

FX Interventions Rules for Central Banks

A Risk-Based Framework

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Contributions

- ▶ Design a rule for central banks that intervene to prevent **disorderly market conditions**
- ▶ Provides guidance on **when** to intervene ("triggers")
- ▶ Appropriate for **floating exchange rate regimes** with FX risks to the economy (e.g. FX unhedged exposures)
- ▶ Consistently control **FX risk** rather than arbitrary FX volatility/level threshold
- ▶ A **risk management framework** for central banks' financial stability mandate: aligned with **industry's best practices** in FX management

What the rule is NOT about

- ▶ Not designed to reach or to preserve a given FX level (e.g. the **equilibrium exchange rate level**)
- ▶ Doesn't prevent **appreciation/depreciation trends** to occur...
- ▶ ... but can be compatible with other approaches, e.g. discretionary FXI
- ▶ We **don't discuss the efficiency** of FX interventions from a welfare/macro point of view
- ▶ Not a guide to calibrate **FX interventions amount**
- ▶ Not a guide for the optimal **currency allocation** of FX reserves

Key Messages

Foreign Exchange intervention rules should

- ▶ Depend on market conditions
- ▶ Objective, be anchored to a risk tolerance level rather than an arbitrary FX level threshold
- ▶ Capture FX non-linearities and asymmetries between appreciation and depreciation
- ▶ Be forward-looking
- ▶ Be easily operationalizable

We propose an FX intervention rule based on **Conditional Value-at-Risk**

VaR FXI Rule

Conditional density and intervention rule based on 2020-05-07 information

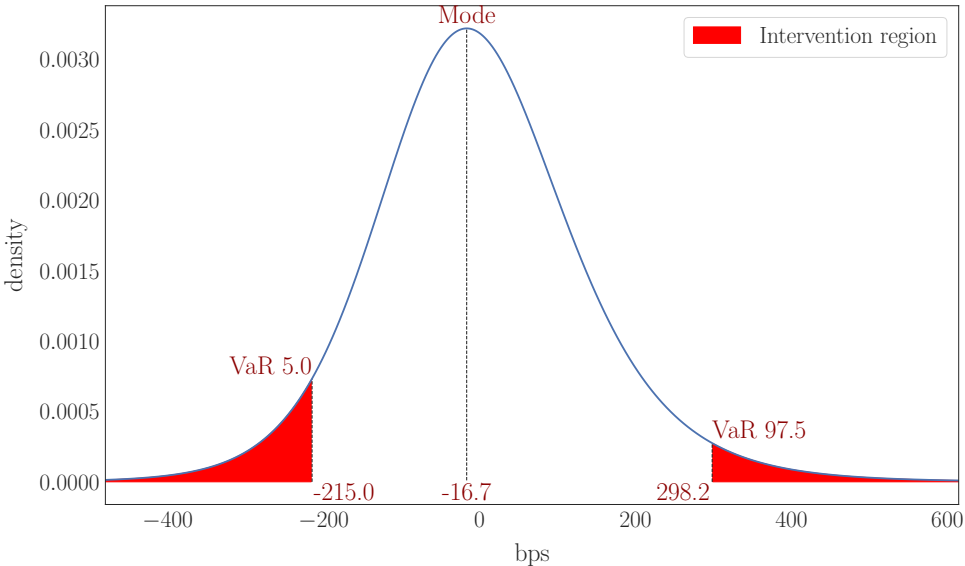


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Specification

Regression Table

	Constant	Microstructure	CIP	FXI	Baseline	Robustness
Intercept	1.09	-2.16	2.15	1.67***	1.63	1.64***
Lag FX log returns	0.09***	0.08***	0.08***	0.08***	0.08***	0.08***
Bid-ask spread abs value		0.11**	0.15***	0.14***	0.15***	0.15***
Forward points first difference		0.32***	0.32***	0.32***	0.27***	0.27***
Interbank rate vs Libor			-1.11***	-0.98***	-1.02***	-1.03***
FX intervention in USD lag				0.04	0.04	
VIX first diff					9.78***	9.79***
EURUSD log returns					0.13***	0.13***
FX intervention dummy lag						4.13
Omega	0.15***	0.14***	0.13***	0.13***	0.14***	0.14***
Alpha	0.17***	0.19***	0.18***	0.18***	0.19***	0.19***
Gamma	0.06***	0.06***	0.06***	0.05***	0.05***	0.05***
Beta	0.98***	0.98***	0.98***	0.99***	0.98***	0.98***
Nu	8.81***	9.11***	9.18***	9.15***	7.77***	7.77***
Lambda	0.13***	0.11***	0.12***	0.12***	0.1***	0.1***
R2	0.4 %	4.9 %	5.1 %	5.1 %	14.3 %	14.3 %
R2 adjusted	0.4 %	4.8 %	5.0 %	5.0 %	14.2 %	14.1 %
Number of observations	4511	4511	4511	4510	4510	4510
Significance *10%, **5%, ***1%						

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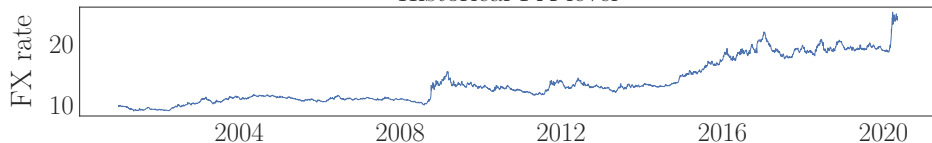
In-sample dynamics

Forecasting

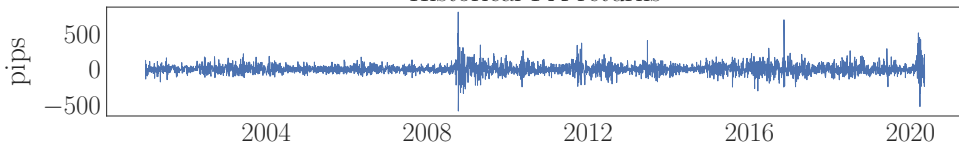
Benchmarking

Dynamics of the Mexican Peso against USD

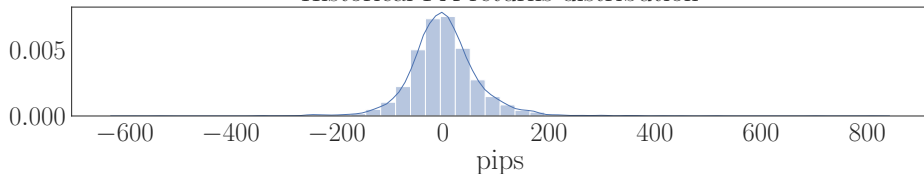
Historical FX level



Historical FX returns



Historical FX returns distribution



Conditional In-Sample Volatility of the Mexican Peso

In-sample FX returns conditional volatility

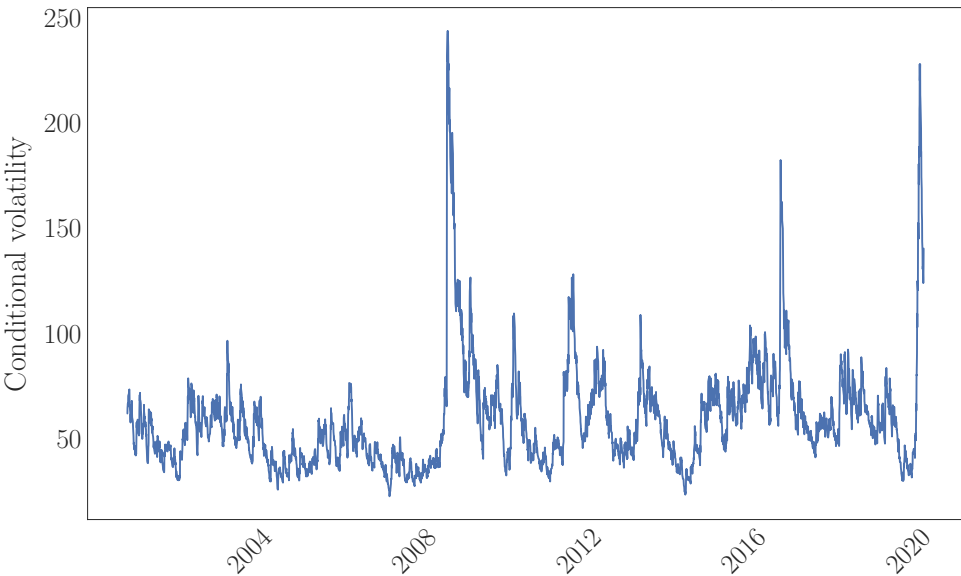


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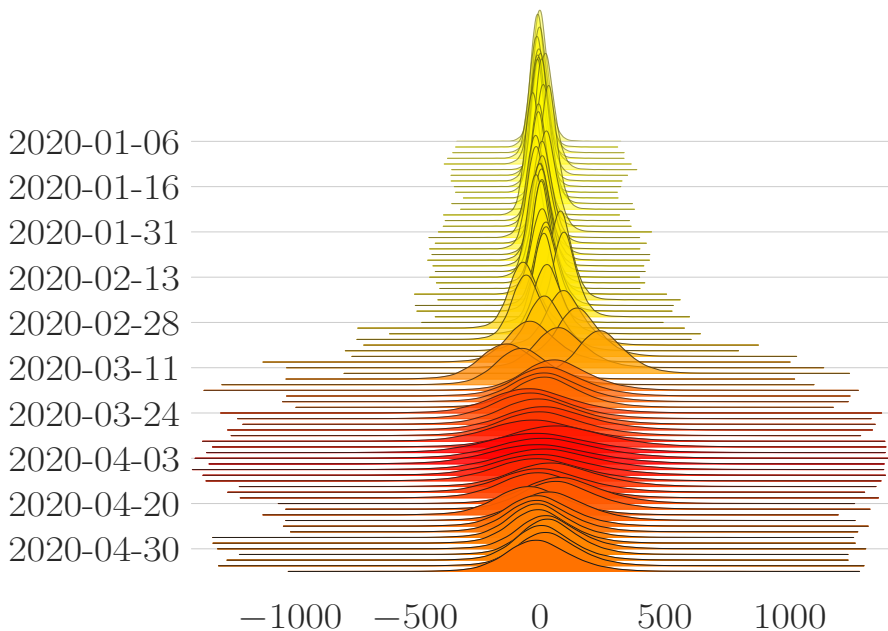
Model

In-sample dynamics

Forecasting

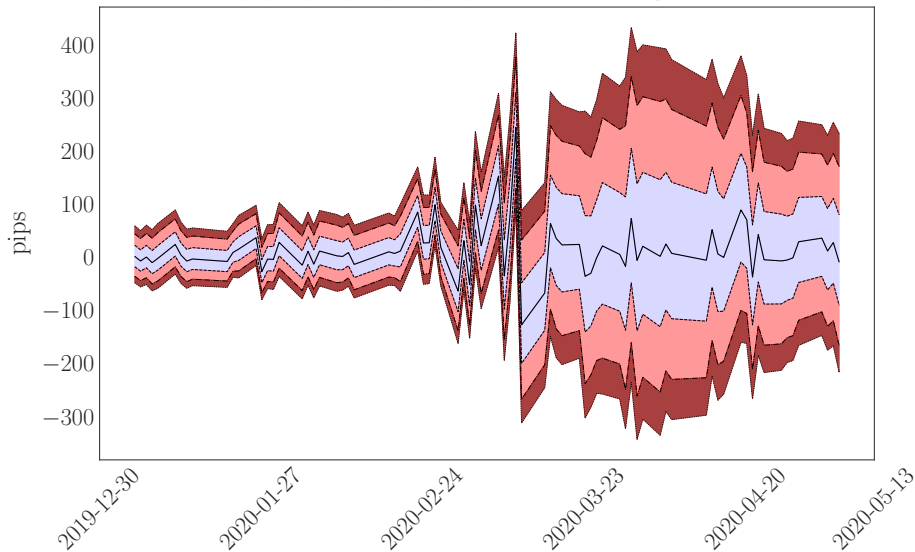
Benchmarking

Out-of-sample conditional density



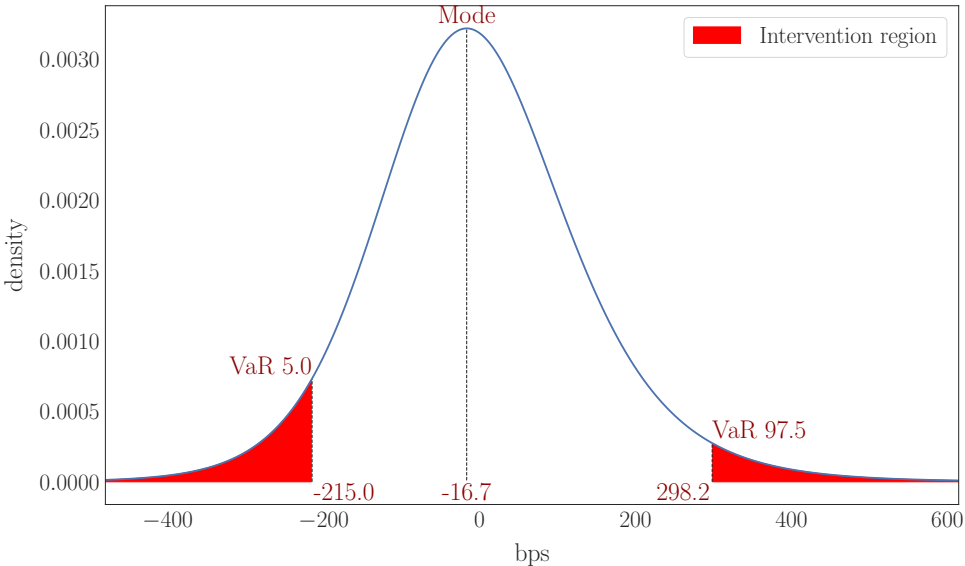
Fan Chart

Fan chart of predictive FX log returns
1, 5, 10, 25, 50, 75, 90, 95 Conditional Quantiles



VaR FXI Rule

Conditional density and intervention rule based on 2020-05-07 information



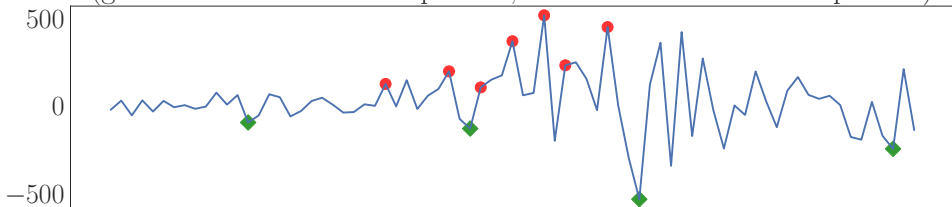
Conditional Cumulative Distribution Function

Conditional cumulative distribution function and intervention thresholds

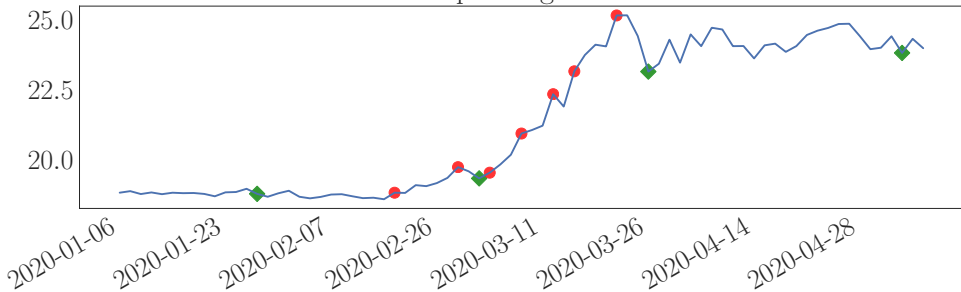


Conditional Exceedance

Log returns and conditional VaR exceedance at 5 percent
(green dot: below VaR 2.5 percent, red dot: above VaR 97.5 percent)



Corresponding FX level



Density Evaluation

Probability Integral Transform (PIT) Test, Out-of-sample

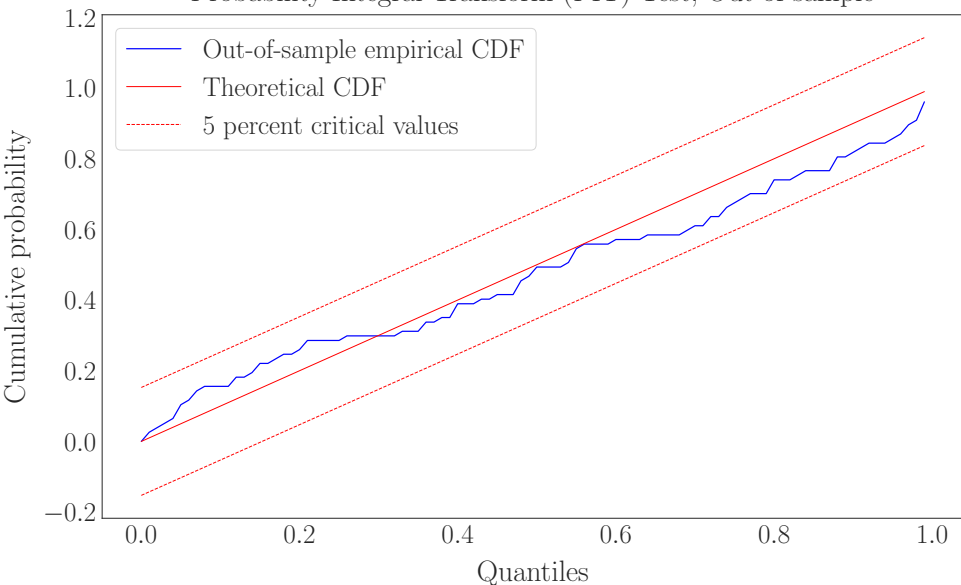


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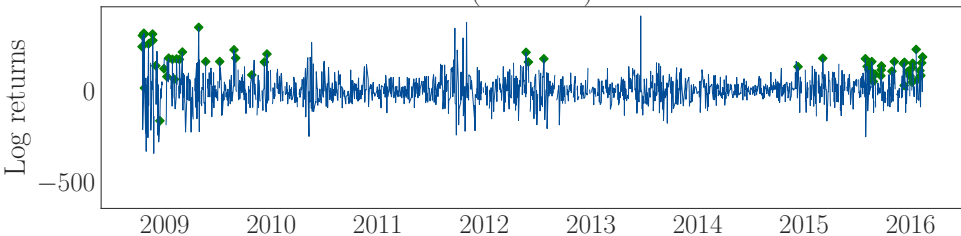
In-sample dynamics

Forecasting

Benchmarking

Rule-Based Benchmarking

FX interventions and FX log returns with minimum price
(sell USD)

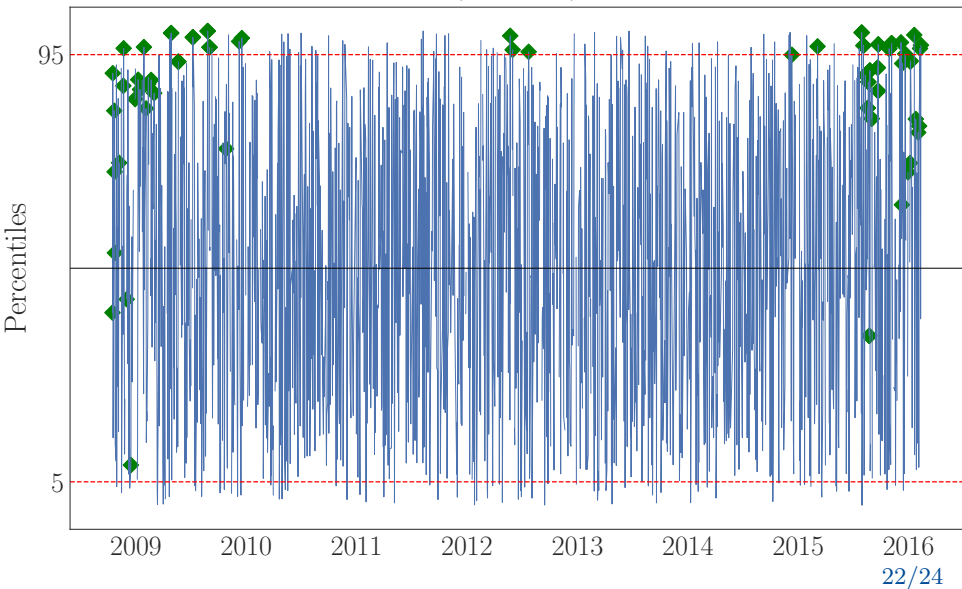


FX interventions and FX level (sell USD)



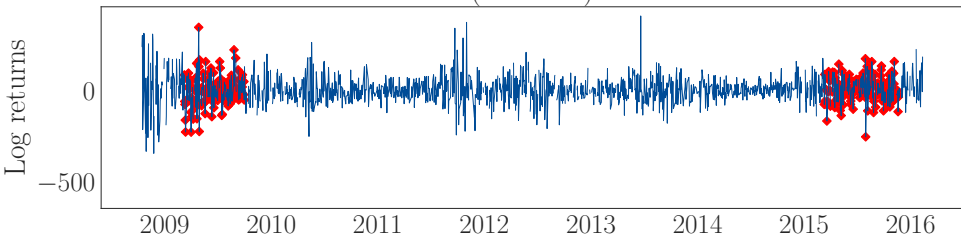
Rule-Based Benchmarking: Risk-Level

Conditional CDF of FX interventions with minimum price
(sell USD)

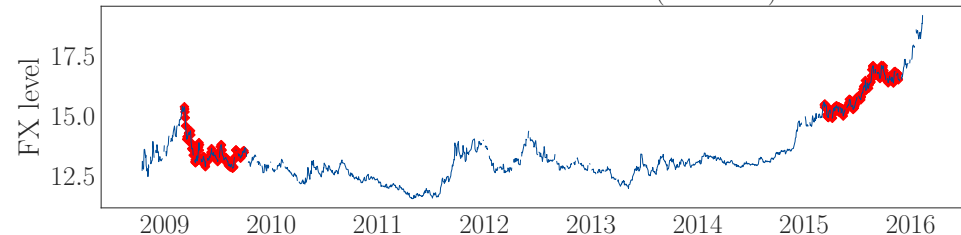


Discretion-Based Benchmarking

FX interventions and FX log returns with no minimum price
(sell USD)



FX interventions and FX level (sell USD)



Discretion-Based Benchmarking: Risk-Level

Conditional CDF of FX interventions with no minimum price
(sell USD)

