The Policy Trilemma and the Global Financial Cycle: Evidence from the International Transmission of Unconventional Monetary Policy

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Flexible exchange rate economies are more insulated to external shocks

A reflection of the Mundellian Trilemma

Countries can attain just 2 of 3 objectives

- Free capital mobility
- FX stability
- Independent monetary policy

Flexible FX are not enough to insulate the economy

Because of the Global Financial Cycle (Rey, 2013)

Developments in the United States

International comovement in financial prices and aggregates (the Global Financial Cycle)

All countries are subject to this Cycle regardless of FX regime
Which view dominates?

A Global VAR to assess the international spillovers of US monetary policy

<table>
<thead>
<tr>
<th>A model of the global economy</th>
<th>Identify both conventional &amp; unconventional shocks</th>
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<tbody>
<tr>
<td>- 33 interconnected economies (&gt;90% of world GDP)</td>
<td>- Theory-based sign restrictions on US variables</td>
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<tr>
<td>- Full country heterogeneity in parameters</td>
<td>- Agnostic on spillovers (unrestricted responses of RoW)</td>
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<td>- Account for third-country &amp; spillback effects</td>
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Results support Helene Rey’s view of the Global Financial Cycle

US monetary policy drives equity prices worldwide and lead to high financial comovement (and especially so with unconventional measures)

Weak evidence that flexible FX imply smaller spillovers
1. The GVAR
   - Structure of the model
   - Identification strategy

2. International spillovers from US monetary policy
   - Conventional monetary policy
   - Unconventional monetary policy
   - Sources of international spillovers

3. Conclusions
### Countries in the GVAR

33 advanced & emerging economies (accounting for more than 90% of world GDP)

<table>
<thead>
<tr>
<th>Asia and Pacific</th>
<th>North America</th>
<th>Europe</th>
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<td>Australia</td>
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* Euro area countries are modelled jointly (as in Dées et al. 2007)
Several countries anchor their currencies to the US Dollar.

USD anchor index of Ilzetzki, Reinhart & Rogoff (2017)

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<thead>
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<th>Argentina</th>
<th>Australia</th>
<th>Brazil</th>
<th>Canada</th>
<th>Chile</th>
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</table>
The GVAR consists of a network of country-specific models

- **Direct effect**
  - US monetary policy spills over to the rest of the world
  - Each country in the rest of the world may affect the US

- **Spillback effects**

- **Third-country effects**

- **Extra-effects due to interactions among receiving countries**
The country-specific VARX models

Each economy depends on both domestic and external developments

\[ Y_{it} = a_i + b_i t + \sum_{j=1}^{p_i} A_{ij} Y_{i,t-j} + \sum_{j=0}^{q_i} B_{ij} Y^*_{i,t-j} + \sum_{j=0}^{q_i} C_{ij} X_{t-j} + u_{it} \]

Domestic variables
- Real GDP growth
- CPI inflation
- Short-term interest rate
- Term spread (long – short rates)
- Real equity prices
- Nominal effective exchange rate

(quarterly data: 1994Q1 – 2016Q4)

Foreign variables
- Weighted averages of other countries’ domestic variables
  \[ Y^*_{it} = \sum_{j \neq i} \omega_{ij} Y_{jt} \]
- Weights capture the importance of country \( j \) for \( i \)
  (based on bilateral trade flows)

Oil prices
- Common observed factor
- Endogenous to global developments

\[ X_t = a_x + b_x t + \sum_{j=1}^{p_x} D_{j} X_{t-j} + \sum_{j=0}^{q_z} F_{j} Y_{t-j} + u_{xt} \]
- Weighted averages of GDP growth & inflation across all countries
  (GDP-based weights)
Identification of US monetary policy shocks

Restrict responses of US variables
Restrictions informed by standard monetary theory

Unrestricted responses in rest of the world
Agnostic on size & sign of international spillovers

<table>
<thead>
<tr>
<th>Responses of US variables</th>
<th>Conventional</th>
<th>Unconventional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-term interest rate</td>
<td>−</td>
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<tr>
<td>Term spread</td>
<td>+</td>
<td>−</td>
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<td>Inflation</td>
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<tr>
<td>Output growth</td>
<td>+</td>
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<td>Real equity prices</td>
<td>+</td>
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<td>NEER</td>
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Compression of term spread raises growth and inflation, policy rate unchanged (Baumeister & Benati, 2013)

Asset prices rise
USD depreciates

Note: sign restrictions are imposed on impact and one period after the shock
Road map

1. The GVAR
   - Structure of the model
   - Identification strategy

2. International spillovers from US monetary policy
   - Conventional monetary policy
   - Unconventional monetary policy
   - Sources of international spillovers

3. Conclusions
Drop in US policy rate: domestic and spillover effects

Sizable output spillovers (outsize domestic effects)

Note: median responses & 68% bands for the US and rest of the world to an expansionary US monetary policy shock (25 basis points)

Strong reaction of world equity prices (confirm Rey 2016)
Drop in US policy rate: country-level spillovers

Output growth

Real equity prices

Short-term interest rate

Note: maximum absolute responses and associated 68% bands
Flexible FX countries feature smaller spillovers...

Note: GDP-weighted means for groups (in blue) and for rest of the world (dashed black)
... but the relationship is weak due to large uncertainty

Note: maximum absolute responses and associated 68% bands, GDP-weighted group means in dotted blue
Compression in US term spread: domestic and spillover effects

Note: median responses & 68% bands for the US and rest of the world to an expansionary US term spread shock (25 basis points)
Compression in US term spread: country-level spillovers

Note: maximum absolute responses and associated 68% bands
Comparing spillovers from conventional & unconventional measures

Output growth

Real equity prices

Note: maximum absolute responses to expansionary conventional (x-axis) and unconventional (y-axis) monetary policy shocks
Again, flexible FX countries feature smaller spillovers...

Note: GDP-weighted means for groups (in blue) and for rest of the world (dashed black)
... but large uncertainty weakens the relationship

Note: maximum absolute responses and associated 68% bands, GDP-weighted group means in dotted blue
Alternative identification strategies of unconventional monetary policy

**Benchmark**

- Output growth
- Inflation
- Short-term rate
- Term spread
- NEER
- Real equity prices

**ZLB on short-term rate**

**Unrestricted real equity prices**

**Shadow rate (Wu & Xia)**
Investigating the sources of international spillovers

To what extent do spillovers depend on third-country & spillback effects?

US

Direct effect

Spillback effects

UK

Third-country effects

China

Euro Area
Case 1: shut down spillback effects

The US model is exogenous to developments in the rest of the world.
Investigating the sources of international spillovers

Case 2: shut down spillback and third-country effects

The US model is exogenous to developments in the rest of the world

Each country depends just on US developments
Drop in US policy rate

**Benchmark**

**No spillback effects**

**Direct effects**
Compression in US term spread

**Benchmark**

- Output growth
- Inflation
- Short-term rate
- Term spread
- NEER
- Real equity prices

**No spillback effects**

- Output growth
- Inflation
- Short-term rate
- Term spread
- NEER
- Real equity prices

**Direct effects**

- Output growth
- Inflation
- Short-term rate
- Term spread
- NEER
- Real equity prices
Investigating the sources of international spillovers on equity prices
Conclusions

Two views on international spillovers and FX regime

<table>
<thead>
<tr>
<th>Mundellian Trilemma</th>
<th>Global Financial Cycle</th>
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<tbody>
<tr>
<td>Flexible exchange rate economies are more insulated to external shocks</td>
<td>Flexible FX are not enough to insulate the economy</td>
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</table>

A GVAR to study the international transmission of US (un)conventional monetary policy

| Allow for full country heterogeneity | Account for third-country & spillback effects | Theory-based identification strategy (agnostic about spillovers) |

Results support the Global Financial Cycle’s view

| US monetary policy leads to high financial comovement (especially so with unconventional measures) | Weak evidence that flexible FX imply smaller spillovers |
Additional slides
GVAR diagnostics

Eigenvalues of the GVAR

Residual serial dependence

Residual cross-sectional dependence
Drop in US policy rate: country-level spillovers

Note: maximum absolute responses and associated 68% bands
Compression in US term spread: country-level spillovers

Note: maximum absolute responses and associated 68% bands
Comparing spillovers from UMP and CMP shocks

Output growth

Inflation

Short-term rate

Term spread

NEER

Real equity prices