



The dollar and real economic activity: an evolving relationship

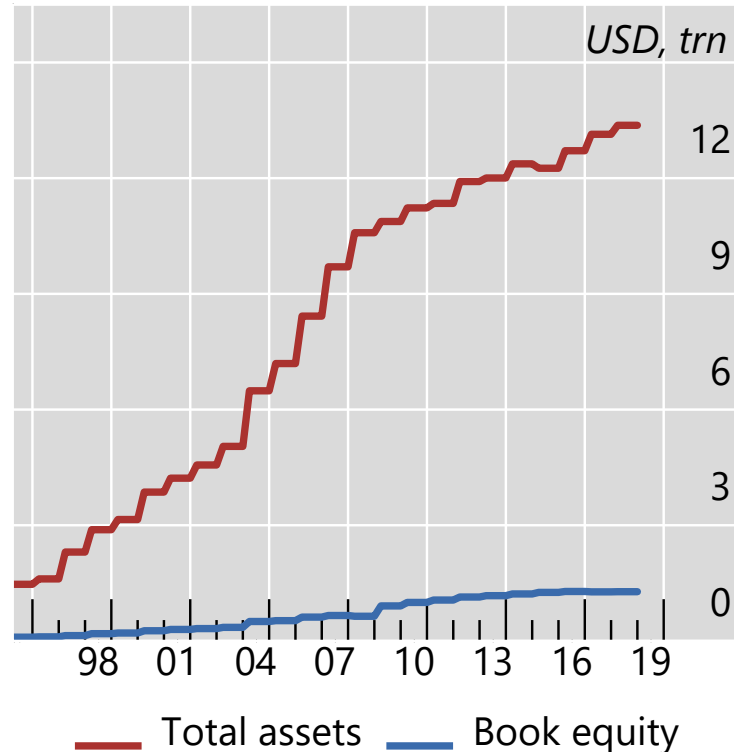
Burcu Erik, Marco Lombardi, Dubravko Mihajek and Hyun Song Shin*
2020 AEA meetings in San Diego

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



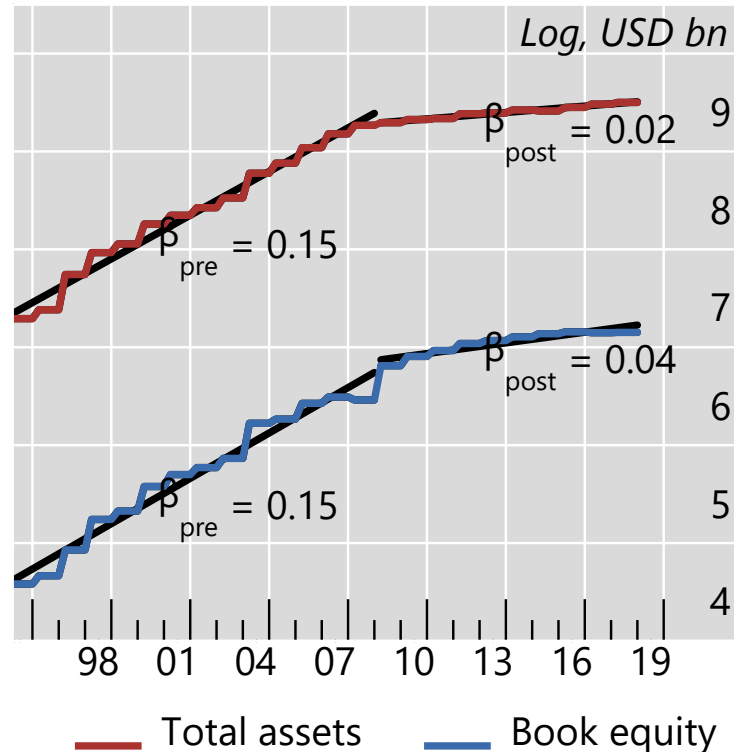
Post-crisis developments in the banking sector

Total assets and book equity of 17 US banks



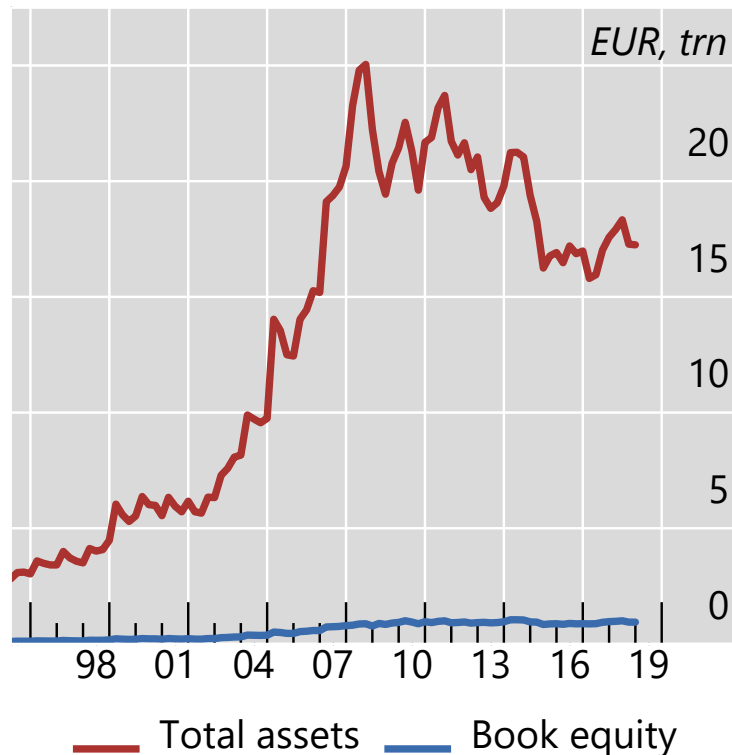
Banks: Bank of America Corporation; Bank of New York Mellon Corporation; Capital One Financial Corporation; Citigroup Inc.; Citizens Financial Group Inc.; Fifth Third Bancorp; JPMorgan Chase & Co.; Morgan Stanley; Goldman Sachs Group Inc.; Northern Trust Corporation; PNC Financial Services Group Inc.; Regions Financial Corporation; State Street Corporation; SunTrust Banks Inc.; Truist Financial Corporation; U.S. Bancorp and Wells Fargo & Company.

Total assets and book equity of 17 US banks: in log scale



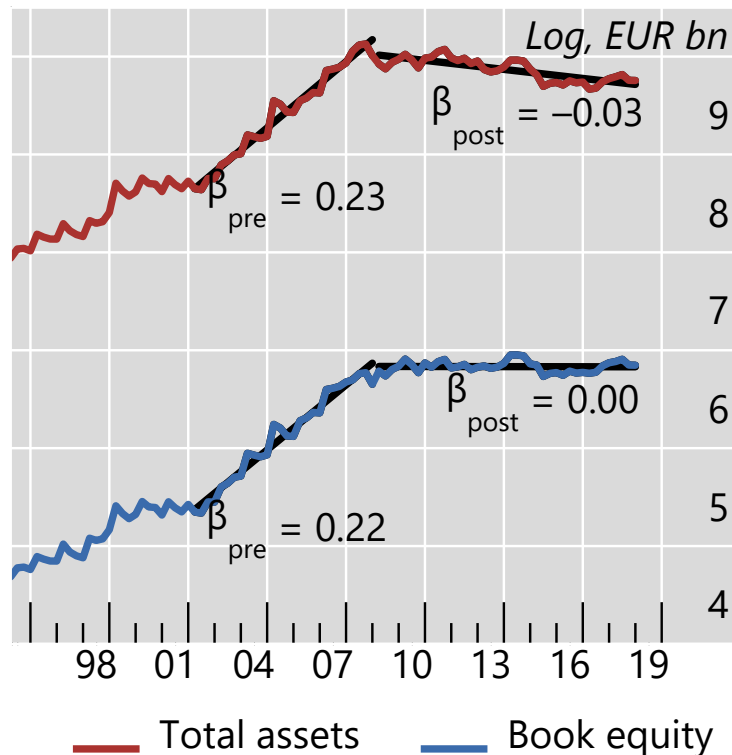
The beta coefficient shows the trend growth rate in natural logarithm. For instance, a 0.15 value corresponds to around 15% growth rate per annum. Banks: Bank of America Corporation; Bank of New York Mellon Corporation; Capital One Financial Corporation; Citigroup Inc.; Citizens Financial Group Inc.; Fifth Third Bancorp; JPMorgan Chase & Co.; Morgan Stanley; Goldman Sachs Group Inc.; Northern Trust Corporation; PNC Financial Services Group Inc.; Regions Financial Corporation; State Street Corporation; SunTrust Banks Inc.; Truist Financial Corporation; U.S. Bancorp and Wells Fargo & Company.

Total assets and book equity of 26 euro area banks



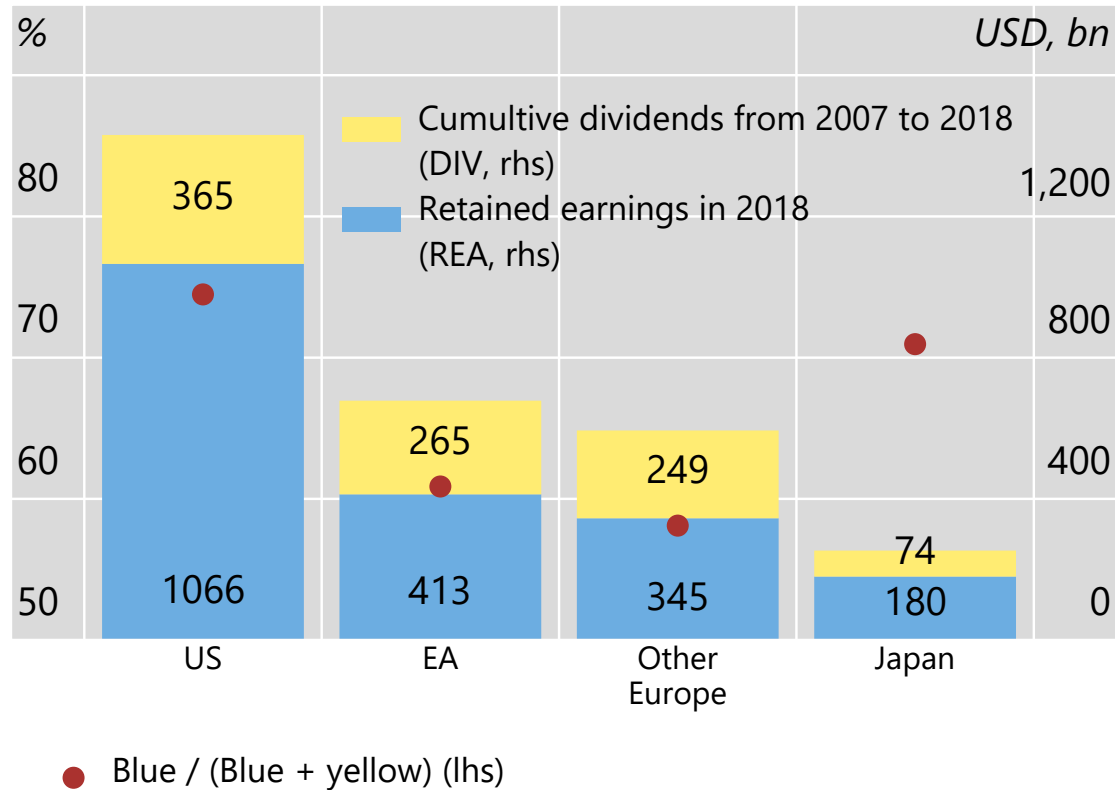
Banks: AIB Group Plc; Banca Monte dei Paschi di Siena SpA; Banco Bilbao Vizcaya Argentaria SA; Banco Bpm SpA; Banco de Sabadell SA; Banco Popular Español SA; Banco Santander SA; Bank of Ireland Group; Bankia SA; BNP Paribas SA; CaixaBank SA; Commerzbank AG; Crédit Agricole SA; Crédit Industriel et Commercial SA; Deutsche Bank AG; Dexia SA; Erste Group Bank AG; ING Groep NV and Nordea Bank Abp.; Intesa Sanpaolo SpA; KBC Group NV; Natixis SA; Raiffeisen Bank International AG; Société Générale SA; UniCredit SpA; Unione di Banche Italiane SpA.

Total assets and book equity of 26 euro area banks: in log scale

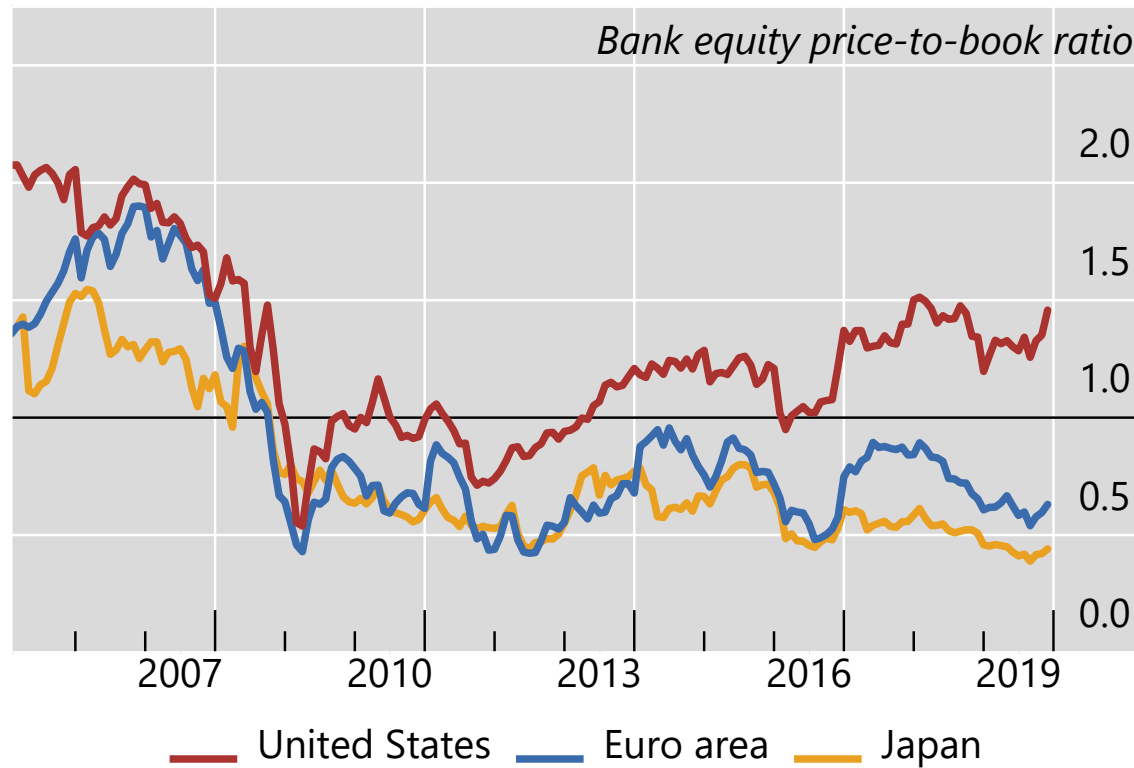


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Cumulative dividends since 2007 have eroded bank equity

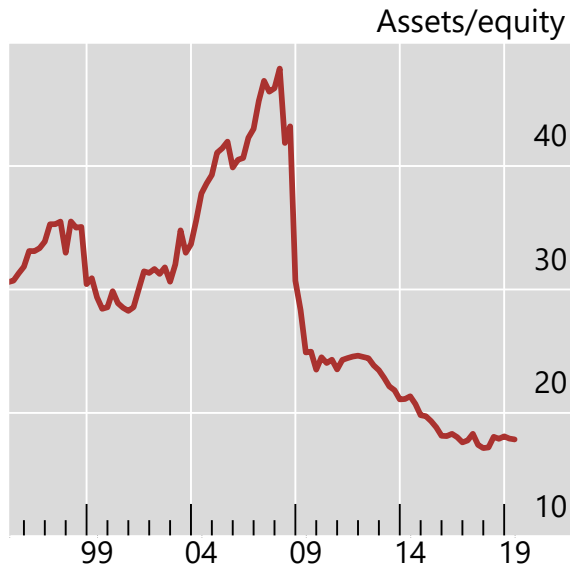


Low price-to-book ratios create incentive to pay out equity

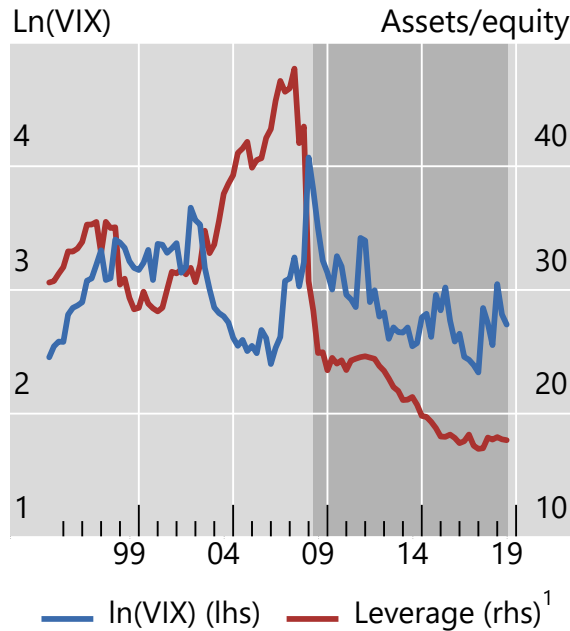


Leverage of US securities broker-dealer sector

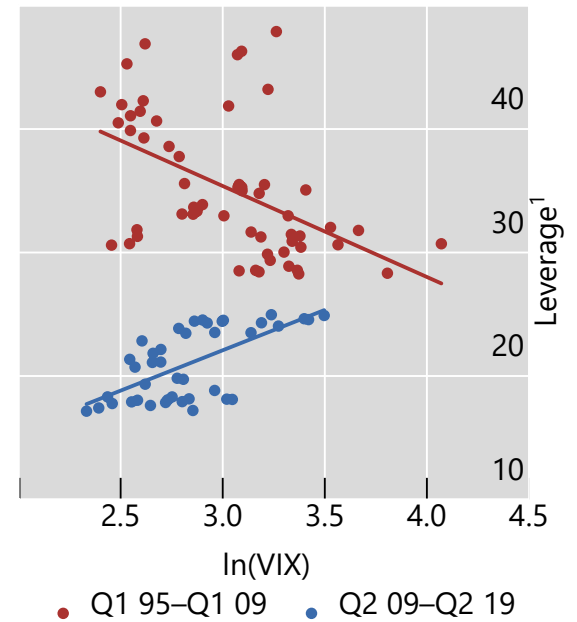
Leverage¹



Leverage and VIX index

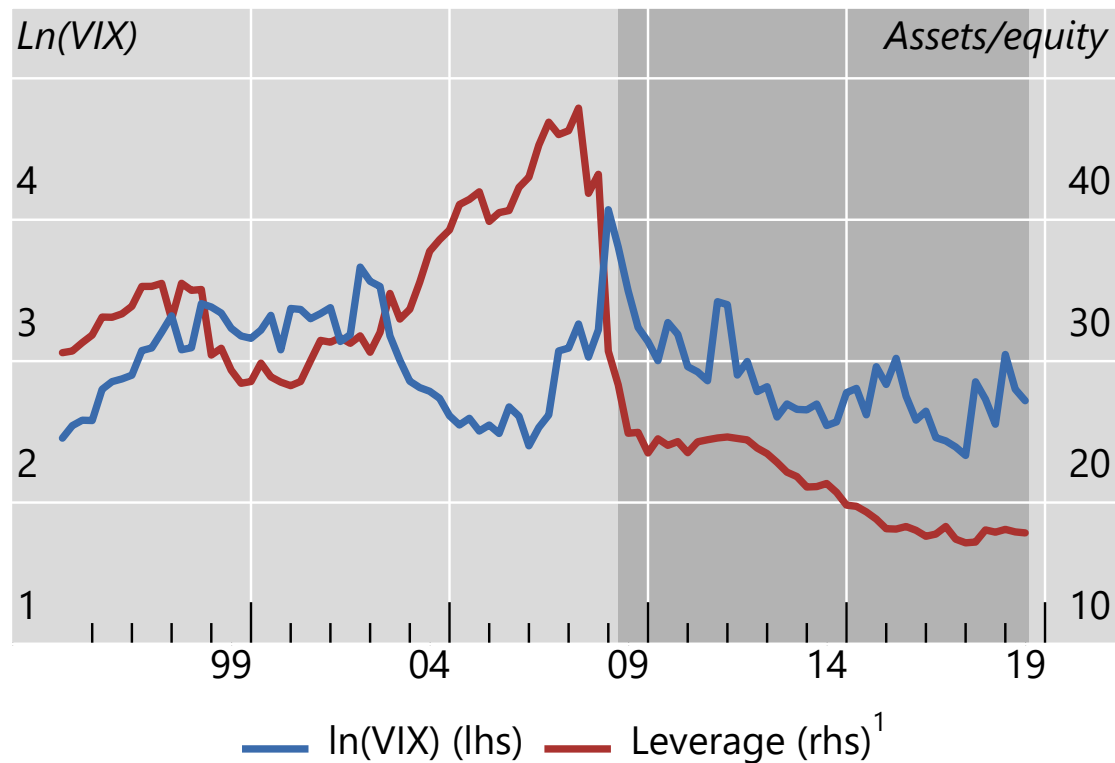


Leverage and VIX index



¹ Calculated as total assets divided by equity.
Sources: Federal Reserve, *Flow of Funds*; Bloomberg; BIS calculations.

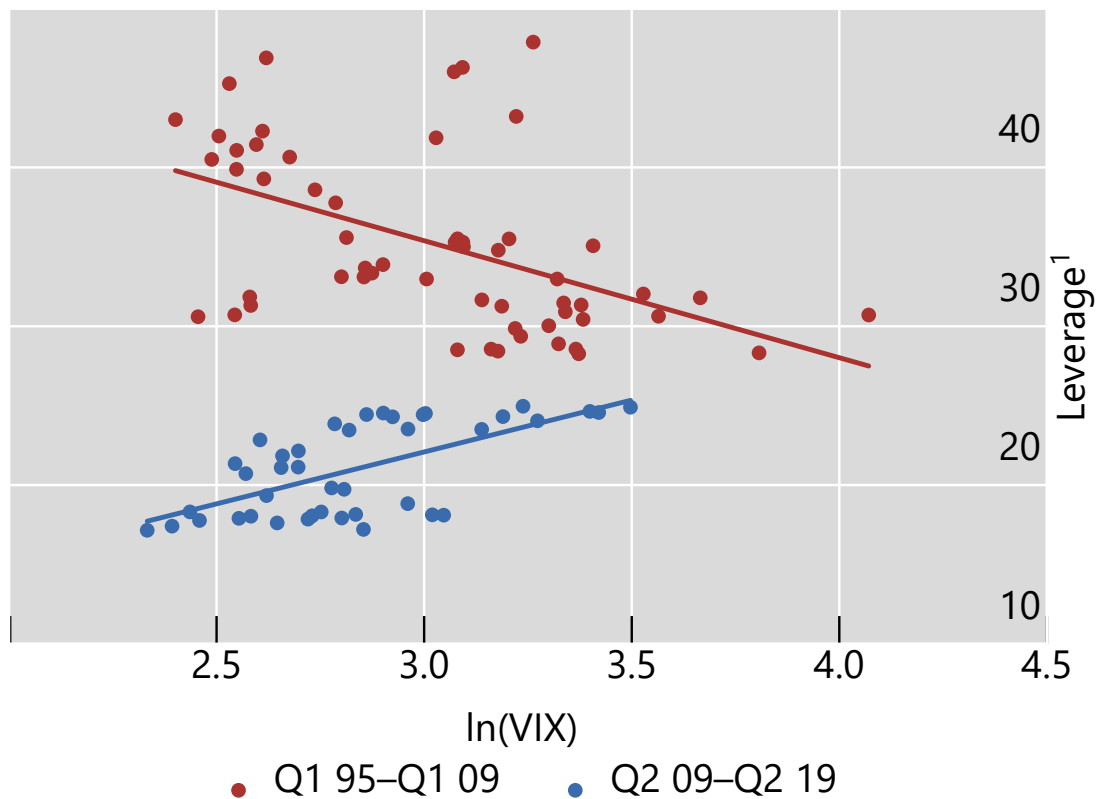
Leverage of US securities broker-dealer sector and VIX index



¹ Calculated as total assets divided by equity.

Sources: Federal Reserve, *Flow of Funds*; Bloomberg; BIS calculations.

Leverage no longer dances to the tune of the VIX index

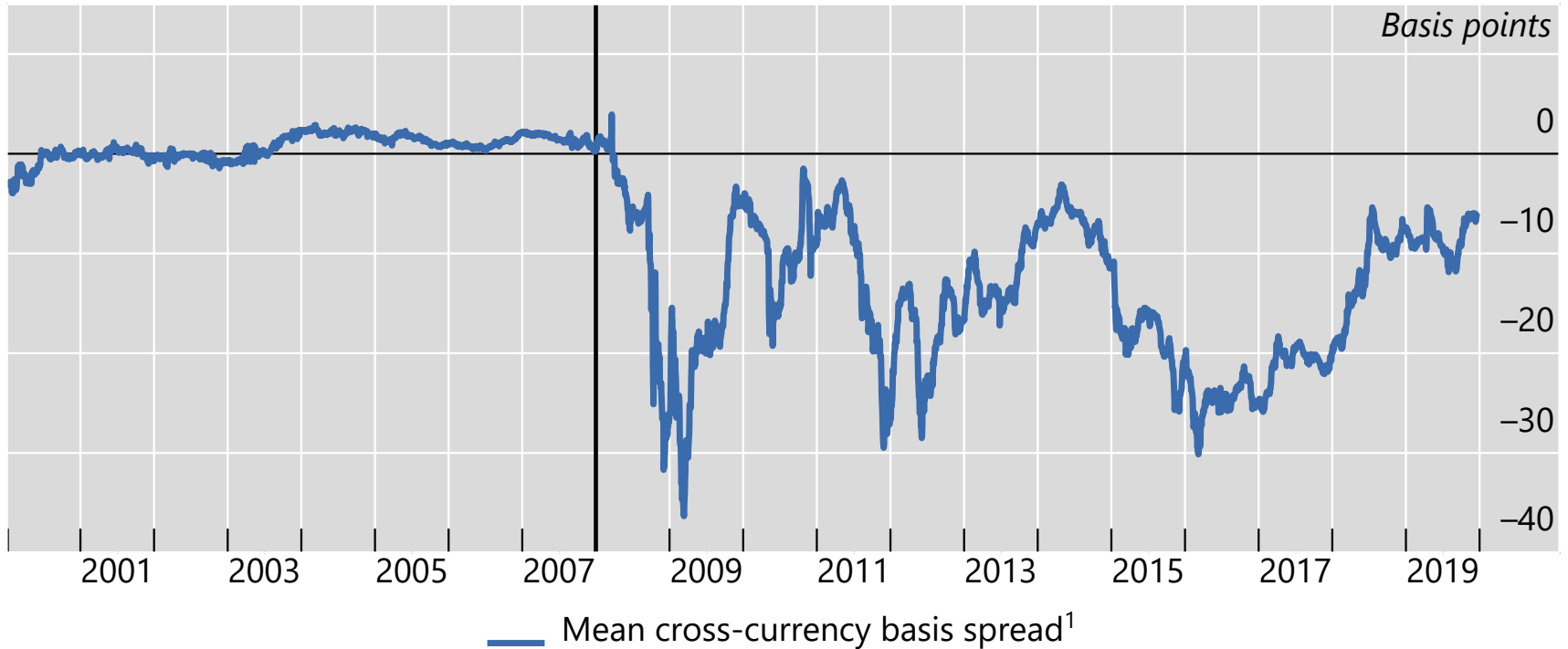


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CIP deviation

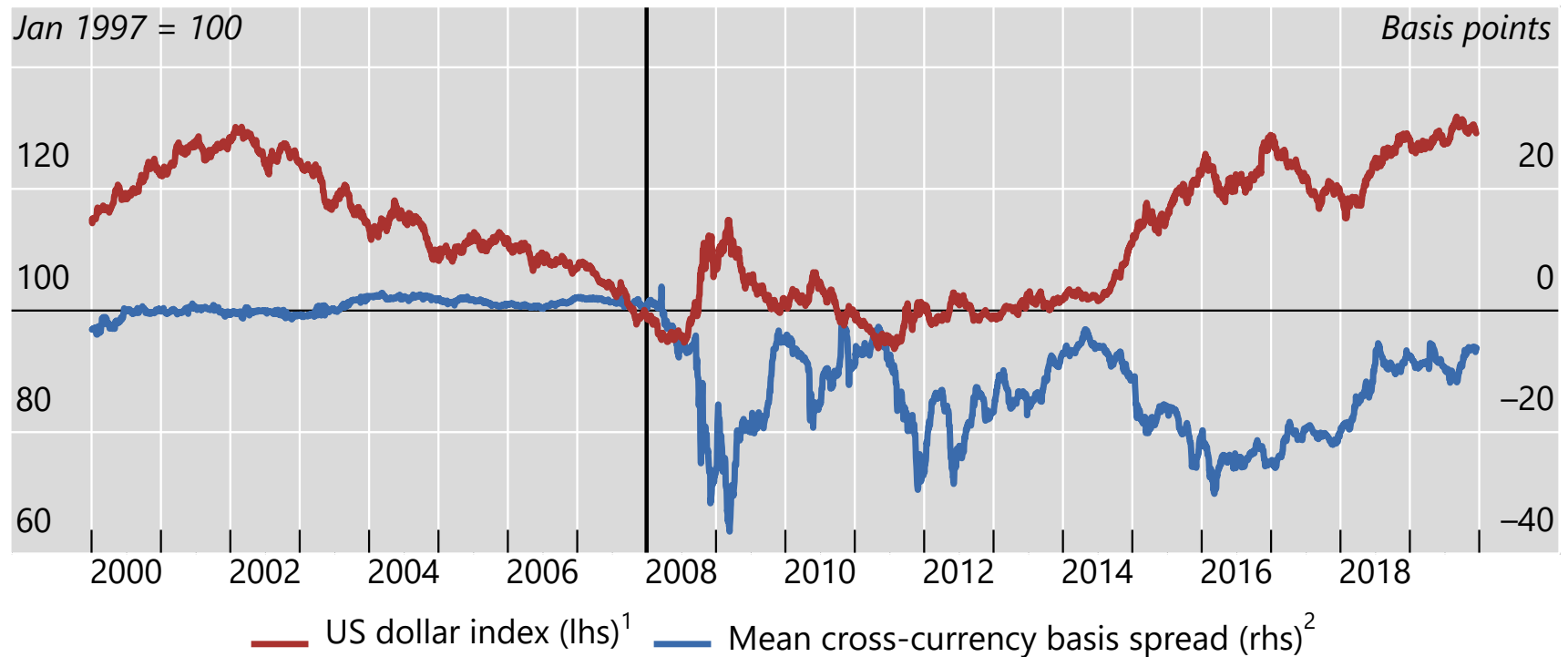
Avdjiev, Du, Koch and Shin (AER Insights 2019)



¹ Average five-year cross currency basis across Australian dollar, British pound, Canadian dollar, Danish krone, euro, Japanese yen, New Zealand dollar, Norwegian krone, Swedish krona and Swiss franc vis-à-vis the US dollar.
Sources: Bloomberg; BIS calculations.

US dollar broad index and the cross-currency basis

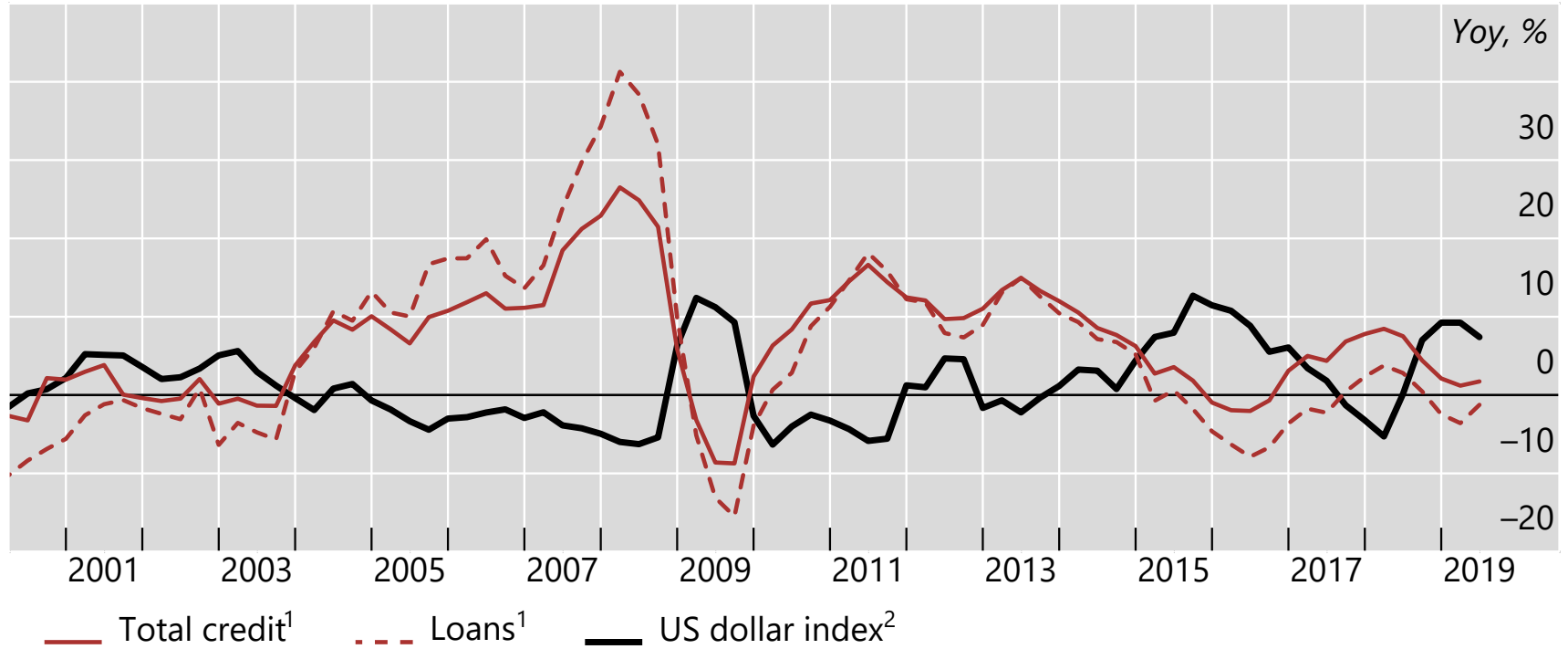
Avdjiev, Du, Koch and Shin (AER Insights 2019)



¹ Federal Reserve Board trade-weighted nominal dollar index, broad, based on goods trade. Higher values indicate a stronger US dollar. ² Average five-year cross currency basis across Australian dollar, British pound, Canadian dollar, Danish krone, euro, Japanese yen, New Zealand dollar, Norwegian krone, Swedish krona and Swiss franc vis-à-vis the US dollar.

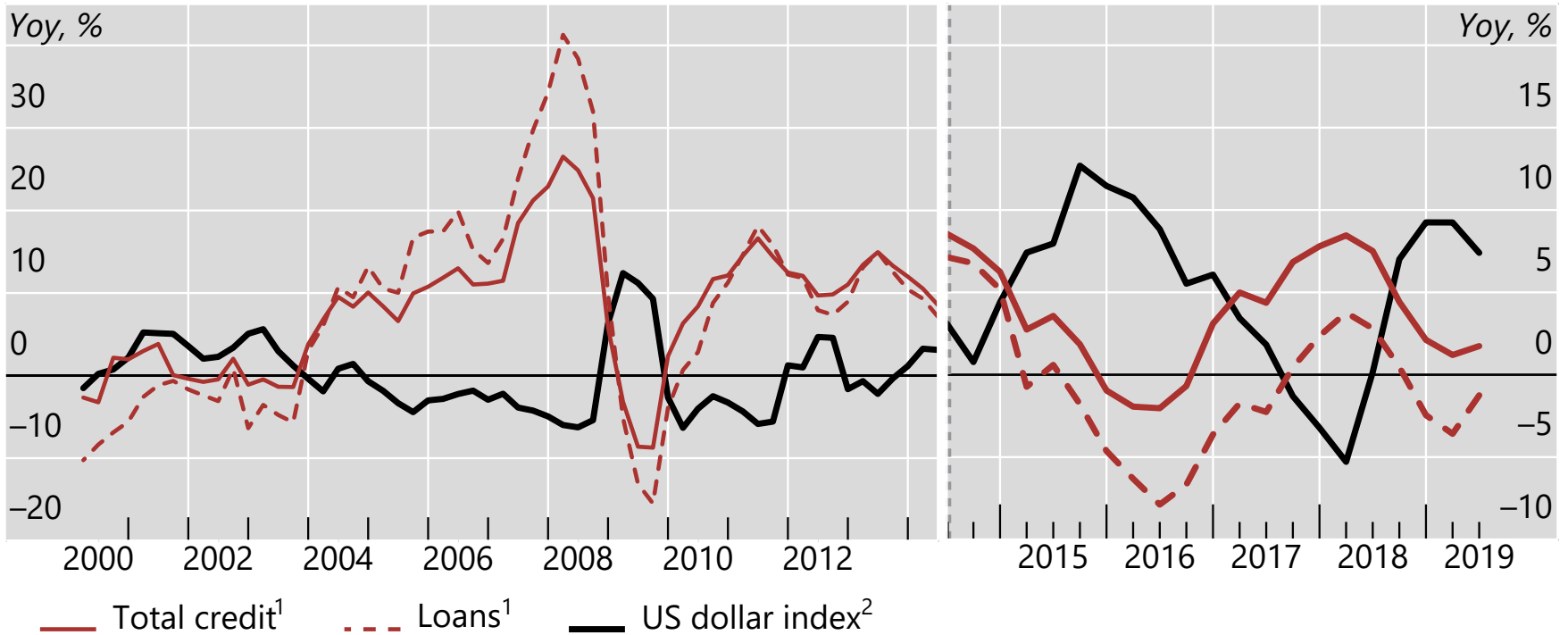
Sources: Federal Reserve Bank of St Louis, FRED; Bloomberg; BIS calculations.

US dollar credit to EMEs



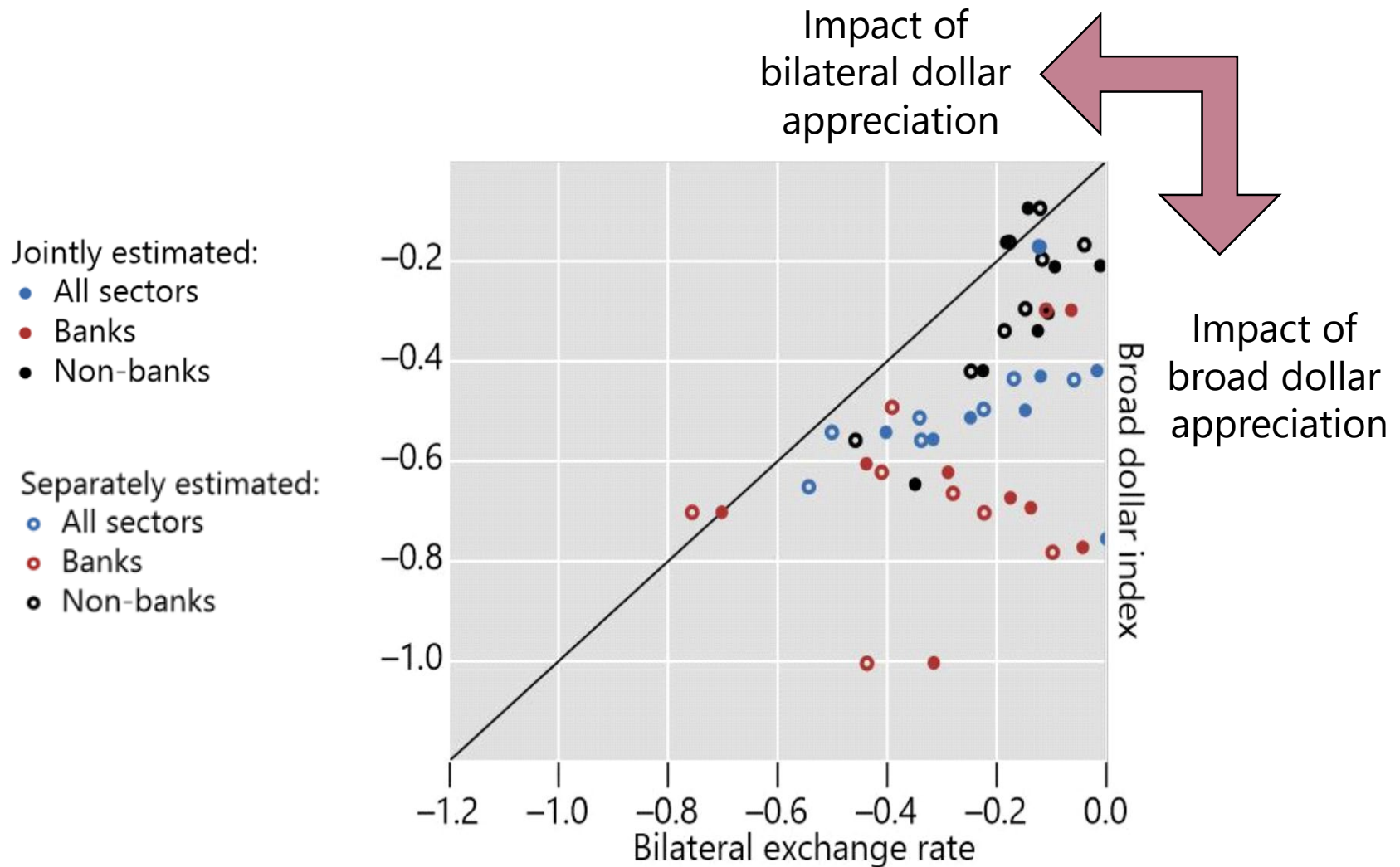
¹ Annual growth of US dollar-denominated credit or loans to non-banks in EMEs. ² Annual growth of the Federal Reserve Board trade-weighted nominal dollar index, major EMEs.
Sources: Datastream; Dealogic; Euroclear; FRED; Thomson Reuters; Xtrakter Ltd; national data; BIS locational banking statistics; BIS effective exchange rate statistics; BIS calculations.

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Regression coefficients for bank capital flows

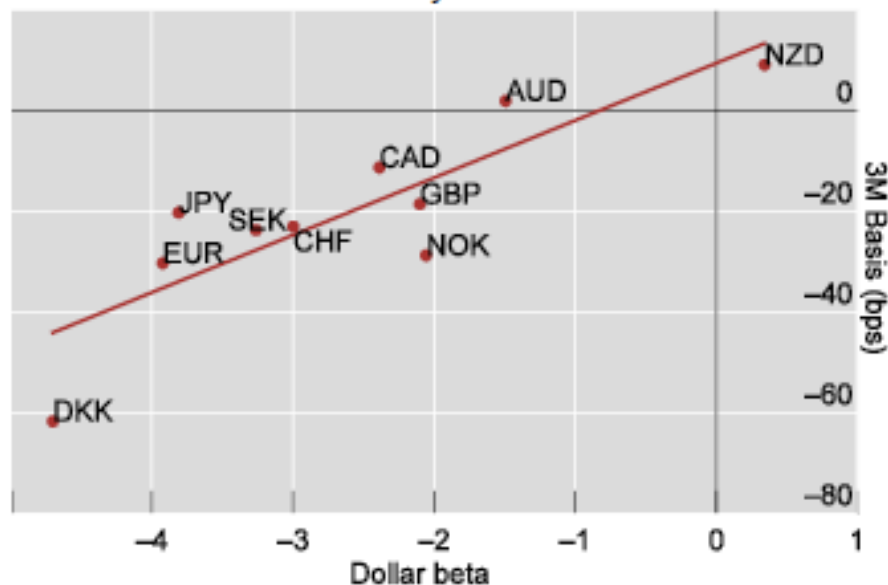


Estimated coefficients from panel regressions, US dollar.
Source: BIS calculations.

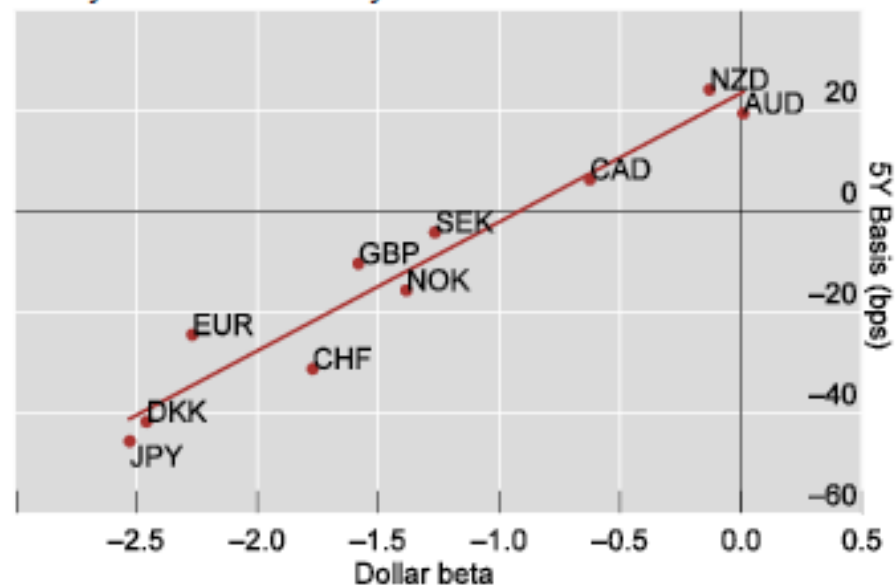
Why broad dollar index?

- 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 \(RES 2015\)](#)

Three-month cross-currency basis vs dollar beta



Five-year cross-currency basis vs dollar beta



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 running 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

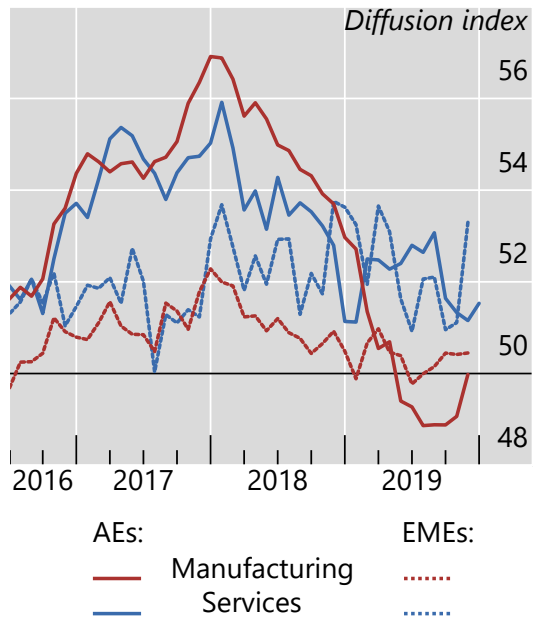
- the daily dollar beta (for 3M basis); correlation: 85% (LHP)
- the quarterly dollar beta (for 5Y basis); correlation: 97% (RHP)



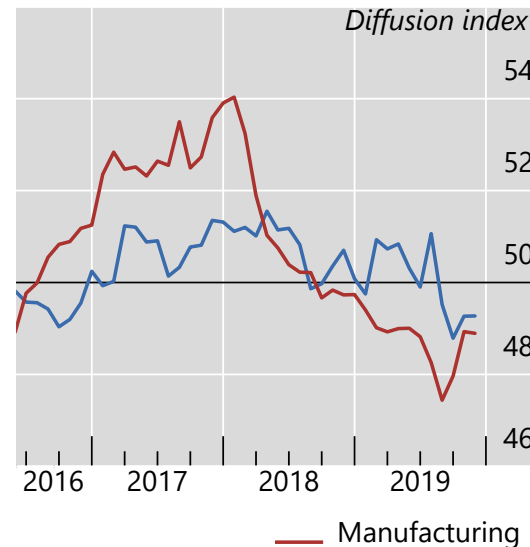
Evolving relationship between the dollar and PMIs

Headline, new export orders and employment PMIs¹

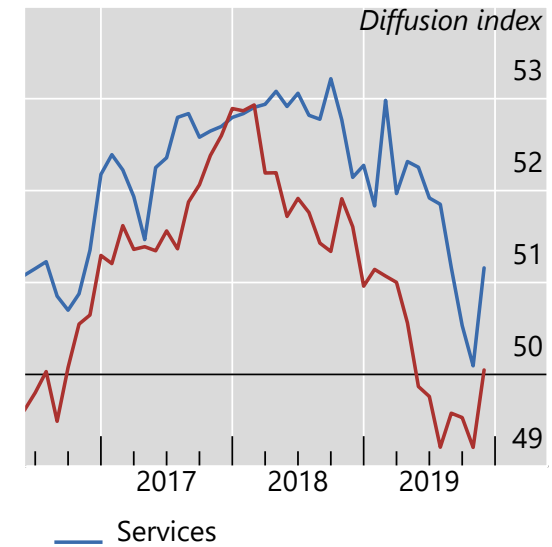
Headline²



New export orders³



Employment³



¹ A value of 50 indicates that the number of firms reporting improvement and deterioration are equal; a value above 50 indicates improvement. Aggregations based on GDP and PPP exchange rates. ² For manufacturing, eight AEs and 17 EMEs; for services, five AEs and four EMEs. ³ Global.

Sources: IMF, *World Economic Outlook*; Datastream; IHS Markit; BIS calculations.

PMIs and financial variables

- Purchasing managers closely follow financial markets to assess their financing conditions
 - Correlation between PMIs and high-frequency financial variables
 - Equity prices are good predictors of current-month PMIs (Erik et al 2019).
- Principal components from equities, corporate spreads and the USD
- Focus on β from:

$$PMI_t = \alpha + \beta \Delta pc_t + \varphi PMI_{t-1} + \varepsilon_t \quad (1)$$

Nowcasting exercise

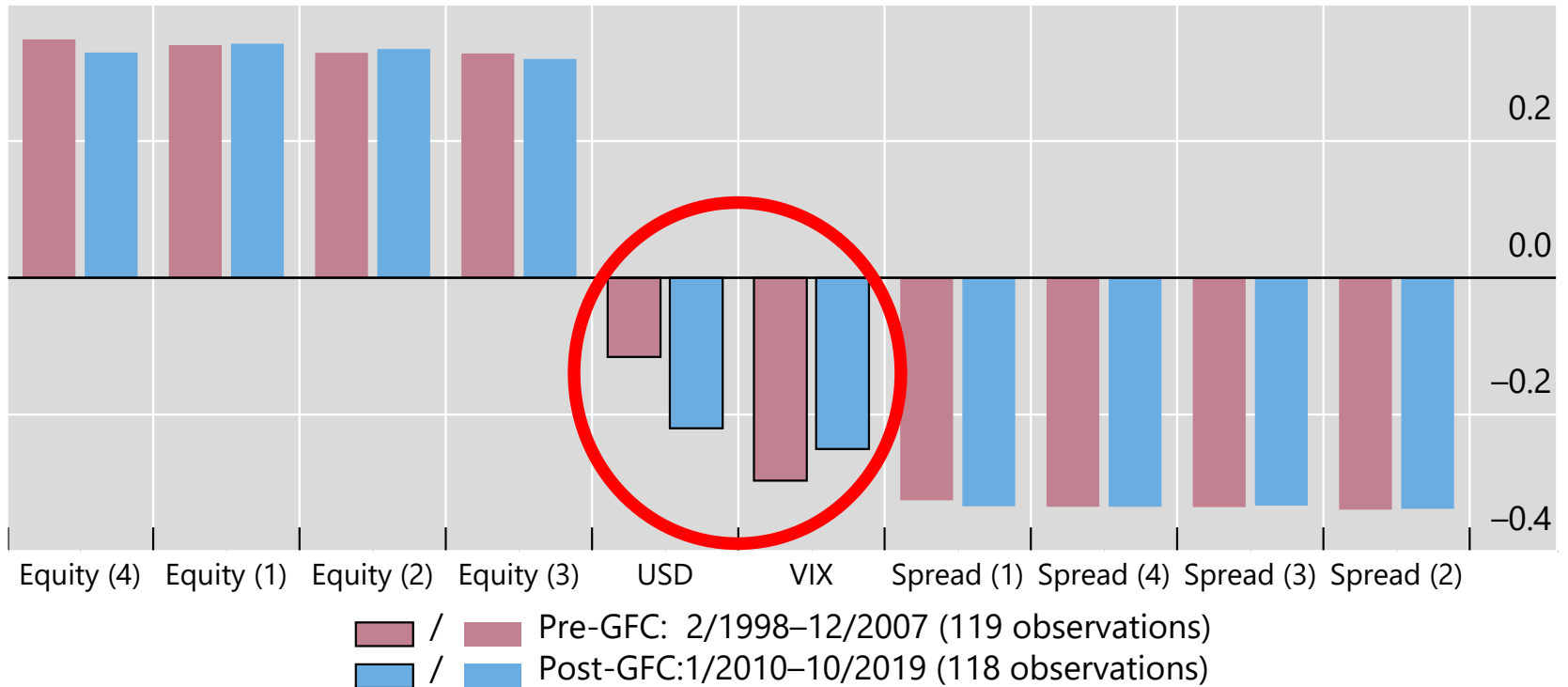
Nowcasting PMIs with the first principal component of financial variables

	Full sample	Pre-GFC	Post-GFC
PMI_{t-1}	0.944*	0.944*	0.943*
Δpc_t	0.215*	0.200*	0.077*
R^2	0.936	0.910	0.912
RMSE	0.843*	0.906*	0.950*

* denotes results significance at the 1% level. RMSE is computed as the ratio over a plain AR(1) benchmark; significance is determined by Clark and McCracken (2012) test. Full sample: 2/1998 -10/2019 (261 observations); pre-GFC: 2/1998 - 12/2007 (119 observations); post-GFC: 1/2010 - 10/2019 (118 observations).

Sources: Federal Reserve Bank of St Louis, FRED; Bloomberg; Datastream; ICE BofAML indices; IHS Markit; MSCI; authors' calculations.

Loadings of the first principal component before and after the GFC



Main takeaways from nowcasting exercise

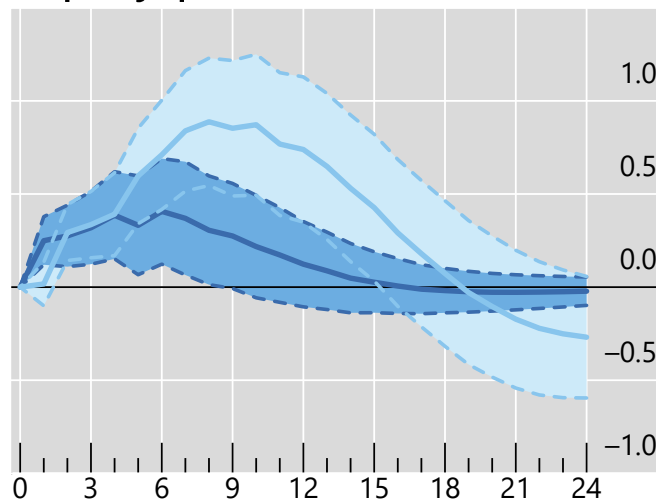
- Synthetic index based on PC outperforms the AR(1) benchmark across all sub-periods
- Post-crisis PC loading on the dollar higher, at the expense of VIX
- Sign on USD is negative, i.e. dollar appreciation acts as a drag on PMIs

A small-scale VAR

- VAR ordering
 - World equity returns
 - Changes in broad dollar index
 - Global manufacturing PMI (excluding the US)
 - Global trade growth
- Equity returns and dollar index changes measured over a window that predates the PMI poll
 - "Global equity price shocks" as news before the PMI release
 - "US dollar shocks" as additional news before PMI release
 - "PMI shock" as change in PMIs not already priced into financial variables

Responses of global trade growth to equity price and US dollar shocks

Equity prices

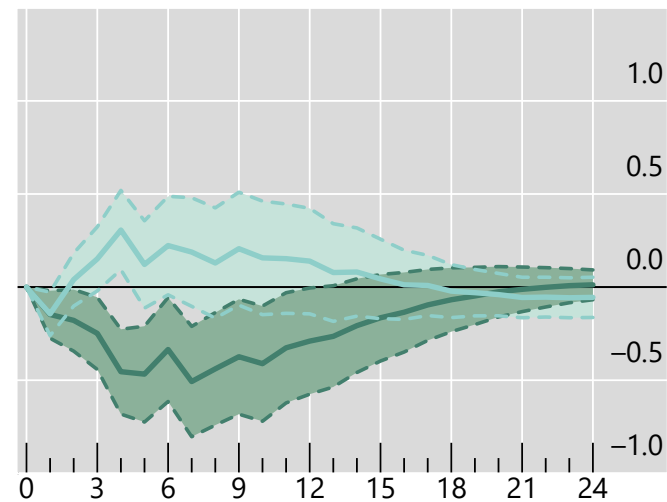


Months

Mean point estimate: +/- one standard error:

— Pre-GFC — Post-GFC

US dollar index



Months

Mean point estimate: +/- one standard error:

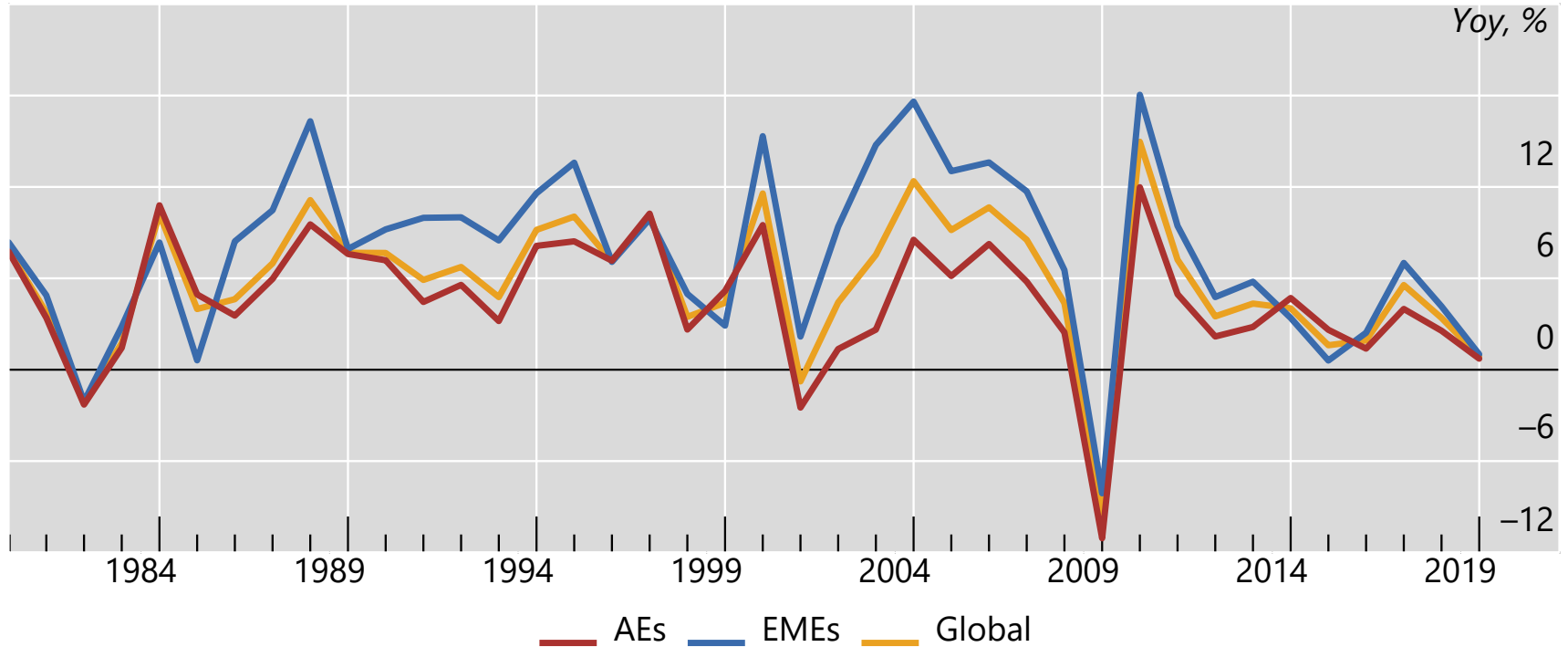
— Pre-GFC — Post-GFC

Pre-GFC: 8/1998 -- 12/2007 (113 observations); post-GFC; 1/2010 -- 6/2019 (114 observations).
 Equity: MSCI Emerging Markets Index, local currency; US dollar: Federal Reserve Board trade-weighted nominal dollar index, other important trading partners, based on goods trade; Trade: CPB World Trade Volume index, seasonally adjusted.



Perspectives on trade and finance linkage

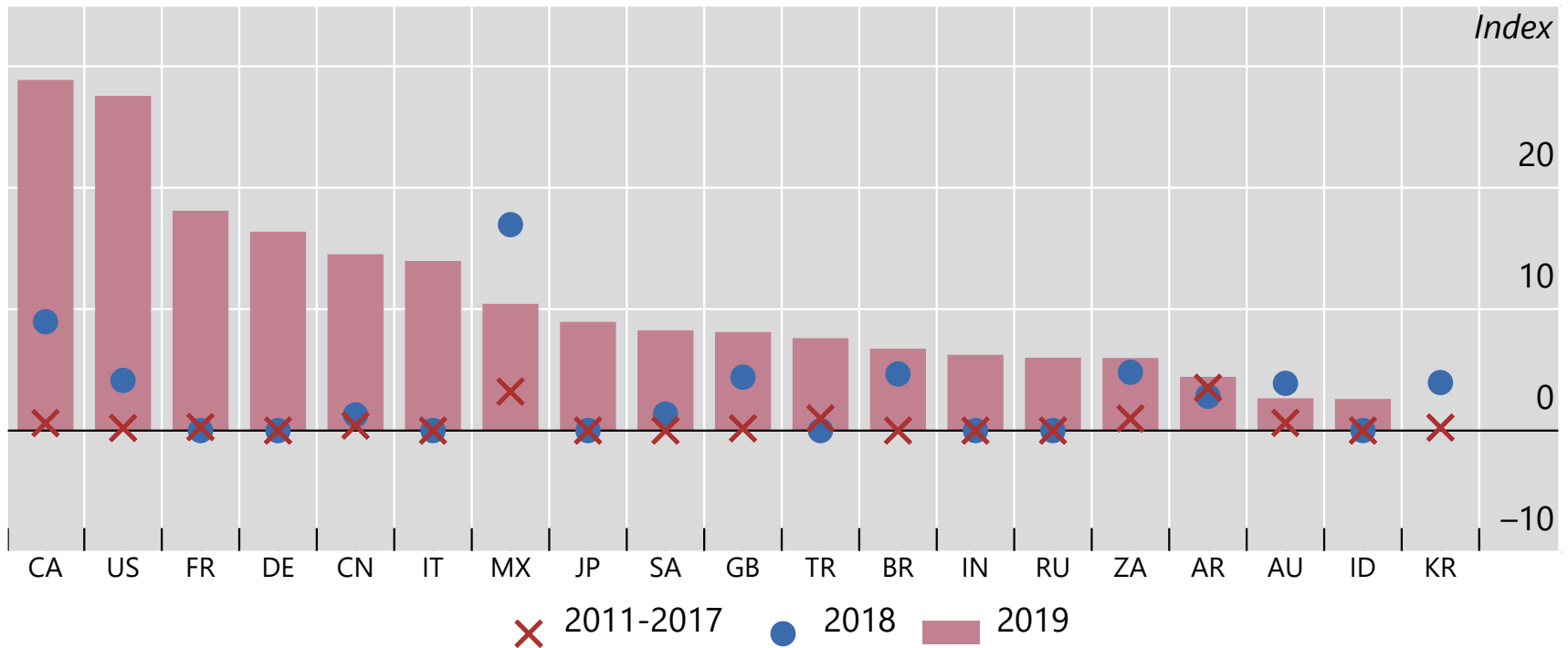
Exports volume growth



AEs = AU, CA, EU, JP, NZ, NO, SE, CH, DK, GB, US. EMEs = AE, AR, BR, CL, CN, CO, HK, ID, IN, KR, MX, MY, PE, PH, PL, RU, SA, SG, TH, TR and ZA.

Sources: IMF, *World Economic Outlook*; BIS calculations.

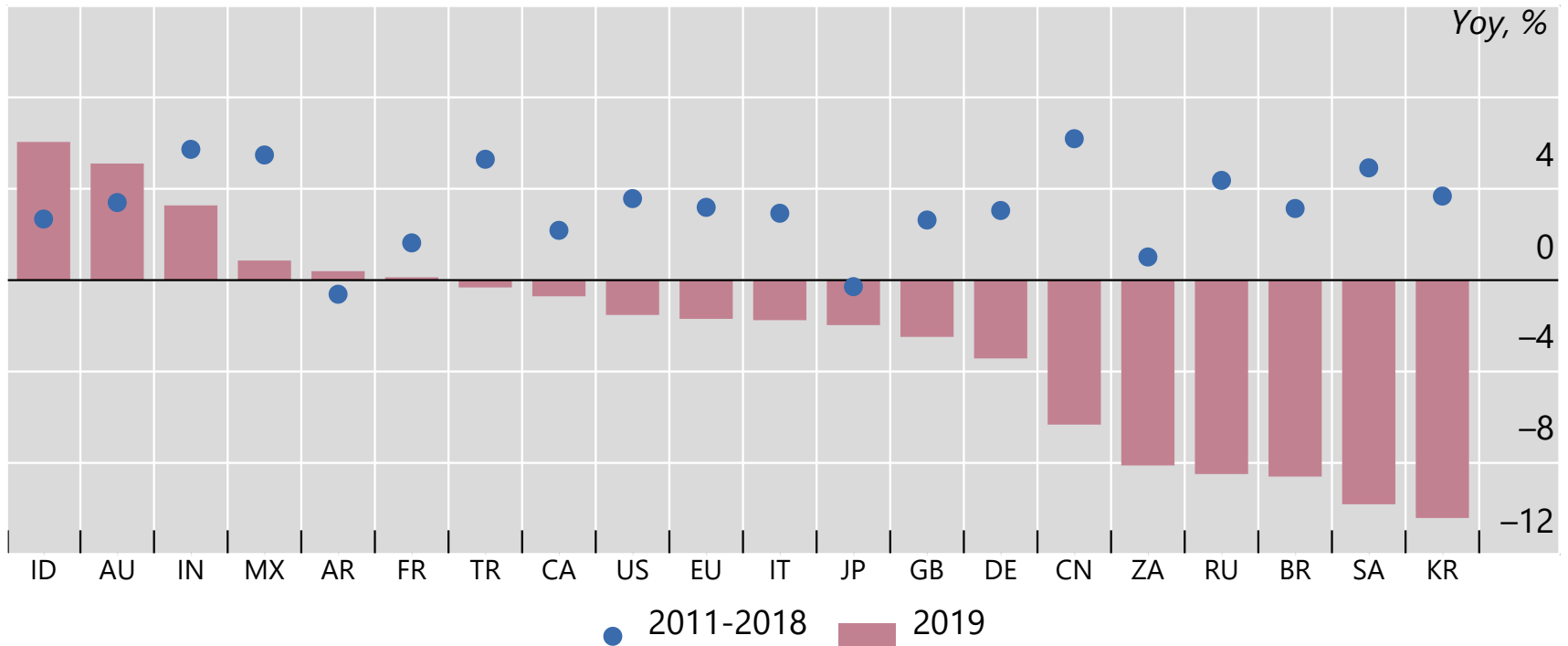
Trade policy uncertainty¹



¹ World Trade Uncertainty Index, constructed by counting the number of times uncertainty is mentioned within a proximity to a word related to trade in the Economist Intelligence Unit (EIU) country reports. The index is an equally weighted average scaled by total number of words in the EIU reports.

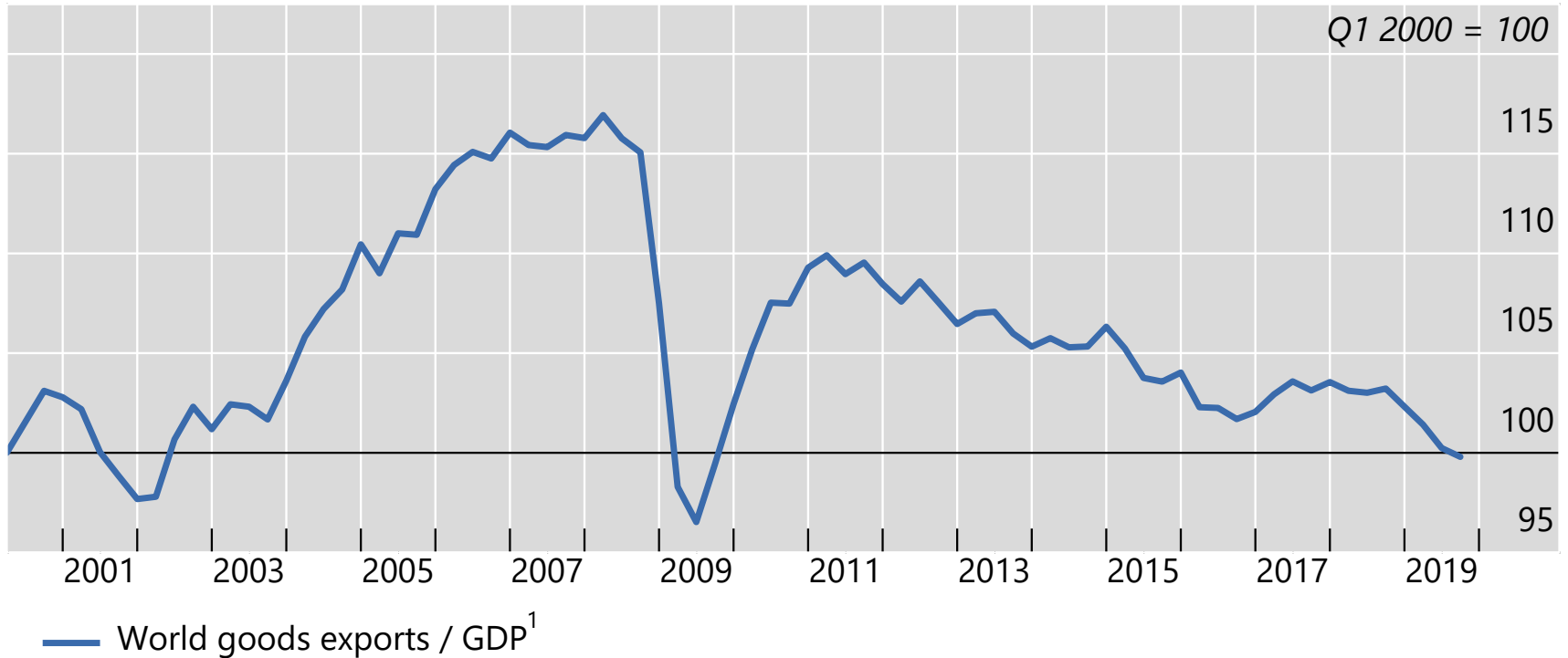
Sources: Ahir H, N Bloom and D Furceri, "The world uncertainty index"; Brookings analysis of QCEW and EMSI data; BIS calculations.

Exports value growth¹



¹ Simple average of growth rates for periods shown.
Sources: IMF, *World Economic Outlook*; BIS calculations.

Ratio of world goods exports to world GDP



¹ Both exports and GDP are measured in constant prices.

Sources: IMF, *World Economic Outlook*; World Trade Organization; Datastream; national data; BIS calculations.

Global goods trade and the dollar



¹ Federal Reserve Board trade-weighted nominal dollar index, broad group of major trading partners of the US ("broad"), based only on trade in goods. An increase indicates appreciation of the US dollar. ² Both exports and GDP are measured in constant prices.

Sources: Federal Reserve Bank of St Louis, FRED; IMF, *World Economic Outlook*; World Trade Organization; Datastream; national data; BIS calculations.

Findings from empirical study using micro data

- Micro study of Mexican exporters
 - Loans matched with borrowing firm and lending bank
 - 4.6 million shipments by destination and 8 digit product category
- Findings
 - Exporters who borrow from banks more dependent on dollar wholesale funding exhibit greater contraction of export shipments when the broad dollar appreciates
 - Evidence for both working capital channel and dollar invoicing channel (Gopinath and Stein (2019), Gopinath et al. (2019))

Bruno and Shin (2019) "Dollar exchange rate as a credit supply factor: evidence from firm-level exports" BIS Working Paper

<https://www.bis.org/publ/work819.htm>

Broad dollar index

- Broad dollar index has attributes of an indicator of dollar funding conditions
- Indicator of shadow price of bank balance sheet capacity
- Possible role as linchpin that ties together financial and real variables