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The views are those of the author and not necessarily reflective of those of the Federal Reserve Bank of New York or the Federal Reserve System.
Roadmap: International spillovers of prudential policies

✓ Project overview

✓ Policy lessons
“Prudential policies crossing borders” (December 2016) Claudia Buch, Matthieu Bussiere, and Linda S. Goldberg VoxEU

✓ Experience of Hong Kong
Kelvin Ho, Eric Wong and Edward Tan (IJCB)

✓ Experience of Canada
H. Evren Damar and Adi Mordel (IJCB)
Effectiveness?
- Desired consequences may be weakened by spillovers.
- Domestic and foreign entities may not be similarly impacted.
- There may be shifts outside regulatory perimeter to non-covered entities/activities.

Unintended consequences?
- Spillovers to other geographic regions

Large gaps exist in empirical evidence

The IBRN addresses gaps: Create a new database (with IMF), support range of country studies, conduct meta-analysis, policy implications.
Project Overview -2

Analytical issue # 1. Very few and very recent instances of macro-prudential policies. How can effects really be identified?

Solution: For analytical results, consider tools that operate similarly to macro-prudential tools.

Some prudential instruments have a long history, and operate on similar margins within banks, applied without macro-prudential label.

Need data on key instruments, with timing of changes.

Since international spillovers are target, need cross-country evidence.

IBRN and IMF together built a prudential instruments database.
IBRN and IMF database collaboration

- Covers 2000Q1 through 2014Q4. 64 countries.
- Contains 5 types of prudential instruments:
  - Countercyclical capital buffers
    - General capital requirements
    - Sector-specific capital requirements (split into real estate credit, consumer credit, and other)
  - Interbank exposure limits
  - Concentration limits
  - Loan-to-value ratio limits, and
  - Reserve requirements (local and foreign currency)

- Tightening is -1, loosening +1 (SSCB, RR take values between -3 and +5)

Analytical Issue #2: Country-specific case studies seldom generalize. Need lessons from broad set of experiences, with causality established.

**Careful experiment design**

- Determine channels of international spillovers through banks.
- Determine econometric tests for these spillovers.
  - Use identification through heterogeneity approach.
- Collaborate and coordinate efforts across multiple countries.
- Teams use confidential micro data and explore idiosyncratic issues.

**Perform ideal meta-analysis**

- Which bank features and data characteristics are associated with higher likelihood of significant international spillovers?
- Summarize results across countries.
Inward transmission through home global banks

Exposure-weighted foreign prudential policy

Foreign affiliates of home global bank

Foreign counterparty of home global bank

Foreign global bank

Foreign affiliates of home global bank

Foreign counterparts of home global bank in third countries

Regulation in the home country of a foreign global bank

Prudential policy by destination country of a loan

Foreign global bank in country $j$

Home global bank

Domestic affiliates of foreign global bank ($j$)

Regulation in the host country of affiliates of the foreign bank

Outward transmission through home global banks

Foreign global bank

Home global bank
<table>
<thead>
<tr>
<th>Types of Specification by Country</th>
<th><em>Inward transmission of...</em></th>
<th>Home policy via affiliates</th>
<th><em>Outward transmission of...</em></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exposure-weighted regulation through global banks</td>
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<td>Destination country policy through global banks</td>
</tr>
<tr>
<td>Canada</td>
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<td>✓</td>
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<tr>
<td>Chile</td>
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<td>France</td>
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<td>Germany</td>
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<td>Hong Kong</td>
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<td>Italy</td>
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<td>Mexico</td>
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<td>Netherlands</td>
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<td>Turkey</td>
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<td>United Kingdom</td>
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<td>✓</td>
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<tr>
<td>United States</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Total # countries</td>
<td>8</td>
<td>10</td>
<td>6</td>
</tr>
</tbody>
</table>
Meta-analysis of International Spillovers of Prudential Policy

1. Prudential instruments do sometimes spill over internationally through bank lending.

2. Not one-size-fits-all: Spillovers heterogeneous in size and direction
   - By prudential instrument
   - By bank business models (global bank, branch, subsidiary).
   - Banks with stronger balance sheets tend to reduce international lending by less when regulations tighten.
   - No clear difference between AEs and EMs, or by stage of business cycle

3. Market share repositioning occurs.

4. International spillovers on loan growth have not been large.
Policy Relevance: International Spillovers of Prudential Instruments

1. Spillovers increase challenges controlling credit growth.
2. But not one-size-fits-all, so the extent and direction of challenge not as clean as simple theoretical models would predict.
   • Institution-specific heterogeneity in amplitude and direction
   • Banking structure and FI strengths key to instrument effects
   • While spillovers are not yet large, potential for increase as tools are activated more.
3. Market share repositioning may result internationally.
   • Banks with stronger balance sheets reduce lending by less when regulations tighten, may expand international and domestic roles.
   • Is this a good or bad outcome? Micro- v. Macro-pru goals?

➢ Optimal designs and best approaches toward reciprocity are muddled.
International Banking and Cross-border Effects of Regulation: Lessons from Hong Kong SAR

Kelvin Ho, Eric Wong and Edward Tan
Hong Kong Monetary Authority

Hong Kong is an international financial centre with a strong presence of foreign banks. This provides a natural and suitable experimental setting to study the issue of inward spillovers, specifically how hosted foreign banks in HK (FBAs) adjust lending in response to tighter prudential policies imposed in their home countries.

The views and analysis expressed in this presentation are those of the authors, and do not necessarily reflect those of the Hong Kong Monetary Authority.
Inward transmission through domestic affiliates of foreign global banks

Dark green arrows show the directions of prudential policies in the dark green boxes. Blue boxes denote foreign global banks. Dot lines denote lending: blue one for intragroup loans and dark green dot arrow for the direction of lending influenced by respective prudential policy.
Data

- Panel data containing bank-level and country-level information
- 70 foreign banks with parent banks in 21 countries
- Quarterly data from 2000Q1 to 2014Q4
- Bank-level data:
  - Affiliate-level: Confidential regulatory data from the HKMA
  - Parent-level: Bankscope
- Country-level data:
  - Business and financial cycles: BIS
  - Prudential instruments: IBRN Prudential Instruments Database

<table>
<thead>
<tr>
<th>HomeP</th>
<th>Description of Prudential Instruments</th>
</tr>
</thead>
<tbody>
<tr>
<td>CapitalReq</td>
<td>Overall capital requirements</td>
</tr>
<tr>
<td>SSCB</td>
<td>Sector-specific capital buffers on real estate sector exposure</td>
</tr>
<tr>
<td>LTVCap</td>
<td>Loan-to-value ratio cap for mortgage loans</td>
</tr>
<tr>
<td>RRLocal</td>
<td>Reserve requirements on local currency deposits</td>
</tr>
</tbody>
</table>
Economic significance of differences in inward loan responses due to cross-sectional variation in balance sheet

Assume 2 banks, *high* and *low*, with the same set of bank characteristics except $X$:

$$X_{high} - X_{low} = \sigma_X \text{ (1 standard deviation of } X)$$

$\Delta Y_{high}$: Loan growth of the bank *high* with higher value of $X$

$\Delta Y_{low}$: Loan growth of the bank *low* with lower value of $X$

$\Delta Y_{high} - \Delta Y_{low}$: Difference in loan growth of the 2 banks

<table>
<thead>
<tr>
<th>$\Delta Y_{high} - \Delta Y_{low}$ (Difference in loan growth)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HomeP (Prudential Policies):</strong></td>
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<tr>
<td>Capital Requirements</td>
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<tr>
<td>----------------------</td>
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<tr>
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<tr>
<td>$X$ (Bank Characteristics):</td>
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<tr>
<td>Tier 1 Ratio</td>
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<tr>
<td>Illiquid Assets Ratio</td>
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<tr>
<td>Core Deposits Ratio</td>
</tr>
<tr>
<td>Net Due to(overseas offices) Ratio</td>
</tr>
</tbody>
</table>
Assessing the aggregate inward spillover effect of prudential measures on the Hong Kong banking sector

- Assume all countries simultaneously tighten the policy
- Estimated change in bank’s loans
  \[= \text{Estimated marginal effect of } HomeP \times \text{total loans at the end of 2014}\]
- **Aggregate marginal impact**
  \[= \frac{\text{Sum of the estimated change in loans of the affected FBAs}}{\text{Total amount of loans in the HK banking sector at the end of 2014}}\]

### Changes in lending as % of banking sector’s loans at the end of 2014

<table>
<thead>
<tr>
<th>Change in home-country prudential measure</th>
<th>Capital requirements</th>
<th>Sector-specific capital buffer</th>
<th>LTV cap</th>
<th>Reserve requirements on local currency deposits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contemporaneous change</td>
<td>-0.5%</td>
<td>0.2%</td>
<td>0.6%</td>
<td>2.8%</td>
</tr>
<tr>
<td>Three-quarter cumulative change</td>
<td>-4.1%</td>
<td>-3.9%</td>
<td>-0.8%</td>
<td>6.2%</td>
</tr>
</tbody>
</table>
Policy Relevance

• The set of balance sheet factors that influence the spillover transmission varies by prudential measures

• From a host supervisor’s perspective, understanding the balance sheet structure of the banking organisation of an FBA is important in assessing the international transmission of prudential policy

• Size of the spillover effects arising from changes in the overall capital requirements and reserve requirements are larger than that for sector-specific measures

• The relatively smaller spillover effects for sector-specific prudential measures can be partly explained by portfolio rebalancing across and within affiliates of international banks
International Banking and Cross-border Effects of Regulation: Lessons from Canada

Evren H. Damar
(Hobart and William Smith Colleges)
Adi Mordel
(Bank of Canada)

The views presented are solely those of the authors and may differ from official Bank of Canada views. No responsibility for them should be attributed to the Bank.
Inward transmission through home global banks

Inward transmission through domestic affiliates of foreign global banks

Outward transmission through home global banks

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- **Foreign economy**
  - Exposure-weighted foreign prudential policy
    - Foreign affiliates of home global bank
    - Foreign counterparty of home global bank
    - Home global bank

- **Domestic economy**
  - Regulation in the home country of a foreign global bank
    - Foreign global bank
    - Domestic affiliates of foreign global bank (j)
  - Prudential policy by destination country of a loan
    - Foreign affiliates of home global bank in country j
  - Third country exposure-weighted prudential policy (excl. the home and destination country)
    - Foreign counterparties of home global bank in third countries
  - Regulation in the host country of affiliates of the foreign bank
    - Home global bank

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**Inward transmission through home global banks**

**Inward transmission through domestic affiliates of foreign global banks**

**Outward transmission through home global banks**
The Outward Transmission Channel

Regulatory change in destination country (j) ($DestP_{j,t}$)

Canadian global bank (i)

Foreign affiliate in country (j) of Canadian bank (i)

Foreign lending to destination country (j)
Global Canadian Banks - Stylized Facts

- **Six banks that operate globally**
  - Active in 35 countries (2000:Q1-2013Q4)
  - Banks were mainly exposed to tightening episodes of prudential instruments.
    - Capital requirements, loan-to-value, reserve requirements

- **Relatively active internationally**
  - About 20% of their assets and liabilities are foreign.

- **Operate traditionally with capital buffers**
  - Min tier-1 ratio of 7% vs. Basel II min of 4%
  - Min total capital ratio of 10% vs. Basel II min of 8%
What Do We Find?

- Spillovers are heterogeneous and may lead to market share repositioning

- When the prudential index tightens, foreign lending rises
  - Strongest effect for capital requirements

- Bank characteristics matter
  - Banks with higher tier-1 ratios lend more,
  - And so do banks that are more internationally active

- ...but so does their business model
  - Lower increase in foreign lending when done mainly via affiliates
  - Banks with an active cross-border channel may better adjust
The impact of prudential policy tightening on Canadian bank lending abroad

- **Overall effect**: 3.5%  
  - $200 million
- **If lending mainly via an affiliate**: 3.0%  
  - $175 million
- **For better capitalized banks (extra 100bps in tier-1 ratio)**: 1.5%  
  - $90 million
- **When capital req. are tightened**: 10.5%  
  - $600 million
Thank You!