Does monetary policy in Mexico has **more than one** dimension?
  - Currency and bond yields in Mexico respond to surprises in **policy rate**
  - Do they also respond to changes in policy **statements**?
  - Do they respond to surprises about **future path** of policy rate?
- Relevant for central banks in EMs
  - No response $\rightarrow$ Less room to operate relative to AEs
  - Response $\rightarrow$ Deal with high inflation and spillovers from policies abroad

Roadmap

- Identification of monetary policy surprises
- Monetary policy dimensions
  - Selection, estimation, interpretation
- Effects of monetary policy
  - Asset prices
  - Portfolio flows

Identification of Monetary Policy Surprises

Monetary Policy Surprises in Mexico

- Elsewhere, futures or overnight indexed swaps (OIS) on policy rate
- In Mexico, swap market references TIIE28D
- Swaps with maturities up to 1 year
  - — Inflation targeting adoption
  - — Anchored inflation expectations

  } Forward-looking policies
- Considerations: timing change in 2015, usage of daylight saving time

Dataset

- Asset price changes in **30-minute** windows around **regular** policy announcements
  - **Surprises**: Swap rates (3M, 6M, 9M, 1Y)
  - **Effects**: Exchange rate (pesos per U.S. dollar), bond yields (2Y, 5Y, 10Y, 30Y)
  - **Robustness**: 50-minute and daily windows
- Sources:
  - Intraday data from Bloomberg, daily portfolio holdings from Banxico
- Sample period: January 2011 to December 2021

Monetary Policy Dimensions

Assessing the Number of Factors

- Cragg–Donald test:
  - Null: Variability observed in data mostly explained by k_0 factors ($k_0 < n$)
  - Wald statistic: Asymp. χ^2 with $(n - k_0)(n - k_0 + 1)/2 - n$ degrees of freedom
- Applied to:
  - Exchange rate and bond yields
  - Swaps with maturities up to 1 year $\rightarrow$ For intrepretation

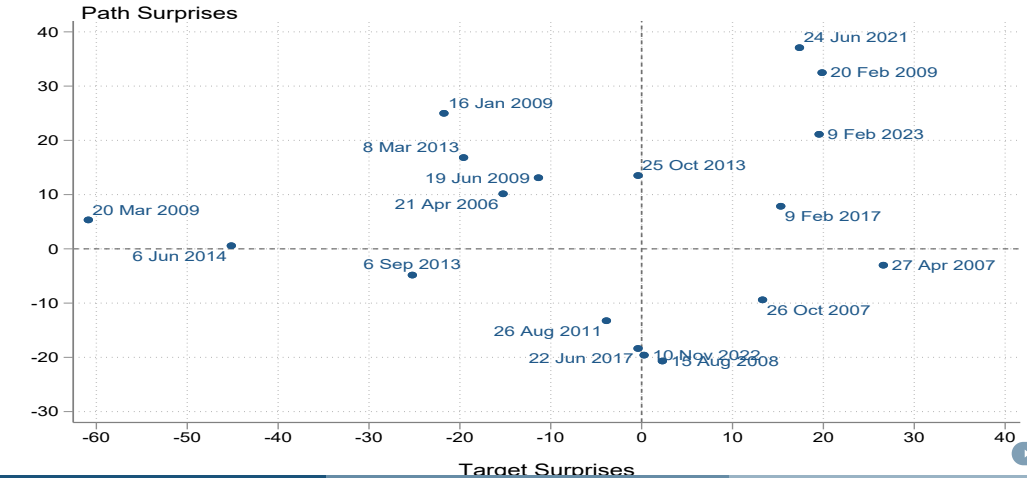
How Many Factors Drive Asset Price Changes in Mexico?

	Frequency	$H_0 : k = k_0$	Wald Statistic	Degrees of Freedom	p-value	Observations
Exchange Rate & Yield Curve	Intraday	0	29.56	10	0.001	56
		1	10.07	5	0.073	56
		2	1.14	1	0.285	56
	Daily	0	40.20	10	0.000	135
		1	18.93	5	0.002	135
		2	0.00	1	0.978	135
Swaps	Intraday	0	28.30	6	0.000	87
		1	7.21	2	0.027	87
	Daily	0	33.06	6	0.000	190
		1	9.35	2	0.009	190

Estimation and Interpretation of Factors

- Factors estimated by principal components on X comprised of changes in **swaps**
  - First two principal components (PCs) based on Cragg–Donald test
  - PCs are linear combinations and orthogonal but have no interpretation
  - Rotated and rescaled for **interpretation**
- Two types of monetary policy surprises as in Gürkaynak et al. (2005)
  - **Target** surprises: *current* policy rate
  - **Path** surprises: *future path* of policy rate linked to **statements**

Monetary Policy Dimensions



Frequency

Statements and Path Surprises Are Linked

Date	Path	Description
21-Apr-2006	+	Statement announces an easing of monetary conditions but notes that 'for the **foreseeable future** there is no space available for further easing.'
15-Aug-2008	−	Statement highlights that global inflationary pressures continue to rise but an improvement is **foreseen in the medium term** due to the prospects for lower global growth. Downside risks to the local economy have increased.
16-Jan-2009	+	Statement notes 'a higher than expected upward **trend in inflation** in the last quarter' and that 'instability in financial markets continues to be a risk factor for the **inflationary trend**.'
20-Feb-2009	+	Statement indicates that 'the strong financial turmoil represents a risk to the **expected inflation path**, even considering the greater contraction in demand and the reduction in commodities prices.'
19-Jun-2009	+	Statement indicates that 'the Board considers that its easing cycle is **close to an end**.'
08-Mar-2013	+	Statement makes clear that the 50 basis point reduction in the policy rate 'does **not** represent the **beginning of an easing cycle**.'
25-Oct-2013	+	Statement highlights that 'no further cuts in the policy rate are appropriate in the **foreseeable future**.'
09-Feb-2017	+	Statement highlights the effects of the tightenings in 2016 and '**the ones required in 2017**' to counteract inflationary pressures.
22-Jun-2017	−	Statement drops reference to do 'the necessary tightenings **ahead**' from the previous statement.
24-Jun-2021	+	Statement highlights additional shocks to those expected in headline and core inflation, and notes that their **expected paths** in the following quarters are higher than previously estimated.

Effects of Monetary Policy on Asset Prices

Contemporaneous Effects on Asset Prices

$$\Delta y_t = \beta_0 + \beta_1 Target_t + \beta_2 Path_t + \varepsilon_t,$$

Δy_t: intraday change in bond yields or exchange rate

$Target_t$ and $Path_t$: intraday monetary policy surprises

- Positive: Tightenings
- Negative: Easings

ε_t: error term

Asset Price Responses to Intraday Monetary Policy Surprises

	FX Returns		Δ 2Y Yield		Δ 5Y Yield		Δ 10Y Yield		Δ 30Y Yield	
Target	-2.31***	-2.31***	0.67***	0.68***	0.52***	0.43***	0.44***	0.44***	0.30***	0.30***
	(0.82)	(0.79)	(0.080)	(0.083)	(0.13)	(0.099)	(0.073)	(0.072)	(0.071)	(0.072)
Path		-2.12		0.95***		1.00***		0.78***		0.69***
		(1.57)		(0.17)		(0.21)		(0.16)		(0.19)
Constant	-9.17***	-9.17***	-0.32	-0.29	-0.56	-0.35	-0.60	-0.57*	-0.79**	-0.76**
	(3.21)	(3.19)	(0.42)	(0.32)	(0.47)	(0.37)	(0.40)	(0.33)	(0.39)	(0.34)
Obs.	87	87	71	71	56	56	71	71	71	71
R^2	0.26	0.28	0.72	0.84	0.39	0.64	0.55	0.69	0.37	0.53

Notes: Robust standard errors are shown in parentheses. *, **, *** asterisks respectively indicate significance at the 10%, 5% and 1% level.

Persistence of Effects on Yields

- On-impact response with event studies, **persistence** with local projections

$$y_{t+h} = \alpha_h^1 + \alpha_h^2 \, y_{t-1} + \beta_h^1 \, Target_t + \beta_h^2 \, Path_t + \eta_h^{'} z_{t-1} + u_{t+h},$$

  - h: horizon in days with $h = 0, 1, \ldots, 30$
  - $Target_t$ and $Path_t$: factors on announcement days and zero otherwise
  - z_{t-1}: vector of lagged variables to control for potential drivers of yields

Yields

Conclusions

Conclusions

- Monetary policy in Mexico has **two** dimensions: actions and words
  - Multidimensionality of monetary policy not exclusive to AEs
  - Path surprises improve implementation of monetary policy in EMs
- Banxico **manages expectations** about path of policy rate **via statements**
  - Even without being constrained by zero lower bound (ZLB)
- Banxico's **actions** and **words** influence asset prices *and* portfolio flows

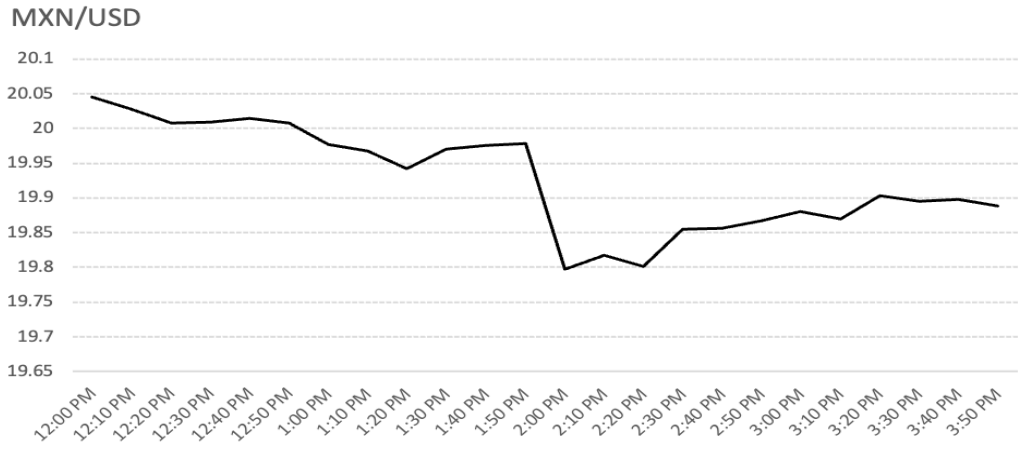
Related Work

Related Work

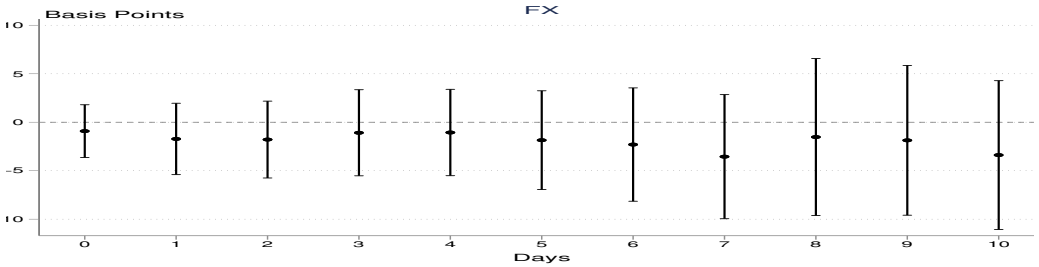
- MP effects on stock prices
- SVAR IV model to capture MP effects on macro variables
- Solís. "Term Premia and Credit Risk in Emerging Markets: The Role of U.S. Monetary Policy," *Journal of International Economics*, 2025
- Chiguil-Rojas, Esquivel y Leal. "La transmisión de la política monetaria a través del crédito bancario en México," *El Trimestre Económico*, 2024

Appendix

Exchange Rate on June 24, 2021



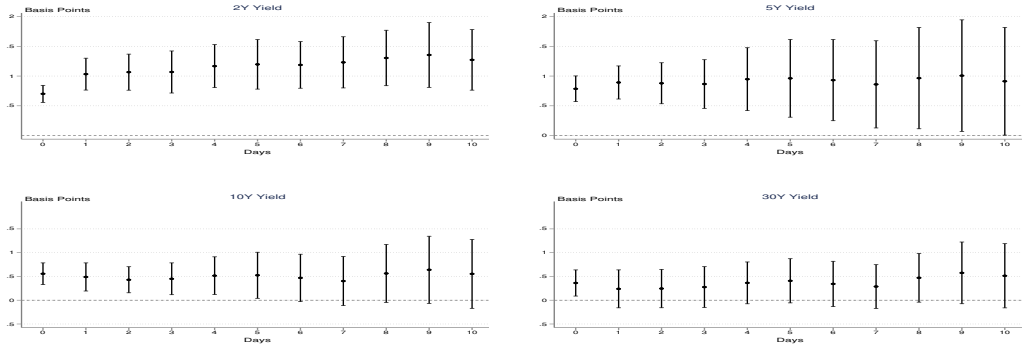
Persistence of **Exchange Rate** Response to PR Tightening



Notes: This figure plots the coefficient estimates and 95% confidence intervals for the response of the exchange rate (FX) returns to policy rate surprises. Returns are calculated from close of day $t-1$ to day $t+h$, where t is a day with a monetary policy announcement and $h = 0, 1, \ldots, 10$.

◂ Persistence

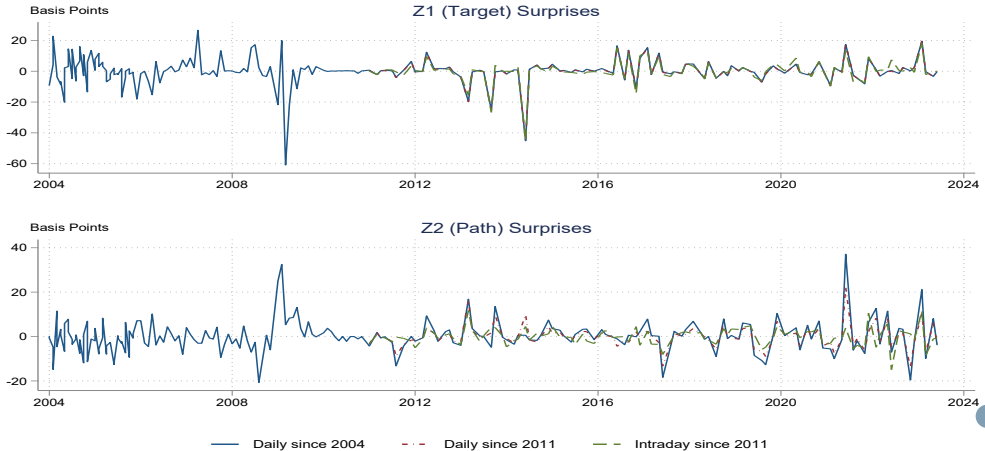
Persistence of **Yield Curve** Response to PR Tightening



Notes: This figure plots the coefficient estimates and 95% confidence intervals for the response of the 2-, 5-, 10- and 30-year yield changes to policy rate surprises. Yield changes are calculated from close of day $t-1$ to day $t+k$, where t is a day with a monetary policy announcement and $k = 0, 1, \ldots, 10$.

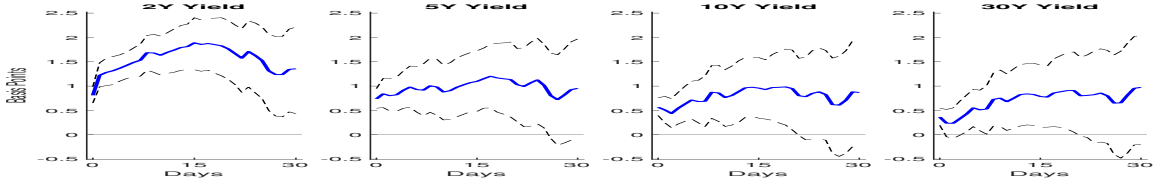
Persistence

Monetary Policy Surprises in Mexico: Intraday vs. Daily Data

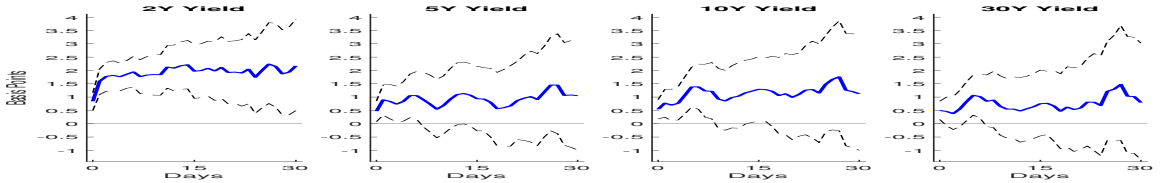


Dimensions

Persistence of Yields to Monetary Policy Surprises



(a) Target Surprise



(b) Path Surprise

Persistence