# The dollar exchange rate as a global risk factor

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Geneva, 10 December 2019

*The views expressed here are mine and not necessarily those of the Bank for International Settlements

US dollar-denominated credit to non-banks outside the

World

Per cent / USD tn

Emerging market economies

Per cent / USD tn
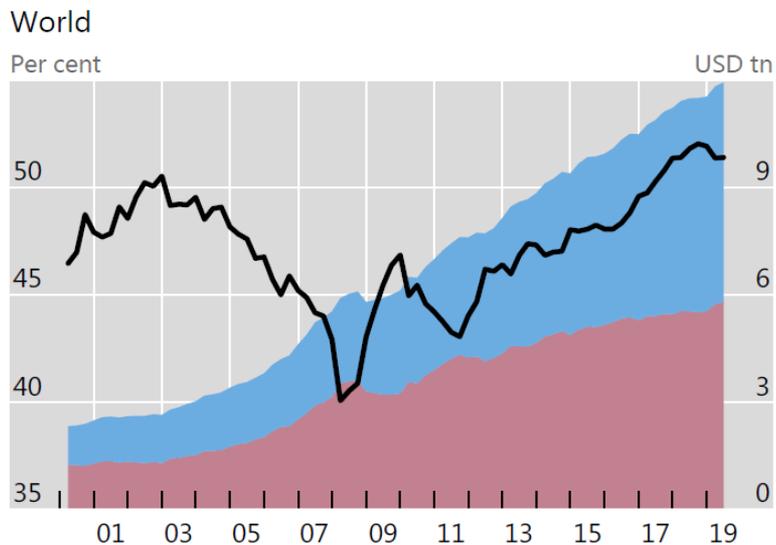
Lhs:
— Share of bonds
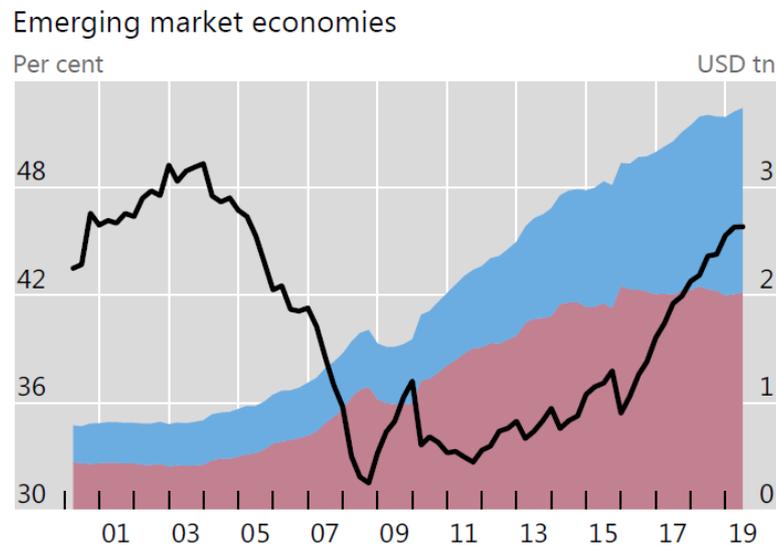
Amounts outstanding (rhs):
- Bonds issued by non-banks
- Bank loans to non-banks[1]

[1] Loans by LBS-reporting banks to non-bank borrowers, including non-bank financial entities, comprise cross-border plus local loans. Non-banks comprise non-bank financial entities, non-financial corporations, governments, households and international organisations.
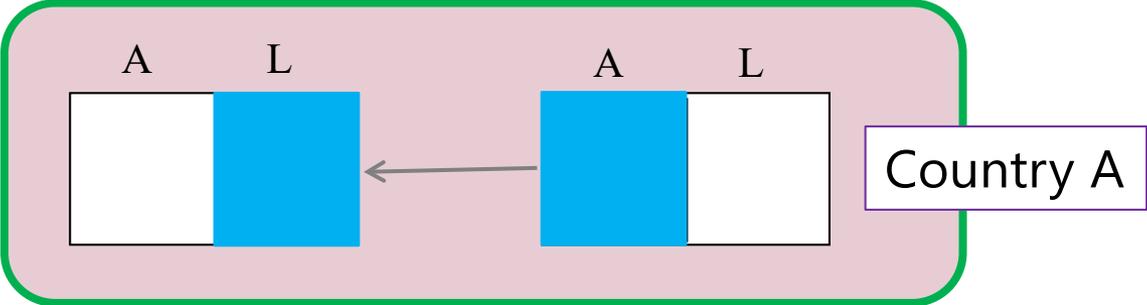
Sources: Datastream; Dealogic; Euroclear; Refinitiv; Xtrakter Ltd; national data; BIS locational banking statistics; BIS calculations.

"Original Sin"

- Eichengreen and Hausmann (2000)

- Eichengreen, Hausmann and Panizza (2003)
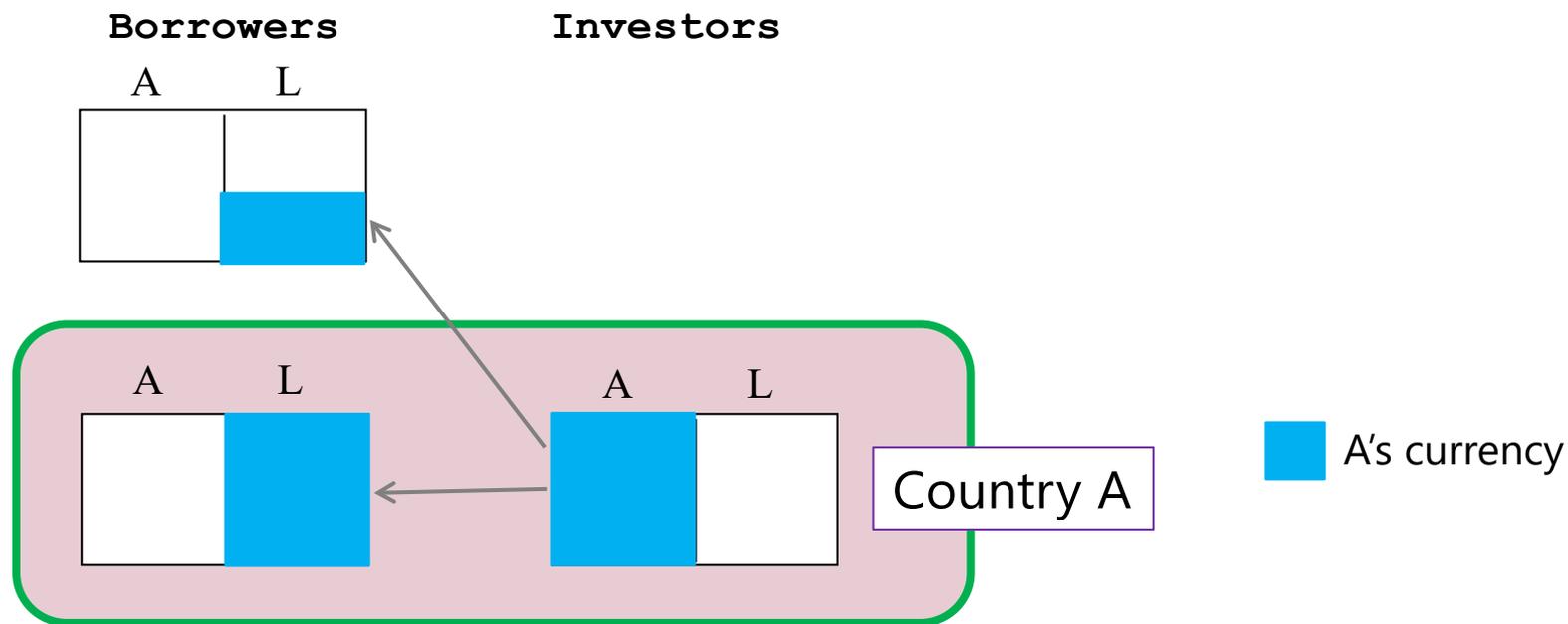
- Carstens and Shin (2019)
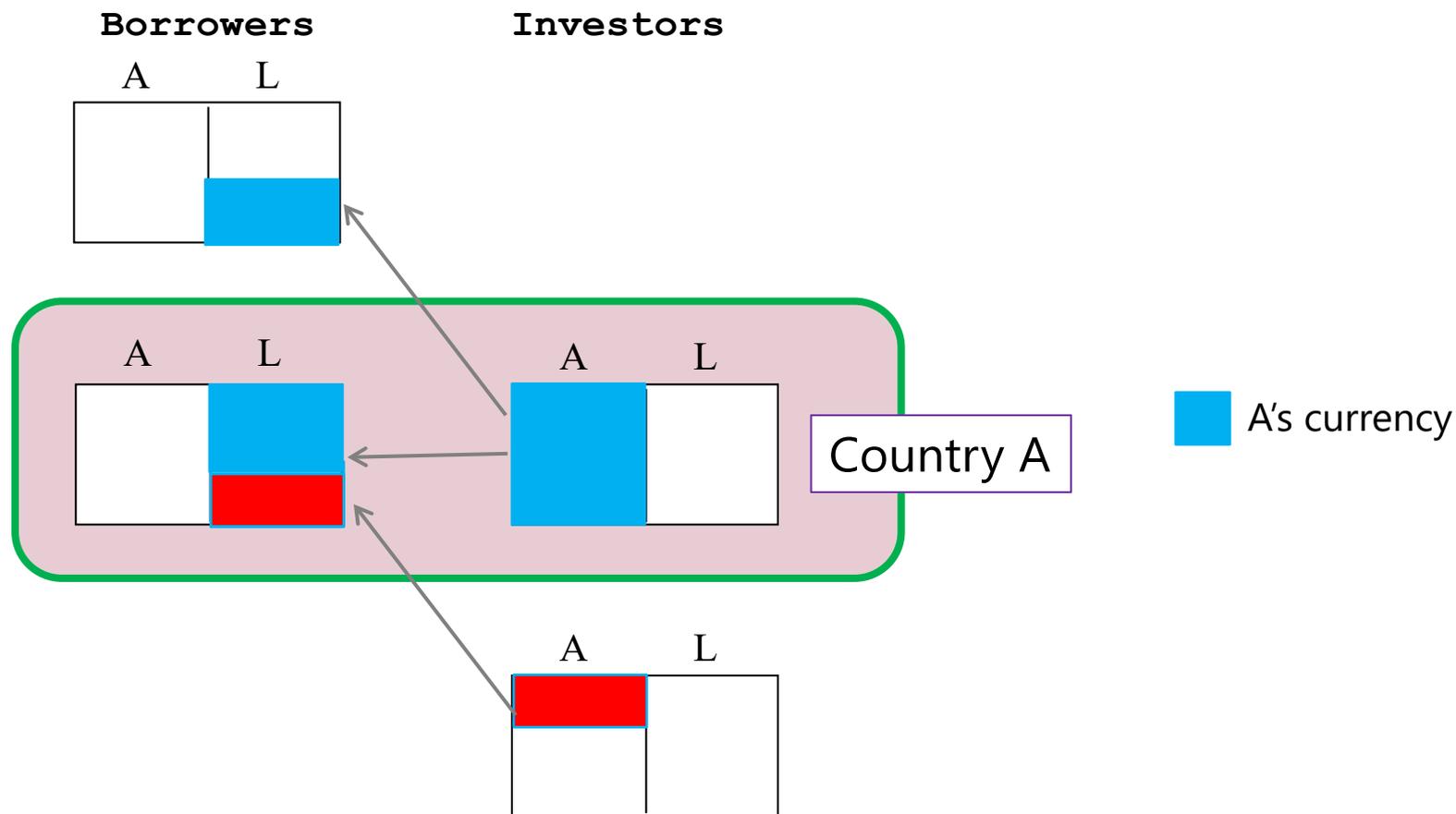
Borrowers　　　　Investors

A　L　　　　A　L

Country A

A's currency

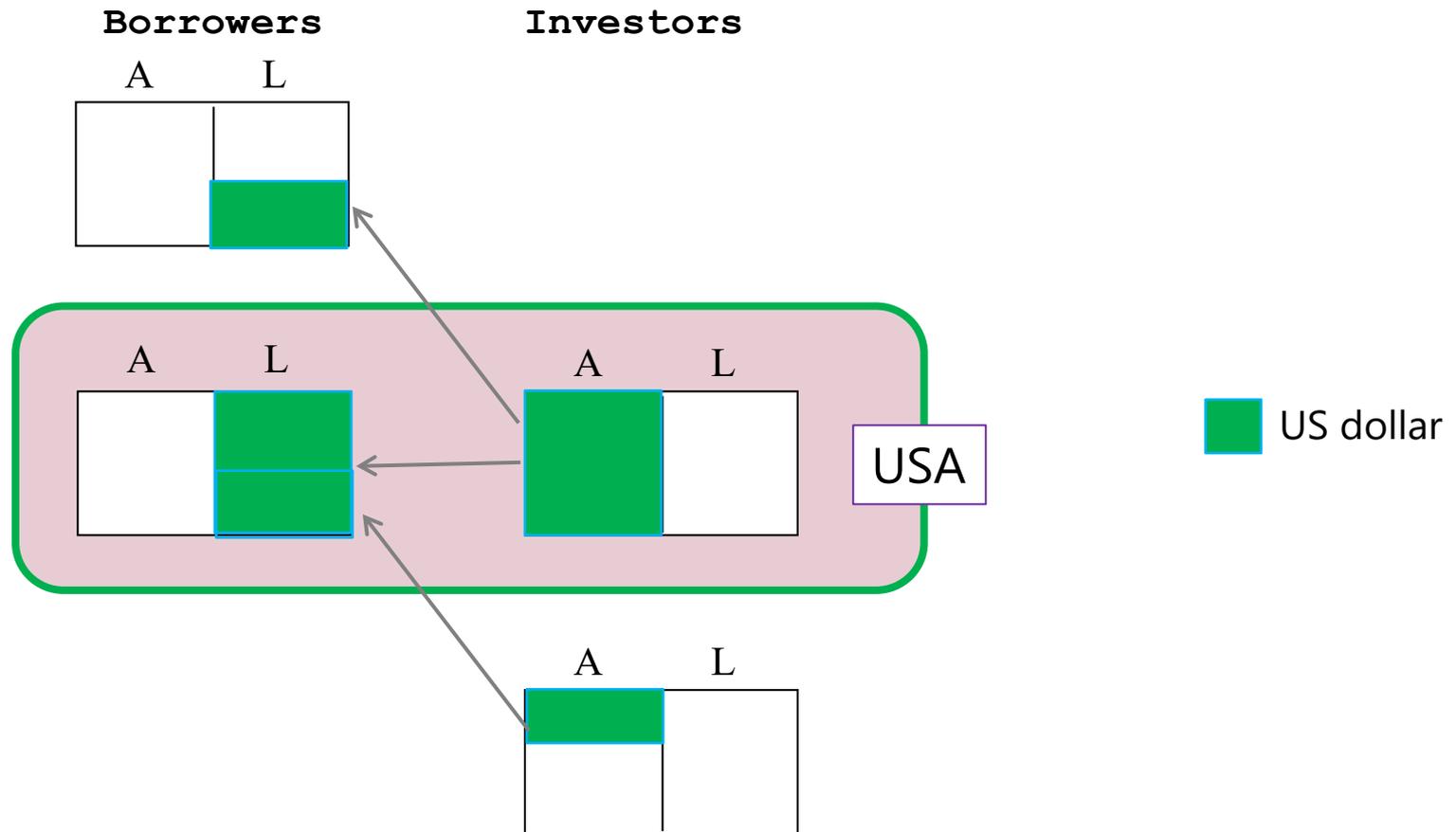# Finding 1: lenders tend to lend in their own currency

Maggiori, Neiman and Schreger (2018) "The rise of the dollar and fall of the euro as international currencies"

Finding 2: borrowers are subject to "original sin"; when borrowing from abroad, they do so in foreign currency
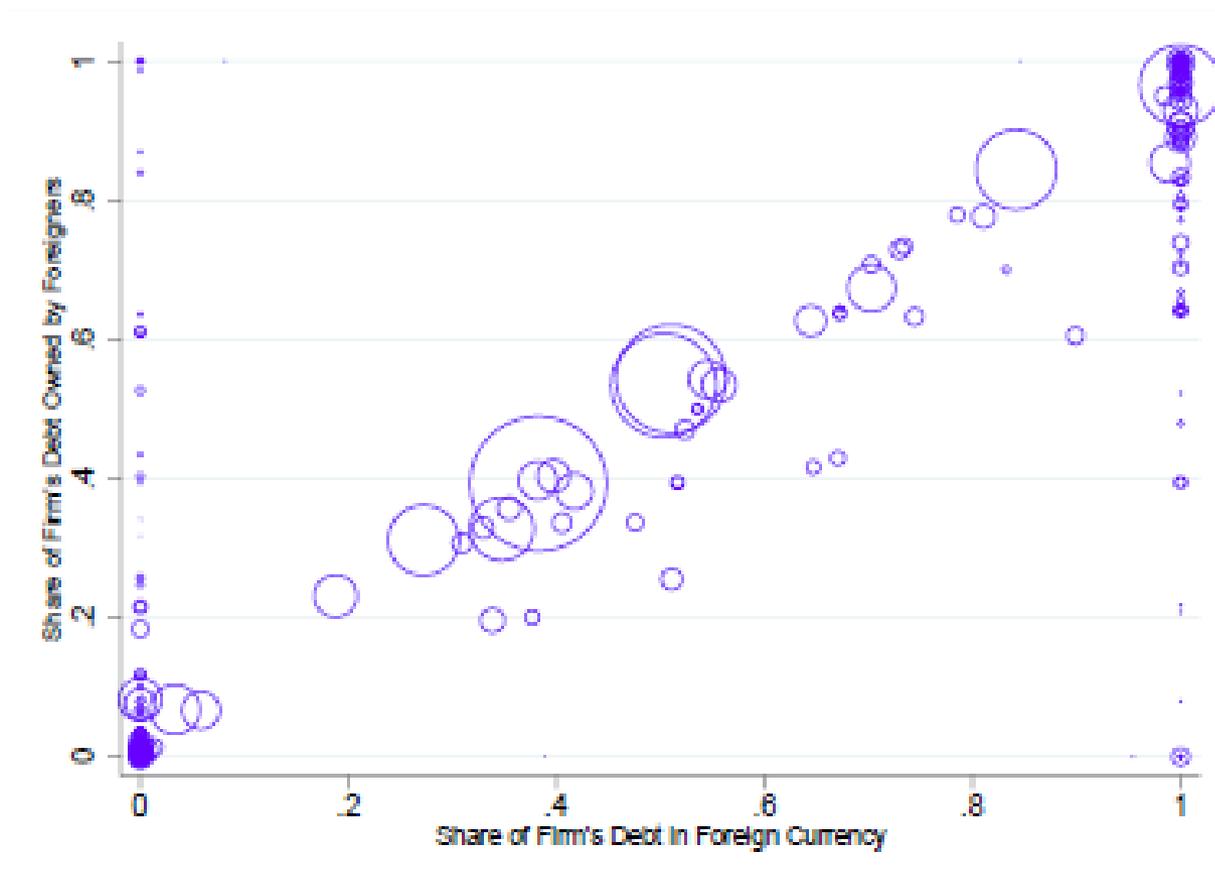
Finding 3: exception is the US and the US dollar

Borrowers   Investors

A   L

A   L   A   L

USA

A   L

■ US dollar

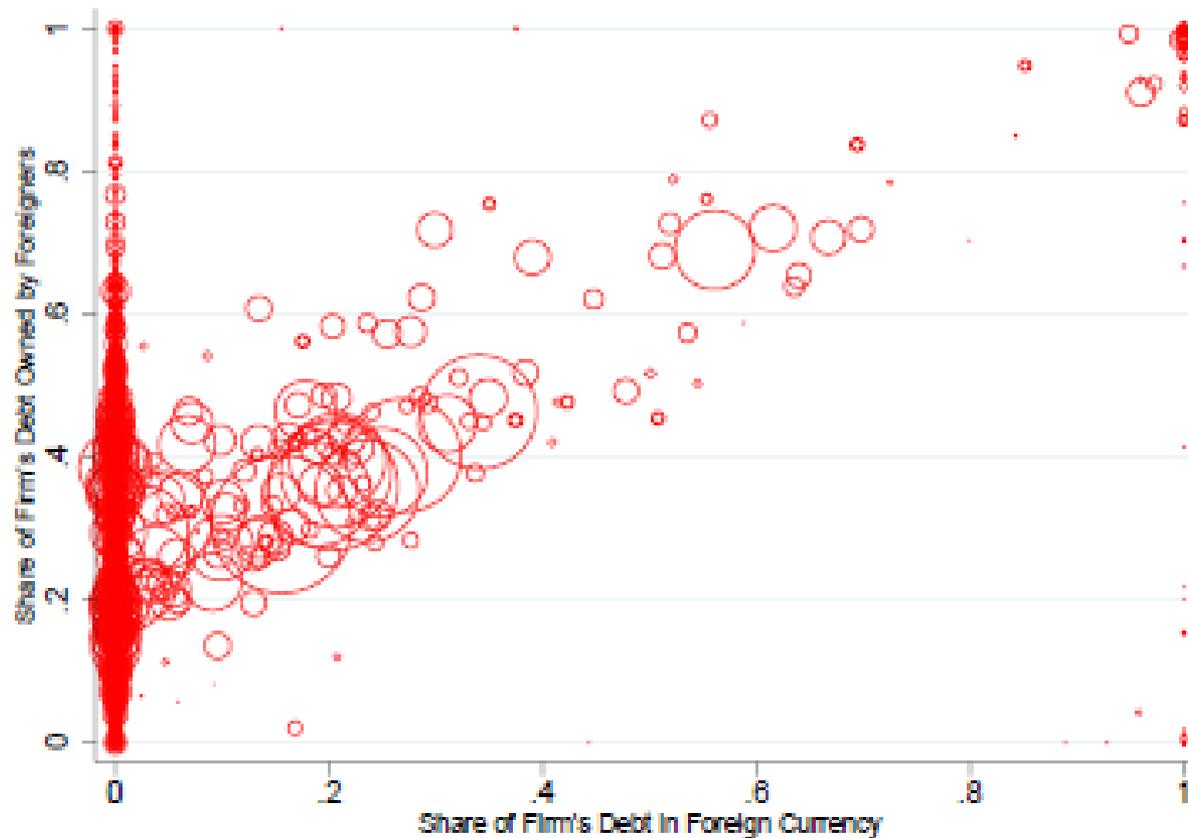# Canadian corporate bond issuance

(a) CAN

Maggiori, Neiman and Schreger (2018) "The rise of the dollar and fall of the euro as international currencies"
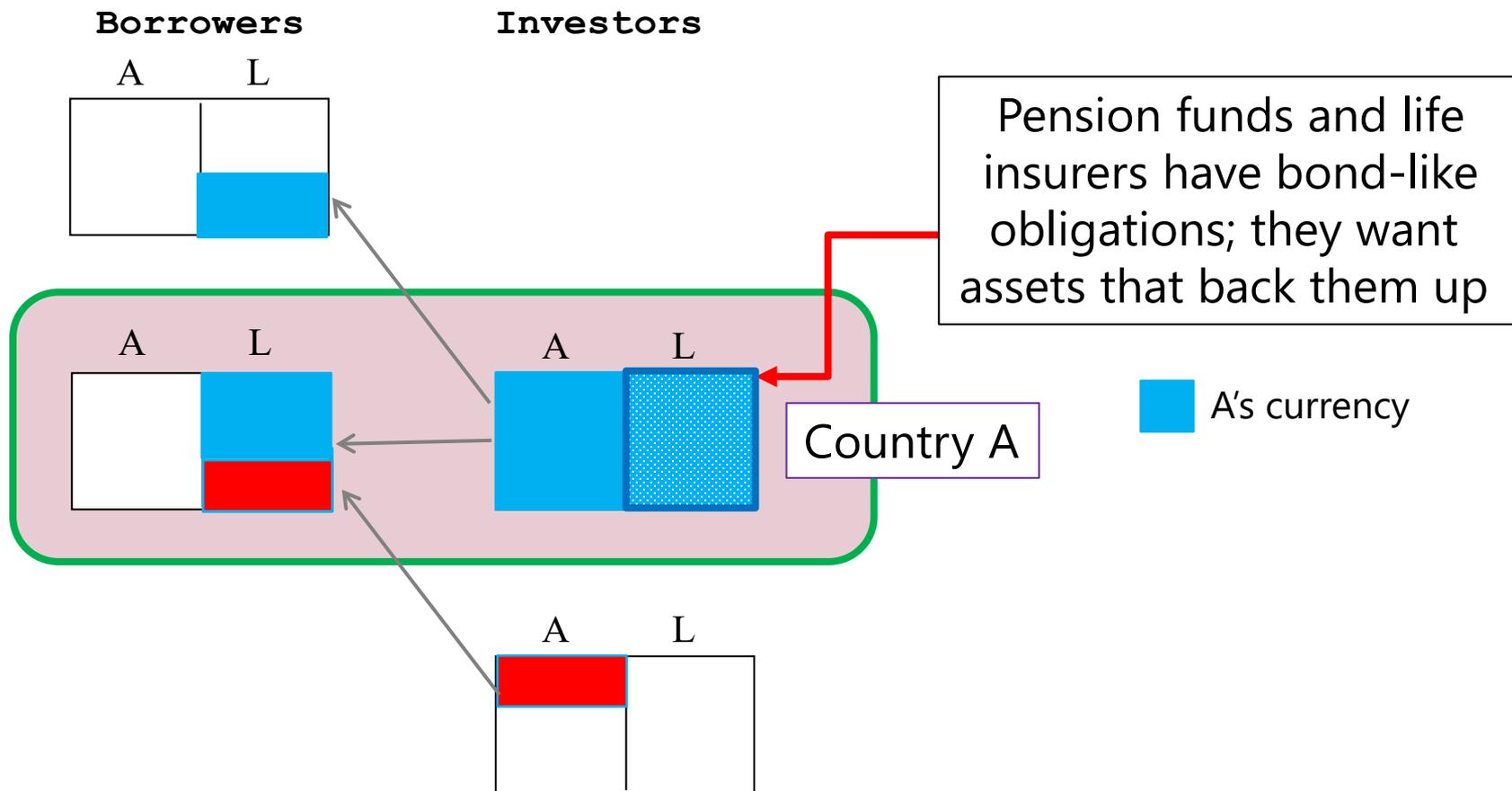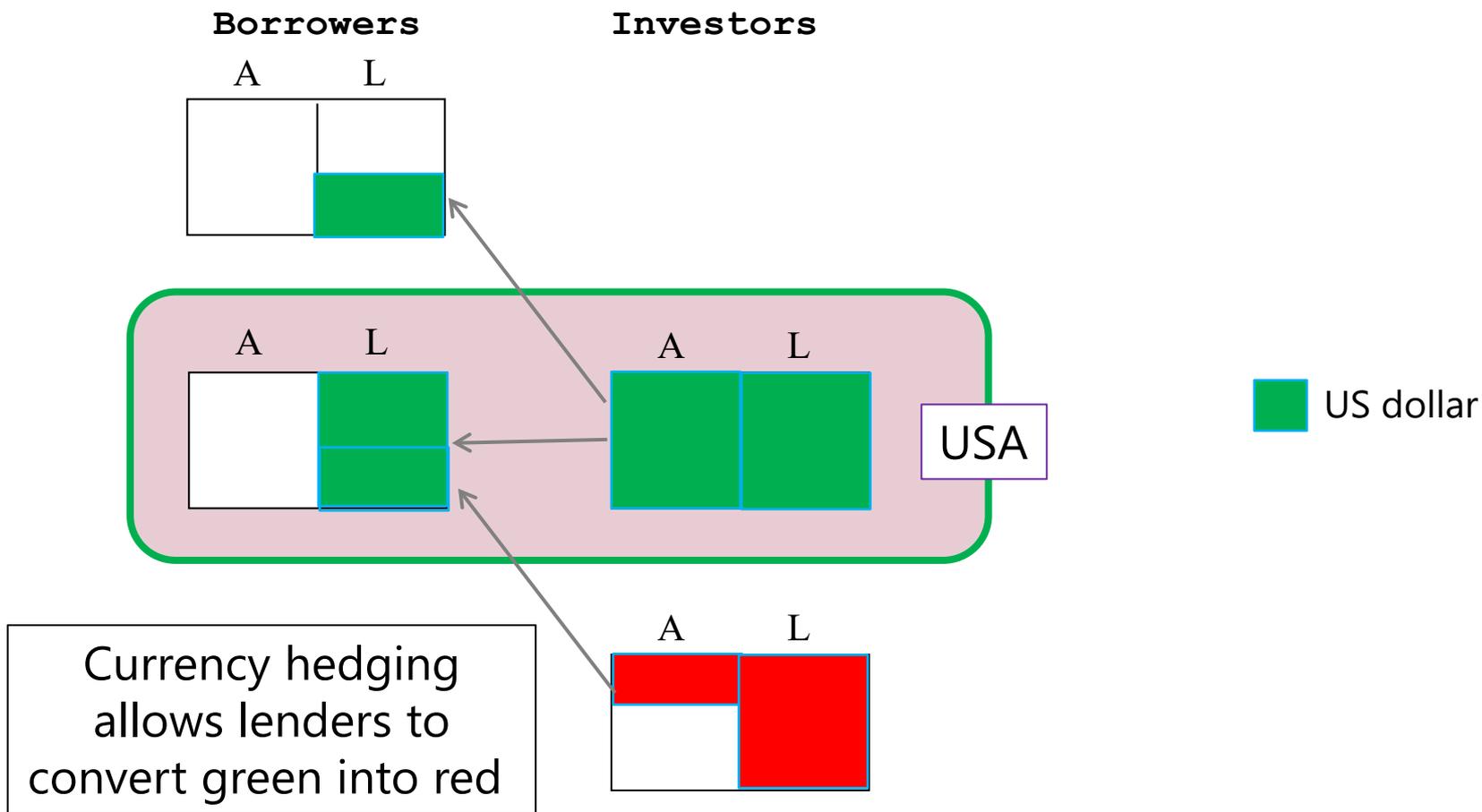
US corporate bonds issuance

(d) USA

Maggiori, Neiman and Schreger (2018) "The rise of the dollar and fall of the euro as international currencies"

Liabilities side of lender's balance sheet looms into view

Borrowers   Investors

Pension funds and life insurers have bond-like obligations; they want assets that back them up

Country A

A's currency

BIS

Banking sector facilitates currency hedging

Borrowers　　**Investors**

Currency hedging allows lenders to convert green into red

US dollar

USA

FX swaps: insights from 2019 BIS triennial survey

Benchmarked FX swap turnover[1]

USD trn

13	14	15	16	17	18	19

— Total   USD vis-à-vis: ▮ EUR   ▮ AUD   ▮ Other
                             ▮ JPY   ▮ CHF
                             ▮ GBP   ▮ CAD
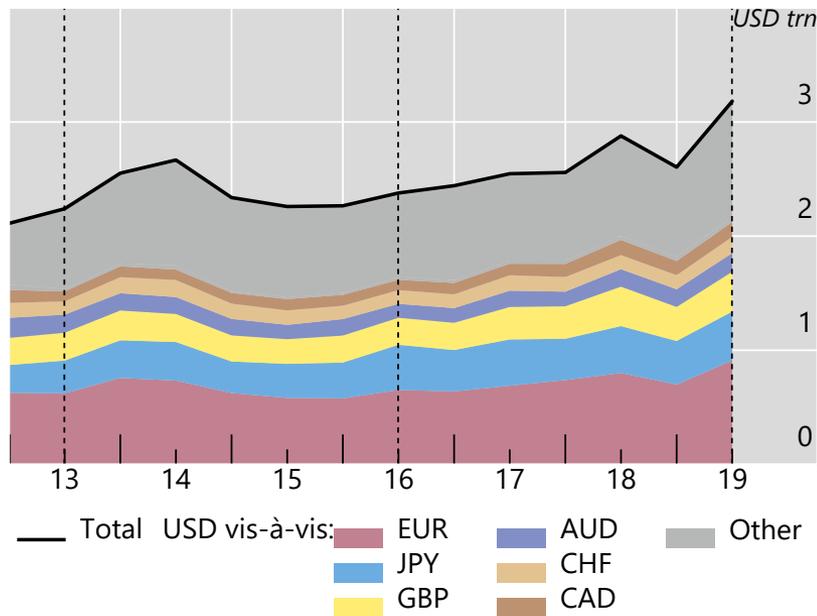
FX swap turnover by maturity[2]

USD bn

Up to a week · 8 days–1 month · 1–3 months · 3–6 months · Over 6 months

▮ Actual   ✕ Predicted[3]
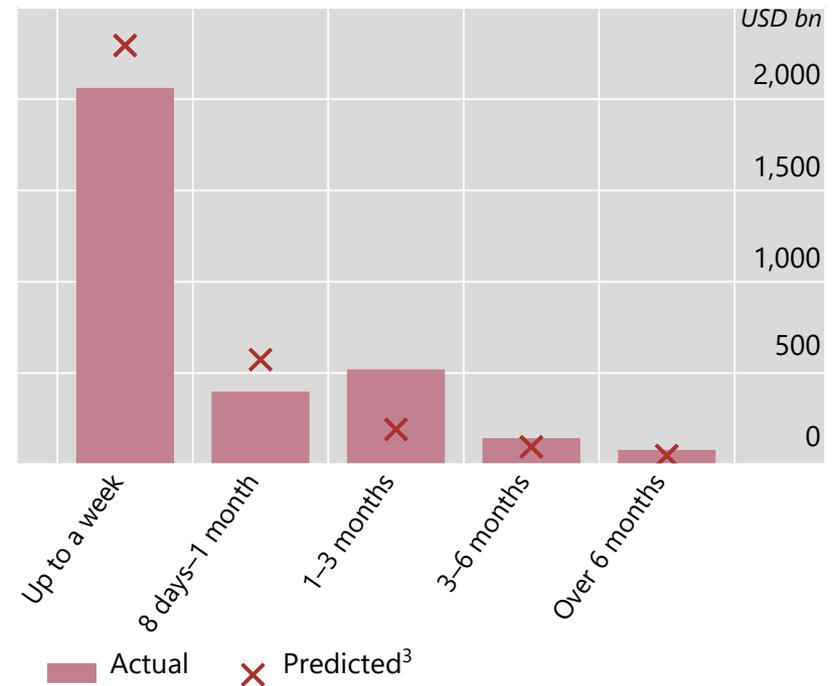
[1] The vertical lines indicate April 2013, April 2016 and April 2019 (the dates of the BIS Triennial Survey). Benchmarked series are calculated using the proportional Denton technique. Based on breakdowns by currency pairs from the foreign exchange committees in London, New York, Singapore, Tokyo and Australia. The breakdown for USD/CHF and USD/CAD is not available from the Tokyo foreign exchange committee.   [2] Adjusted for local and cross-border inter-dealer double-counting, ie "net-net" basis; daily averages in April.   [3] Predicted distribution based on the assumption of an inverse relationship between turnover and maturity; using discrete maturities of one week, one month, three months, six months and one year for each maturity bucket; for example, daily turnover of one-week FX swaps is assumed to be four times that of one-month ones, daily turnover of one-month FX swaps is assumed to be three times that of three-month ones, etc.

Sources: Foreign exchange committee surveys; BIS Triennial Central Bank Survey; authors' calculations.
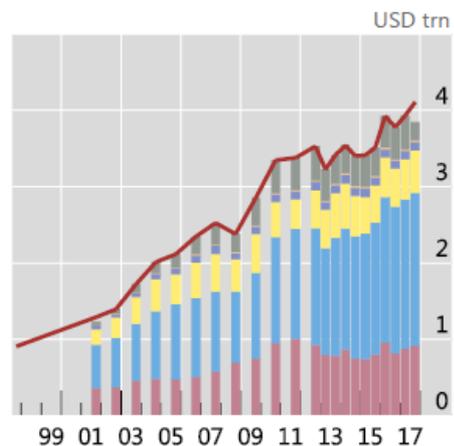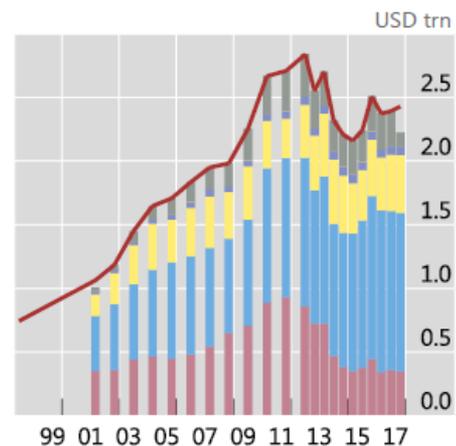
Evidence on aggregates from CPIS

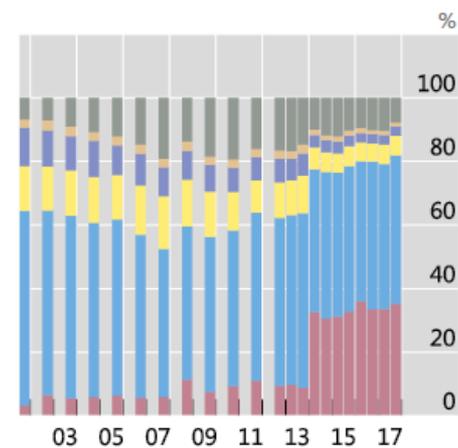# Japan - Currency composition of International portfolio investment

Total portfolio

USD trn

Debt

USD trn

Equity

USD trn

Legend:
- JPY
- USD
- EUR
- GBP
- CHF
- OTHER

Note: In 2017-H2 components do not add up to total.
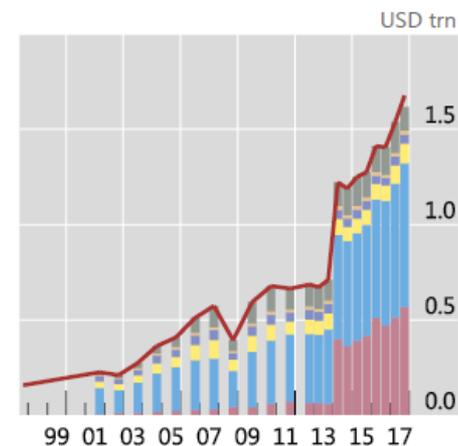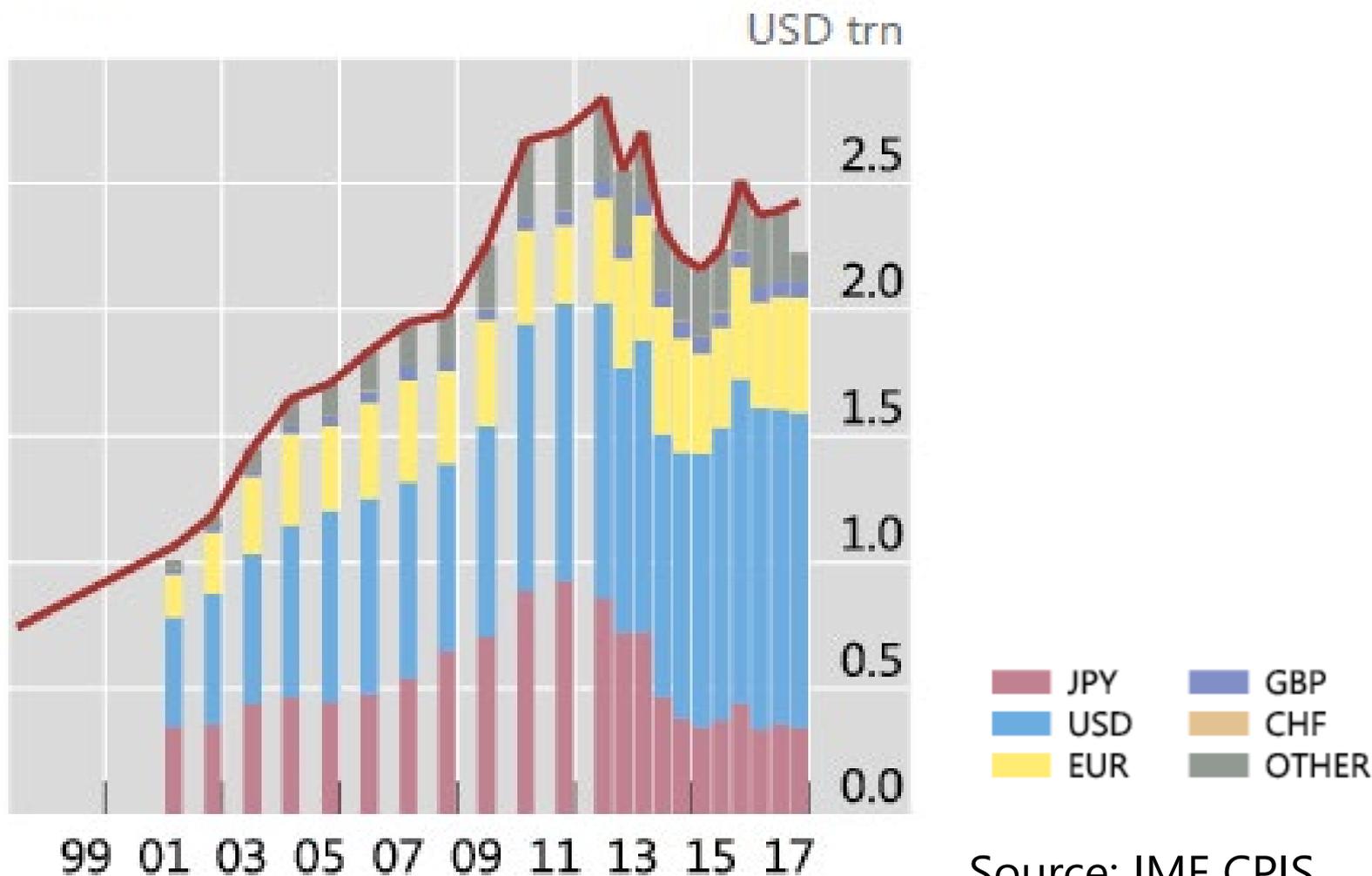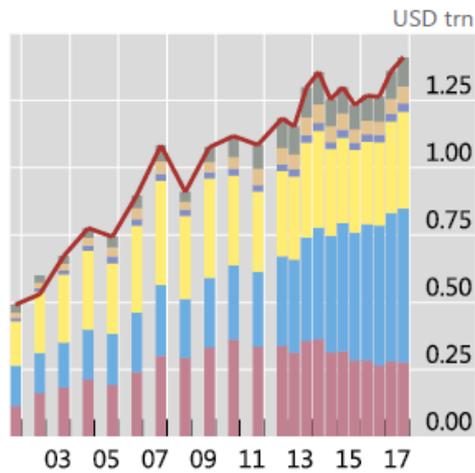
Source: IMF CPIS.

Japan: currency composition of international portfolio investment (debt)

Source: IMF CPIS

Switzerland - Currency composition of International portfolio investment

Total portfolio

Debt

Equity
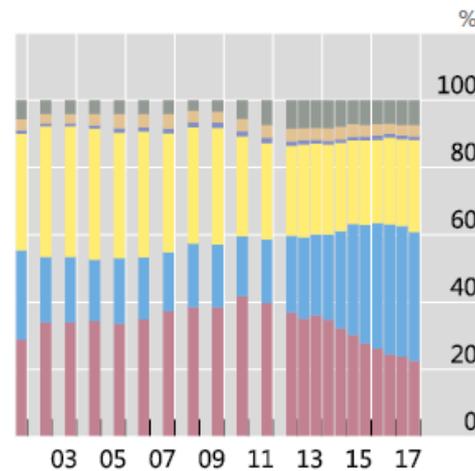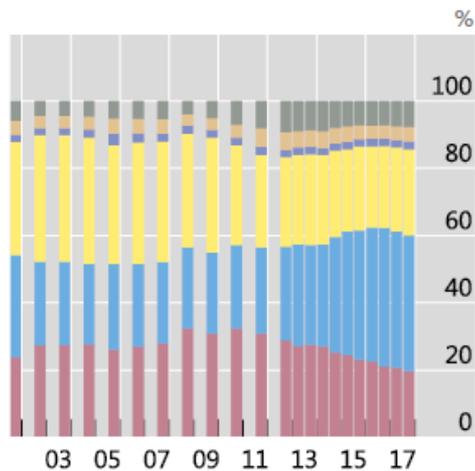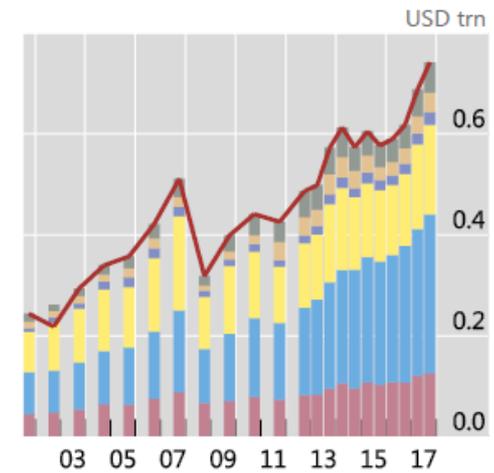
Legend:
- CHF
- EUR
- USD
- JPY
- GBP
- OTHER

Source: IMF CPIS.

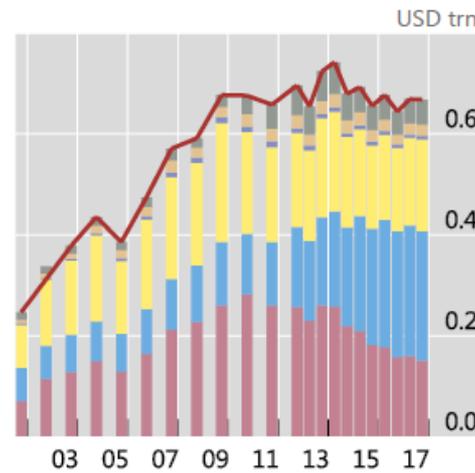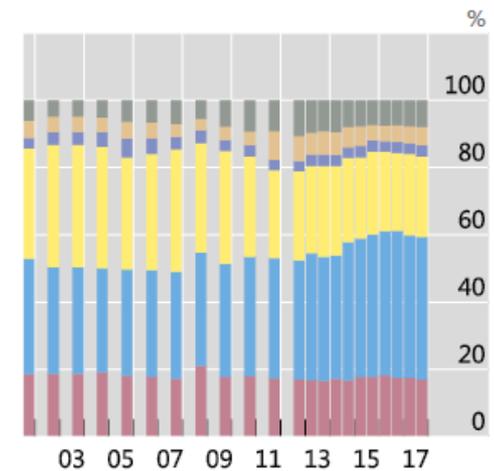# Switzerland: currency composition of international portfolio investment (debt)
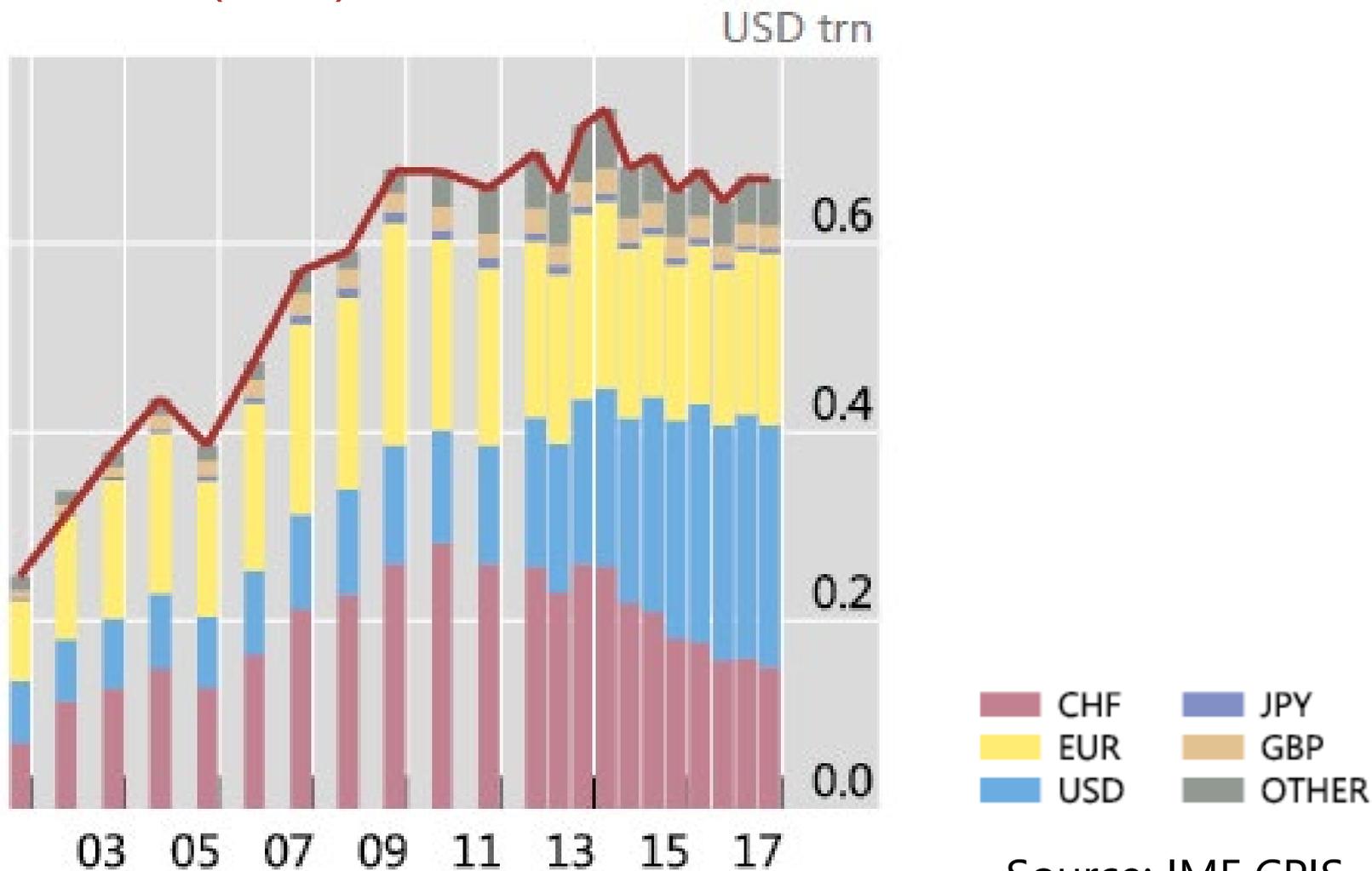
Source: IMF CPIS

Determinants of bond currency denomination

- **Borrower's preferences**
  - Cash flows
  - Invoicing currency

- **Investor's (lender's) preferences**
  - Domestic currency instruments to hedge bond-like obligations in domestic currency

- **Availability of hedging**
  - Can meet domestic bond-like obligations while holding foreign currency assets

US dollar broad index and the cross-currency basis
Avdjiev, Du, Koch and Shin (2019)
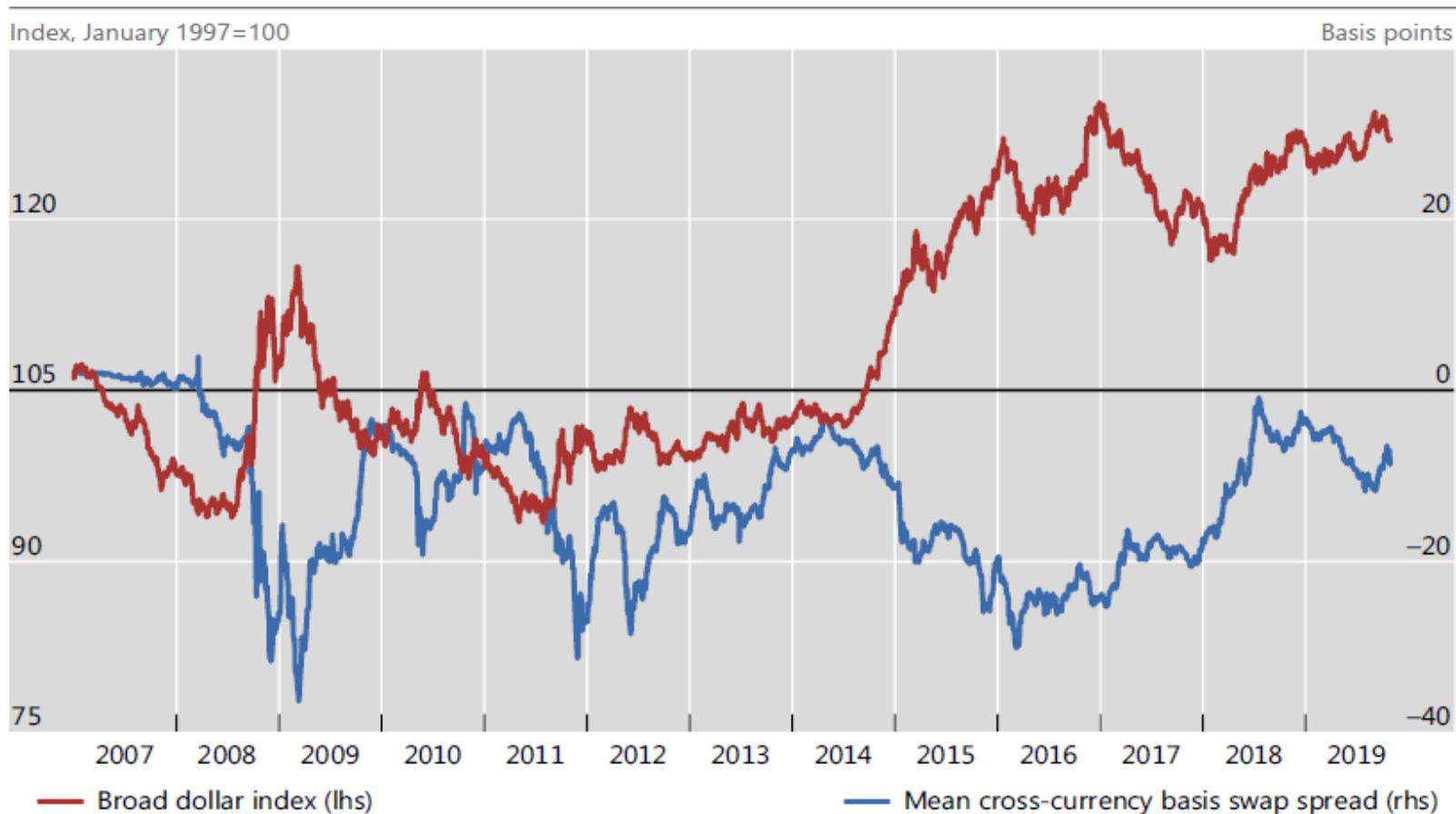
The red line shows the Federal Reserve Board's US trade-weighted broad dollar index, with higher values indicating a stronger US dollar. The blue line is the simple average of the five-year cross currency basis swap spreads for AUD, CAD, CHF, DKK, EUR, GBP, JPY, NOK, NZD and SEK vis-à-vis the US dollar.

Sources: Board of Governors of the Federal Reserve System; Bloomberg.

Cross-currency basis vs. dollar beta (2007–16)

Figure 5

The vertical axis of the LHP shows the average three-month cross-currency basis expressed in basis points, while the horizontal axis indicates the regression beta of runn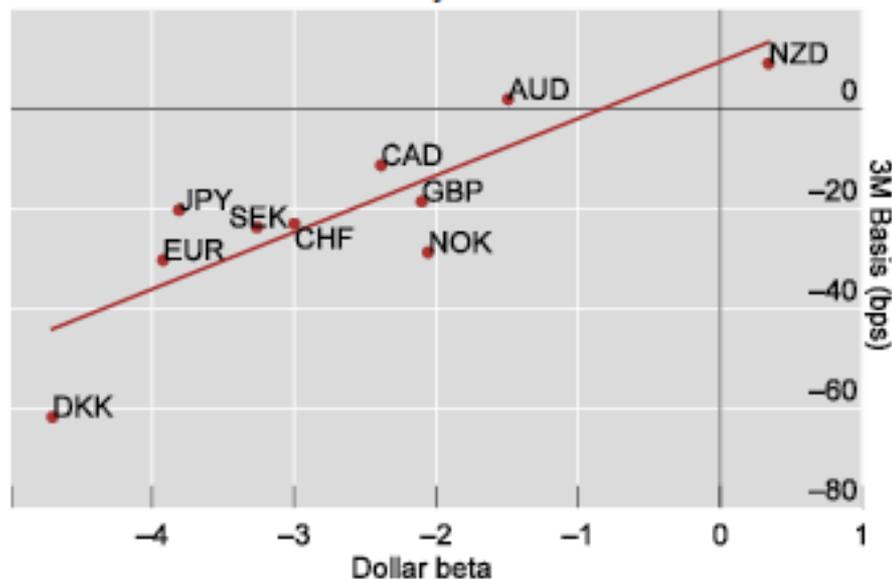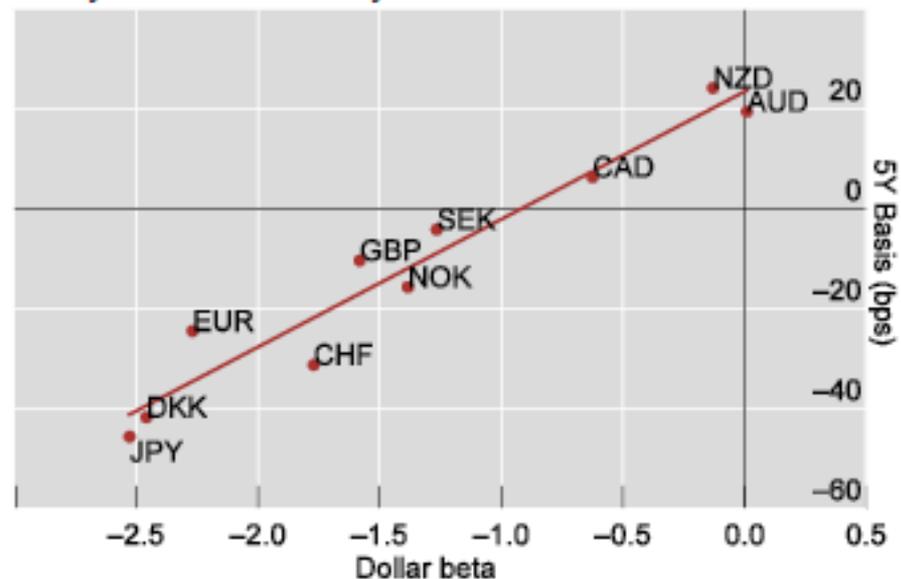ing daily regression for changes in the three-month cross-currency basis on changes in the broad US dollar index. The vertical axis of the RHP shows the average five-year cross-currency basis expressed in basis points, while the horizontal axis indicates the regression beta of running quarterly regression for changes in the five-year cross-currency basis on changes in the broad US dollar index.

Strong positive relationship between the average basis and
- the daily dollar beta (for 3M basis); correlation: 85% (LHP)
- the quarterly dollar beta (for 5Y basis); correlation: 97% (RHP)

Have EMEs overcome "Original Sin"?
Foreign ownership in EME local currency sovereign bond markets
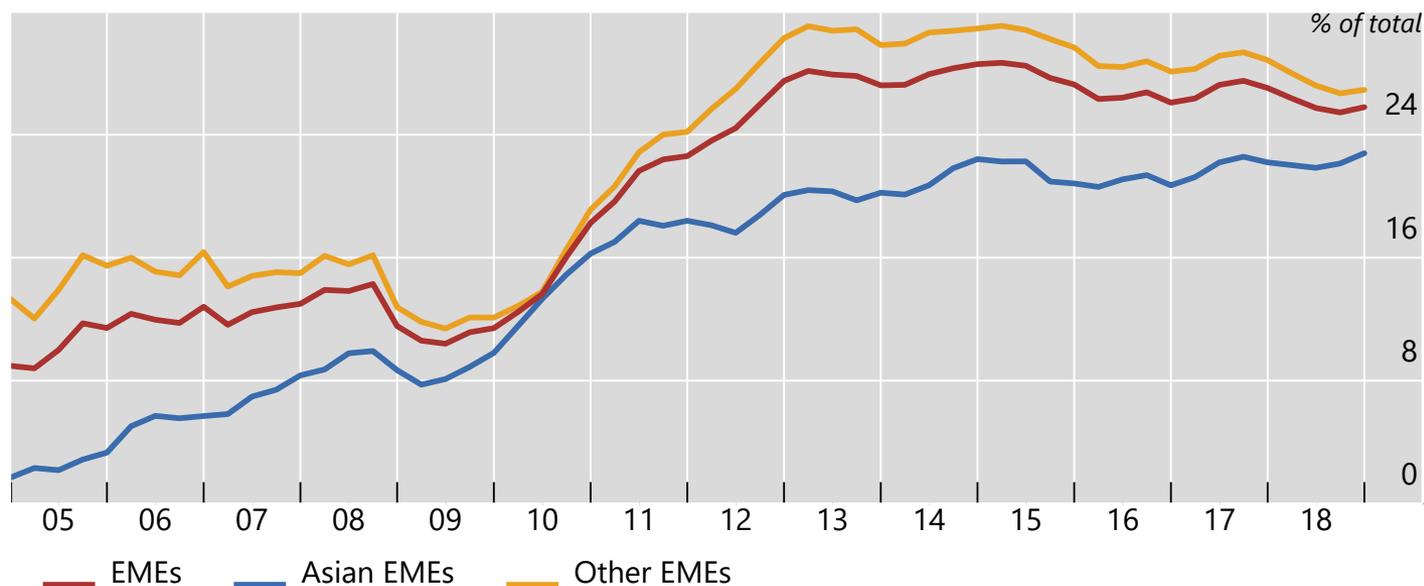
Source: Institute of International Finance.

Non-resident holdings of EME local currency sovereign bonds
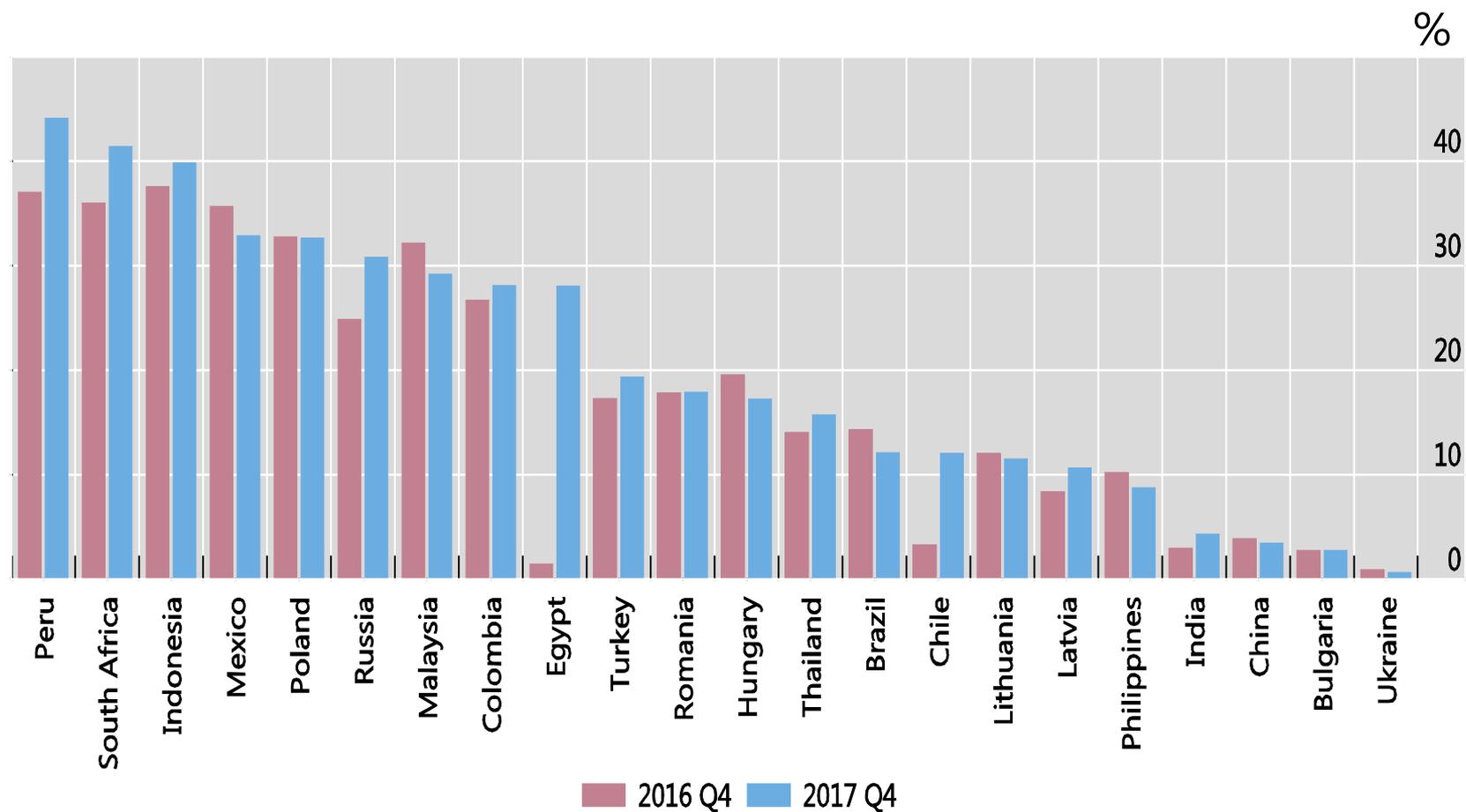
Source: World Bank

Two duration measures

$$\text{Duration} = -\frac{dP/P}{dr}$$

- Compare duration measures with:
  - Percentage return in local currency terms
  - Percentage return in dollar terms

Percentage return

Yield change

0
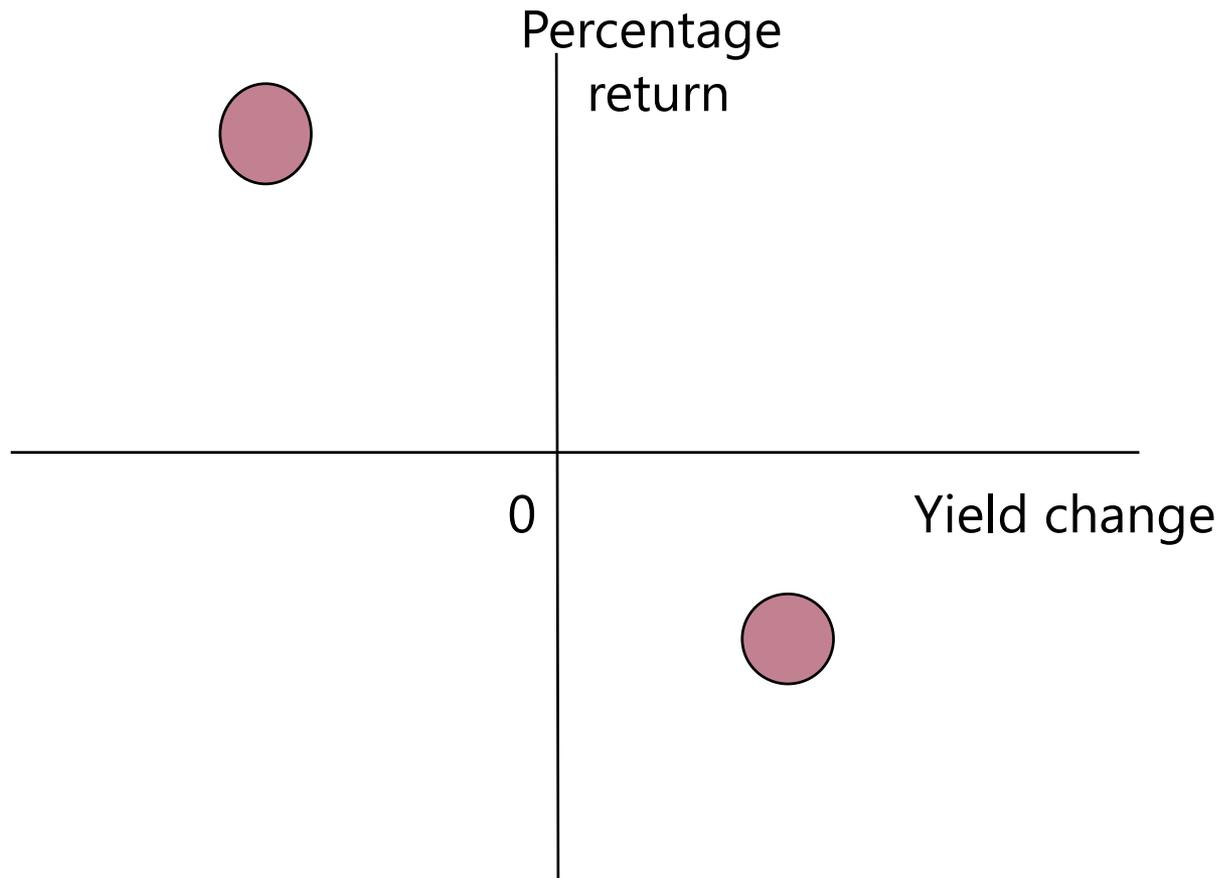
EMEs local currency sovereign bond returns[1], January 2013 – October 2018

Mexico

$y = -0.01 -5.05x$
where $R^2 = 0.88$

$y = -0.06 -12.4x$
where $R^2 = 0.58$

Change in yield, in percentage points

Return, in percent

- Local currency return

South Africa
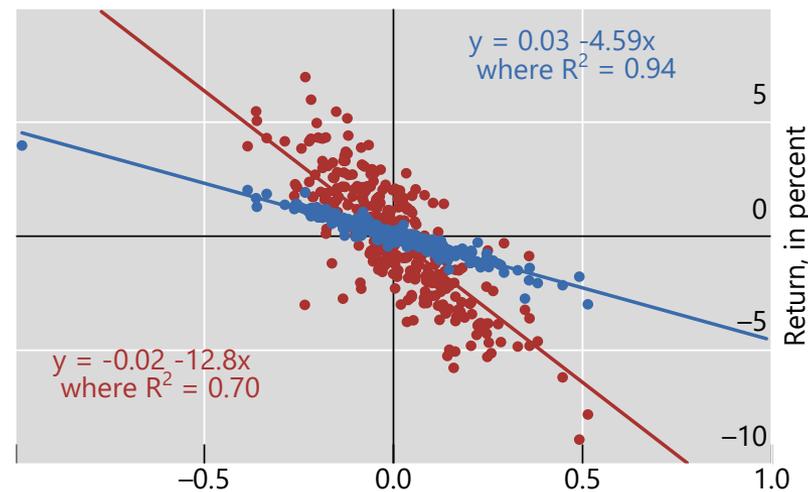
$y = 0.03 -4.59x$
where $R^2 = 0.94$

$y = -0.02 -12.8x$
where $R^2 = 0.70$

Change in yield, in percentage points

Return, in percent

- US dollar return

[1]Total return on bonds denominated in local currency as weekly change in JPMorgan GBI-EM principal return index in local currency and US dollar.

Sources: JPMorgan Chase; BIS calculations.

EMEs local currency sovereign bond returns[1], January 2013 – October 2018

Indonesia

$$y = -0.01 - 4.52x$$
$$\text{where } R^2 = 0.88$$

$$y = -0.09 - 6.6x$$
$$\text{where } R^2 = 0.60$$

Return, in percent

Change in yield, in percentage points

• US dollar return

Brazil
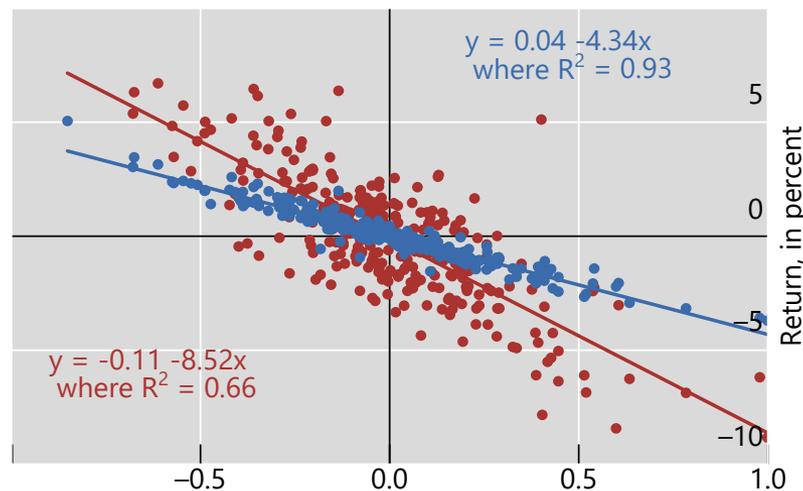
$$y = 0.04 - 4.34x$$
$$\text{where } R^2 = 0.93$$

$$y = -0.11 - 8.52x$$
$$\text{where } R^2 = 0.66$$

Return, in percent

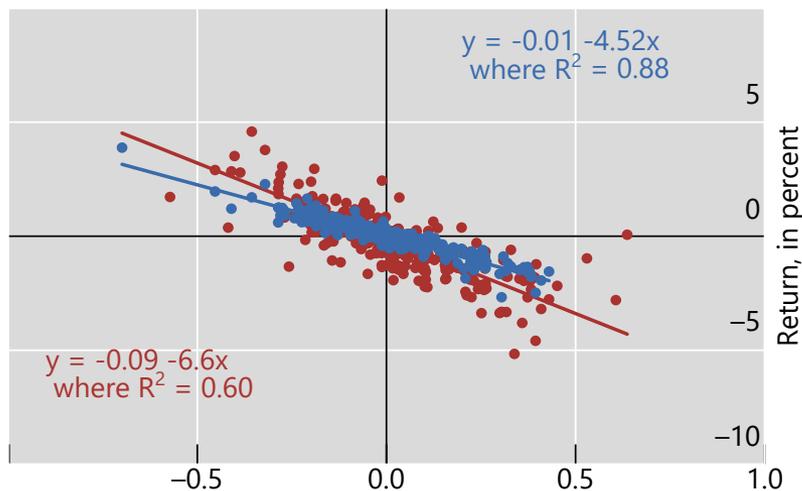Change in yield, in percentage points

• US dollar return

[1]Total return on bonds denominated in local currency as weekly change in JPMorgan GBI-EM principal return index in local currency and US dollar.

Sources: JPMorgan Chase; BIS calculations.

Local currency yield change in Asia after taper tantrum

Figure 2. Weekly change in LC yield spread after taper tantrum
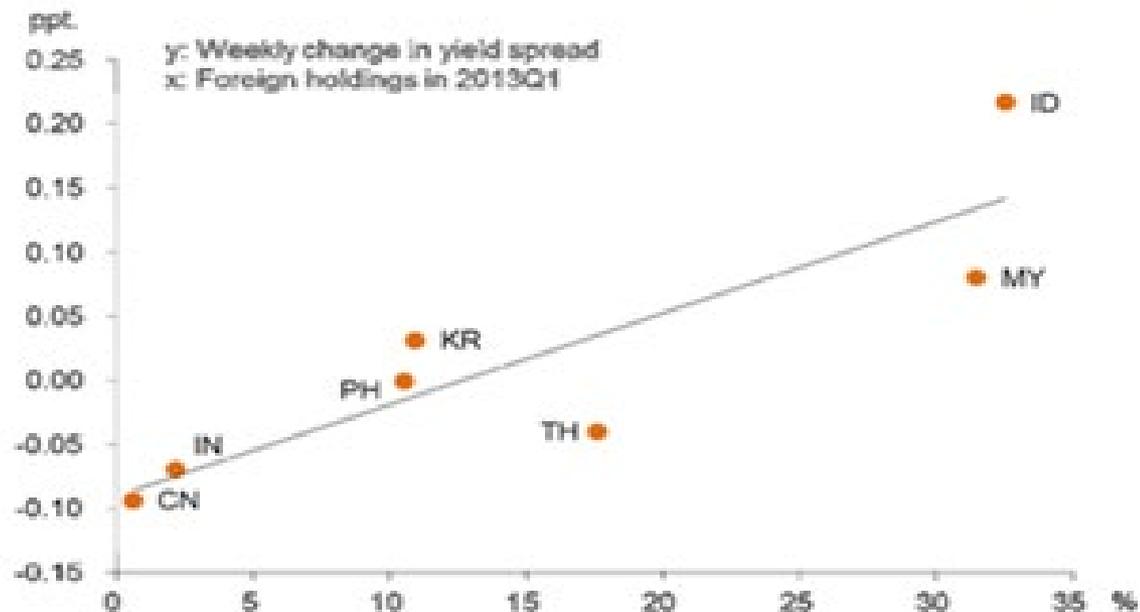
Note: Changes of five-year generic LC yield spread over US Treasury of the same tenor from 22 to 29 May 2013. The R-squared of the simple linear regression is 0.76.

Source: Bloomberg, Arslanalp and Tsuda (2014) and Asian Bonds Online.

Source: Hong Kong Monetary Authority

Advanced economies sovereign bond returns[1], January 2013 – October 2018

France

$y = -0.03 - 5.41x$
where $R^2 = 0.96$

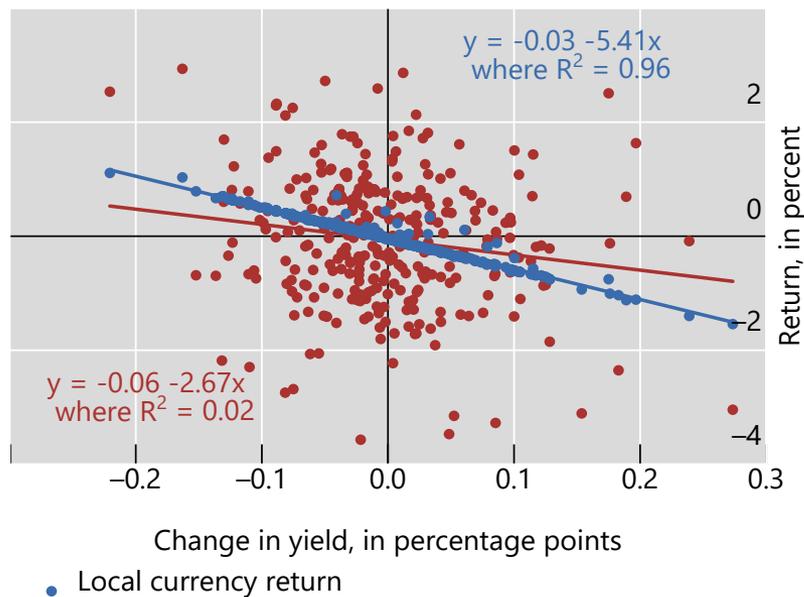$y = -0.06 - 2.67x$
where $R^2 = 0.02$

Return, in percent

Change in yield, in percentage points

● Local currency return

Sweden

$y = -0.03 - 5.09x$
where $R^2 = 0.94$

$y = -0.12 - 1.91x$
where $R^2 = 0.01$

Return, in percent

Change in yield, in percentage points

● US dollar return
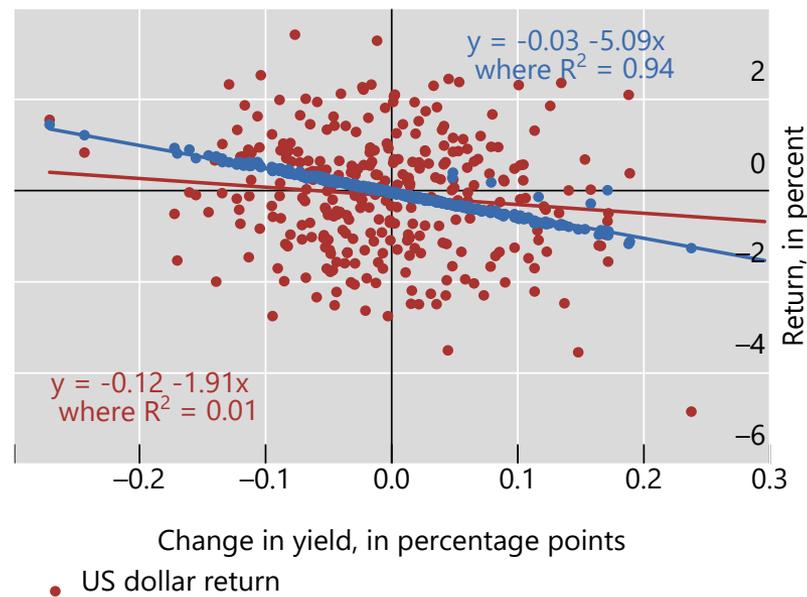
[1] GBI Global Country 5 to 7 year maturity indices for the selected economies.

Sources: JPMorgan Chase; BIS calculations.

- Monetary policy frameworks in EMEs: inflation targeting, the exchange rate and financial stability
  - *BIS Annual Economic Report 2019, Chapter II*

Monetary policy and exchange rates

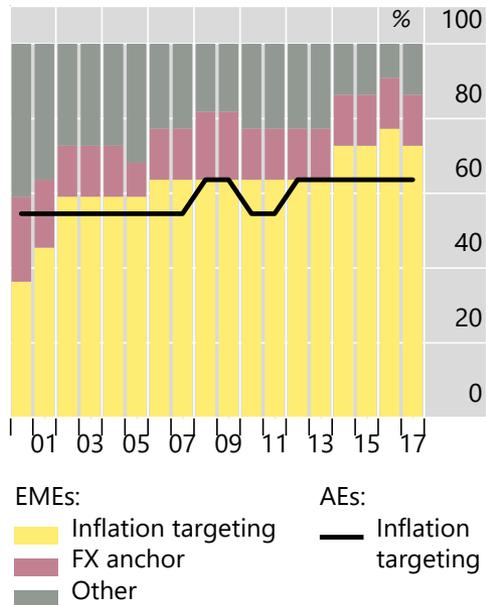- Conventionally, exchange rates enter through
  - Exchange rate pass-through to inflation
  - Net exports

- Standard models prescribe "benign neglect of exchange rate"
  - This prescription is honoured more in the breach than in its observance

Inflation targeting in EMEs

Monetary policy regimes

EMEs:
- Inflation targeting
- FX anchor
- Other

AEs:
- Inflation targeting

FX reserves
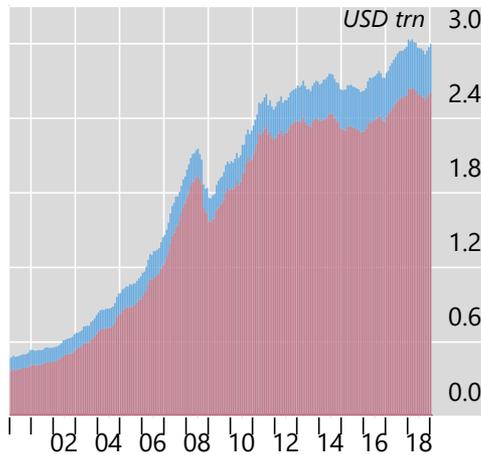
Use of macroprudential tools
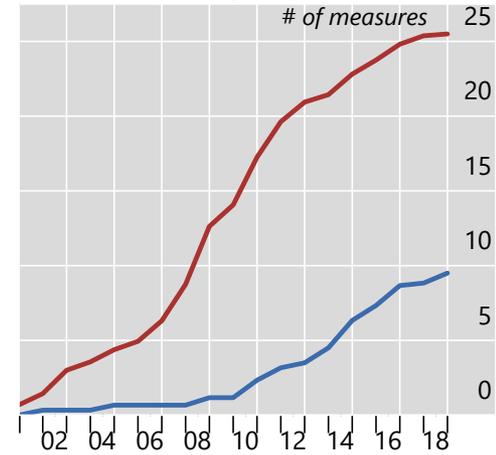
Inflation targeting EMEs
Inflation targeting AEs

Monetary policy and exchange rates

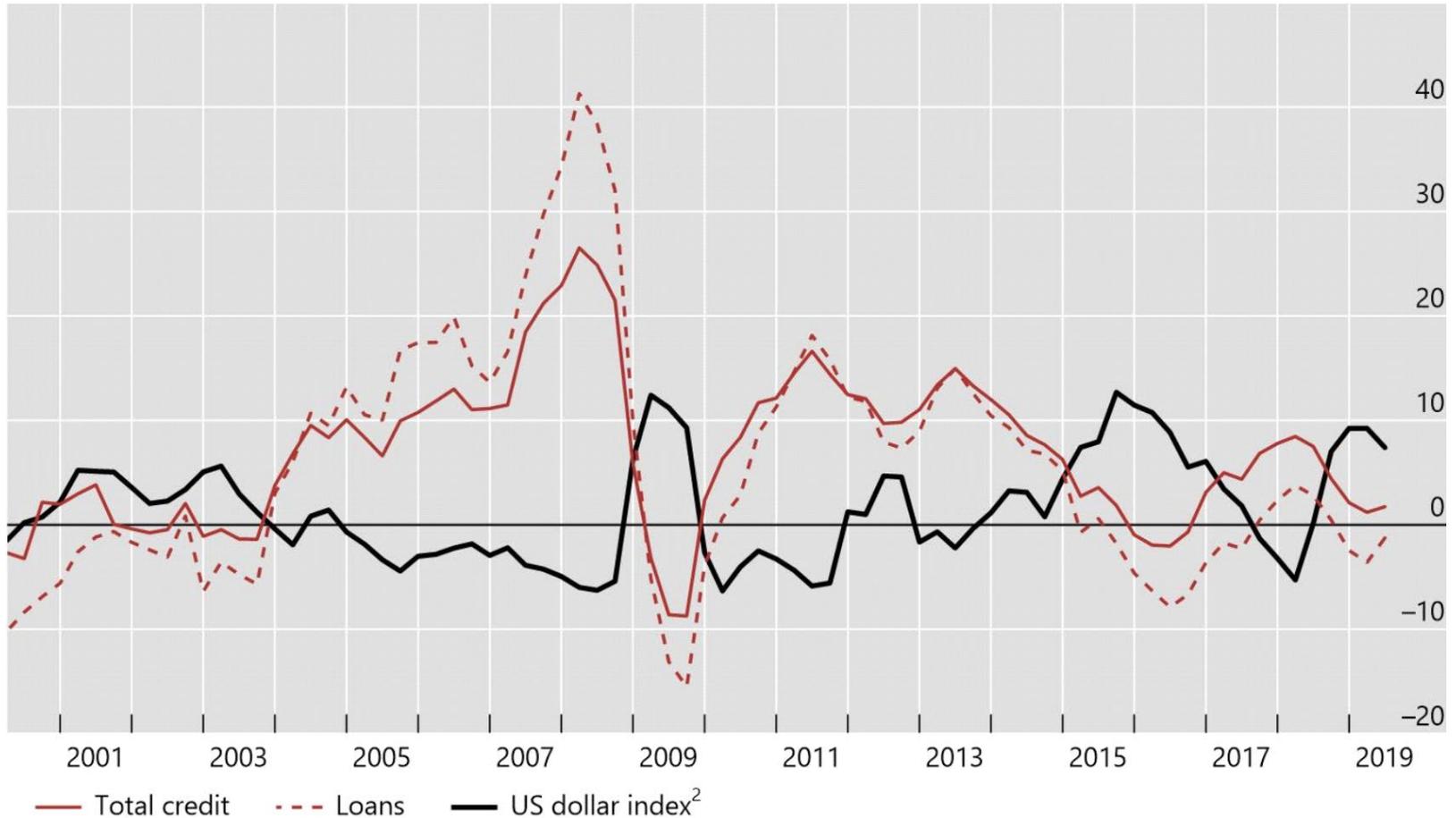- Weak dollar phase
  - Buoyant financial conditions
  - Buoyant real economic activity
  - Capital inflows to EMEs
  - Subdued inflation

- Strong dollar phase
  - Tighter financial conditions
  - Slowing real economic activity
  - Capital outflows from EMEs
  - Pass-through to inflation

US dollar credit to EMEs[1]

[1] Annual growth of US dollar-denominated credit to non-banks in EMEs.   [2] Annual growth of the Federal Reserve Board trade-weighted nominal dollar index, major EMEs.

Sources: Datastream; Dealogic; Euroclear; FRED; Thomson Reuters; Xtrakter Ltd; national data; BIS locational banking statistics; BIS effective exchange rate statistics; BIS calculations.

Regression coefficients for bank capital flows
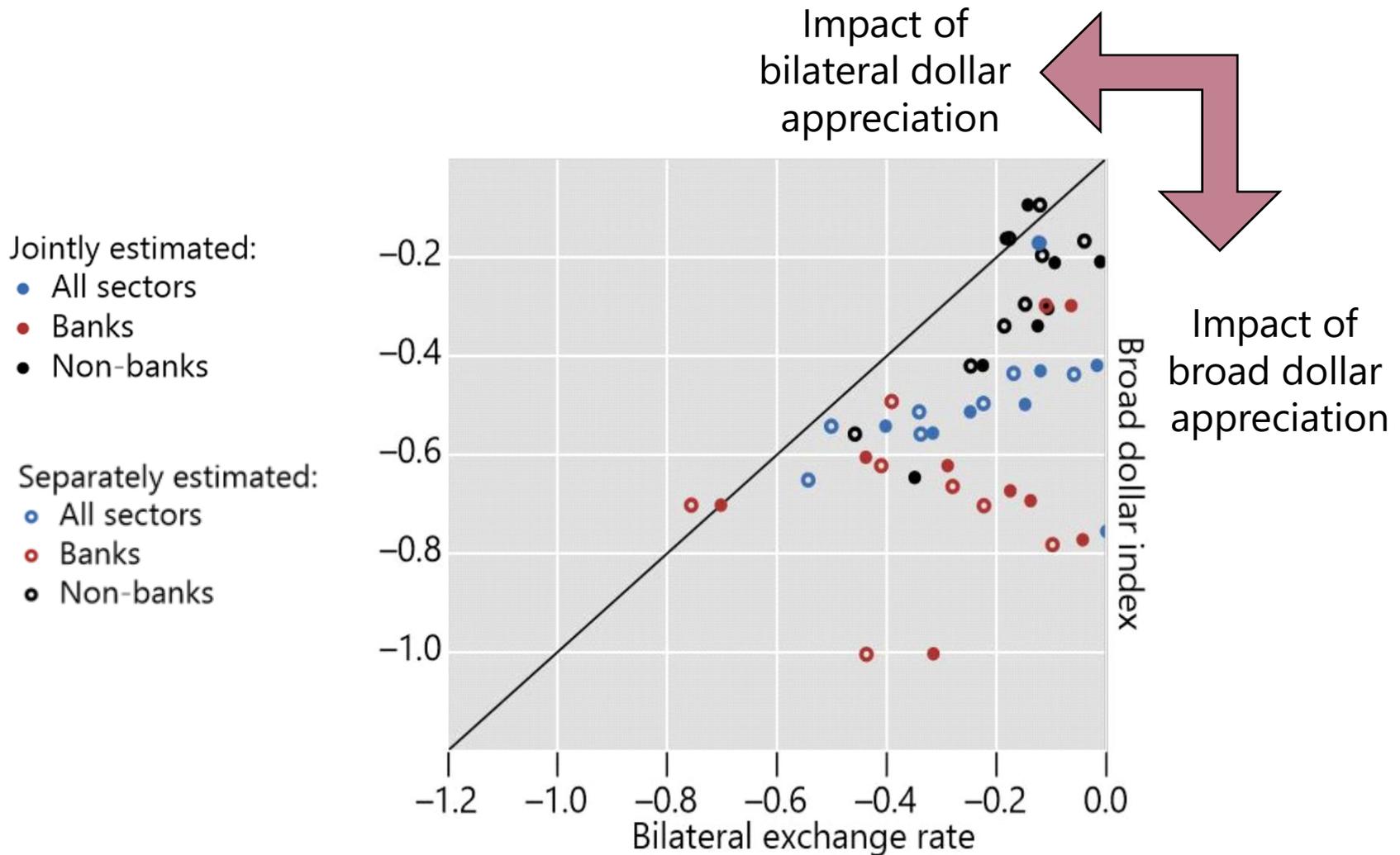
Estimated coefficients from panel regressions, US dollar.
Source: BIS calculations.

# Broad dollar also shows up EME bond fund flows

- Depreciation of broad dollar index associated with
  - larger EME bond fund inflows
  - tighter EME bond spreads
- Impact of broad dollar index is stronger than bilateral dollar exchange rate
- Holds for both EME local currency and advanced economy currency bonds

Panel regression coefficients for EME bond purchases and bond spreads

EME bond purchase regressions[1]

EME bond spread regressions[2]
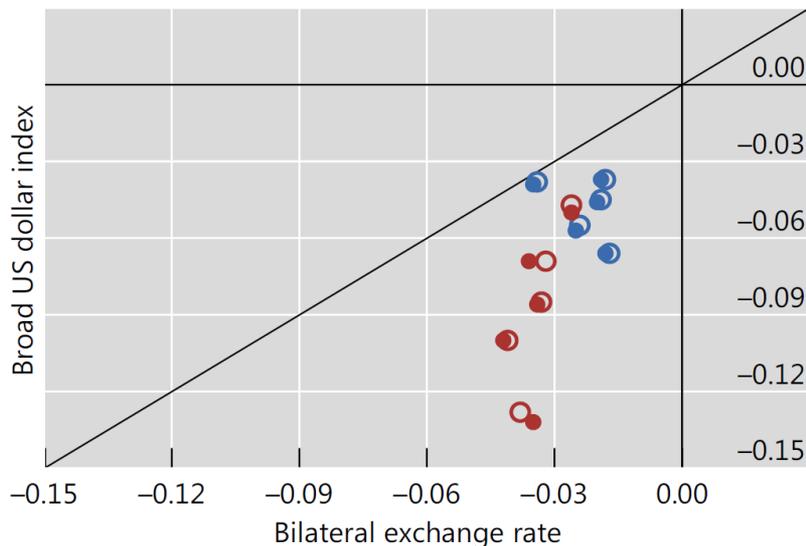
- ● Hard currency fund, jointly estimated
- ○ Hard currency fund, seperately estimated
- ● Local currency fund, jointly estimated
- ○ Local currency fund, seperately estimated
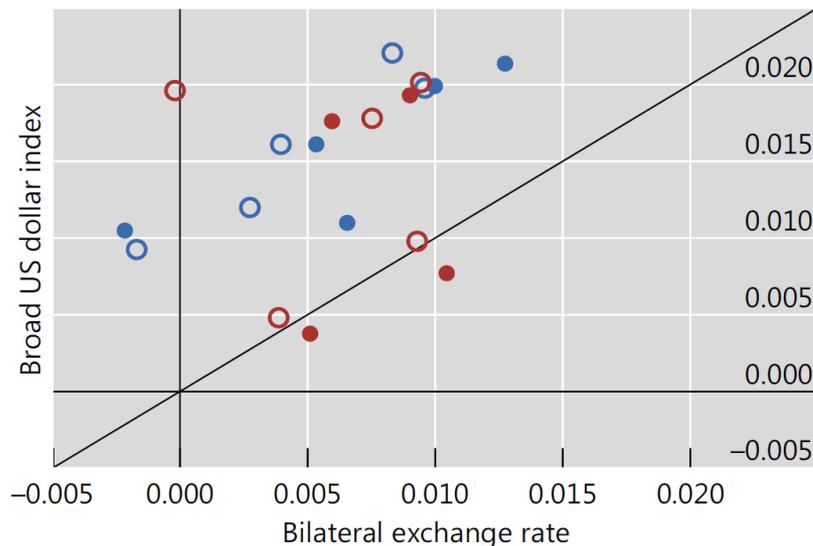
- ● Du-Schreger spreads, jointly estimated
- ○ Du-Schreger spreads, seperately estimated
- ● Foreign currency spreads, jointly estimated
- ○ Foreign currency spreads, seperately estimated

[1] The coefficient values on the vertical axis show the impact of 1 percent broad dollar appreciation on the ratio of the amount of purchase of a country's bonds divided by total net assets of a bond fund, while those on the horizontal axis the impact of bilateral dollar appreciation.
[2] The coefficient values on the vertical axis show the impact of 1 percent broad dollar appreciation on bond spreads, while those on the horizontal axis the impact of bilateral dollar appreciation.

Sources: EPFR; BIS calculations.

Why broad dollar index?

- Consider global lender with diversified portfolio of dollar credits to borrowers around the world

- Some borrowers face currency mismatch or otherwise benefit from weaker dollar (eg, oil firm)

- Dollar depreciation against whole basket implies:
  - Reduction in credit risk for individual borrowers
  - Reduced tail risk for diversified loan portfolio
  - Reduced Value-at-Risk
  - Increased lending capacity given economic capital
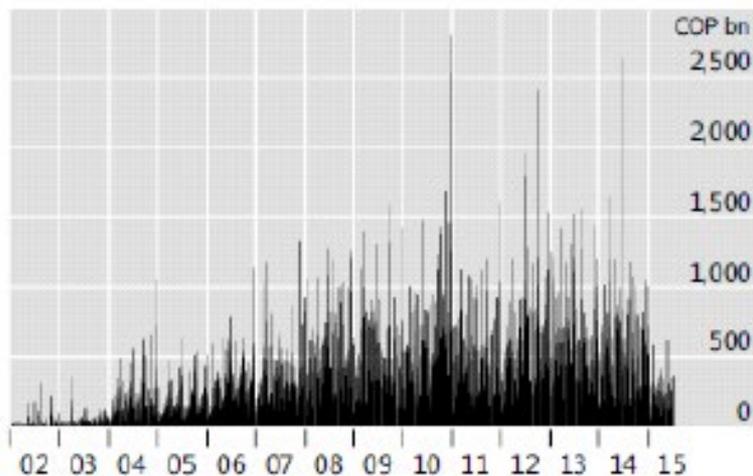
- Bruno and Shin (RES 2015)

High frequency micro dataset from Colombia
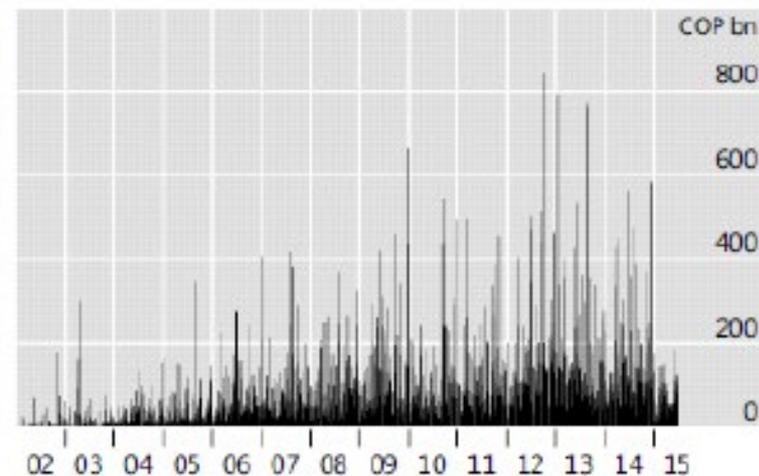## Hofmann, Shin and Villamizar (2019)

- Daily data on FX intervention and sterilisation operations from the Bank of the Republic, Colombia

- Daily data on flow of new corporate loans from credit registry for 38 banks

- Sample spanning up to 15 years (2001-2015)
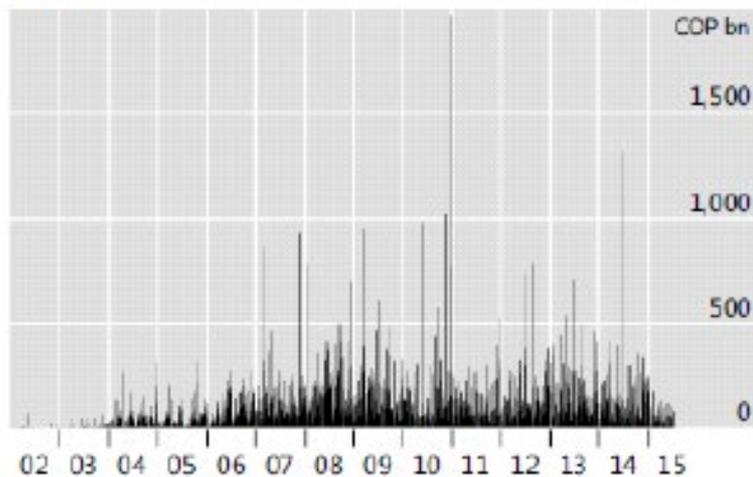
New corporate loans in Colombia

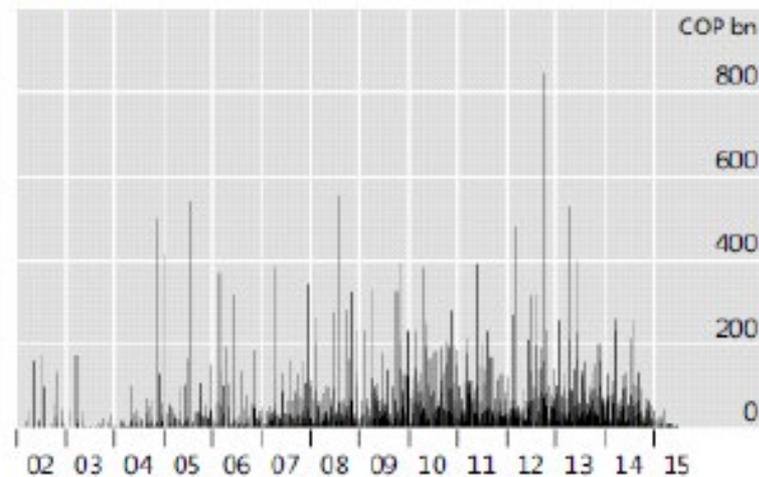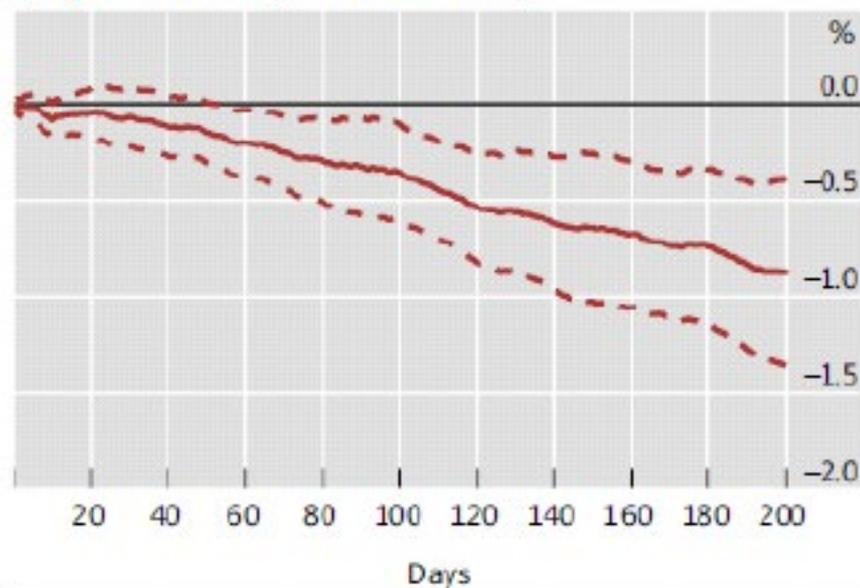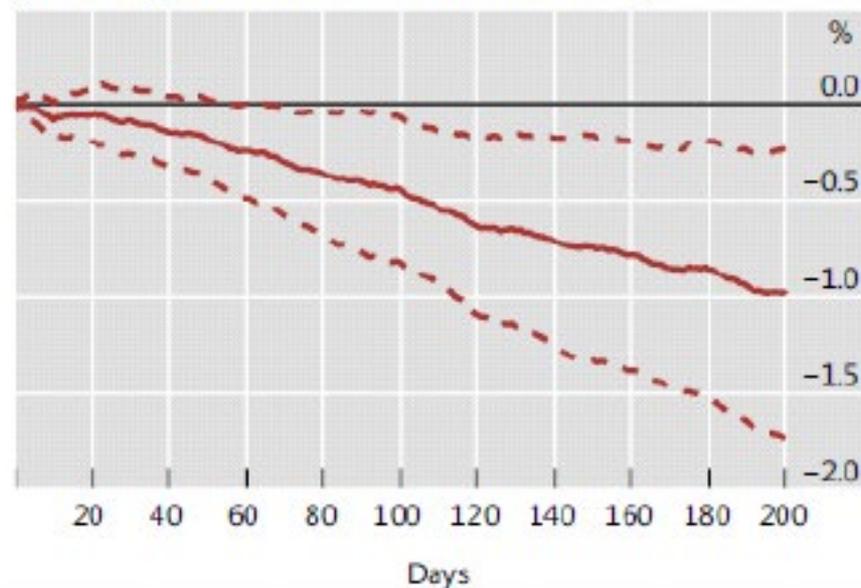# Impact of FXI on new corporate loans in Colombia

Sample period 2002-2010
(only discretionary FX intervention)
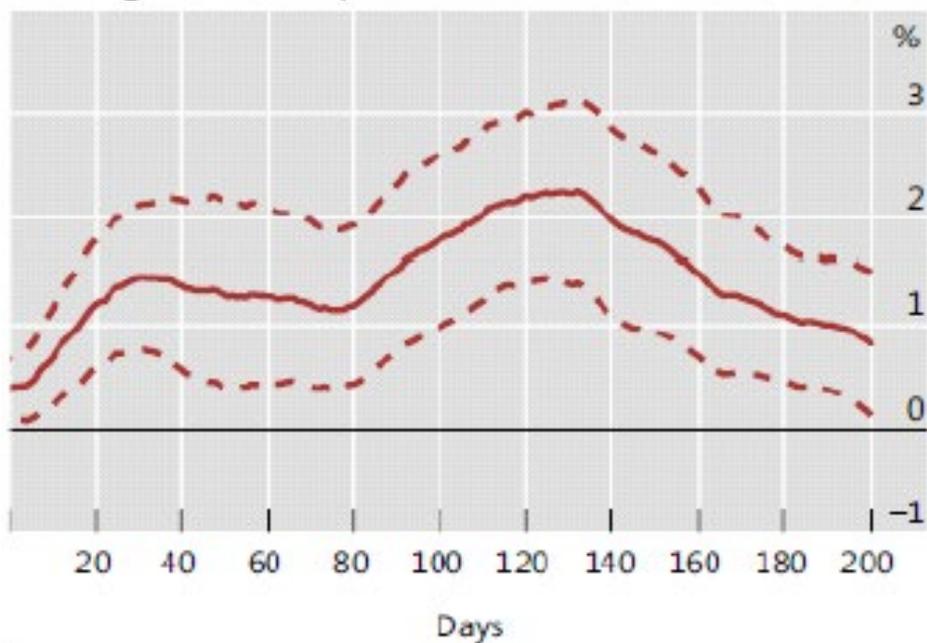
Sample period 2002-2015
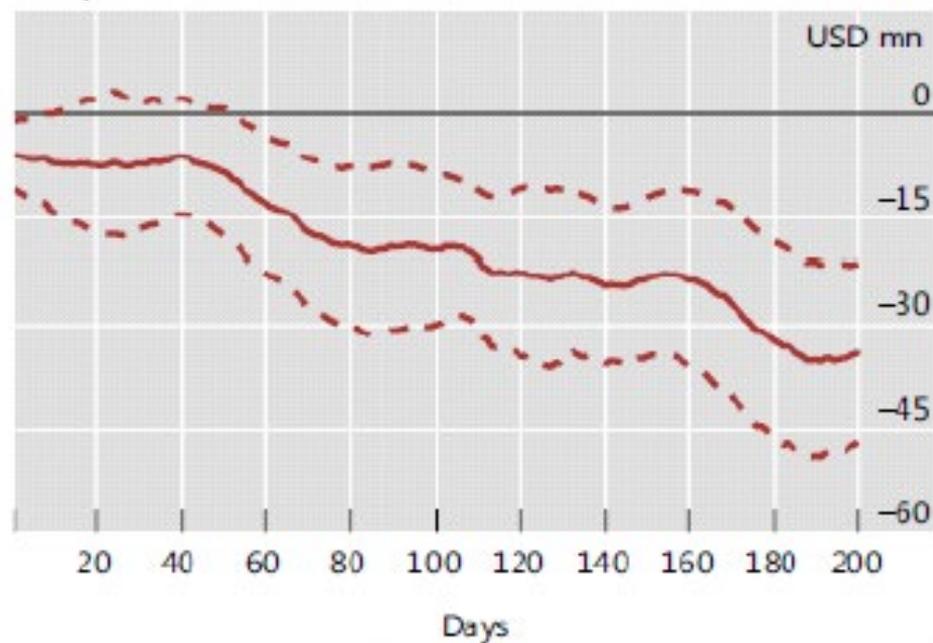(including pre-announced FX intervention)

Size of impulse normalised to 30 million USD

Impact of FXI on exchange rate and capital flows

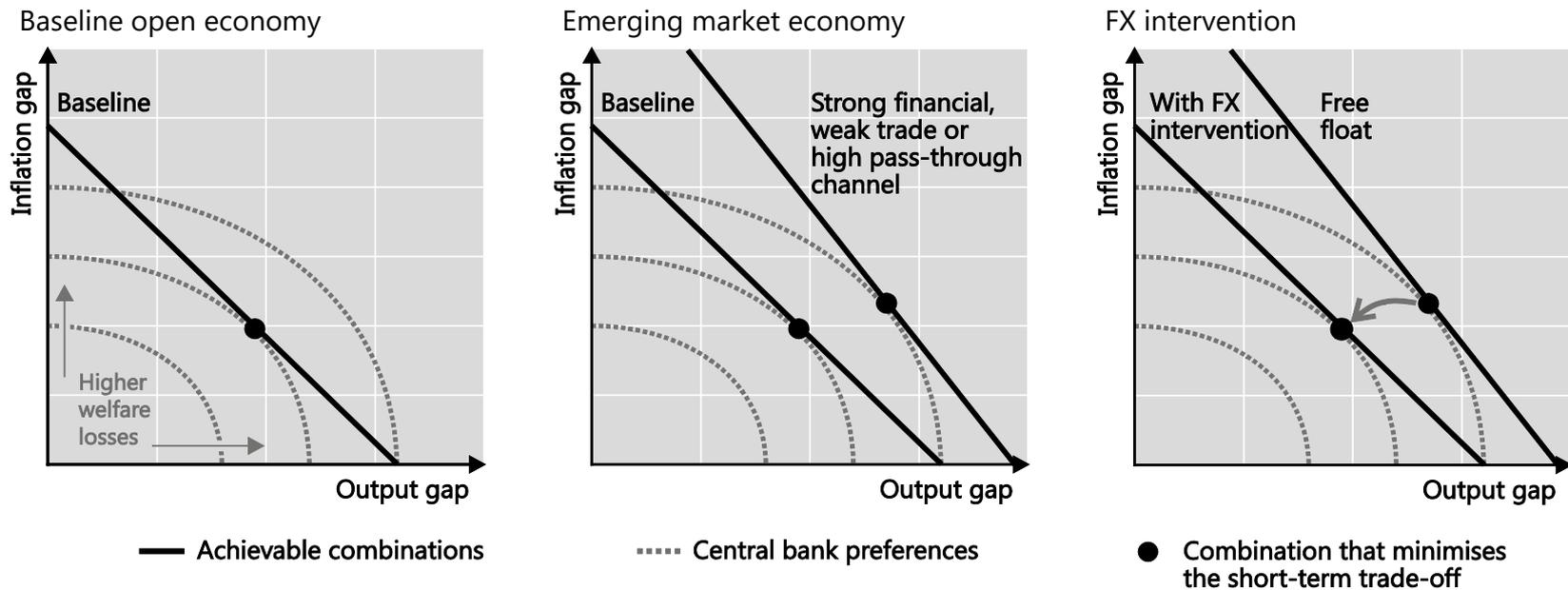
Exchange rate (COP per USD)

Net portfolio inflows

Size of impulse normalised to 30 million USD

FX intervention impact depending on bank characteristics

	20 Days	40 Days	60 Days	80 Days	100 Days
Capitalisation	0.020***	0.039***	0.058***	0.077***	0.097***
	(0.001)	(0.002)	(0.002)	(0.003)	(0.004)
Bank Size	0.014***	0.029***	0.044***	0.060***	0.077***
	(0.001)	(0.002)	(0.002)	(0.003)	(0.004)
Debt	-0.003***	-0.006***	-0.01***	-0.013***	-0.016***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Provisions	-0.017***	-0.033***	-0.049***	-0.065***	-0.082***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
FXI*Capitalisation	0.10***	0.16***	0.19**	0.25**	0.31**
	(0.034)	(0.55)	(0.077)	(0.10)	(0.12)
FXI*Bank Size	0.11***	0.15***	0.18**	0.26***	0.31**
	(0.033)	(0.055)	(0.077)	(0.10)	(0.12)
FXI*Debt	-0.008***	-0.011**	-0.013*	-0.021**	-0.024**
	(0.003)	(0.005)	(0.007)	(0.009)	(0.012)
FXI*Provisions	-0.024	-0.036	-0.031	-0.035	-0.037
	(0.015)	(0.026)	(0.036)	(0.047)	(0.058)

Short-term monetary policy trade-off and FX intervention

Baseline open economy

Emerging market economy

FX intervention

Source: BIS.

Implications for EME monetary policy frameworks

- Macroprudential tools and FX intervention can help improve monetary policy trade-offs in inflation targeting EMEs, but there is no "one size fits all"

  - Macroprudential tools subject to circumvention

  - Design and use of FX intervention weighed against costs

    - Net benefit depends on associated fiscal costs
    - FX intervention does little to address broad dollar

- Theory to catch up with practice

  - More work needed on the conceptual foundations of EME monetary policy practice