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

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The views expressed in this paper are those of the authors and do not necessarily represent those of the Federal Reserve Board or the Federal Reserve System.
Do U.S. monetary policies (MPs) affect EME asset prices?

Yes, but measuring the effect is not trivial.

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

→ 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...

→ We find that countries perceived as riskier are more vulnerable.
→ When we account for vulnerability, the effect of U.S. unconventional MPs is not necessarily unusual for most countries.
EME sovereign yields

- LSAP1
- June FOMC

Basis Points

US  EME index  US  EME index

-100  0  0  40
Heterogeneous reactions around LSAP1

Go to June FOMC
EME exchange rates and stock returns

**Exchange rates**

- LSAP1: 1.5
- June FOMC: 1.0

**Stock returns**

- LSAP1: 10
- June FOMC: 0
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:**

- **International Spillovers of MP:**

- **Unconventional MP**
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
  
  → LSAP1, 2, and 3.
  
  → MEP or operation twist.
  
  → Beginning of the end of accommodative policy (2013).
2. Impulse-responses to U.S. monetary policy shocks

Asset prices follow:

\[ A(1) Y_{td} = \mu + \epsilon_{td}, \]

where \( \epsilon_{td} \) is related to underlying structural shocks, including MP shocks

\[ \epsilon_{td} = R\eta_{td}. \]

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 \( Y_{td} \),

\[ Y_{td} = [10 \text{ and } 2-y \text{ Treasuries, AAA and High yield corporate, } \]
\[ \ldots \text{EME yields, Xrates, Stock prices}]. \]

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.
  → 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.
  → 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**
  - For many countries, fluctuations in yields were significant with respect to a normal distribution.
  - Most EME currencies appreciated, in some cases significantly.
  - 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)

\[ \Delta Y_{i,tm}^{EME} = \alpha_i + (\beta_1 + \beta_2 X_{i,t_{m-1}}) \Delta Y_{sov,tm}^{US} + (\beta_3 + \beta_4 X_{i,t_{m-1}}) \Delta Y_{hy,tm}^{US} + \epsilon_{i,tm} \]

- Interest-rate channel: \((\beta_1 + \beta_2 X_{i,t_{m-1}})\)

- Risk channel: \((\beta_3 + \beta_4 X_{i,t_{m-1}})\)

- Vulnerability \(\beta_2 X_{i,t_{m-1}}, \beta_4 X_{i,t_{m-1}}\)

- 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 $R^2$
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<thead>
<tr>
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<tbody>
<tr>
<td><strong>Macro/fiscal stability</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Policy rate</td>
<td>0.08**</td>
<td>0.03***</td>
<td>3.26</td>
</tr>
<tr>
<td>CDS</td>
<td>0.00***</td>
<td>0.00***</td>
<td>5.91</td>
</tr>
<tr>
<td>Gov. yield</td>
<td>0.11***</td>
<td>0.04***</td>
<td>7.51</td>
</tr>
<tr>
<td>Rate diff.</td>
<td>0.11***</td>
<td>0.04***</td>
<td>8.33</td>
</tr>
<tr>
<td>Debt to GDP</td>
<td>0.00</td>
<td>0.00</td>
<td>0.15</td>
</tr>
<tr>
<td>Inflation</td>
<td>0.10</td>
<td>0.08</td>
<td>0.50</td>
</tr>
<tr>
<td>GDP growth</td>
<td>-0.09***</td>
<td>-0.01*</td>
<td>3.06</td>
</tr>
<tr>
<td>Output gap</td>
<td>0.01</td>
<td>0.01</td>
<td>0.13</td>
</tr>
<tr>
<td><strong>Financial openness/external dependence</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-CA/GDP</td>
<td>0.01</td>
<td>0.01***</td>
<td>1.01</td>
</tr>
<tr>
<td>Financial open.</td>
<td>-0.27**</td>
<td>-0.01</td>
<td>0.82</td>
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<tr>
<td>Market cap. to GDP</td>
<td>0.00</td>
<td>0.00***</td>
<td>1.09</td>
</tr>
<tr>
<td>U.S. Exp. to GDP</td>
<td>0.00</td>
<td>-0.01**</td>
<td>1.03</td>
</tr>
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4. What drives EMEs vulnerability to U.S. monetary policy

| Country Variables | U.S. Sovereign Yield | U.S. High Yield Spread | Gains in $R^2$
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<tr>
<td><strong>Currency-related</strong></td>
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<tr>
<td>Soft peg</td>
<td>-0.66**</td>
<td>-0.24***</td>
<td></td>
</tr>
<tr>
<td>Managed floating</td>
<td>-0.45</td>
<td>0.04***</td>
<td>2.31</td>
</tr>
<tr>
<td>Carry-to-risk ratio</td>
<td>-0.07</td>
<td>0.06***</td>
<td>1.24</td>
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<tr>
<td>Currency IV</td>
<td>0.03**</td>
<td>0.01***</td>
<td>3.16</td>
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<tr>
<td><strong>Bank Vulnerability</strong></td>
<td></td>
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<td></td>
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<tr>
<td>Avg. EDF</td>
<td>0.46***</td>
<td>0.14***</td>
<td>3.58</td>
</tr>
<tr>
<td>Avg. Moody’s</td>
<td>-0.09***</td>
<td>-0.04***</td>
<td>3.24</td>
</tr>
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</table>
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)
  - If the perception of risk (interest rates, CDS) increases.
  - 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:

\[ \hat{\beta}_1 + \hat{\beta}_2 E(X_{i,t_{m-1}}) \]

\[ (\Delta Y_{i,tm}^{EME} = \alpha_i + (\hat{\beta}_1 + \hat{\beta}_2 X_{i,t_{m-1}}) \Delta Y_{sov,tm}^{US} + (\hat{\beta}_3 + \hat{\beta}_4 X_{i,t_{m-1}}) \Delta Y_{hy,tm}^{US} + \epsilon_{i,t_m}) \]

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

\[ \frac{1}{n} \sum_{i=1}^{n} \Delta Y_{t}^{EME} / \Delta Y_{t}^{US} \]
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.
  → The effect is often larger than that on U.S. yields.
  → The effect varies across 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.