Domestic and Multilateral Effects of Capital Controls in Emerging Markets

Pasricha, Falagiarda, Bijsterbosch, Aizenman
NBER WP. No. 20822
7 March 2015

*The views expressed in the paper are those of the author(s). No responsibility for them should be attributed to the Bank of Canada, the European Central Bank or the NBER.*
Ongoing policy debate on capital controls

- Controls *could* stem large and volatile inflows in recipient country
- But may have *spillover effects* on other emerging markets

"Emerging markets that have implemented capital controls ... have deflected such flows towards economies with no controls in place, thereby creating political tension."

— Manuel Ramos-Francia
Deputy Governor, Bank of Mexico

Artist: Martin Bijsterbosch (inspired by an illustration in the Economist).
This paper addresses two questions

- What are the **domestic effects** of capital controls?

- What are their **multilateral** (spillover) effects?
Contributions to the literature

1. **New dataset**, captures actual policy changes for 18 EMEs, 2001-2011
   - Weight changes to increase cross-country comparability

2. **Domestic effects:**
   - Most existing studies assess impact of capital controls:
     - One variable at a time (e.g.: NKI)
     - One country at a time (country-specific VARs)
     - Inclusion of variables in VARs often ad-hoc
   - We use panel VARs, and base methodology on the impossible trinity

3. **Multilateral (spillover) effects:**
   - Literature is limited. Existing studies:
     - Assess only Brazil’s controls and/or only post crisis period (Forbes et al. 2012; Lambert et al. 2011)
     - Do not capture policy changes well (Giordani et al., 2014; Beirne and Friedrich, 2014)
   - We assess spillovers of **all BRICS’ capital controls**, pre- and post-global financial crisis
New dataset: changes in capital controls

- Data points: Each change in a capital account regulation: “Policy changes/announcements”. Total 748 changes
- Data Sources: IMF’s AREAER, regulators’ websites, news sources
- Data coverage: 18 EMEs, 2001Q1-2011Q4
  - Extended version of Pasricha (NAJEF, 2012) and Aizenman and Pasricha (JIMF, 2013)
- Changes are weighted to increase cross-country comparability:
  - A tightening of FDI outflows is weighted by FDI assets/total international assets
  - IIP shares from Lane and Milesi-Ferretti (2007)
What does the dataset look like?

<table>
<thead>
<tr>
<th></th>
<th>Country</th>
<th>India</th>
<th>Brazil</th>
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</thead>
<tbody>
<tr>
<td>2.</td>
<td>Policy Change</td>
<td>Foreign institutional investors (FIIs) allowed to invest USD 2.6 billion in government securities (raised from USD 2 billion).</td>
<td>A 2% tax on capital inflows to both equity and bond markets.</td>
</tr>
<tr>
<td>3.</td>
<td>Announcement Date</td>
<td>19-Jan-07</td>
<td>20-Oct-09</td>
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<td>4.</td>
<td>Effective Date</td>
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<td>20-Oct-09</td>
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<td>5.</td>
<td>Inflow/Outflow</td>
<td>Inflows</td>
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<td>6.</td>
<td>Easing/Tightening</td>
<td>Easing (+1)</td>
<td>Tightening (-1)</td>
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<td>9.</td>
<td>IIP Assets or Liabilities</td>
<td>Liabilities</td>
<td>Liabilities</td>
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<tr>
<td>10.</td>
<td>IIP Category</td>
<td>Portfolio investment: Debt</td>
<td>Portfolio Investment</td>
</tr>
<tr>
<td>11.</td>
<td>Weight (excl. FDI)</td>
<td>0.041</td>
<td>0.83</td>
</tr>
</tbody>
</table>
Methodology: count number of weighted measures per quarter

- EMEs introduced each type of measure in the average quarter
- Need measures of net direction of policy

Note: We exclude measures related to FDI. All CCA measures in the figure are weighted measures.
Economic classification of capital control changes

\[
\begin{align*}
\text{Inflow tightenings} & \quad - \quad \text{Inflow easings} & = & \quad \text{Net inflow tightening measures} \\
\text{Outflow easings} & \quad - \quad \text{Outflow tightenings} & = & \quad \text{Net outflow easing measures}
\end{align*}
\]
Economic classification of capital control changes

\[
\text{Inflow tightenings} - \text{Inflow easings} = \text{Net inflow tightening measures}
\]

\[
\text{Outflow easings} - \text{Outflow tightenings} = \text{Net outflow easing measures}
\]

NKI reducing measures - NKI increasing measures

ROBUSTNESS CHECKS
What are the domestic effects of capital controls?
Methodology is based on the “impossible trinity”

Policy choice: Fully flexible exchange rate

Policy choice: Financially closed system.

Policy choice: Monetary union or currency board

Source: Aizenman, Chinn and Ito (2008)
Methodology is based on the impossible trinity

- **Baseline model:** Panel VAR

- **Endogenous variables:**
  - Net Inflow Tightenings
  - Net Outflow Easings
  - Net Capital Inflows (NKI/GDP)
  - Absolute covered interest rate differentials (monetary policy autonomy)
  - Change in spot exchange rates vis-à-vis the US dollar

- **Exogenous variables:**
  - Global GDP growth
  - S&P500 stock price growth
  - US Inflation
  - QE and crisis dummies

- **Sample:** 18 EMEs during 2001Q1-2011Q4
Expected IRFs if controls have domestic effects

- Inflow tightening measures
- Net capital inflows
- CIR differential
- Δ Exchange rate vs USD
Baseline model: No escape from trilemma

- **Net Inflow Tightenings:**
  - No impact on NKI
  - Increase monetary policy autonomy
  - But strengthen currency

- **Net Outflow Easings:**
  - No significant impact on any variable (or significant with wrong sign)
Summary - Domestic effects

- No evidence of success in achieving a trilemma configuration of more monetary policy autonomy and weaker exchange rate. Similar conclusions:
  - Pre- and post-crisis
  - Gates vs. walls (India and China)
  - TPVAR: high and low NKI regimes

- Prudential measures do not lead to significant responses in exchange rates and CID

- Robust to:
  - Lag changes and certain ordering changes
  - Additional controls: GDP growth, VIX, business cycles, etc.
  - NKI reducing/increasing measures
  - Alternative measure of monetary policy autonomy
  - BRICS only; excluding two most active countries
What are the multilateral effects of capital controls?
How do we measure multilateral effects?

- Assume that multilateral effects stem from BRICS countries
- **Construct a variable for multilateral effects:**
  - For BRICS: the sum of the number of capital control changes in other BRICS
  - For non-BRICS: the number of capital control changes in the regional BRICS country (i.e. Brazil for Latin-America, China/India for Asia, etc)
- **Use this variable** in baseline model (instead of own controls)
- **Near-PVAR:** foreign capital control changes are exogenous
Significant multilateral effects

- **Foreign Inflow Tightenings:**
  - Increase NKI
  - Appreciate exchange rate

- **Foreign Outflow Easings:**
  - Increase NKI
  - Appreciate exchange rate
Spillovers larger post-crisis

Shock to: **Foreign inflow tightening measures**

**Pre-Crisis**

**Post-Crisis**
Stronger spillovers in Latin America

Shock to: BRICS’ inflow tightening measures

Brazil on Latin America

China/India on Asia
Other interesting results – multilateral effects

- India most insulated of BRICS; Russia and South Africa most exposed to foreign capital control shocks
- Foreign inflow tightening measures explain more variation in other variables than foreign outflow easings
- Banking (other) and portfolio inflows respond more
- Robustness checks similar to those for domestic effects
Conclusions
Multilateral effects matter

- **New dataset** provides detailed information on capital control policies in EMEs:
  - EMEs have used outflow liberalization as tool to manage NKI surges

- No evidence of effectiveness of changes in **domestic capital controls**:
  - Some impacts on the exchange rate and the interest rate differential but no escape from the trilemma

- **Multilateral effects** are important:
  - Clear evidence of spillovers from large EMEs for exchange rates, interest rate differentials and capital flows
  - Largest impacts on other (bank) inflows and portfolio inflows
Questions and Comments?
Appendix
What are capital controls?

- **Narrow definition**: Regulations on international capital transactions that discriminate based on residency of transactor.
  
  Example:
  - Brazil: 6% tax on non-residents’ investments in Brazilian fixed income securities (until June 2013)

- **Broader definition (capital flow measures, CFMs)**: Regulations on international capital transactions that discriminate based on residency or currency of transaction.
  
  Example:
  - Turkey: higher reserve requirements on foreign currency deposits
Old measures of capital controls

- De-jure indices of capital controls
  - Chinn and Ito, 2008; Quinn, 1997; Edwards, 2004
  - Use information on existence of regulations
  - Low frequency (annual) databases
  - Poor measurement. Is China more open than India?

- This paper: changes in regulation.
Changes are weighted to increase cross-country comparability

- “Small” changes. Major policy announcements split by:
  - asset class (portfolio, FDI, etc.)
  - type (price/quantitative/monitoring)

- As weights, we use the share of a country’s international assets or liabilities that the measure is designed to influence
  - A tightening of FDI outflows is weighted by FDI assets/total international assets
  - IIP shares from Lane and Milesi-Ferretti (2007)
What does the dataset look like?

<table>
<thead>
<tr>
<th>1. Country</th>
<th>India</th>
<th>Peru</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Policy Change</td>
<td>Foreign institutional investors (FIIs) allowed to invest USD 2.6 billion in government securities (raised from USD 2 billion).</td>
<td>Marginal reserve requirement rate on foreign currency deposits and on operations indexed to the exchange rate raised from 35% to 45%.</td>
</tr>
<tr>
<td>3. Announcement Date</td>
<td>19-Jan-07</td>
<td>18-Jul-10</td>
</tr>
<tr>
<td>4. Effective Date</td>
<td>19-Jan-07</td>
<td>1-Aug-10</td>
</tr>
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<td>6. Easing/Tightening</td>
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<td>Tightening (-1)</td>
</tr>
<tr>
<td>7. Capital Control/ Currency Based?</td>
<td>Capital Control</td>
<td>Currency Based: Prudential Type</td>
</tr>
<tr>
<td>8. Quant/Price/Monitoring</td>
<td>Quantitative</td>
<td>Price</td>
</tr>
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<td>9. IIP Assets or Liabilities</td>
<td>Liabilities</td>
<td></td>
</tr>
<tr>
<td>10. IIP Category</td>
<td>Portfolio investment: Debt</td>
<td>Other Investment: Currency and Deposits</td>
</tr>
<tr>
<td>11. Weight (excl. FDI)</td>
<td>0.041</td>
<td>0.485</td>
</tr>
<tr>
<td>12. Source</td>
<td>SEBI Circular No. IMD/FII/25/2007</td>
<td>Verified by CB of Peru; The Free Library; AREAER</td>
</tr>
</tbody>
</table>
Economic classification of capital control changes

Inflow tightenings - Inflow easings = Net inflow tightening measures

+ +

Outflow easings - Outflow tightenings = Net outflow easing measures

II II

NKI reducing measures - NKI increasing measures = Net NKI Restricting Measures

ROBUSTNESS CHECKS

SUMMARY MEASURE
Net inflow tightening measures peaked in 2010

Note: Net easing of outflow controls is the difference between outflow easing CCAs and outflow tightening CCAs. Net tightening of inflow controls is analogously defined. We exclude measures related to FDI. All CCA measures in the figure are weighted measures.
Net NKI restricting measures mirror developments in capital flows

Note: Net private capital inflows exclude FDI flows and government and monetary authority transactions from “other” inflows and outflows. Net NKI restricting measures is the difference between NKI reducing capital control actions (inflow tightenings and outflow easings) and NKI increasing actions (inflow easings and outflow tightenings). All measures are weighted. We exclude capital controls related to FDI.
EMEs introduced both NKI reducing and NKI increasing measures in each year

Note: NKI reducing measures is the sum of inflow tightening capital control actions (CCAs) and outflow easing CCAs. NKI increasing measures is the sum of inflow easing CCAs and outflow tightening CCAs. All CCAs are weighted. We exclude CCAs related to FDI.
Prior to 2009, NKI reducing measures consisted primarily of outflow easings.

Note: NKI reducing measures is the sum of inflow tightening capital control actions (CCAs) and outflow easing CCAs. We exclude CCAs related to FDI. All measures in the figure are weighted measures.
Weighted and un-weighted changes in capital controls follow similar patterns over time.

Including FDI-related measures

Excluding FDI-related measures

- All Measures (% of total measures in all years)
- Weighted Measures (% of total weighted measures in all years)
Majority of NKI increasing measures were inflow easings

Note: NKI reducing measures is the sum of inflow tightening capital control actions (CCAs) and outflow easing CCAs. We exclude CCAs related to FDI. All measures in the figure are weighted measures.
Net inflow tightening measures peaked in 2010

Note: Net easing of outflow controls is the difference between outflow easing CCAs and outflow tightening CCAs. Net tightening of inflow controls is analogously defined. We exclude measures related to FDI. All CCA measures in the figure are weighted measures.
More details on our empirical approach: Models

- **Baseline model domestic capital controls:**
  - Panel VAR
  - Number of lags: 2 quarters (using standard selection criteria)
  - Estimated using OLS
  - IRFs and error bands computed using Monte Carlo simulation with 1000 draws

- **Baseline model multilateral effects:**
  - Near-VAR: foreign capital control changes do not react to other variables in the system
  - Panel and country-specific
  - Number of lags: 2 quarters
  - Estimated using SUR
  - IRFs and error bands computed using Gibbs sampling with 25000 draws

- **Shock identification:** Choleski, with capital control changes ordered first, then financial variables, then capital flows.
More details on our empirical approach: Data

- **Endogenous variables:**
  - Capital control changes: number of net inflow tightening and net outflow easing measures
  - Exchange rates vis-à-vis the US dollar: in quarterly percentage changes (increase = depreciation local currency)
  - (Covered) interest rate differentials: 3-month interbank rates vis-à-vis the US dollar LIBOR, in percentage points
  - Capital flows: “hot” NKI as percentage of GDP

- **Exogenous variables:**
  - Global GDP growth (yoy): in percentage points
  - S&P index growth (yoy): in percentage points
  - US inflation (yoy): in percentage points
  - Crisis dummy: takes on value of 1 in 2008Q1 – 2009Q2 for all countries and in 2000Q1 – 2003Q4 for Argentina and Turkey
# Expected Signs: Domestic Effects

<table>
<thead>
<tr>
<th>Shock to</th>
<th>Net Inflow Tightening</th>
<th>Net Outflow Easing</th>
<th>NKI</th>
<th>Absolute CID</th>
<th>Exchange rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact on: Net Inflow Tightening</td>
<td>0</td>
<td>+</td>
<td>+/-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Net Outflow Easing</td>
<td>0</td>
<td>+</td>
<td>+/-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Net Capital Inflows (NKI)</td>
<td>-</td>
<td>-</td>
<td>+/-</td>
<td>+/-</td>
<td>+/-</td>
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<tr>
<td>Absolute Covered Interest differential (CID)</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+/-</td>
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<tr>
<td>Spot exchange rate</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+/-</td>
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</tbody>
</table>

Note: + indicates an expected positive impact, - an expected negative impact, 0 no expected impact, and +/- indicates the impact could be either positive or negative.
Pre- and post-crisis differences, but trilemma rules

Pre-crisis, 2003Q1-2007Q4
Depreciation but lower CID

Post-Crisis, 2008Q1-2011Q4
Higher CID but appreciation
Baseline model: No escape from trilemma
### Expected Signs: Multilateral Effects

<table>
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<th>Net Outflow Easing</th>
<th>NKI</th>
<th>Absolute CID</th>
<th>Exchange rate</th>
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</thead>
<tbody>
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<td>Impact on:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreign Net Inflow Tightening</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Foreign Net Outflow Easing</td>
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<td>0</td>
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<tr>
<td>Net Capital Inflows (NKI)</td>
<td>+</td>
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<tr>
<td>Absolute Covered Interest differential (CID)</td>
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Note: + indicates an expected positive impact, - an expected negative impact, 0 no expected impact, and +/- indicates the impact could be either positive or negative.
Significant multilateral effects
Spillovers to BRICS exchange rates larger than to non-BRICS

Shock to: Inflow tightening measures

Non-BRICS

BRICS

NKI/GDP

Exchange rate
Spillovers to BRICS larger than to non-BRICS

Shock to: Foreign outflow easing measures

Non-BRICS

BRICS

NKI/GDP

Exchange rate

-4

-2

0

2

-2

0

2
Spillovers larger post-crisis

Shock to: Outflow easing measures

Pre-Crisis vs. Post-Crisis graphs comparing NKI/GDP and Exchange rate.
Country-specific models for multilateral effects

- Example: Model for **Mexico** with capital control changes in **Brazil**
- Brazilian NKI reducing measures:
  - increase NKI to Mexico
  - appreciate Mexico’s exchange rate

=> **Similar picture** for many other country combinations
Among BRICS, spillovers least important for India, most for Russia and South Africa

<table>
<thead>
<tr>
<th></th>
<th>NKI/GDP</th>
<th>CIR differential</th>
<th>Exchange rate</th>
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<tbody>
<tr>
<td></td>
<td>Net inflow</td>
<td>Net outflow</td>
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<td>ZAF</td>
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<td>Y</td>
<td>(Y)</td>
</tr>
</tbody>
</table>

Y = significant impact with expected sign; (Y) = significant impact with expected sign with delay; N = no significant impact; (N) = significant impact with unexpected sign.
References

This paper:


Others: