U.S. Unconventional Monetary Policy and Transmission to Emerging Market Economies

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In a nutshell

- Do U.S. monetary policies (MPs) affect EME asset prices?

  Yes, but measuring the effect is not trivial.

  $\longrightarrow$ We identify the effect of MP shocks on EME sovereign yields, exchange rates, and stock prices.

  $\longrightarrow$ The effect is significant for yields, but varies across countries.

- Has the impact of unconventional MPs been unusual?

  It depends on how you define *unusual*.

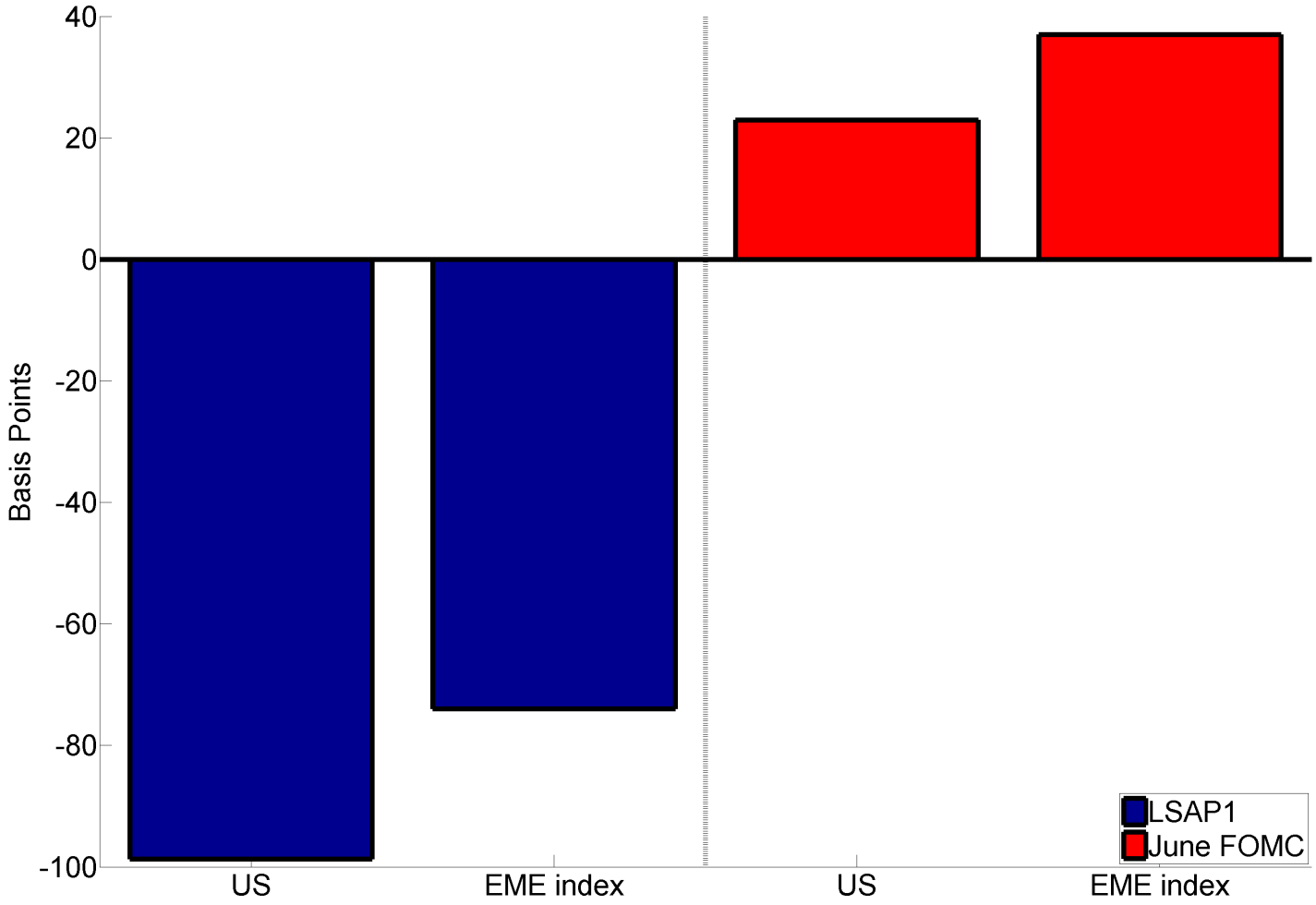
  $\longrightarrow$ We find that, especially around LSAP1 and May-June 2013 FOMC, EME asset prices moved significantly (compared to a normal distribution).

  However, if we account for the vulnerability of EMEs...

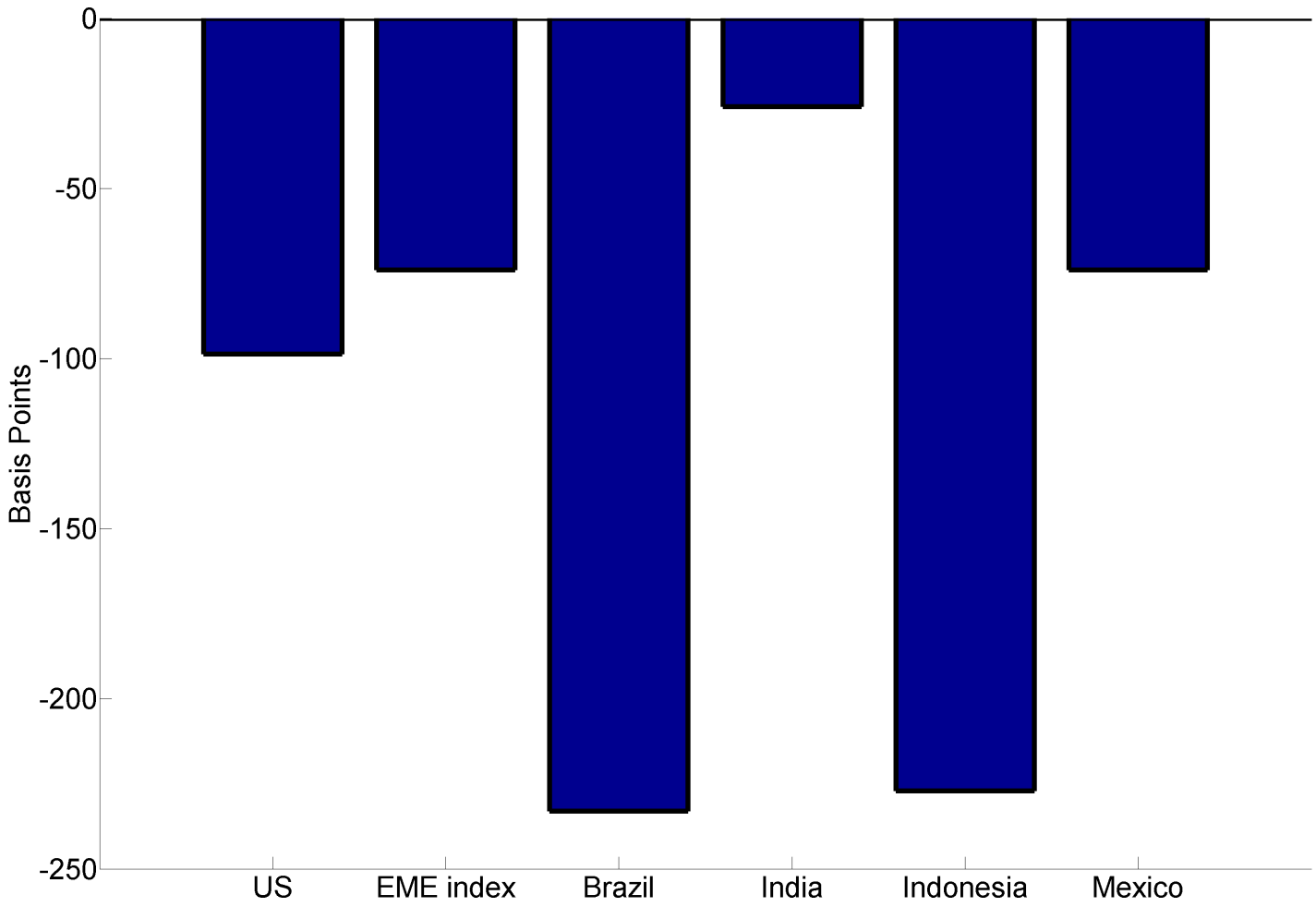
  $\longrightarrow$ We find that countries perceived as riskier are more vulnerable.

  $\longrightarrow$ When we account for vulnerability, the effect of U.S. unconventional MPs is not necessarily unusual for most countries.

EME sovereign yields

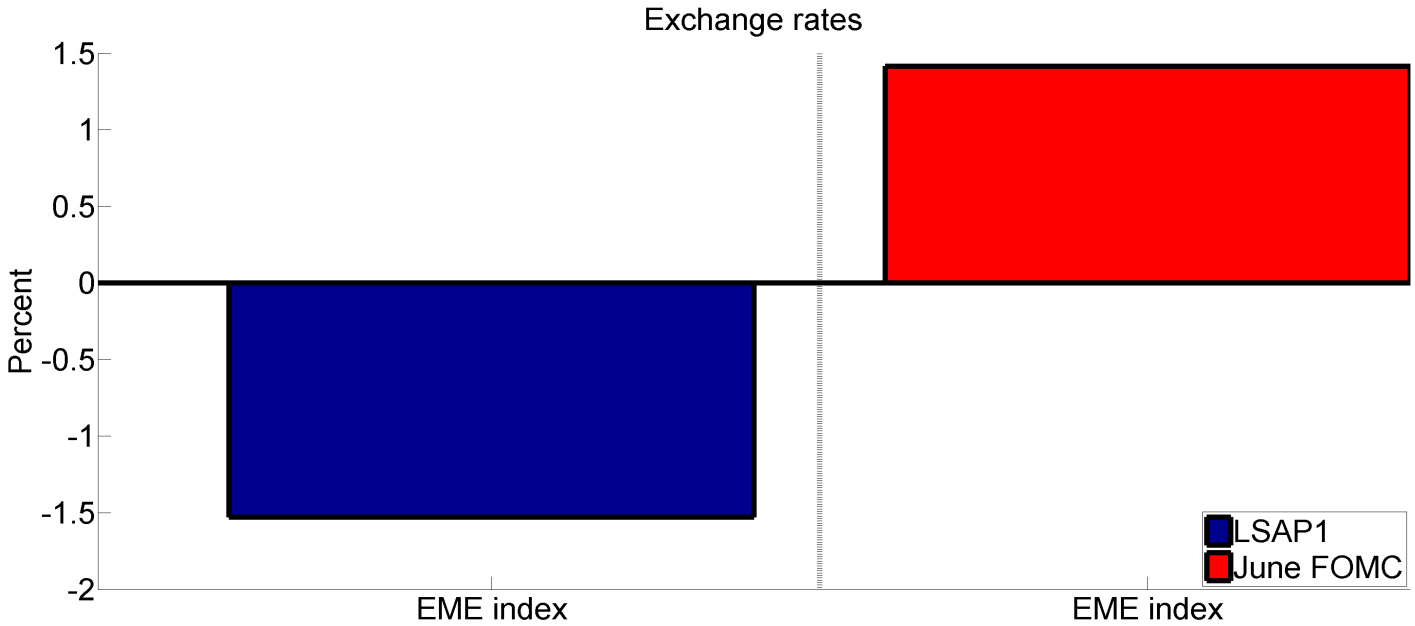


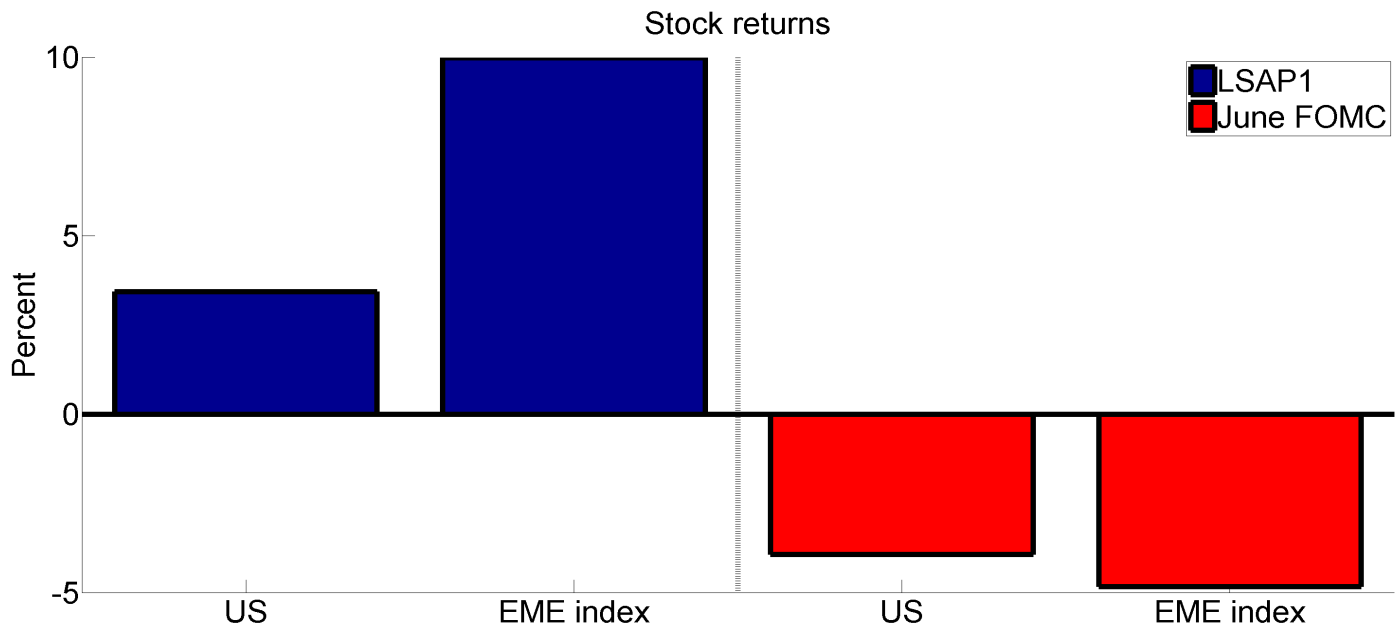
Heterogeneous reactions around LSAP1



Go to June FOMC

EME exchange rates and stock returns





Transmission of monetary policy shocks

- Signaling channel. Future changes in MP rate or the FED's appraisal of U.S. economy.
- Impact on exchange rates and agents' expectations of a reaction by these countries' MP authorities.
- Portfolio-balance channel (between asset classes, from and to U.S. assets).
- Market functioning channel.

Literature Review

- Impact of MP on U.S. interest rates:

$\longrightarrow$ Wright (2012). Structural VAR to identify the effect of MP shocks on U.S. rates.

$\longrightarrow$ Bekaert, Hoerova, and Lo Duca (2012). Measure of MP surprise using high-frequency data (plus measures of uncertainty and risk aversion).

- International Spillovers of MP:

$\longrightarrow$ Bruno and Shin (2013). Effect of MP on capital flows (global banks and risk taking).

$\longrightarrow$ Hausman and Wongswan (2011). Effect of FOMC announcements (heterogeneity and vulnerability around announcements).

- Unconventional MP

$\longrightarrow$ Krishnamurthy and Vissing-Jorgensen (2011). Impact of QE on U.S. interest rates.

$\longrightarrow$ Ahmed and Zlate (2013), Fratzscher et al (2012), Joyce et al (2011). Effects of QE on foreign economies.

The rest of this presentation

1. **Data**
2. **Impulse-response functions to U.S. monetary policy shocks**
3. **Unusual observed changes around unconventional monetary policy announcements**
4. **Drivers of EMEs' vulnerability**
5. **Unusual effect of U.S. monetary policy with respect to a model with EMEs' vulnerability**
6. **Conclusions**

1. Data - 2006 to 2013

- 17 EMEs (Brazil, China, the Czech Republic, Hong Kong, Hungary, India, Indonesia, Korea, Malaysia, Mexico, the Philippines, Poland, Singapore, South Africa, Taiwan, Thailand, and Turkey).
- 3 assets: sovereign bonds, currencies, stocks.
- Aggregated and country-level data.
- *U.S. MP announcements*: FOMC announcements, speeches (Rogers, Scotti, and Wright (2013)).

  Some of them unconventional MPs

  $\longrightarrow$ LSAP1, 2, and 3.
  $\longrightarrow$ MEP or operation twist.
  $\longrightarrow$ Beginning of the end of accommodative policy (2013).

2. Impulse-responses to U.S. monetary policy shocks

Asset prices follow:

$$A(1)\,Y_{t_d} = \mu + \epsilon_{t_d},$$

where ϵ_{t_d} is related to underlying structural shocks, including MP shocks

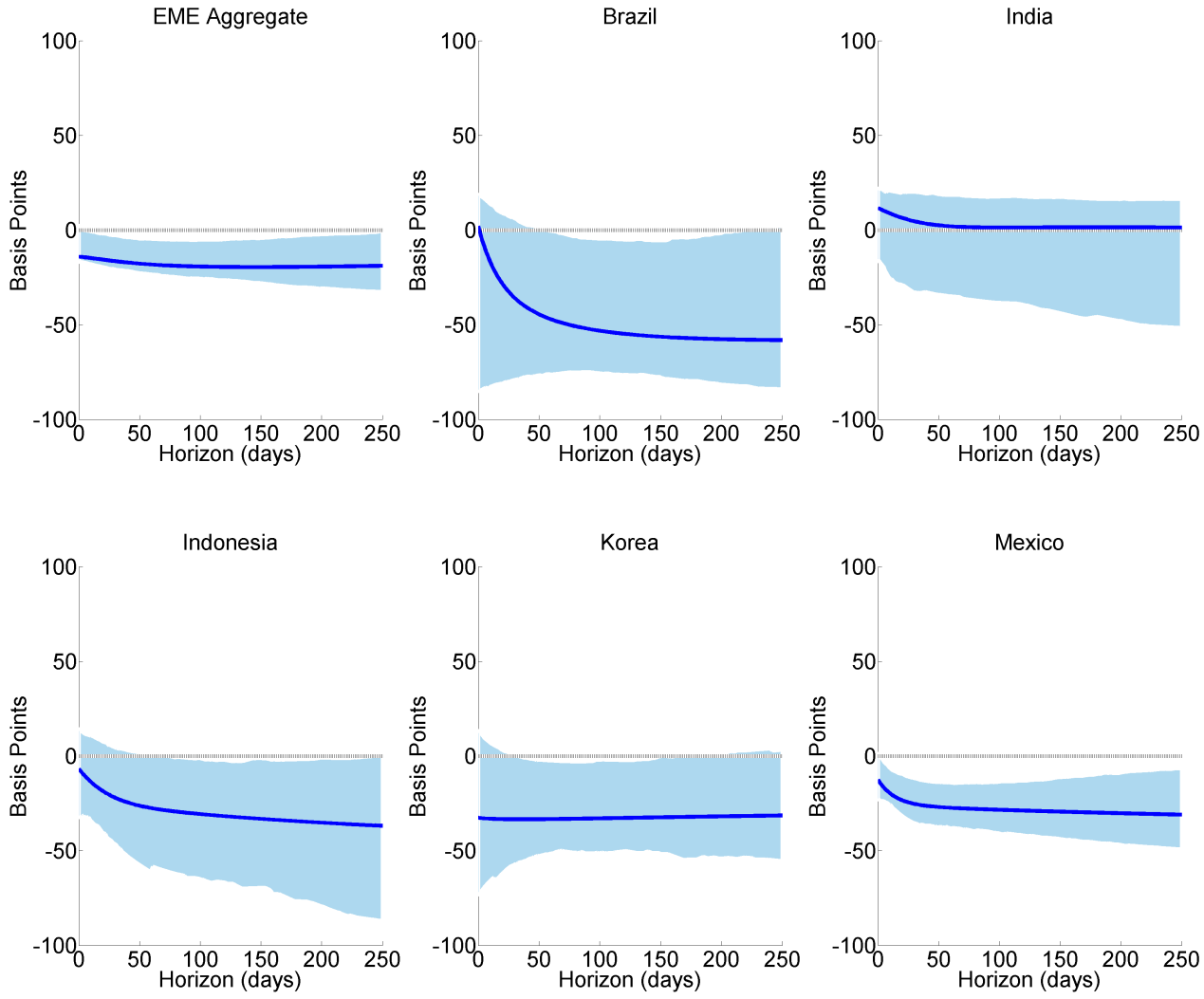
$$\epsilon_{t_d} = R\eta_{t_d}.$$

Identification assumption: **heteroskedasticity** (volatility of MP shocks is higher on the days of unconventional MP announcements).
This method allows us to measure MP shocks from their effects on asset prices in Y_{t_d},

$$\begin{aligned} Y_{t_d} \quad = \quad & [\textit{10 and 2} - \textit{y Treasuries},\ \textit{AAA and High} - \textit{yield corporate}, \\ & \ldots \textit{EME yields},\ \textit{Xrates},\ \textit{Stock prices}]. \end{aligned}$$

The shock is calibrated to decrease 10-year Treasury yields by 25 bps.
(*see effect on U.S. interest rates*)

2. Impulse-responses to U.S. monetary policy shocks



2. Impulse-responses to U.S. monetary policy shocks

- The effect of MP shocks is significant for most countries' sovereign yields.

  $\longrightarrow$ In the same direction as for U.S. interest rates.

- There is substantial heterogeneity in terms of the horizon and magnitude of the estimated effect.

  $\longrightarrow$ For several countries, the effect is larger than that on U.S. yields.

- *For exchange rates*, a shock that decreases U.S. yields is followed by an appreciation of EME currencies, but the effect is not significant.

- The effect *for stock returns* is very small, not significant, and, sometimes, in the *wrong* direction.

3. Unusual observed changes around unconventional monetary policy

- *Around LSAP1*

  $\longrightarrow$ For many countries, fluctuations in yields were significant with respect to a normal distribution.
  $\longrightarrow$ Most EME currencies appreciated, in some cases significantly.
  $\longrightarrow$ EME stock prices increased, but increases were not outsized.

- Fluctuations in EME asset prices were much smaller around the second LSAP, third LSAP, and MEP announcements.

- Large responses around the *June 2013 FOMC*. EME asset prices seemed to retrace some of their gains after the first LSAP.

- Large heterogeneity and responses are not always in the expected direction, especially for exchange rates and stock returns.

4. What drives EMEs vulnerability to U.S. monetary policy

- Macro/fiscal stability:

  Policy rate, CDS spread, interest rate differential, inflation, GDP and output growth

- Financial openness/dependence:

  Current account deficit, Chinn-Ito financial openness, size of stock market, exports to U.S.

- Currency-related measures:

  Currency regime, currency-options implied volatility, carry-to-risk ratio

- Bank vulnerability:

  Average expected default frequency, average Moody's rating

4. What drives EMEs vulnerability to U.S. monetary policy

- Panel-data setting (similar to VAR setting)

$$\Delta Y^{EME}_{i,tm} = \alpha_i + (\beta_1 + \underline{\beta_2} X_{i,t_{m-1}})\Delta Y^{US}_{sov,tm} + (\beta_3 + \underline{\beta_4} X_{i,t_{m-1}})\Delta Y^{US}_{hy,tm} + \epsilon_{i,t_m}$$

- Interest-rate channel: $(\beta_1 + \underline{\beta_2} X_{i,t_{m-1}})$
- Risk channel: $(\beta_3 + \underline{\beta_4} X_{i,t_{m-1}})$
- Vulnerability $\underline{\beta_2} X_{i,t_{m-1}}$, $\underline{\beta_4} X_{i,t_{m-1}}$
- Control variables: VIX, S&P, commodity index.

4. What drives EMEs vulnerability to U.S. monetary policy

Country Variables	U.S. Sovereign Yield	U.S. High Yield Spread	Gains in R^2
Macro/fiscal stability			
Policy rate	0.08**	0.03***	3.26
CDS	0.00***	0.00***	5.91
Gov. yield	0.11***	0.04***	7.51
Rate diff.	0.11***	0.04***	8.33
Debt to GDP	0.00	0.00	0.15
Inflation	0.10	0.08	0.50
GDP growth	-0.09***	-0.01*	3.06
Output gap	0.01	0.01	0.13
Financial openness/external dependence			
-CA/GDP	0.01	0.01***	1.01
Financial open.	-0.27**	-0.01	0.82
Market cap. to GDP	0.00	0.00***	1.09
U.S. Exp. to GDP	0.00	-0.01**	1.03

4. What drives EMEs vulnerability to U.S. monetary policy

Country Variables	U.S. Sovereign Yield	U.S. High Yield Spread	Gains in R^2
Currency-related			
Soft peg	-0.66**	-0.24***	
Managed floating	-0.45	0.04***	2.31
Carry-to-risk ratio	-0.07	0.06***	1.24
Currency IV	0.03**	0.01***	3.16
Bank Vulnerability			
Avg. EDF	0.46***	0.14***	3.58
Avg. Moody's	-0.09***	-0.04***	3.24

4. What drives EMEs vulnerability to U.S. monetary policy

- Sovereign yields in a country might respond more to U.S. interest rates (affected by MP)

  $\longrightarrow$ If the perception of risk (interest rates, CDS) increases.
  $\longrightarrow$ Large CA deficits, slow growth, or more vulnerable banks.

- For exchange rates, the risk channel and currency-related measures seem to explain better heterogeneous reactions.

- For stock returns, few variables are significant (world CAPM).

4. What drives EMEs vulnerability to U.S. monetary policy

In sum

- EME asset prices respond to U.S. MP shocks (especially sovereign bonds).
- Responses around unconventional MP announcements seem to be outsized (with respect to a normal distribution).
- There is substantial heterogeneity in responses.
- Several country-specific variables explain this heterogeneity and introduce the possibility of time-varying responses.

5. Unusual effect of U.S. monetary policy with respect to our model

Compare

- Model-implied response: from a panel-data model with **interest rate differential and currency regime**:

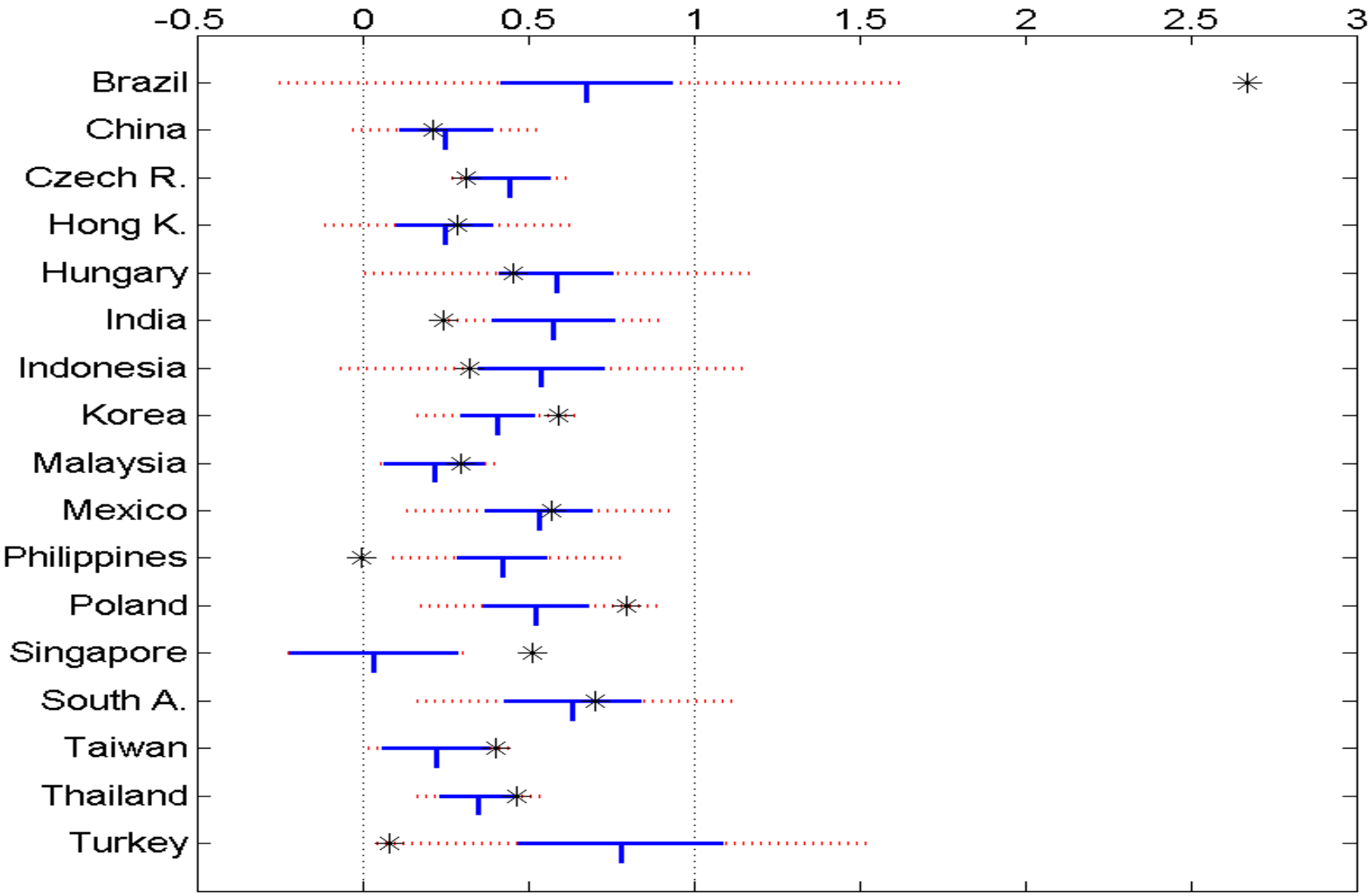
$$\widehat{\beta}_1 + \widehat{\beta}_2 E(X_{i,t_{m-1}})$$

$$(\Delta Y^{EME}_{i,tm} = \alpha_i + (\underline{\beta_1 + \beta_2 X_{i,t_{m-1}}})\Delta Y^{US}_{sov,tm} + (\beta_3 + \underline{\beta_4} X_{i,t_{m-1}})\Delta Y^{US}_{hy,tm} + \epsilon_{i,t_m})$$

- With the average observed response: from the 2-day event study

$$\frac{1}{n}\sum^{n} \Delta Y^{EME}_t / \Delta Y^{US}_t$$

5. Unusual effect of U.S. MP. Vulnerability model



5. Unusual effect of U.S. MP. Vulnerability model

Average observed responses of EME sovereign yields to U.S. yields are **within or below** the confidence interval of the responses implied by a model with **vulnerabilities**, except for Brazil and Singapore.

- Singapore. Size and volatility?
- From event study, Brazil shows outsized responses to U.S. MP.
- The Brazilian real is a traditional carry-trade-investment currency? (*a model with currency IV shows a higher implied response*).
- Unorthodox monetary policy in Brazil? (*a model with a proxy for unorthodox MP also yields a higher response for Brazil*).

6. Conclusions

- EME asset prices experienced large fluctuations around unconventional MP announcements.
- U.S. monetary policy shocks that lower U.S. sovereign yields also lower sovereign yields in most EMEs.

  $\longrightarrow$ The effect is often larger than that on U.S. yields.
  $\longrightarrow$ The effect varies accross countries.

- Country-specific variables drive the vulnerability of EMEs to U.S. MP.
- Average observed responses of EME sovereign yields to U.S. yields are **within or below** the confidence interval of the responses implied by a model with **vulnerabilities**, except for Brazil and Singapore.