Domestic and Multilateral Effects of Capital Controls in Emerging Markets

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Ongoing policy debate on capital controls

Artist: Martin Bijsterbosch (inspired by an illustration in the Economist).

- 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

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?

1.	Country	India	Brazil
2.	Policy Change	**Foreign institutional investors** (FIIs) allowed to invest USD 2.6 billion in government securities (raised from USD 2 billion).	A 2% **tax on capital inflows** to both equity and bond markets.
3.	Announcement Date	19-Jan-07	20-Oct-09
4.	Effective Date	19-Jan-07	20-Oct-09
5.	Inflow/Outflow	Inflows	Inflows
6.	**Easing/Tightening**	**Easing (+1)**	**Tightening (-1)**
9.	IIP Assets or Liabilities	Liabilities	Liabilities
10.	IIP Category	Portfolio investment: Debt	Portfolio Investment
11.	**Weight (excl. FDI)**	**0.041**	**0.83**
12.	Source	SEBI Circular No. IMD/FII/25/2007	Financial Times, Reuters

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**
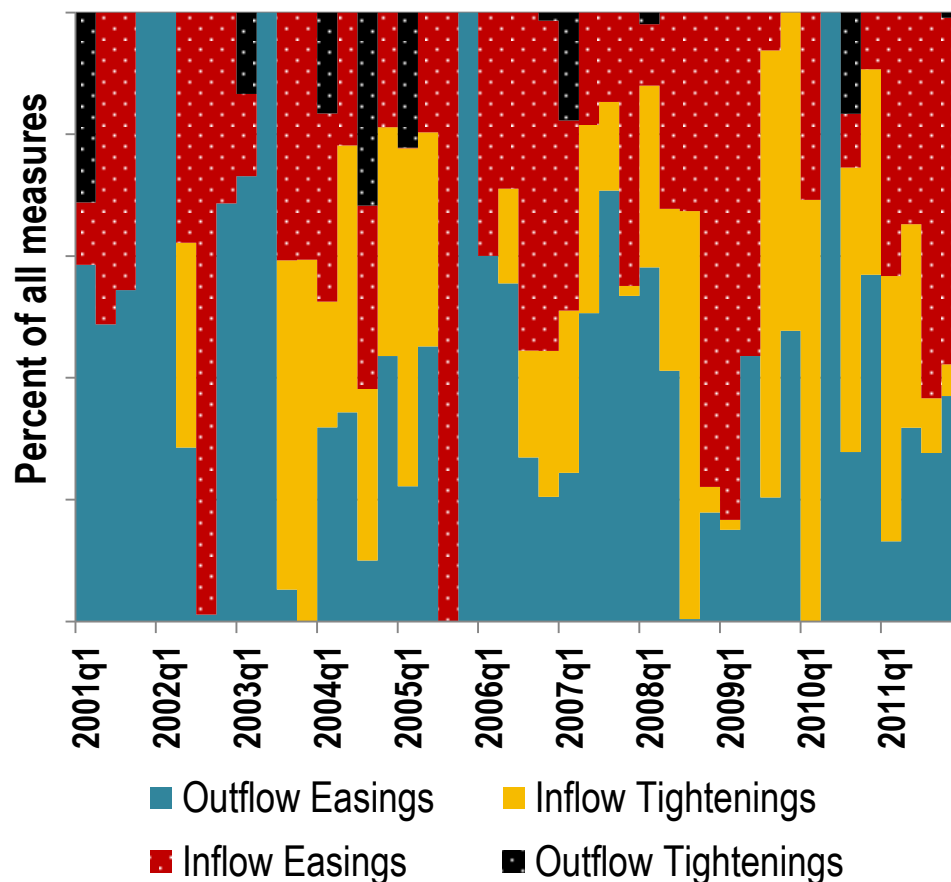
Note: We exclude measures related to FDI. All CCA measures in the figure are weighted measures.

Economic classification of capital control changes

Inflow tightenings   **-**   Inflow easings   **=**   **Net inflow tightening measures**

Outflow easings   **-**   Outflow tightenings   **=**   **Net outflow easing measures**

BASELINE

Economic classification of capital control changes

Inflow tightenings	-	Inflow easings	=	**Net inflow tightening measures**	B
+		**+**			A
					S
					E
Outflow easings	-	Outflow tightenings	=	**Net outflow easing measures**	L
					I
‖		‖			N
					E
NKI reducing measures		**NKI increasing measures**			

ROBUSTNESS CHECKS

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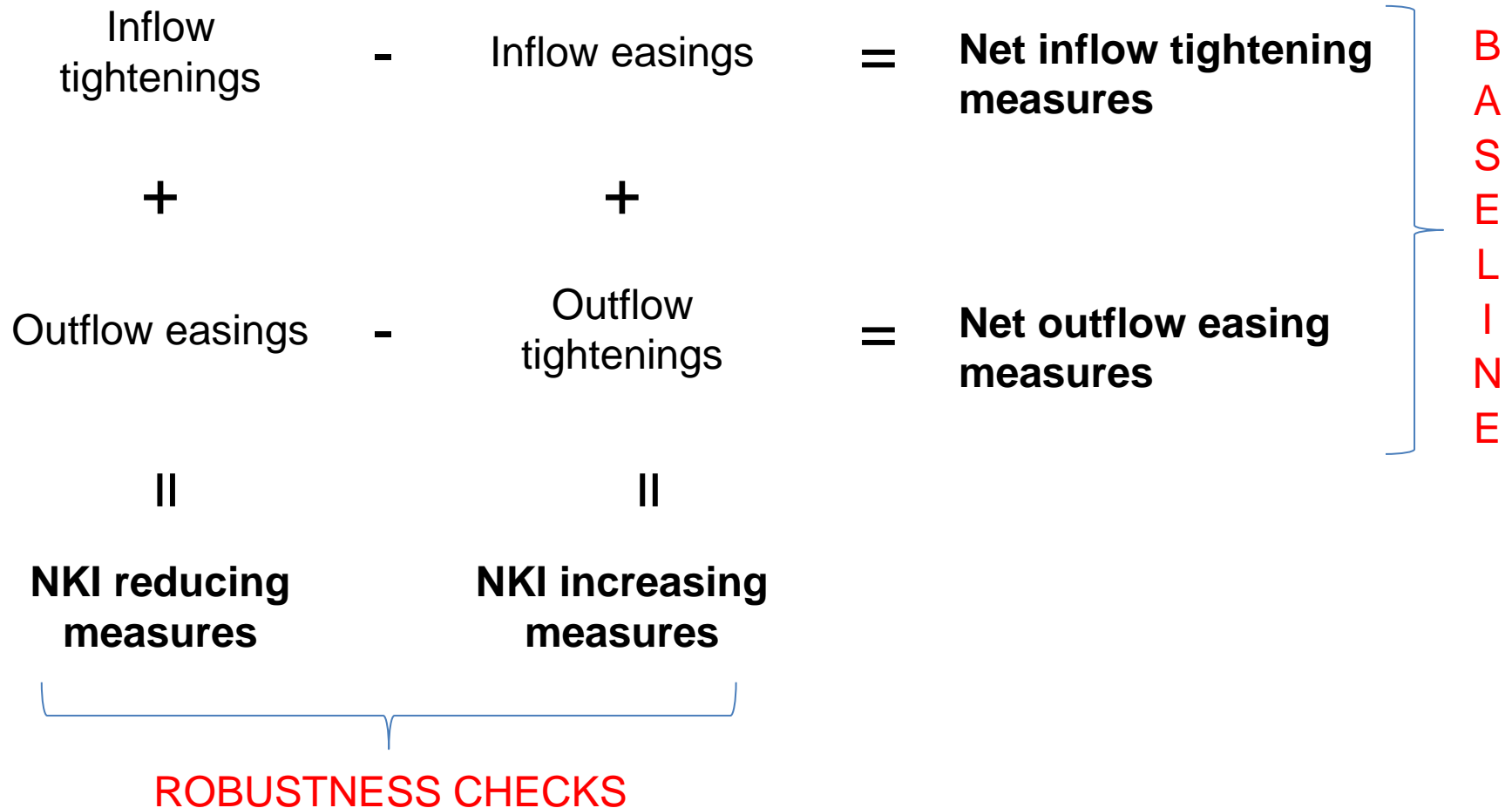
What are the domestic effects of capital controls?

Methodology is based on the "impossible trinity"

Policy choice: Fully
flexible exchange rate

Monetary Policy Independence

Financial Market Openness

Policy choice:
Financially
closed system.

Exchange Rate Stability

Policy choice:
Monetary union or
currency board
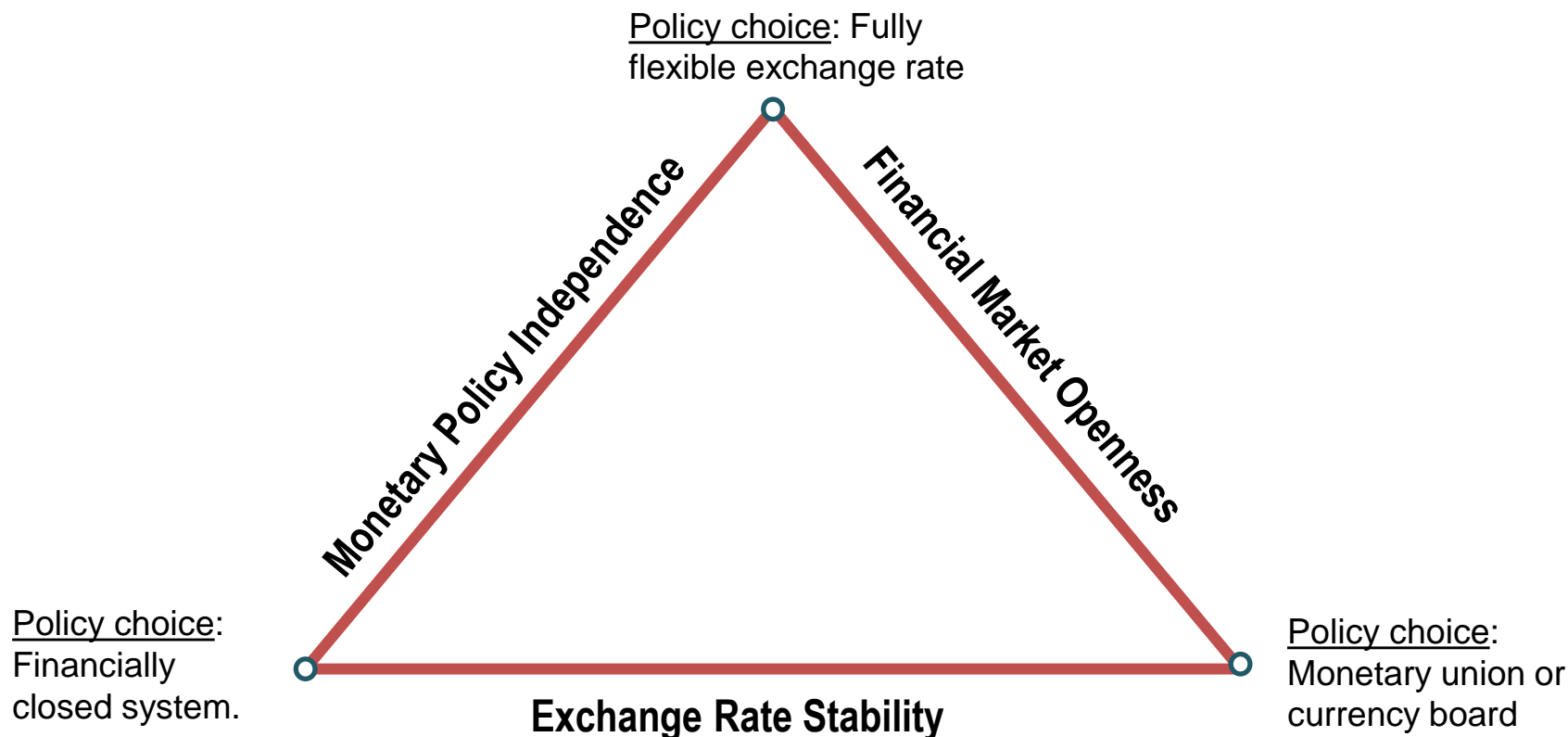
Source: Aizenman, Chinn and Ito (2008)

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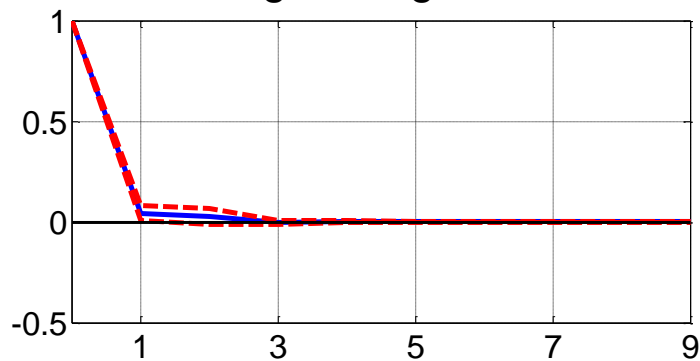
Net capital inflows
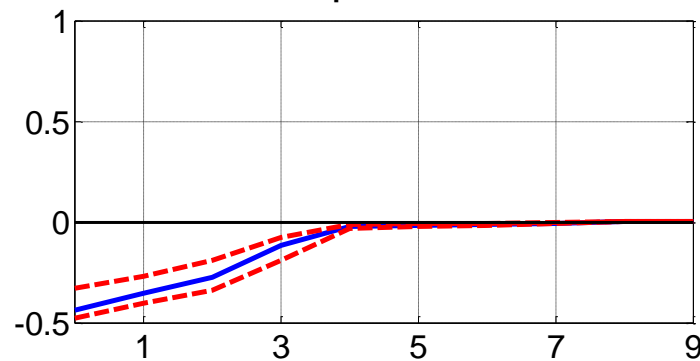
CIR differential
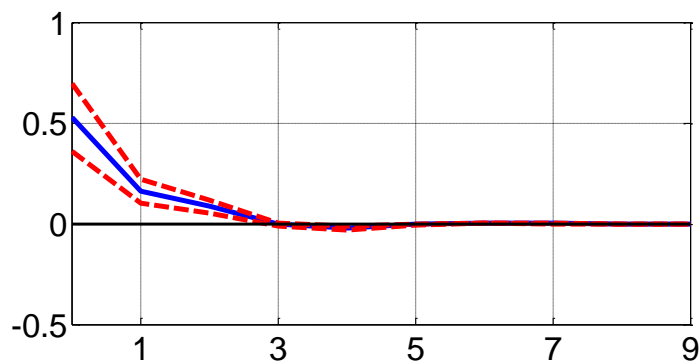
Δ Exchange rate vs USD
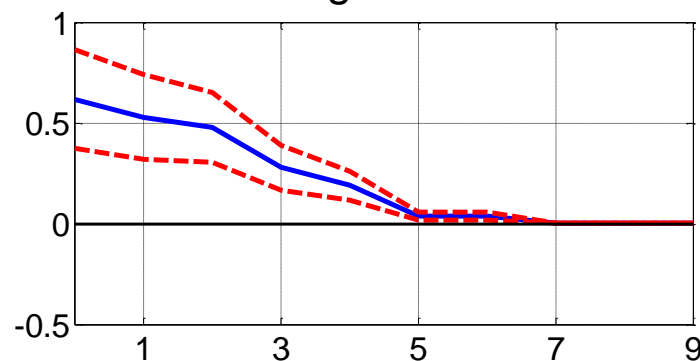
Baseline model: No escape from trilemma

- **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)

Inflow Tightenings — Outflow Easings

(NKI/GDP, CID, Exchange rate)
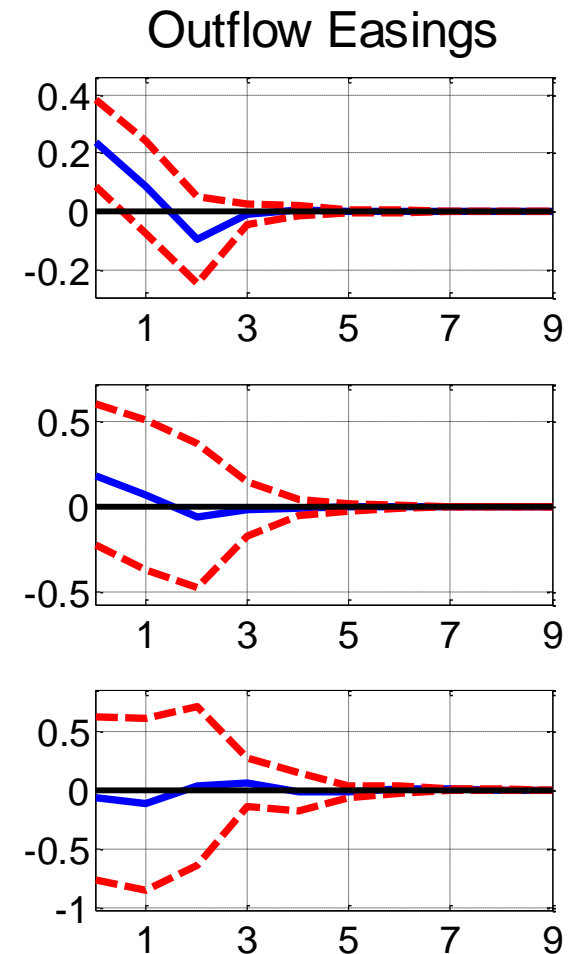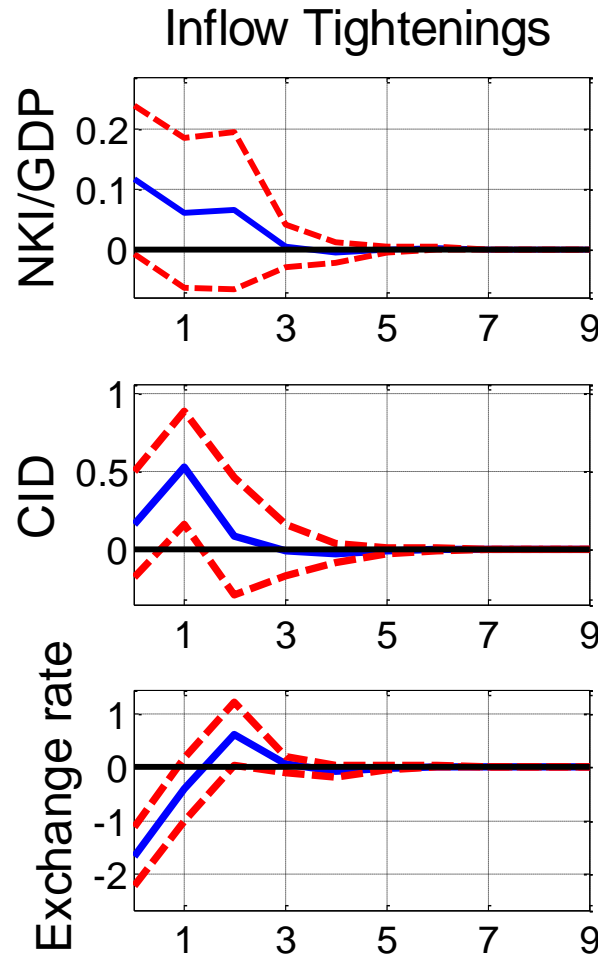
Summary - Domestic effects

- 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
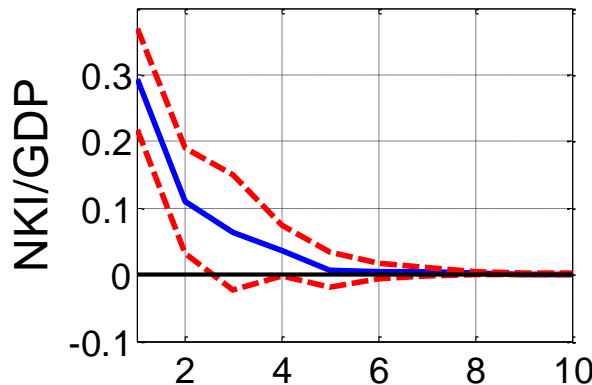 - Appreciate exchange rate

- **Foreign Outflow Easings:**
  - Increase NKI
  - Appreciate exchange rate
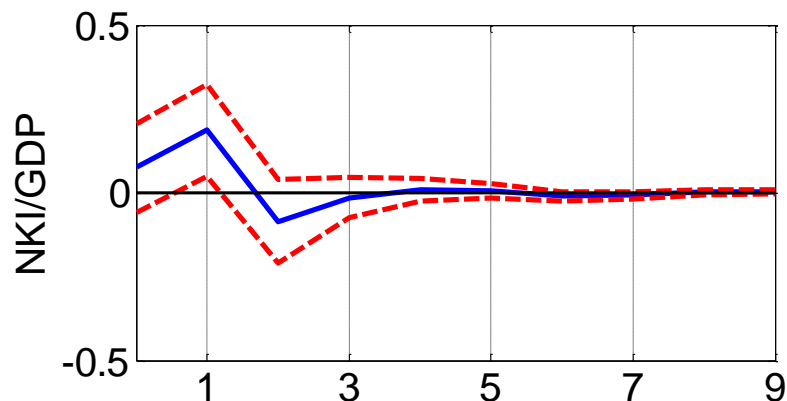
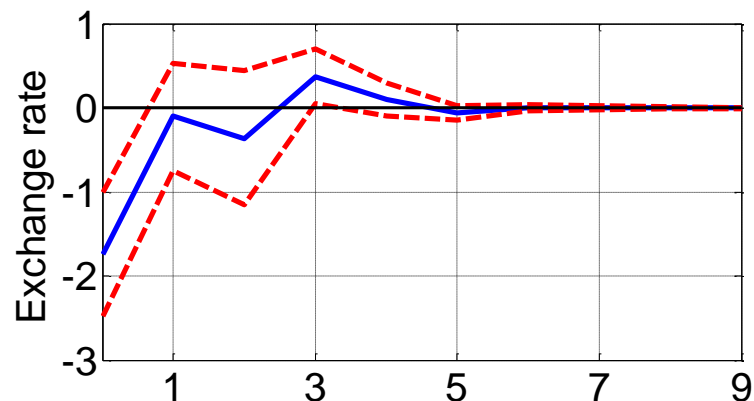Shock to:

Foreign inflow tightenings   Foreign outflow easings
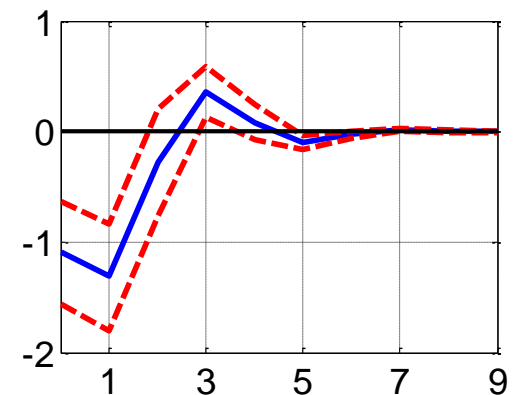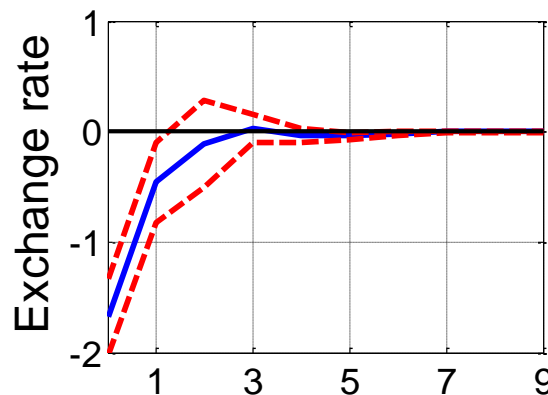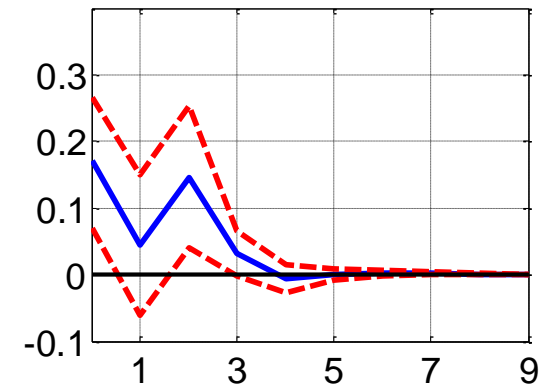
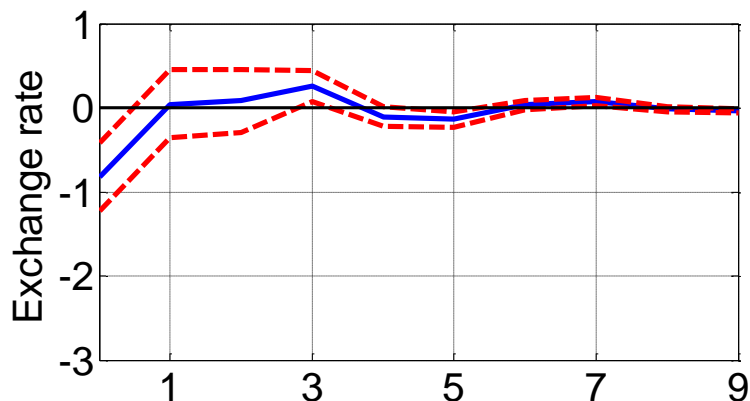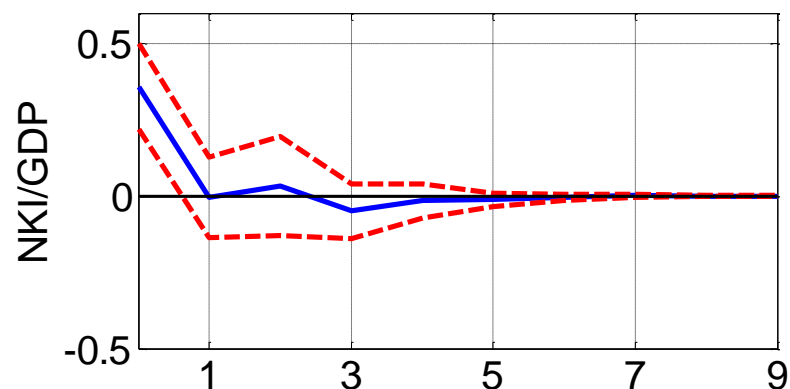# Spillovers larger post-crisis

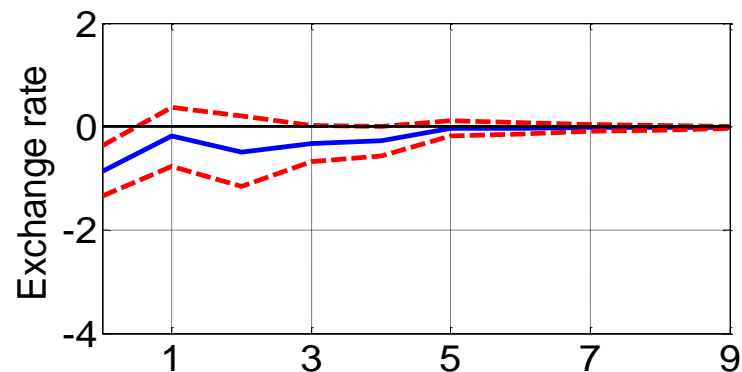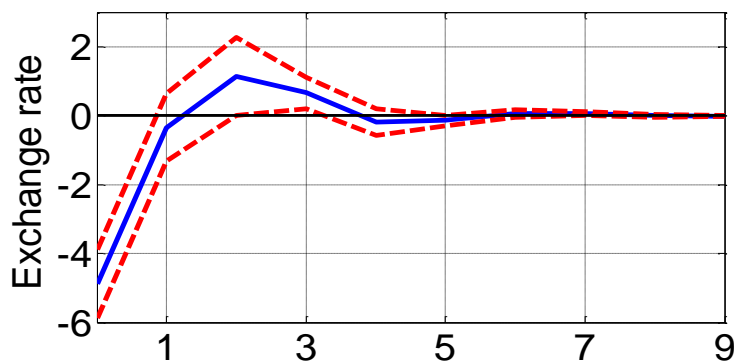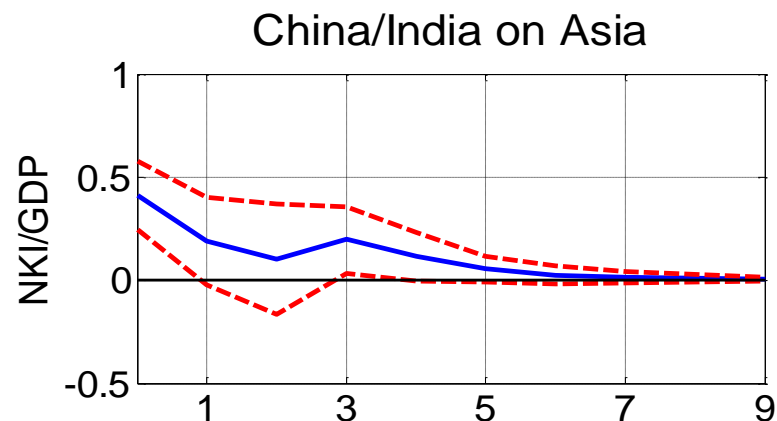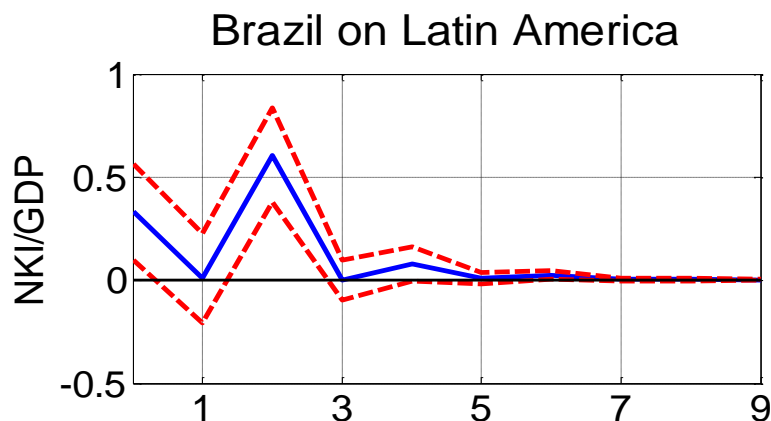Shock to: **Foreign inflow tightening measures**

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?
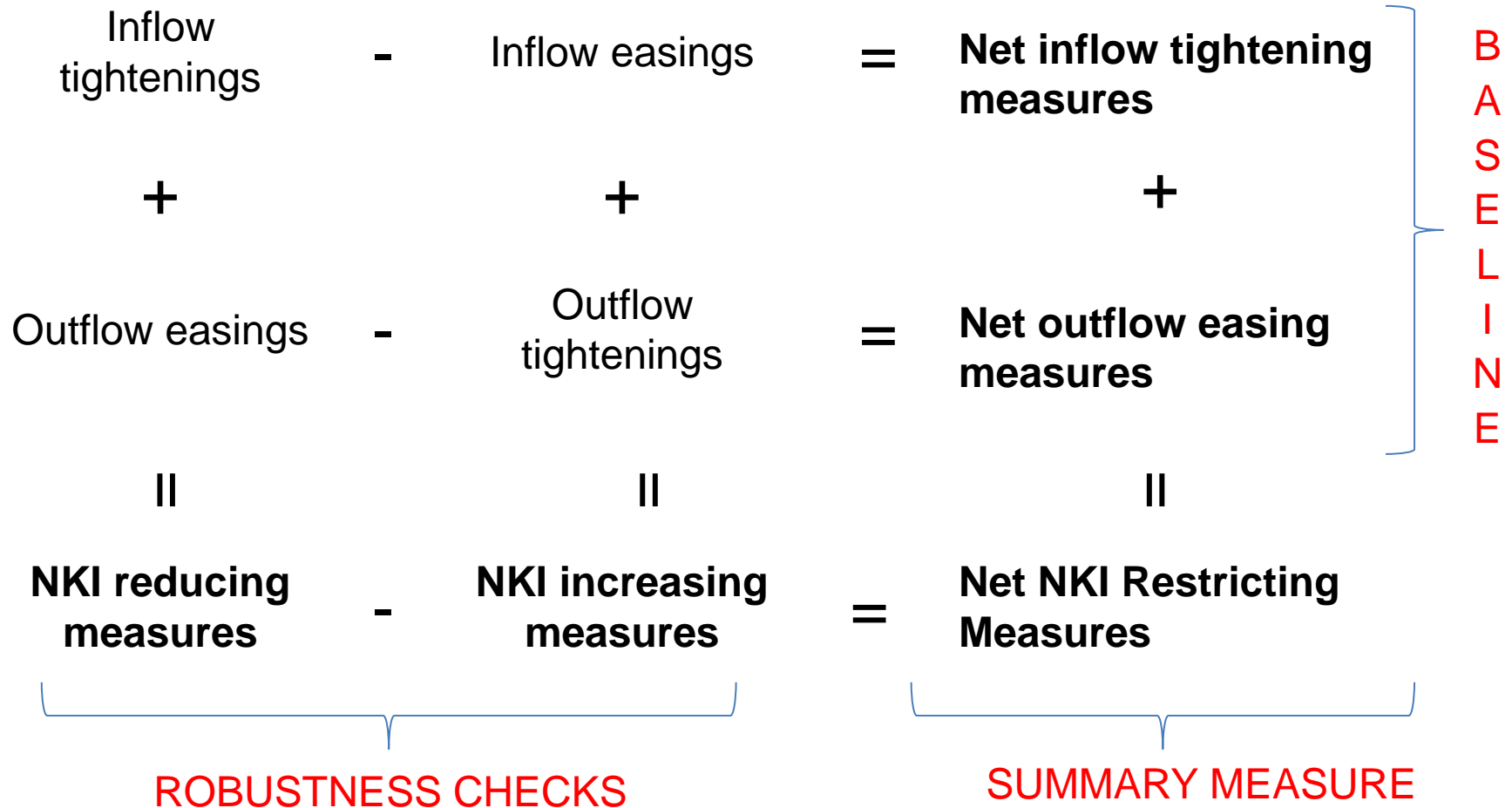
- **This paper: changes in regulation.**

Chinn-Ito Index of De-Jure Capital Account Openness

Legend: Brazil, China, India, Russia
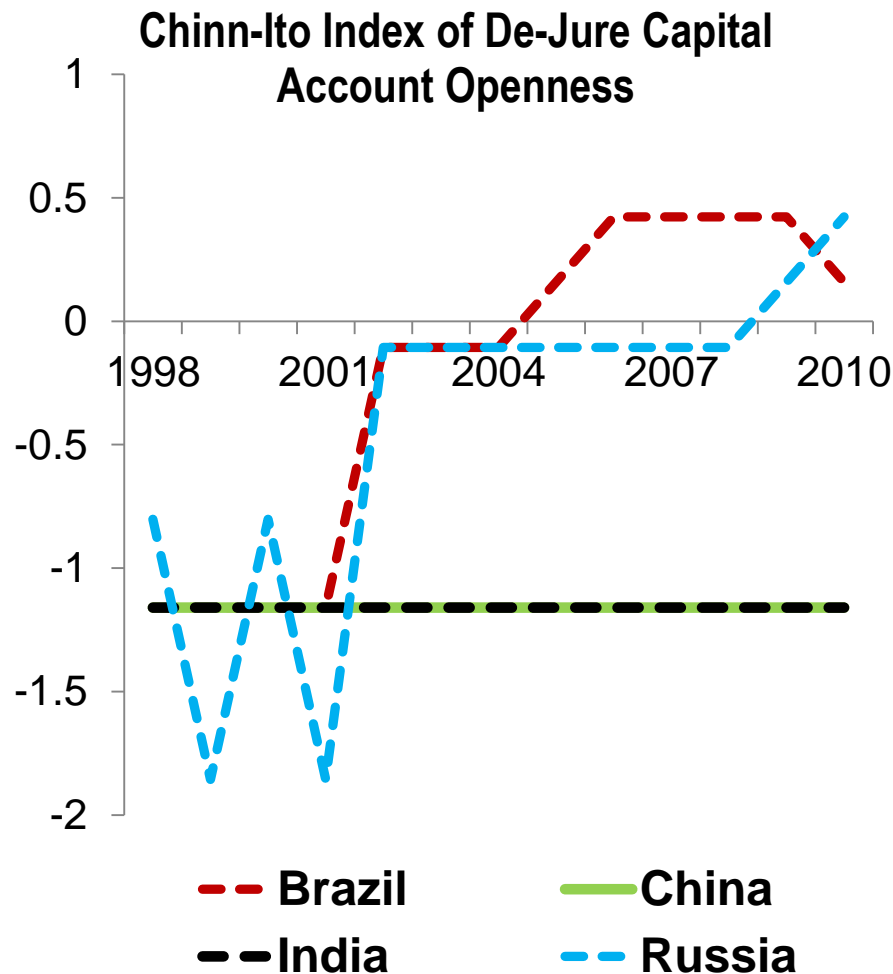
Changes are weighted to increase cross-country comparability

- "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

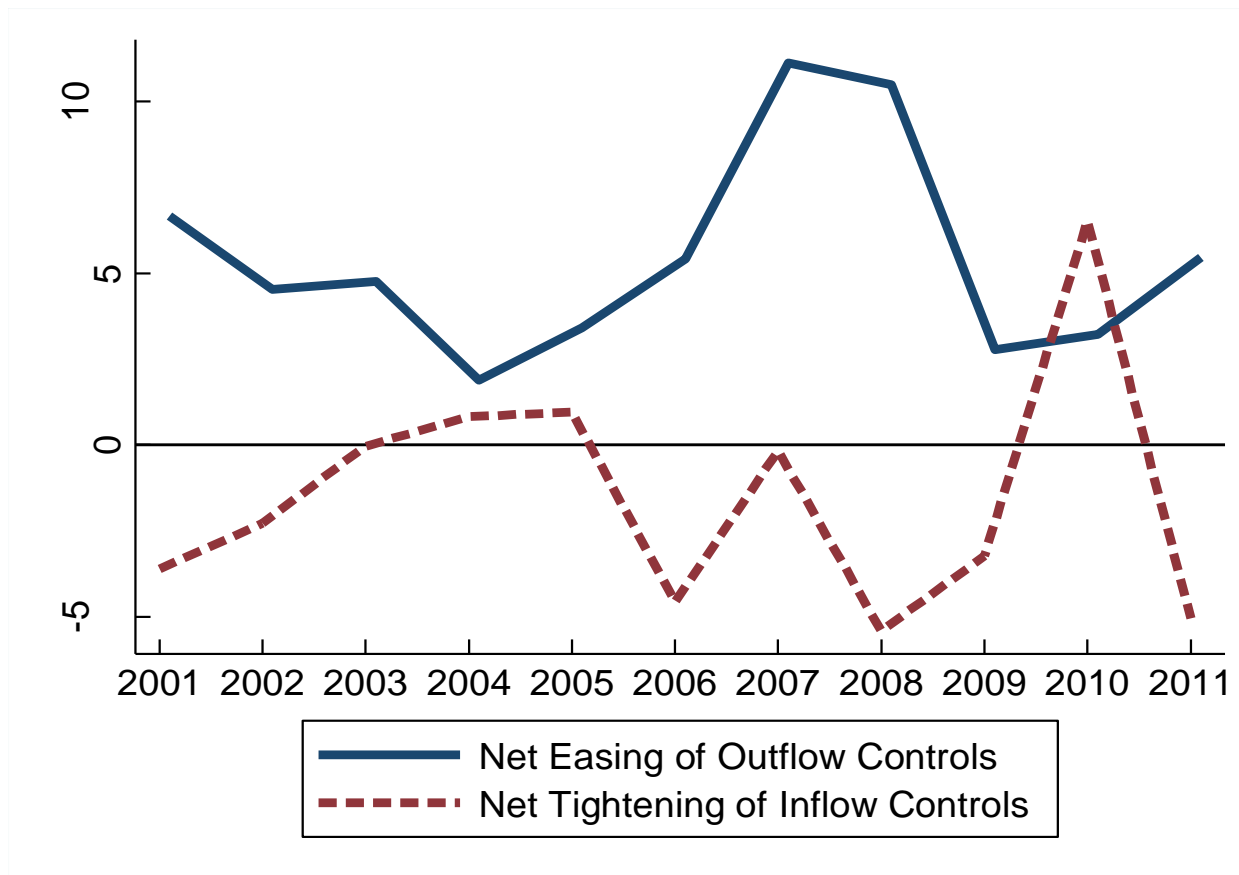 – IIP shares from Lane and Milesi-Ferretti (2007)

What does the dataset look like?

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

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Economic classification of capital control changes

Inflow tightenings	−	Inflow easings	=	**Net inflow tightening measures**
+		**+**		**+**
Outflow easings	−	Outflow tightenings	=	**Net outflow easing measures**
‖		‖		‖
NKI reducing measures	−	**NKI increasing measures**	=	**Net NKI Restricting Measures**

B A S E L I N E

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
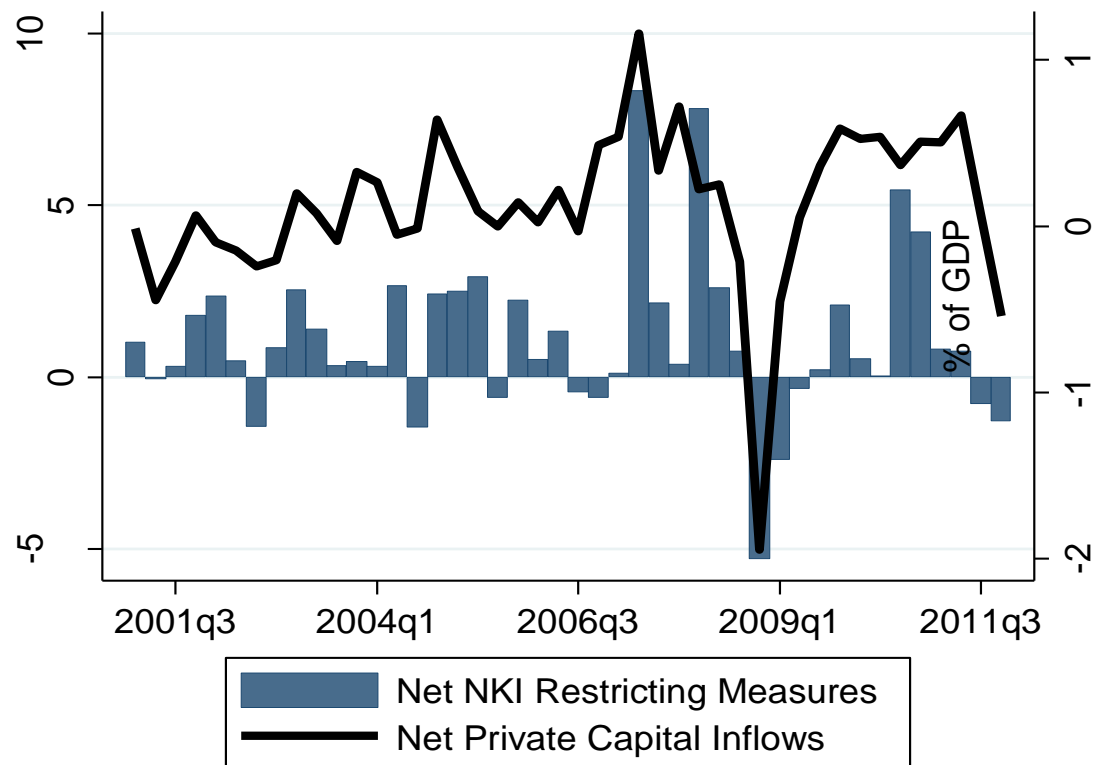

Note: Net private capital inflows exclude FDI flows and government and monetary authority transactions from "other" inflows and outflows. Net NKI restricting measures is the difference between NKI reducing capital control actions (inflow tightenings and outflow easings) and NKI increasing actions (inflow 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
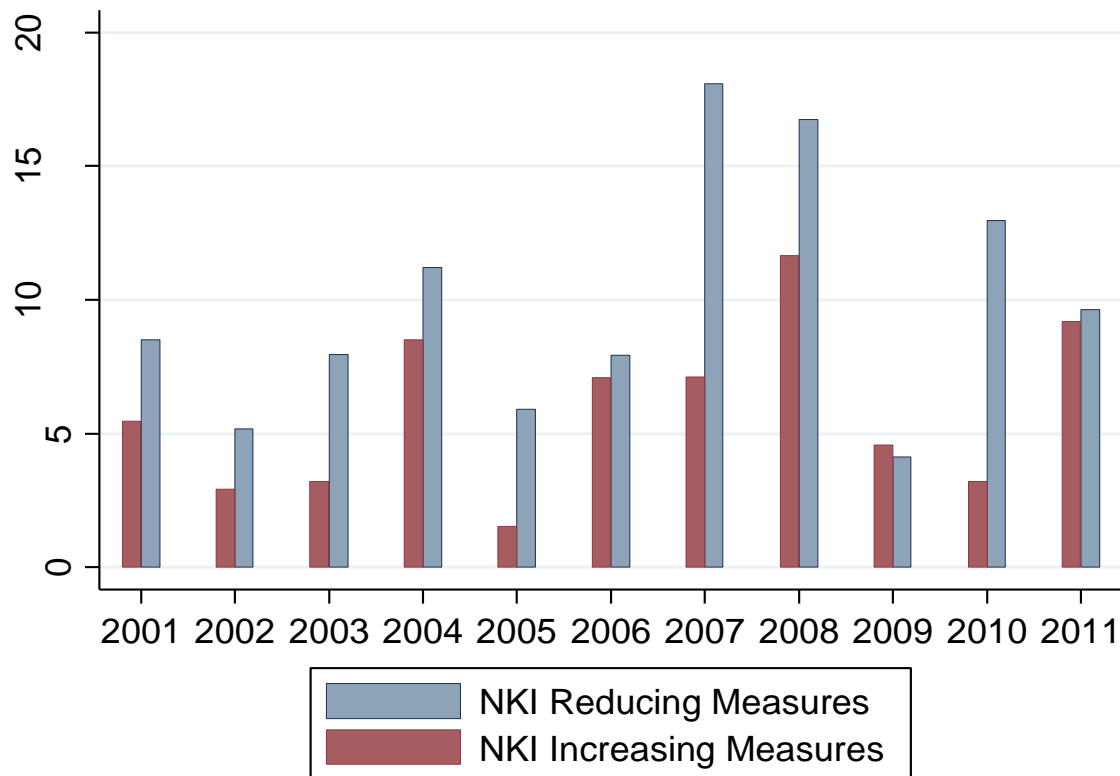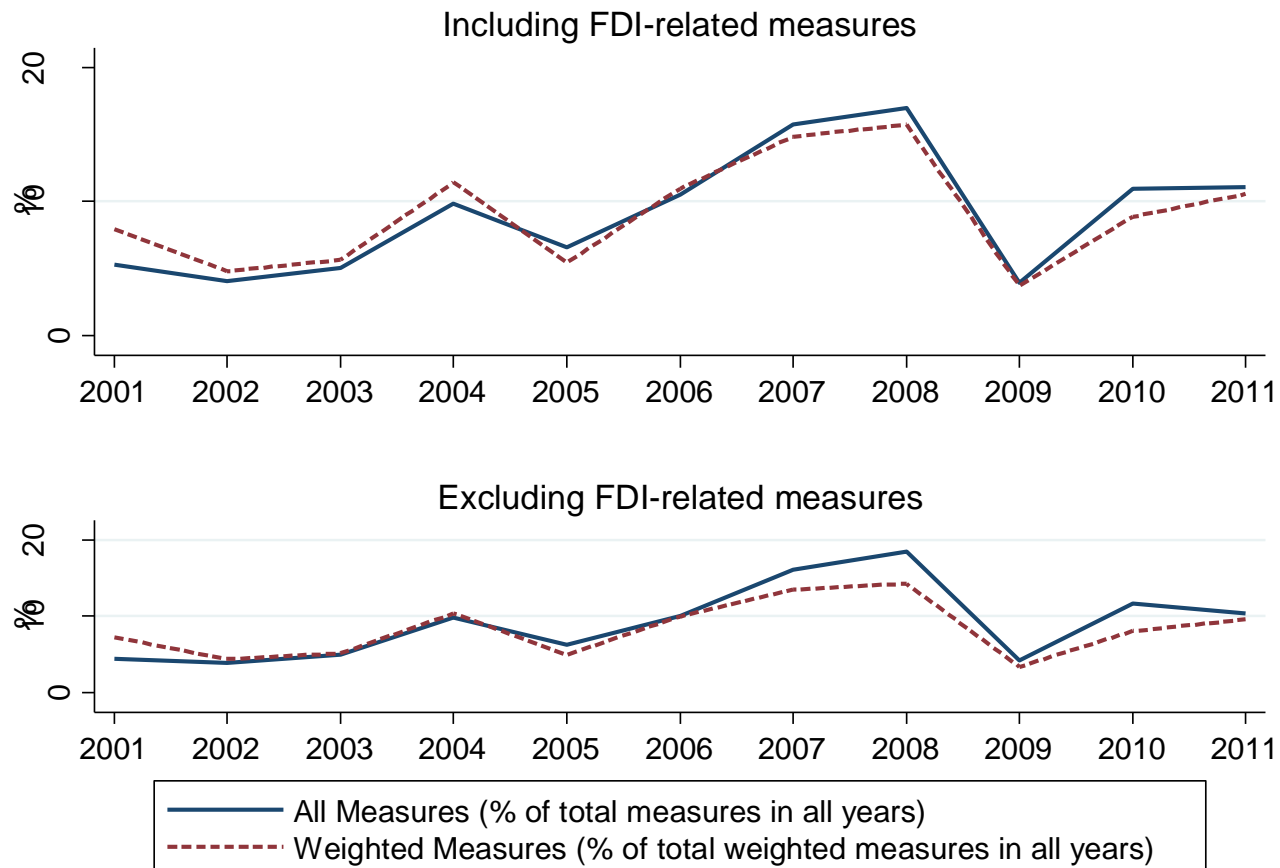

Note: NKI reducing measures is the sum of inflow tightening capital control actions (CCAs) and outflow easing CCAs. NKI increasing measures is the sum of inflow easing CCAs and outflow tightening CCAs. All CCAs are weighted. We exclude CCAs related to FDI.

Prior to 2009, NKI reducing measures consisted primarily of outflow easings
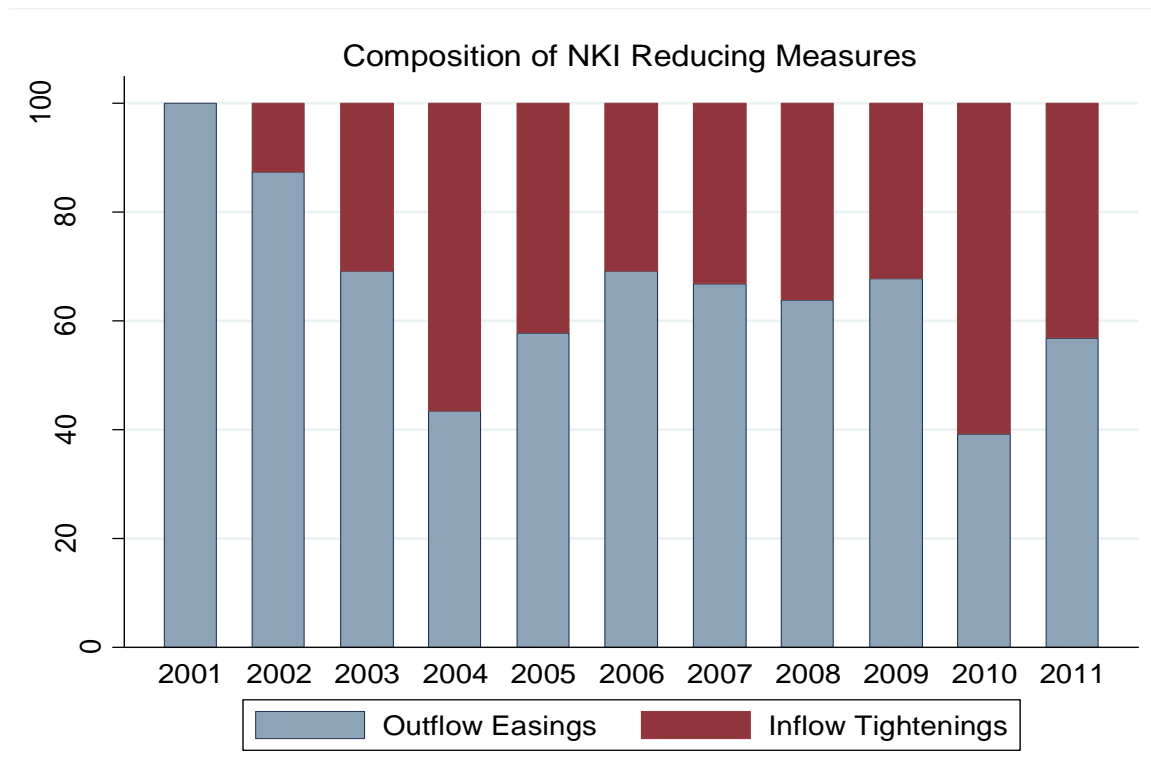
Composition of NKI Reducing Measures

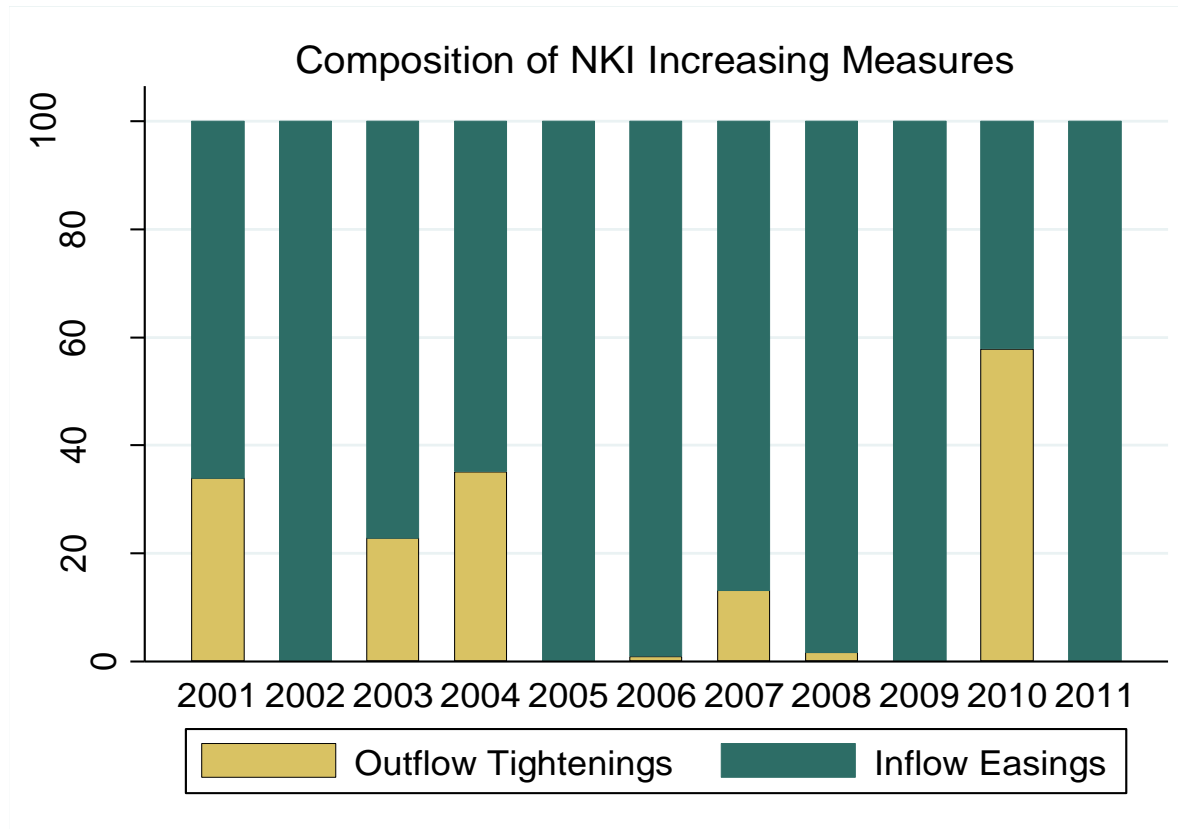Legend: Outflow Easings, Inflow Tightenings

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

Composition of NKI Increasing Measures

Legend: Outflow Tightenings, 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
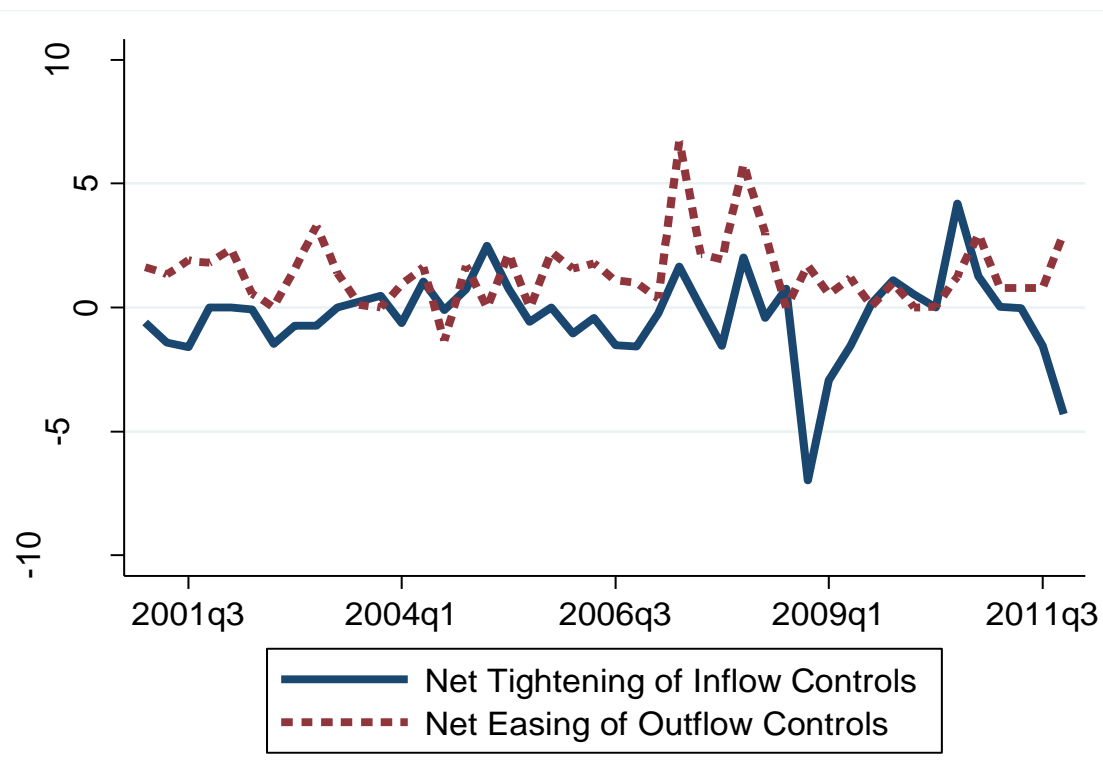
Note: Net easing of outflow controls is the difference between outflow easing CCAs and outflow tightening CCAs. Net tightening of inflow controls is analogously defined. We exclude measures related to FDI. All CCA measures in the figure are weighted measures.

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
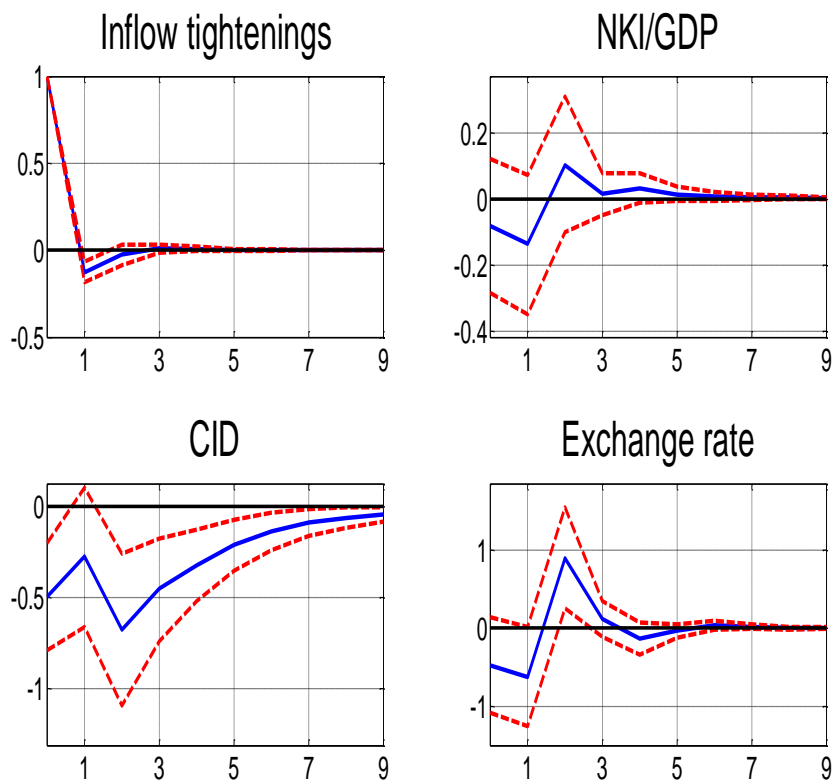
Expected Signs: Domestic Effects

Shock to ⟹ Impact on:	Net Inflow Tightening	Net Outflow Easing	NKI	Absolute CID	Exchange rate
Net Inflow Tightening		0	+	+/-	-
Net Outflow Easing	0		+	+/-	-
Net Capital Inflows (NKI)	-	-		+/-	+/-
Absolute Covered Interest differential (CID)	+	-	-		+/-
Spot exchange rate	+	+	-	+/-	

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

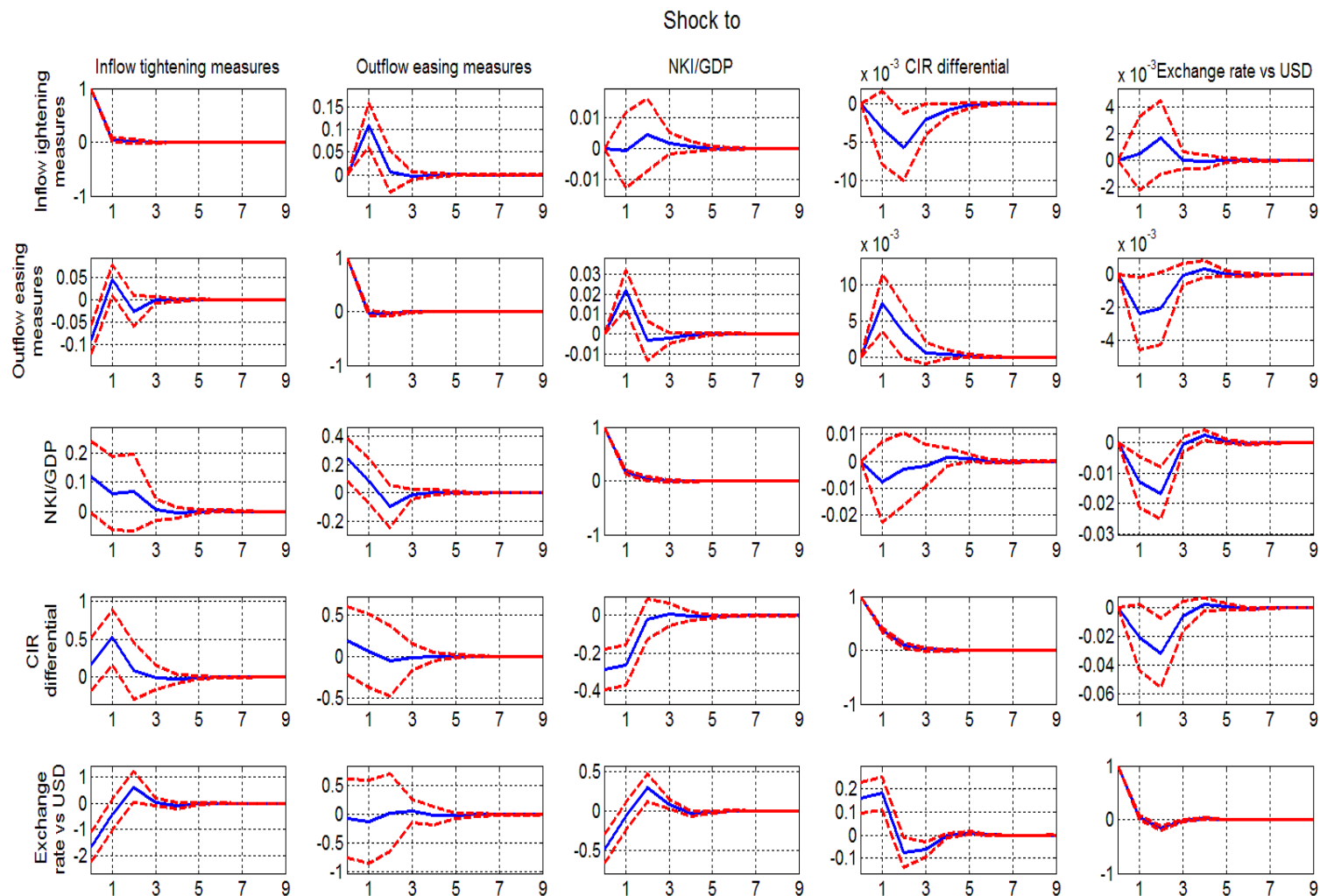Pre-crisis, 2003Q1-2007Q4

Depreciation but lower CID

Post-Crisis, 2008Q1-2011Q4

Higher CID but appreciation
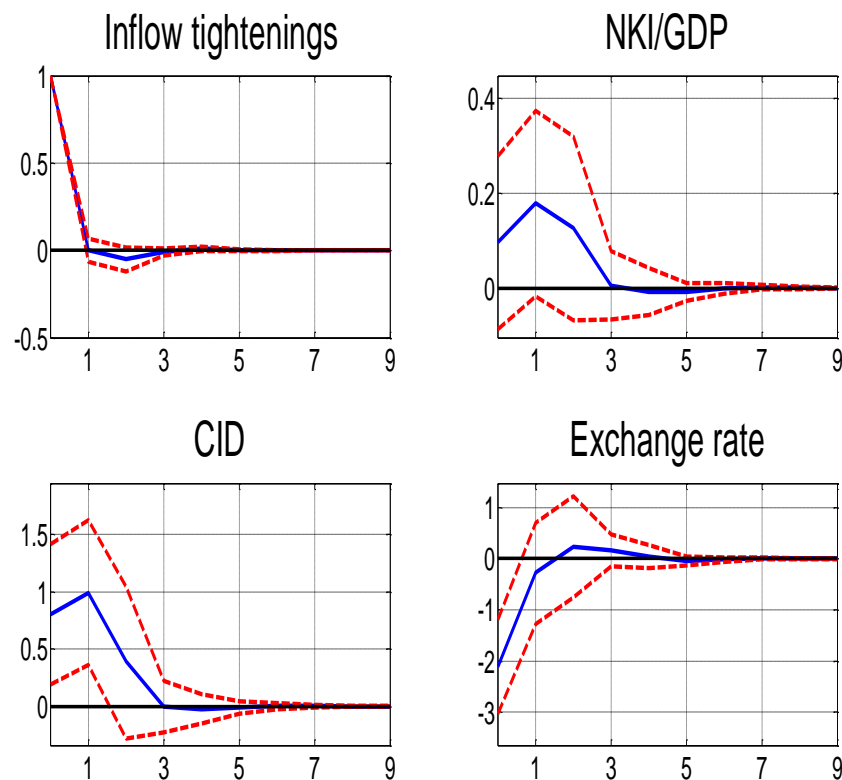
Baseline model: No escape from trilemma

Expected Signs: Multilateral Effects

| Shock to ➡ Impact on:	Net Inflow Tightening	Net Outflow Easing	NKI	Absolute CID	Exchange rate
Foreign Net Inflow Tightening		0	0	0	0
Foreign Net Outflow Easing	0		0	0	0
Net Capital Inflows (NKI)	+	+		+/-	+/-
Absolute Covered Interest differential (CID)	+/-	+/-	+/-		+/-
Spot exchange rate	-	-	-	+/-	

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

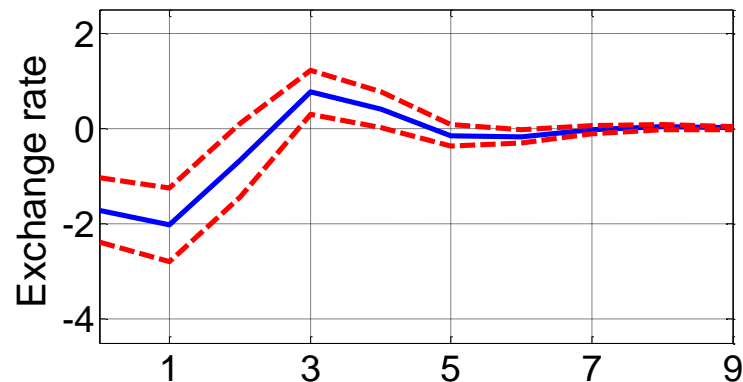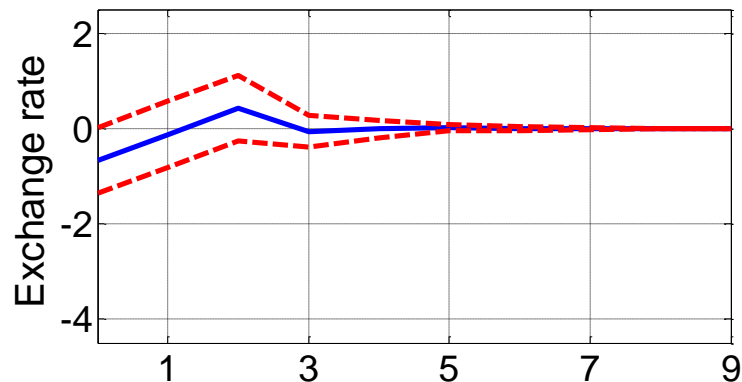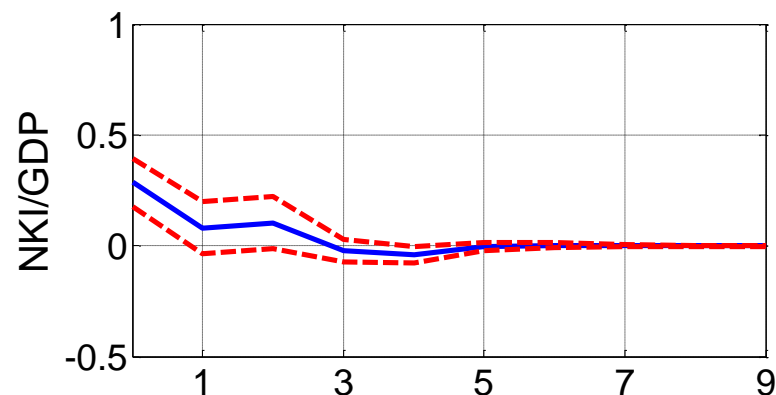Shock to: Inflow tightening measures
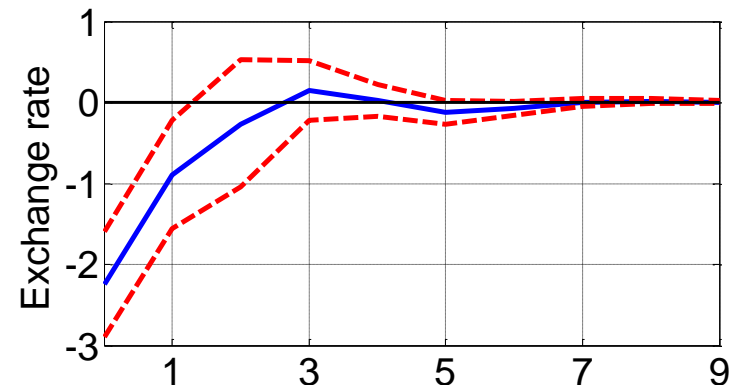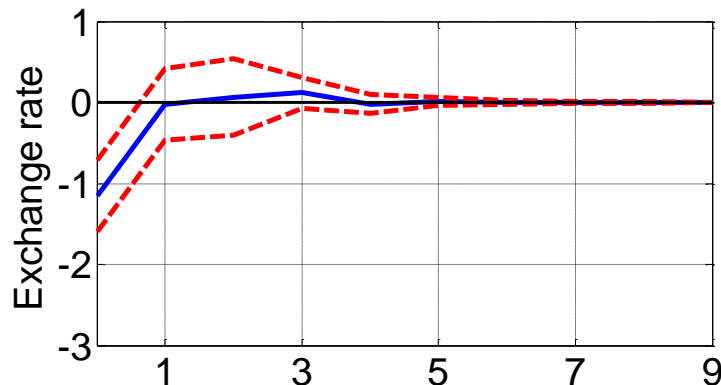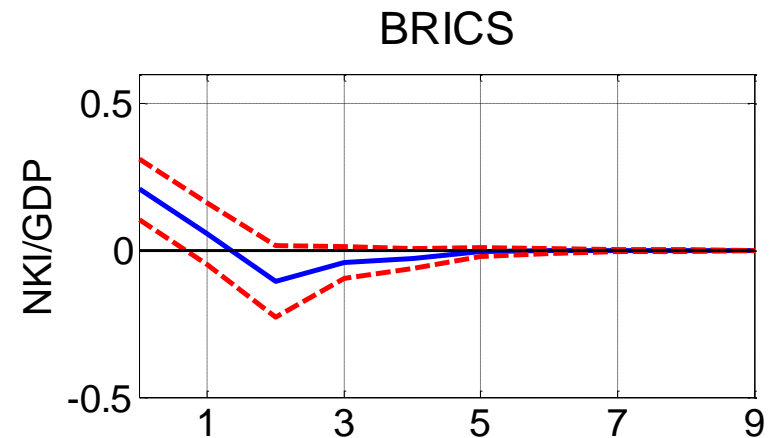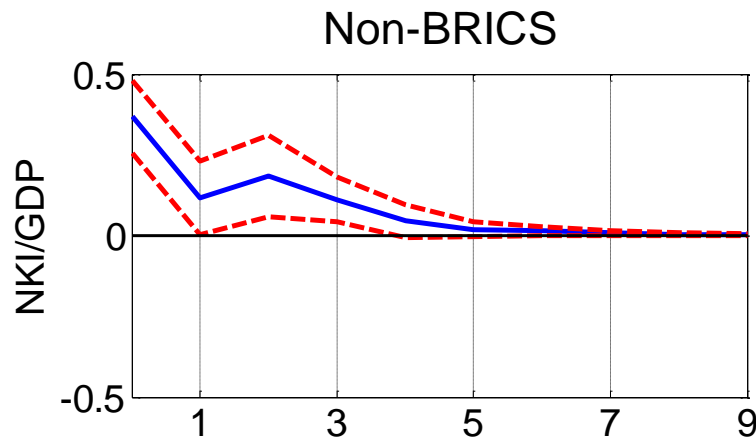
Non-BRICS

BRICS

Spillovers to BRICS larger than to non-BRICS
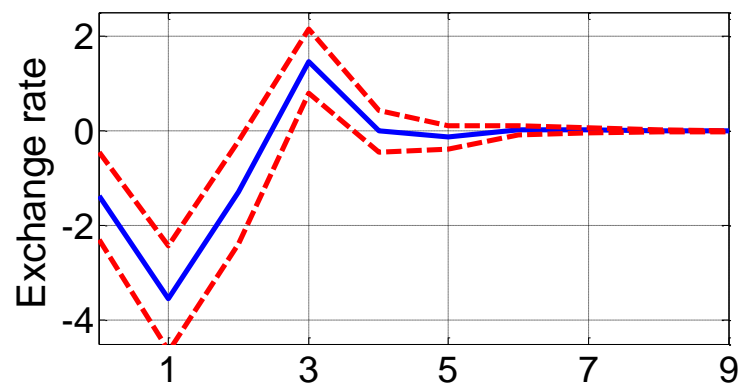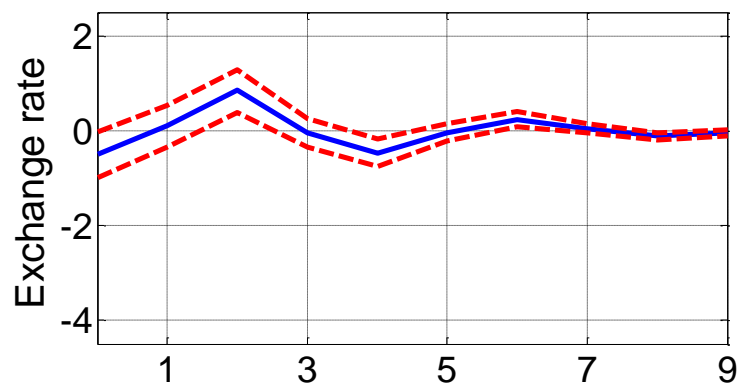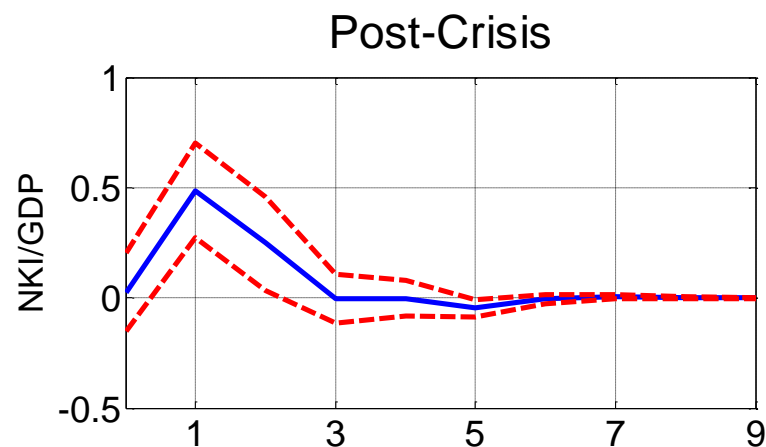
Shock to: Foreign outflow easing measures
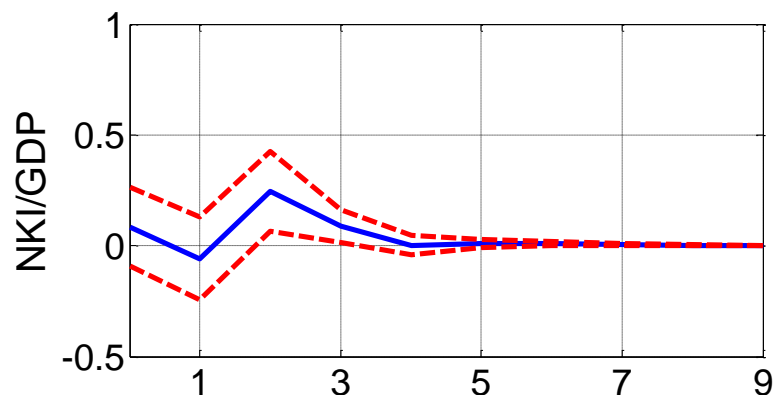
Non-BRICS | BRICS

Spillovers larger post-crisis

Shock to: Outflow easing measures

Pre-Crisis

Post-Crisis
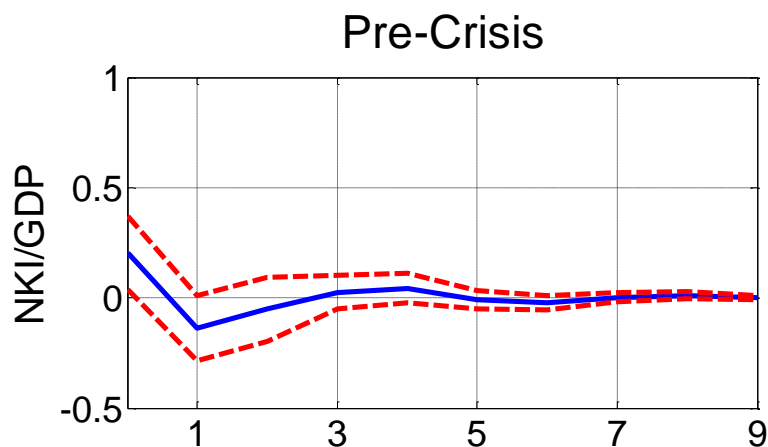
Country-specific models for multilateral effects

- 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

Foreign inflow tightenings

NKI/GDP

Exchange rate

Foreign outflow easings

NKI/GDP

Exchange rate

Among BRICS, spillovers least important for India, most for Russia and South Africa
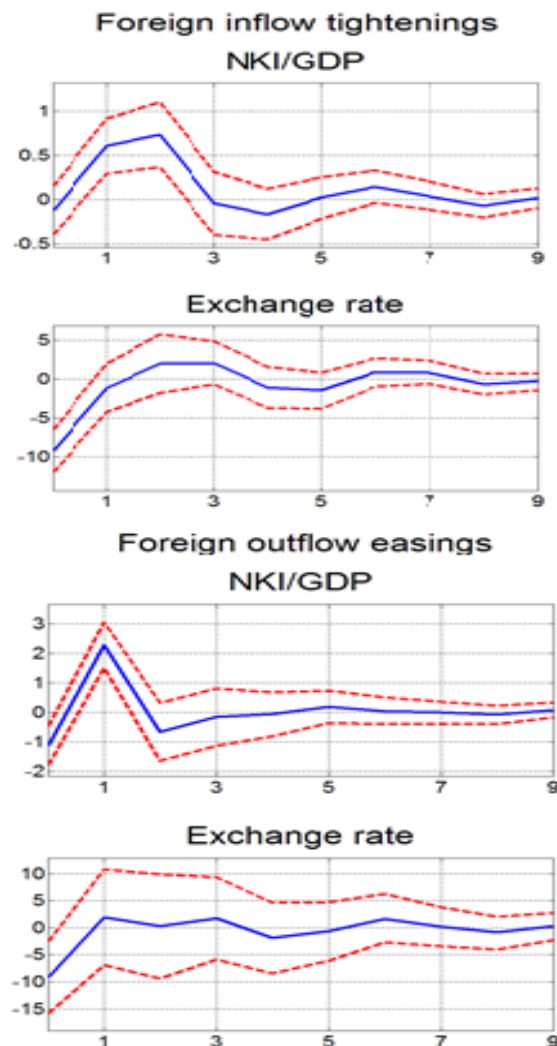
	NKI/GDP		CIR differential		Exchange rate	
	Net inflow tightening	Net outflow easing	Net inflow tightening	Net outflow easing	Net inflow tightening	Net outflow easing
BRA	N	Y	N	Y	Y	Y
CHL	Y	N	N	N	Y	N
CHN	Y	N	N	Y	Y	Y
IDN	N	N	N	N	N	N
IND	N	(N)	N	N	N	(N)
MEX	(Y)	(Y)	Y	N	Y	Y
MYS	N	N	Y	(Y)	(Y)	(Y)
PER	N	N	Y	N	(N)	N
PHL	Y	N	Y	Y	Y	Y
RUS	Y	Y	Y	Y	Y	Y
THA	N	N	(Y)	N	Y	N
ZAF	Y	Y	(Y)	Y	Y	Y

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

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