BANK FOR INTERNATIONAL SETTLEMENTS

Financial crisis, unconventional monetary policy and international spillovers

Qianying Chen, *IMF*

Andrew Filardo, *BIS*

Dong He, *HKIMR*

Feng Zhu, *BIS*

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Quantitative easing (QE)

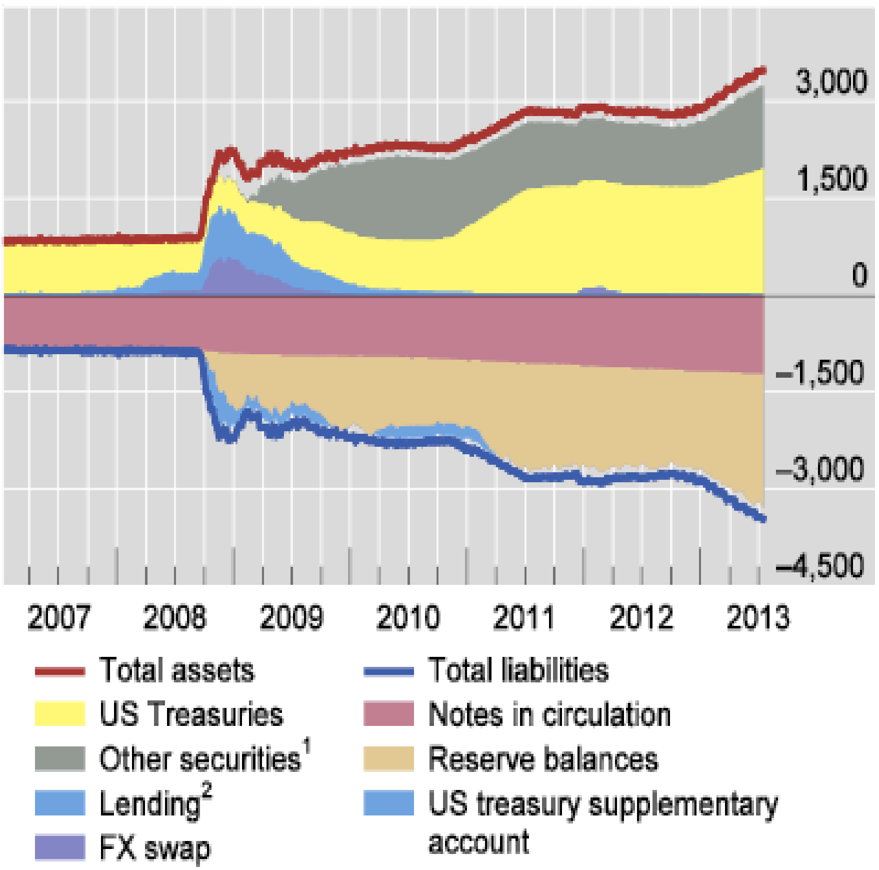
Quantitative easing has been used extensively by other large central banks such as the Federal Reserve, Bank of England and Bank of Japan, but the policy remain controversial in the euro zone … International organizations such as the International Monetary Fund have urged the ECB to consider these types of steps, too.

The Wall Street Journal, April 29, 2014

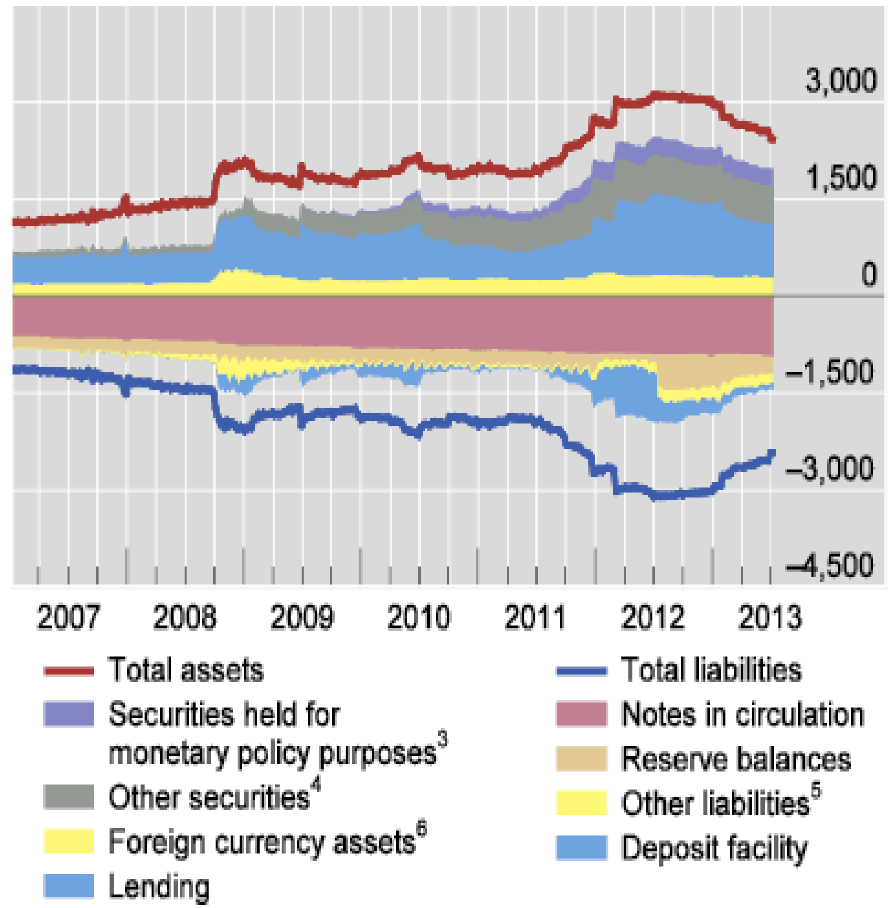
Central bank balance sheet expansion

In billions of respective currency units

Federal Reserve

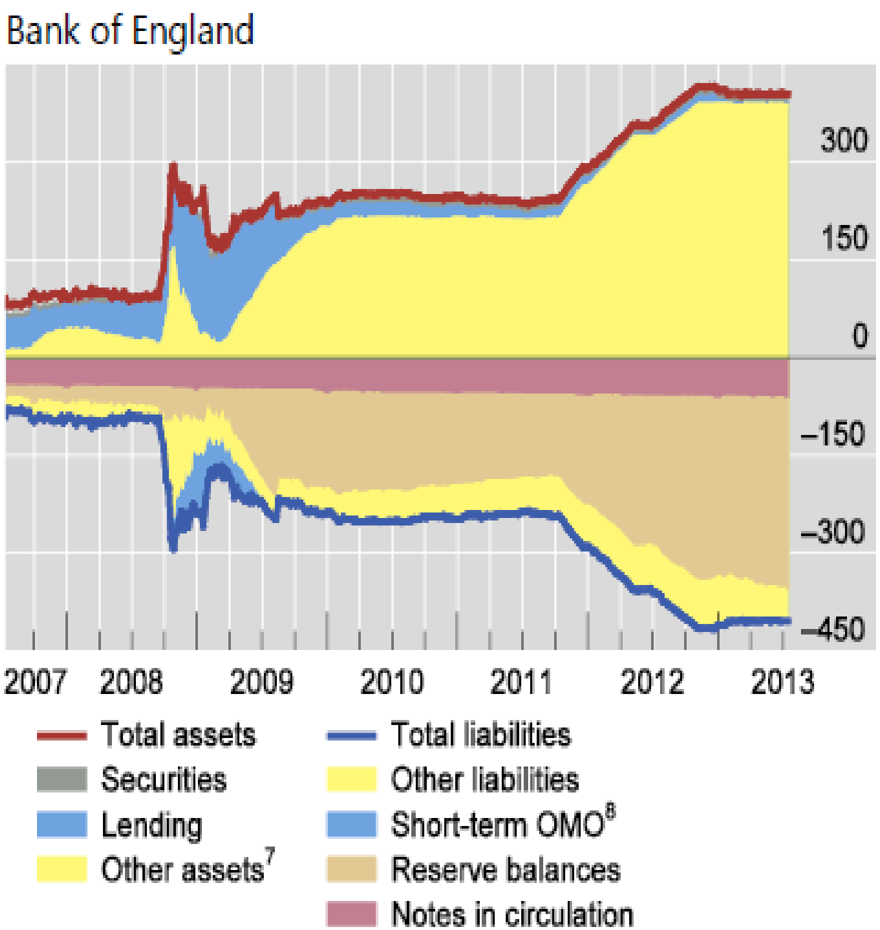


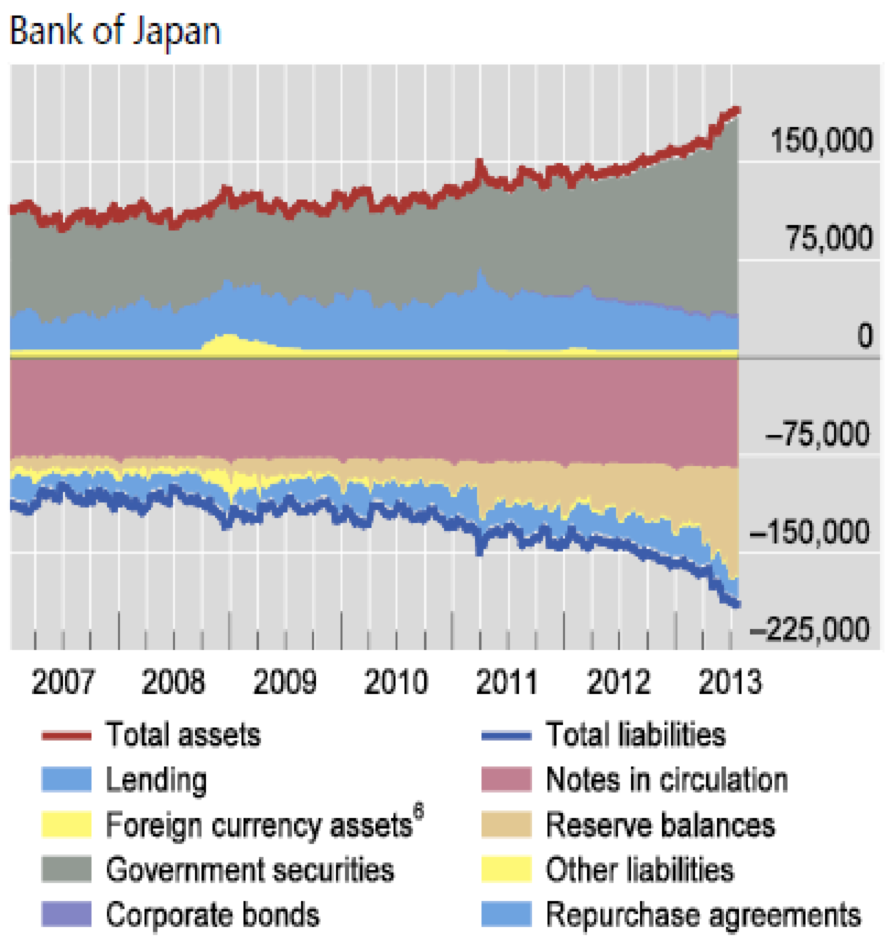
Eurosystem



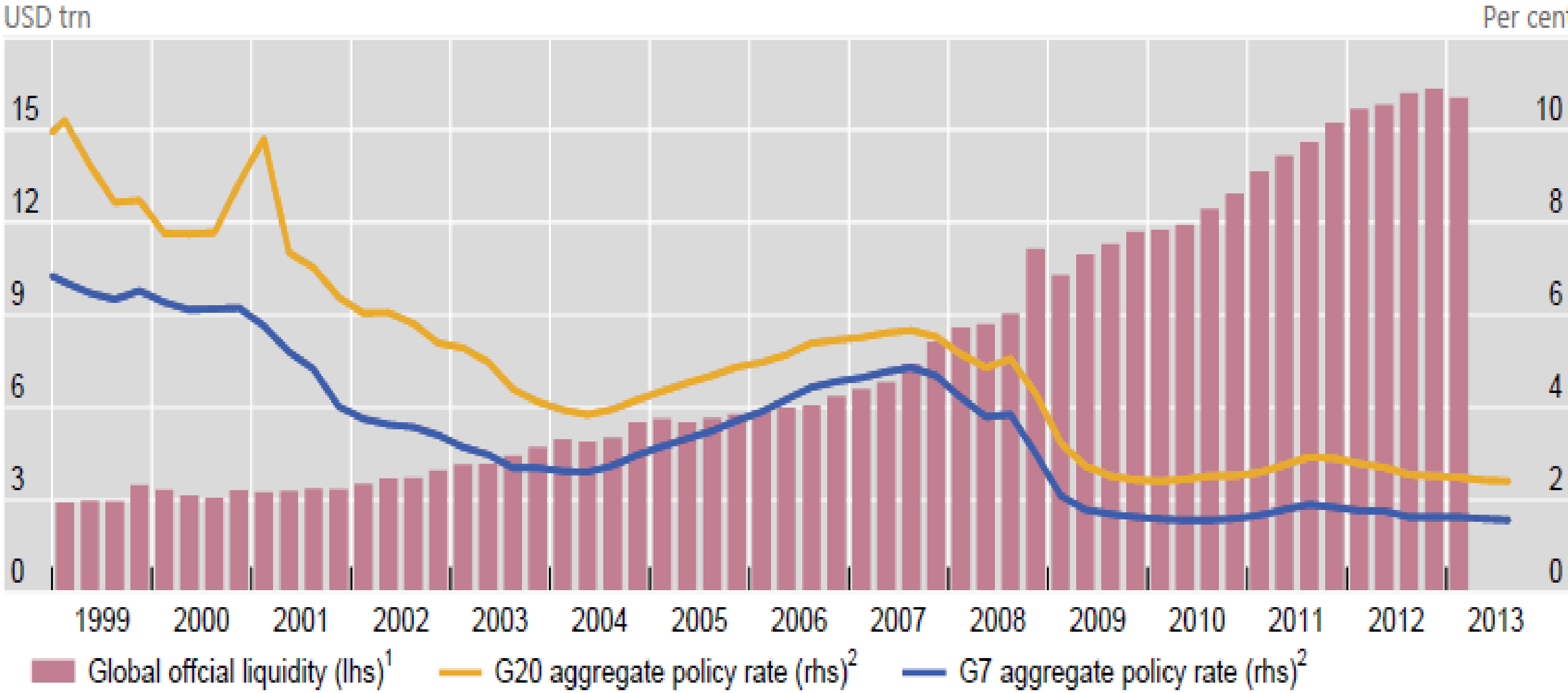
Central bank balance sheet expansion

In billions of respective currency units





Global liquidity



[1] Total assets of central banks of advanced economies and the foreign exchange reserves of emerging markets. Advanced economies comprise the United States, the euro area, Japan, Canada, Sweden, Switzerland and the United Kingdom. Emerging markets comprise Brazil, China, Chinese Taipei, Hong Kong SAR, India, Korea, Malaysia, Mexico, Russia, Singapore, Thailand and Turkey. [2] Weighted average based on 2005 GDP and PP exchange rates.

Sources: Bloomberg; Datastream; national data; IMF IFS; BIS calculations.

Debating the global impact of FRB QE

- View 1
  - Primarily domestic policy, no major cross-border spillovers
  - If any, what strengthens US economy is good for EVERYONE
  - Promotes global macro and financial stability

- View 2
  - Depreciates USD: “currency war”
  - Increases interest rate differentials vis-à-vis other economies
  - Induces large and volatile capital flows in and out of EMEs
  - Overheating and financial stability risks with increased risk-taking and asset market imbalances

Outline

- Announcement effects of central bank balance sheet (CBBS) policies
  - Responses in international financial markets
- Impact of US QE (LSAP) on real and financial sectors
  - Term spread, corporate spread and VIX
  - Global VAR model and spillover effects
    - Domestic
    - Other advanced (euro area, Japan, UK)
    - 13 Emerging economies
- Conclusion

Transmission channels

- Domestic impact
  - ✓ Portfolio balance channel
  - ✓ Signalling or expectations channel
  - ✓ Interest rate channel
  - ✓ Credit channel

- International spillovers
  - ✓ Portfolio rebalancing channel
  - ✓ Combination of credit, asset price channel
  - ✓ Exchange rate channel
  - ✓ Trade channel
  - ✓ Endogenous monetary policy response

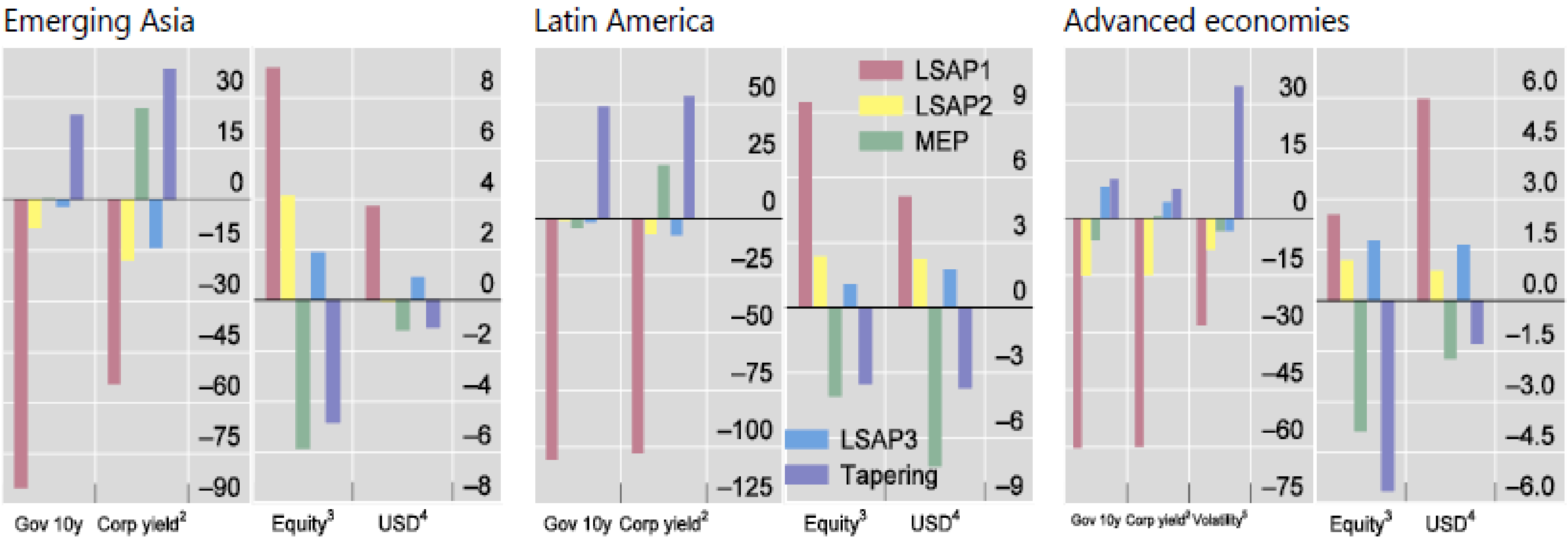
Announcement effects

- Event study methodology
  - ✓ e.g. Meaning and Zhu (2011)
  - ✓ Global financial market reactions
  - ✓ One- and two-day event windows

- Cumulative 2-day percentage changes in
  - ✓ Government bond yields
  - ✓ Corporate bond yields
  - ✓ Sovereign CDS premia
  - ✓ Equity prices
  - ✓ USD bilateral exchange rates

Spillover effects of FRB programmes

In basis points unless otherwise indicated



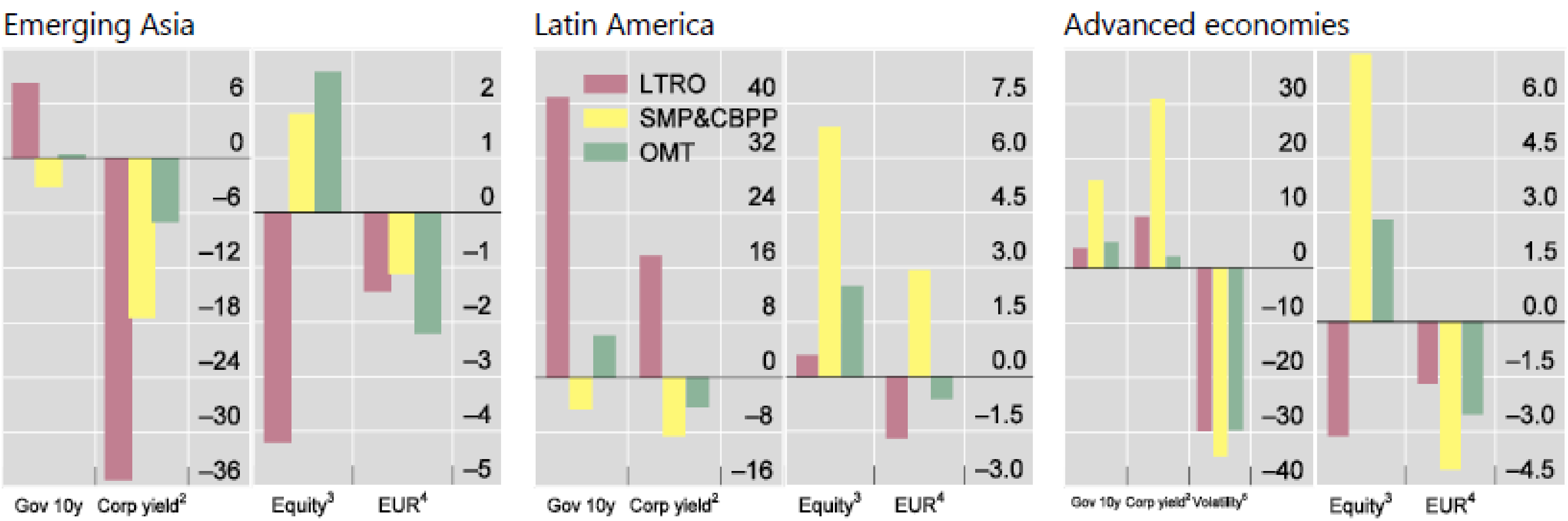
[1] Two-day event window. Simple averages based on a sample of countries. For emerging Asia: China, Hong Kong SAR, India, Indonesia, Korea, Malaysia, the Philippines, Singapore and Thailand; for Latin America: Brazil, Chile and Mexico; for the advanced economies: the euro area, Japan and the United Kingdom. [2] CEMBI Broad yields for emerging Asia and Latin America. [3] In per cent. [4] In per cent; US dollar bilateral exchange rates: a positive change indicates depreciation. [5] In per cent, stock market volatility indices.

Sources: Bloomberg; Datastream; JPMorgan; national data; BIS calculations.

- LSAP1 far more effective, significant USD depreciation with LSAPs
- MEP behaves like Tapering except for impact on gov bond yields

Spillover effects of Eurosystem's programmes

In basis points unless otherwise indicated



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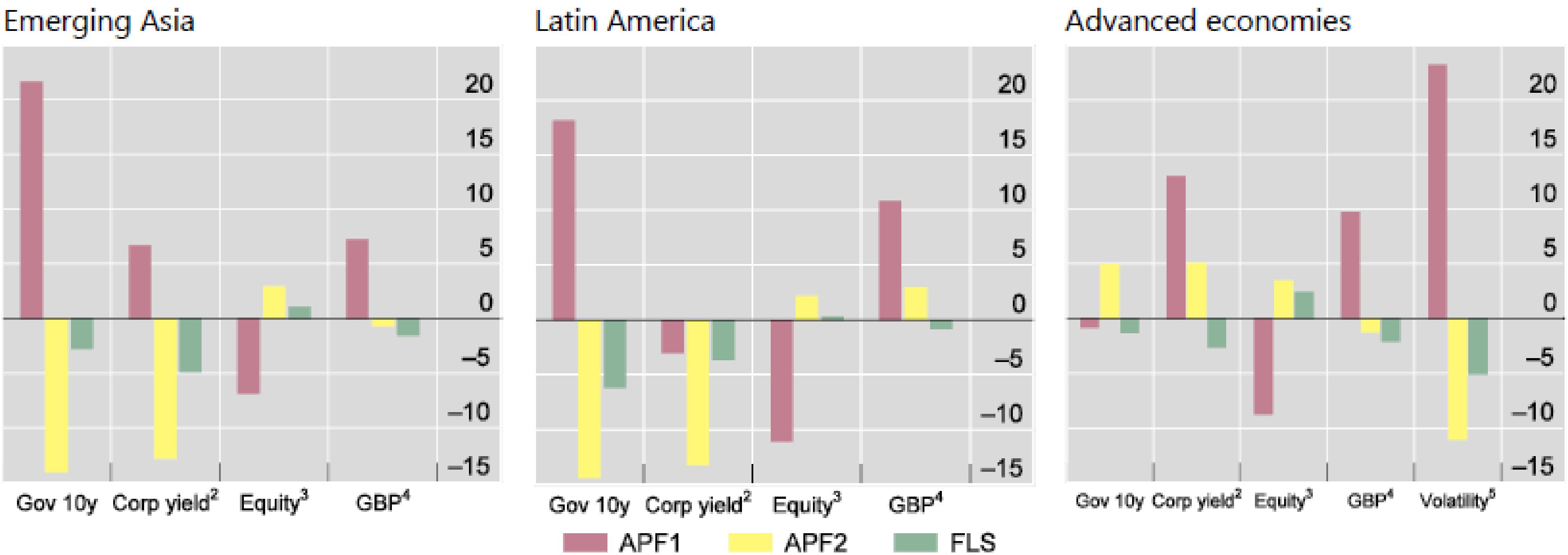
Sources: Bloomberg; Datastream; JPMorgan; national data; BIS calculations.

- CBPP & SMP small but effective, so was OMT
- But gov bond yields rose euro appreciated

Spillover effects of BOE programmes

In basis points unless otherwise indicated



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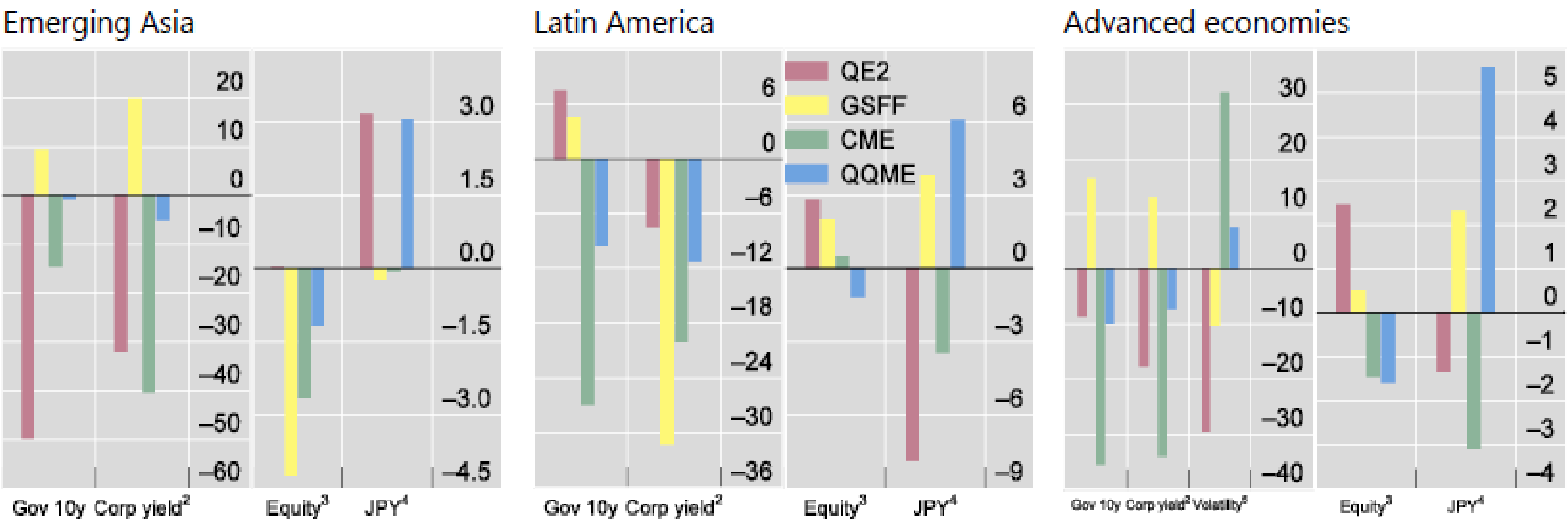
Sources: Bloomberg; Datastream; JPMorgan; national data; BIS calculations.

- Cross-border effects relatively small
- APF1 effects often with opposite signs, depreciates GBP

Spillover effects of BOJ programmes

In basis points unless otherwise indicated



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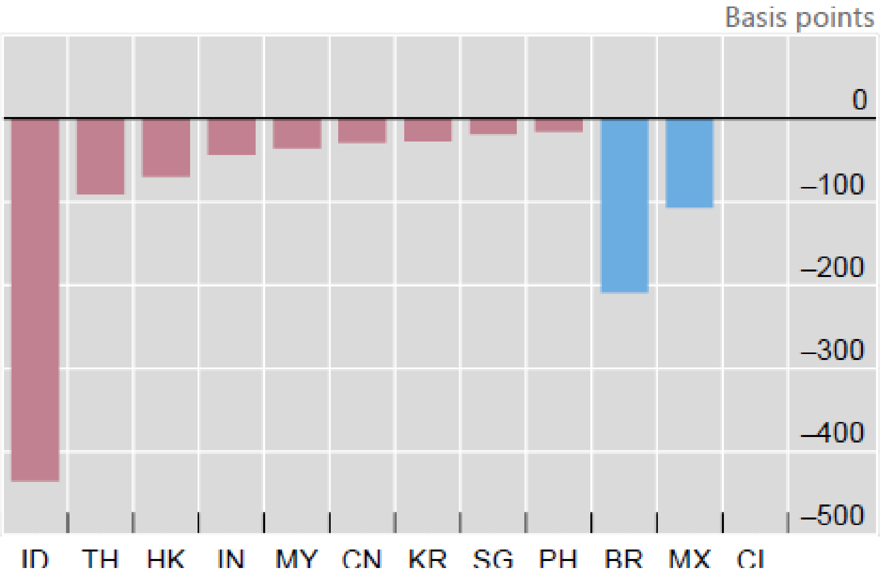
Sources: Bloomberg; Datastream; JPMorgan; national data; BIS calculations.

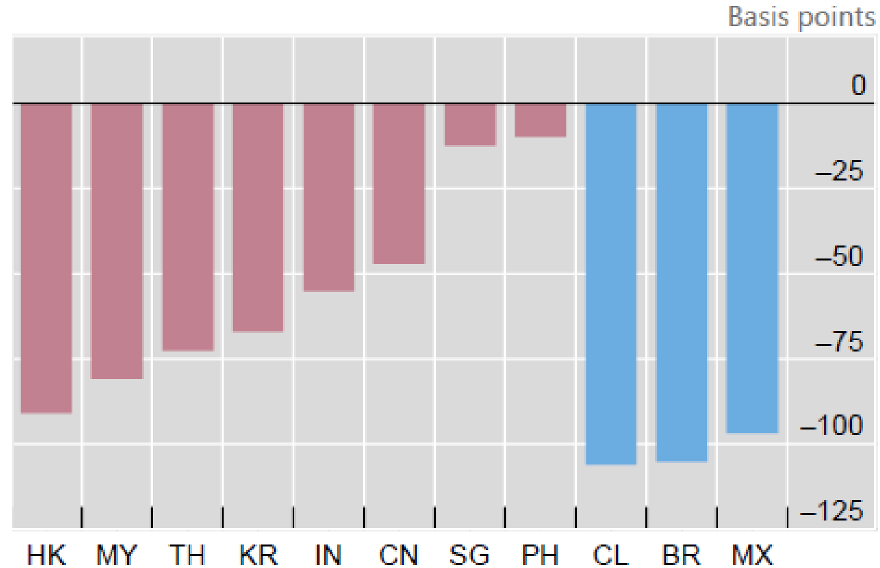
- Far greater impact in emerging Asia
- QQME substantially depreciated JPY

Spillover effects of FRB LSAP1

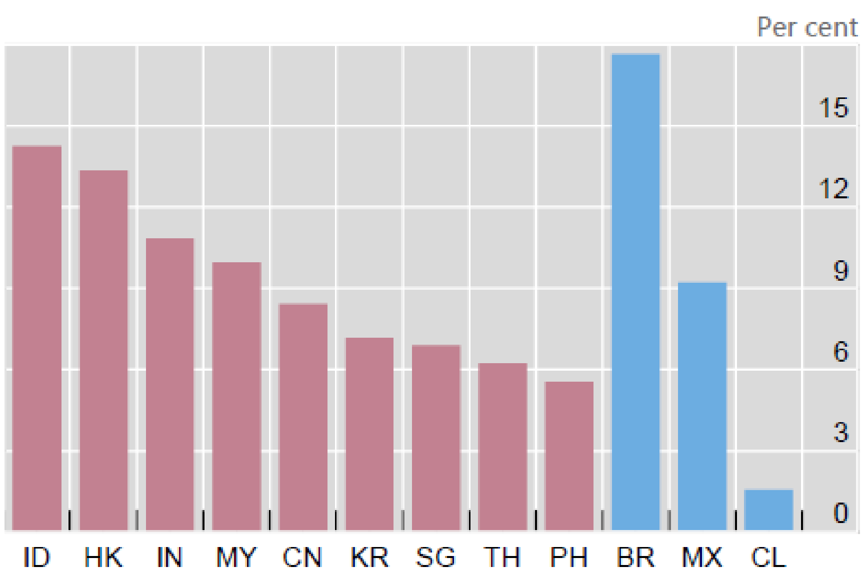
Ten-year sovereign bond yield



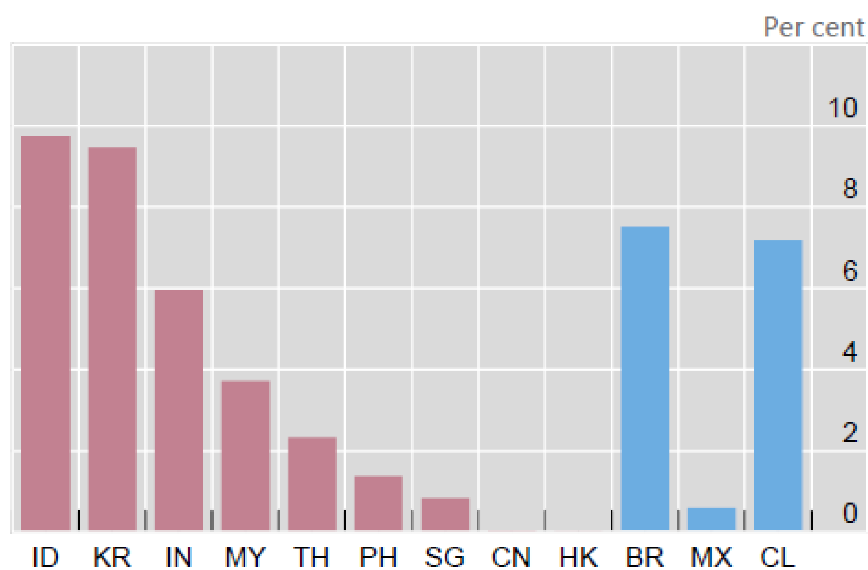
Corporate bond yield[1]



Equity price

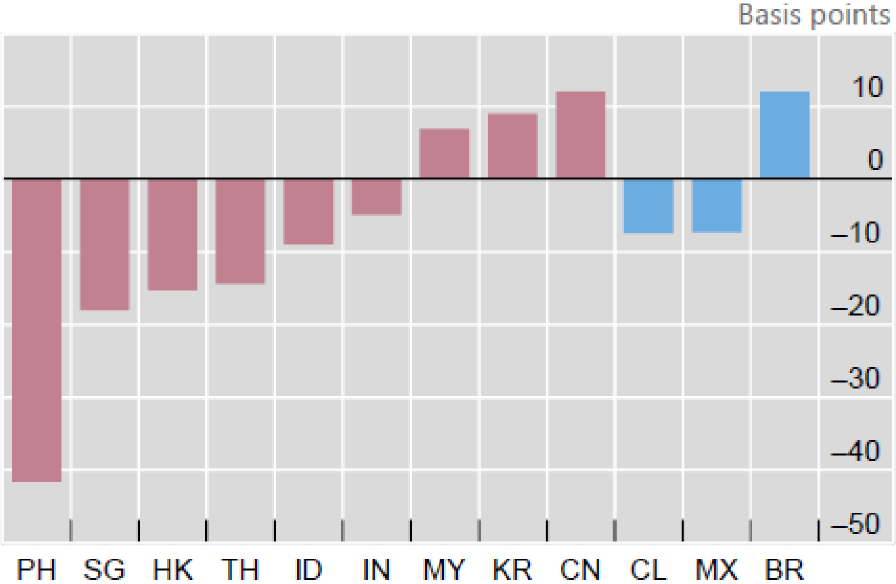


USD per local currency[3]

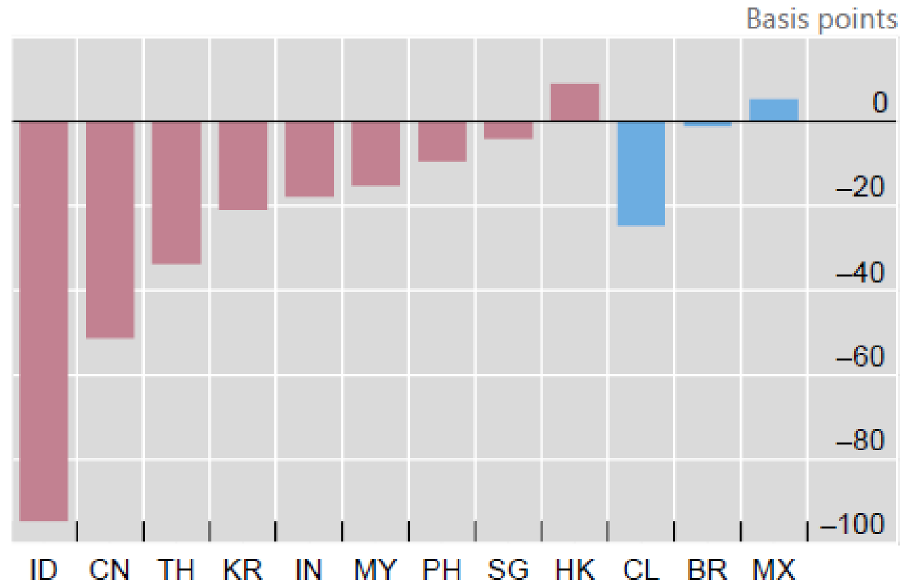


Spillover effects of FRB LSAP2

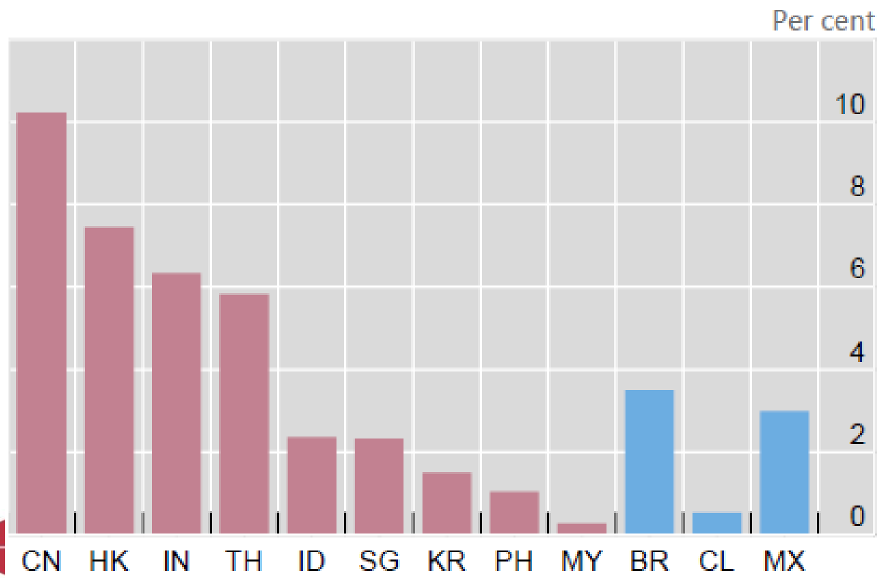
Ten-year sovereign bond yield



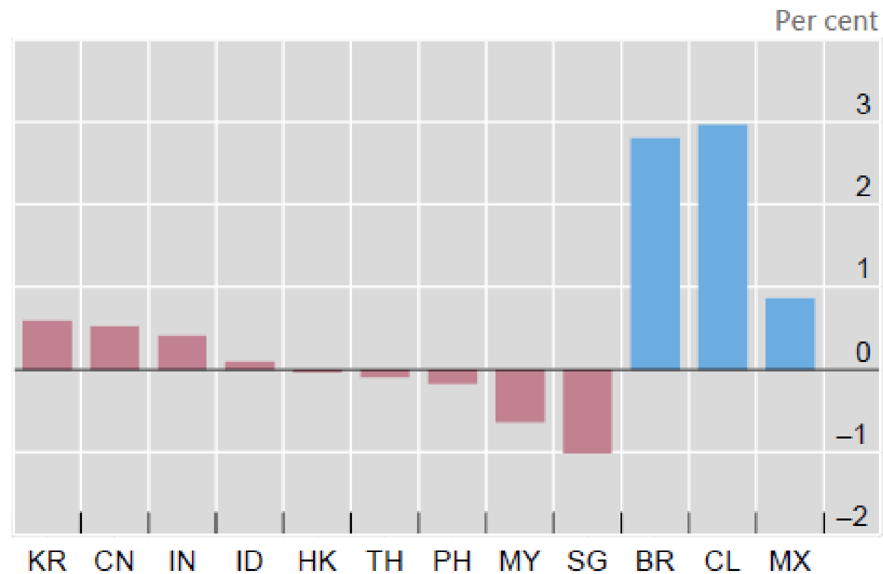
Corporate bond yield[1]



Equity price

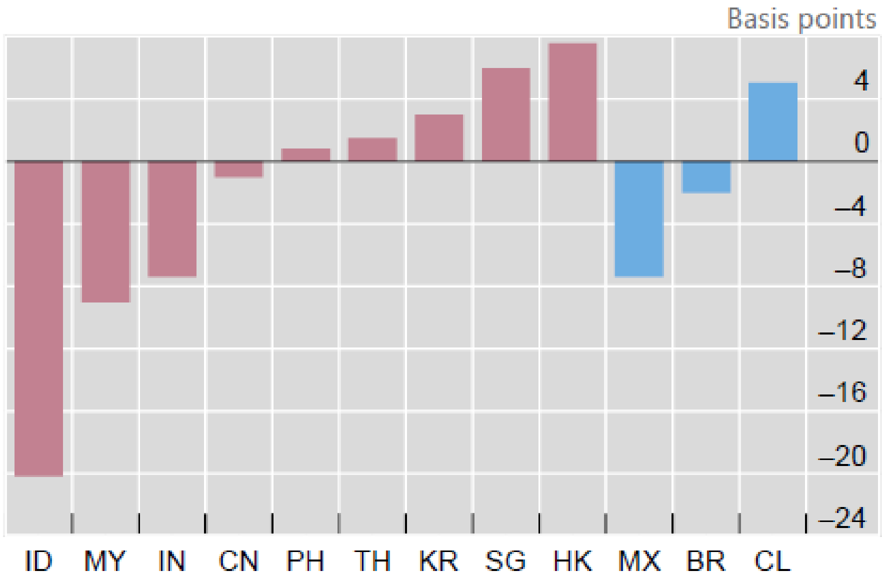


USD per local currency[3]

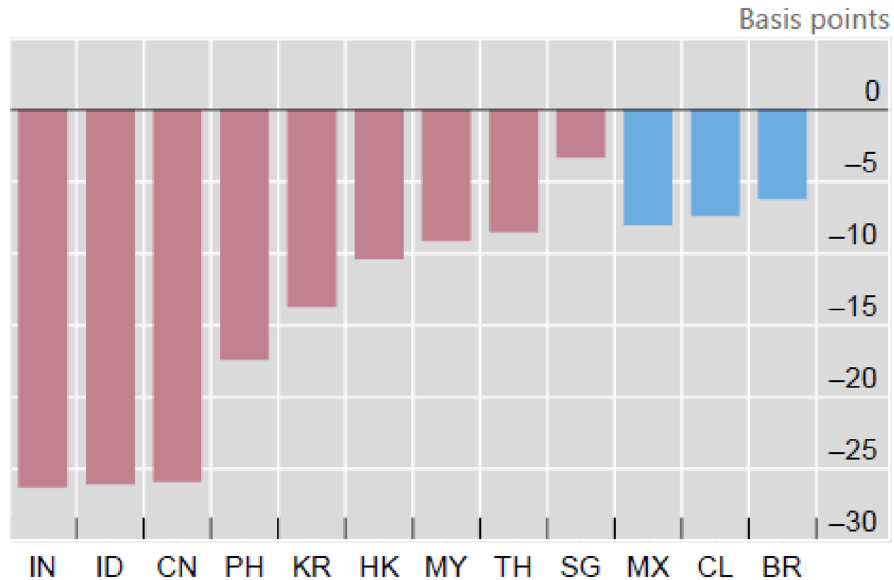


Spillover effects of FRB LSAP3

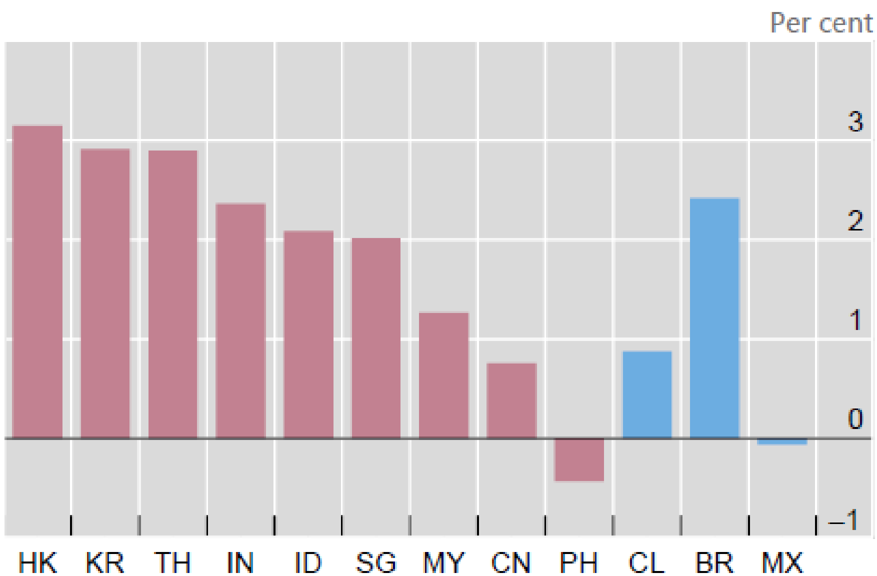
Ten-year sovereign bond yield



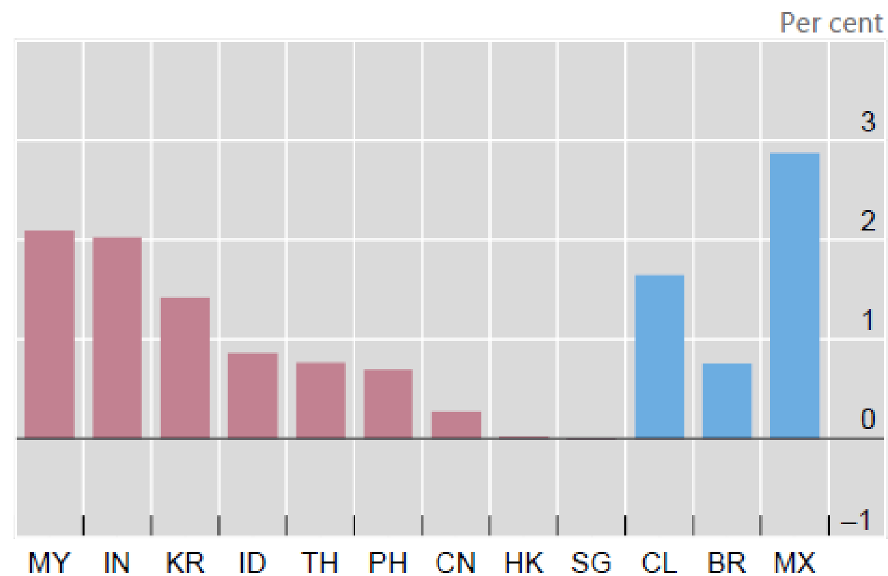
Corporate bond yield[1]



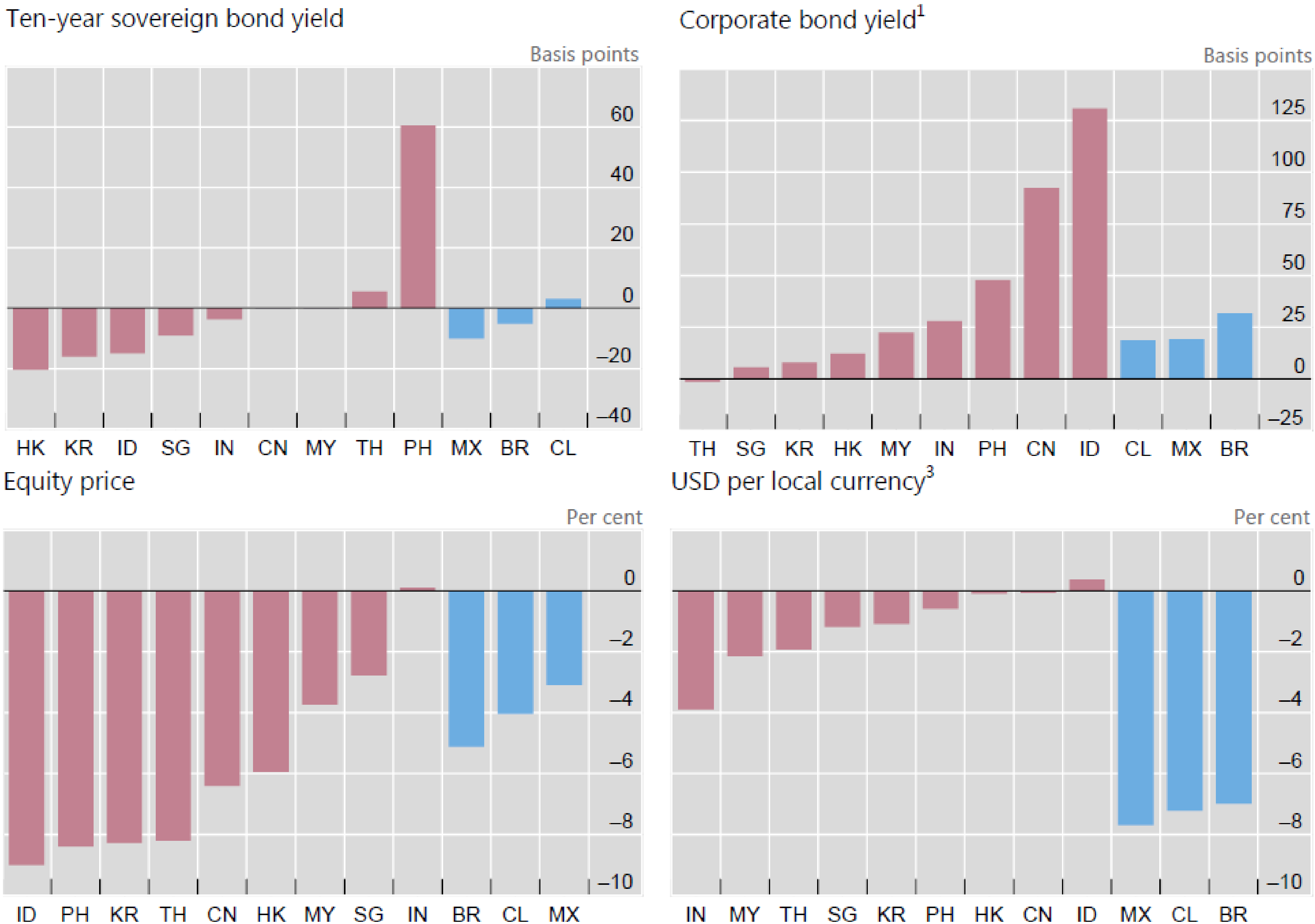
Equity price



USD per local currency[3]



Spillover effects of FRB MEP



Cross-border announcement effects

- Sizeable and varied
  - ✓ More uniform responses in advanced economies
  - ✓ Greater impact in some EMEs than domestically
  - ✓ Strong support for EM equity prices
  - ✓ But currency depreciation
  - ✓ LSAPs lower sovereign and corporate bond yields
  - ✓ Distinct exchange rate responses to LSAP2 (muted in Asia but USD depreciation in Latin America)

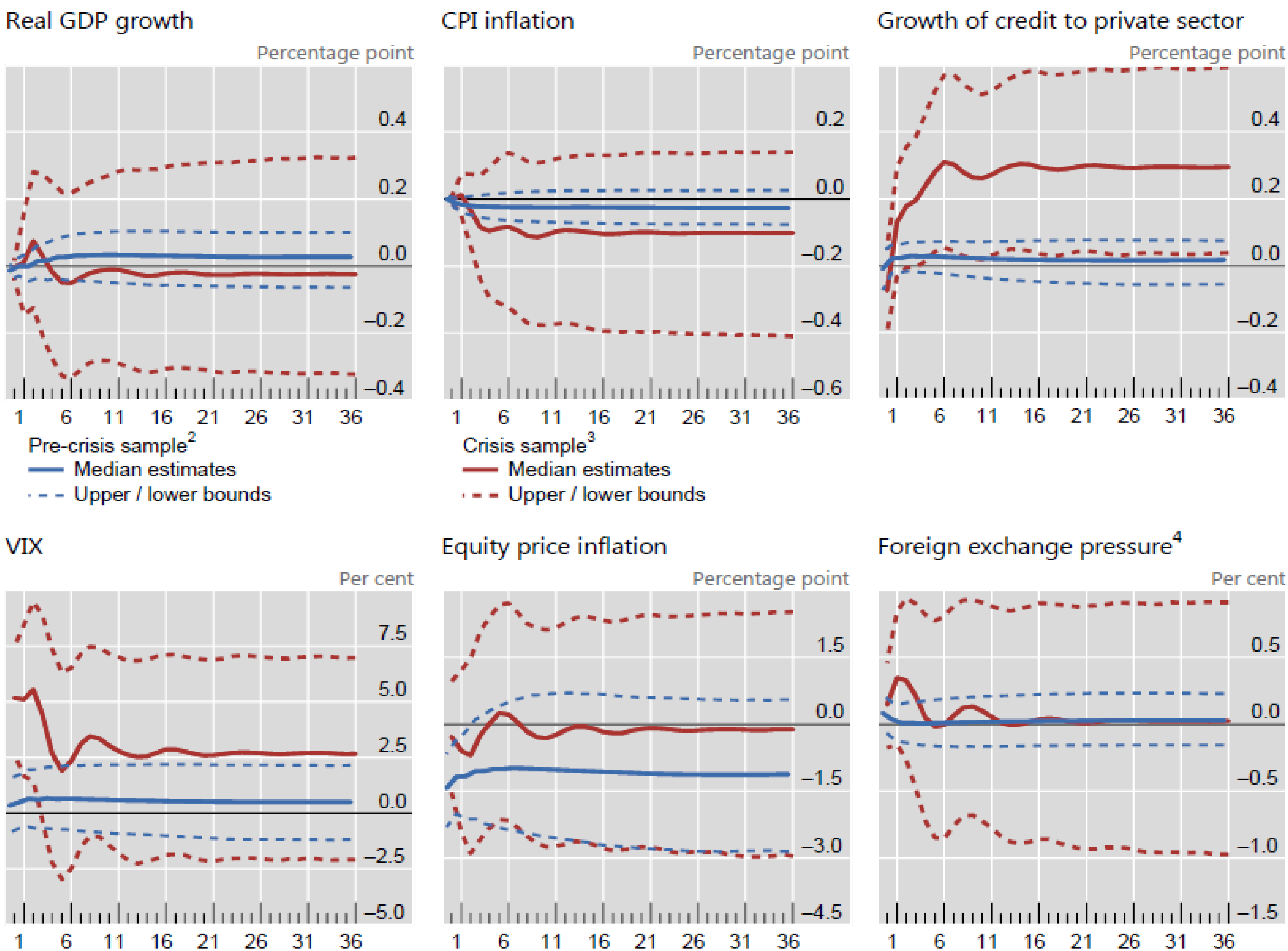
- Outright purchases vs Operation Twist
  - ✓ LSAP1 more “effective” than later programmes
  - ✓ “MEP puzzle”: MEP effects had “wrong” signs and behaved like Tapering
  - ✓ Size of asset holdings matter

Impact on global activity: GVECM model

- Cross-country dependence and transmission
  - Global vector error correction macroeconometric model
  - Pesaran et al 2004, Dees et al 2007
- Strength of cross-country linkages: weights based on
  - Bilateral trade
  - Financial transactions: cross-border bank lending
- Variables of interest
  - Real GDP, inflation, monetary policy, credit to private sector, FX pressure, equity prices
- FRB's extraordinary monetary stimulus
  - VIX, US term (10-year – 3-month Treasury yields) and corporate (Merrill-Lynch BBB-AAA) spreads
- Monthly data (1995-2013) and 17 economies
  - Pre-crisis sample: till June 2007
  - Crisis sample: from July 2007

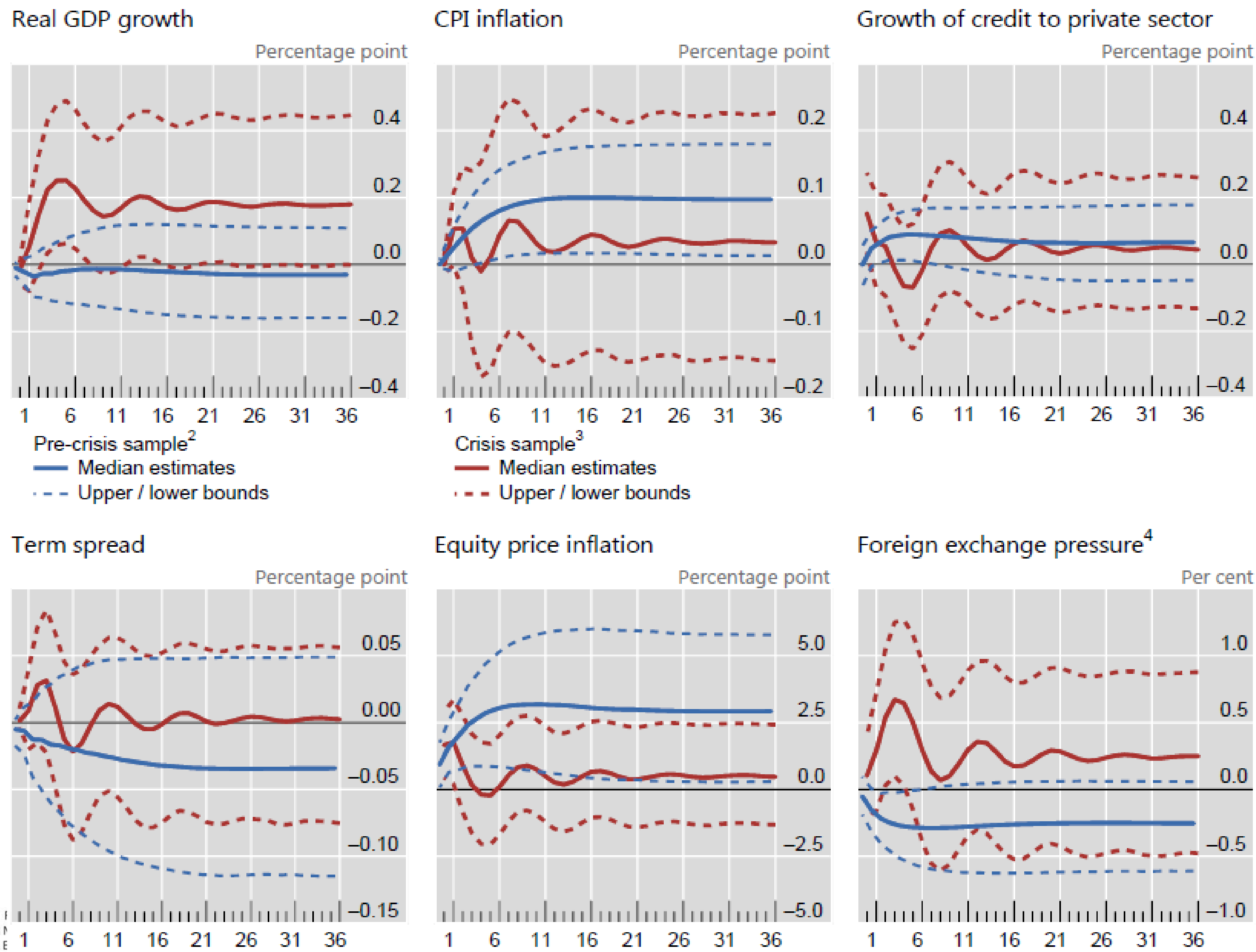
Impulse responses: domestic effects

Reduction in US term spread (14.6 basis points)



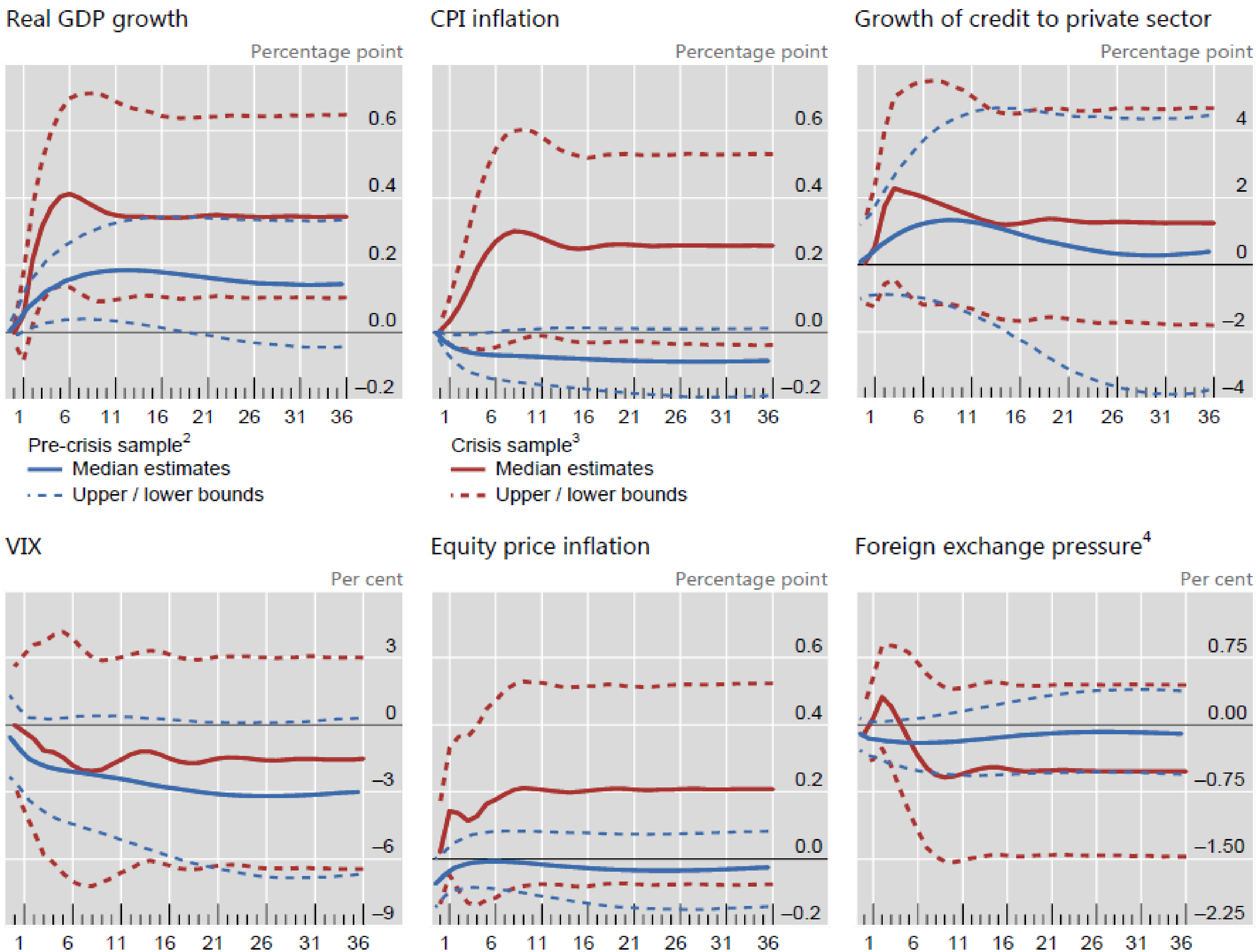
Impulse responses: domestic effects

Reduction in US VIX (8.7% change in natural logarithm)



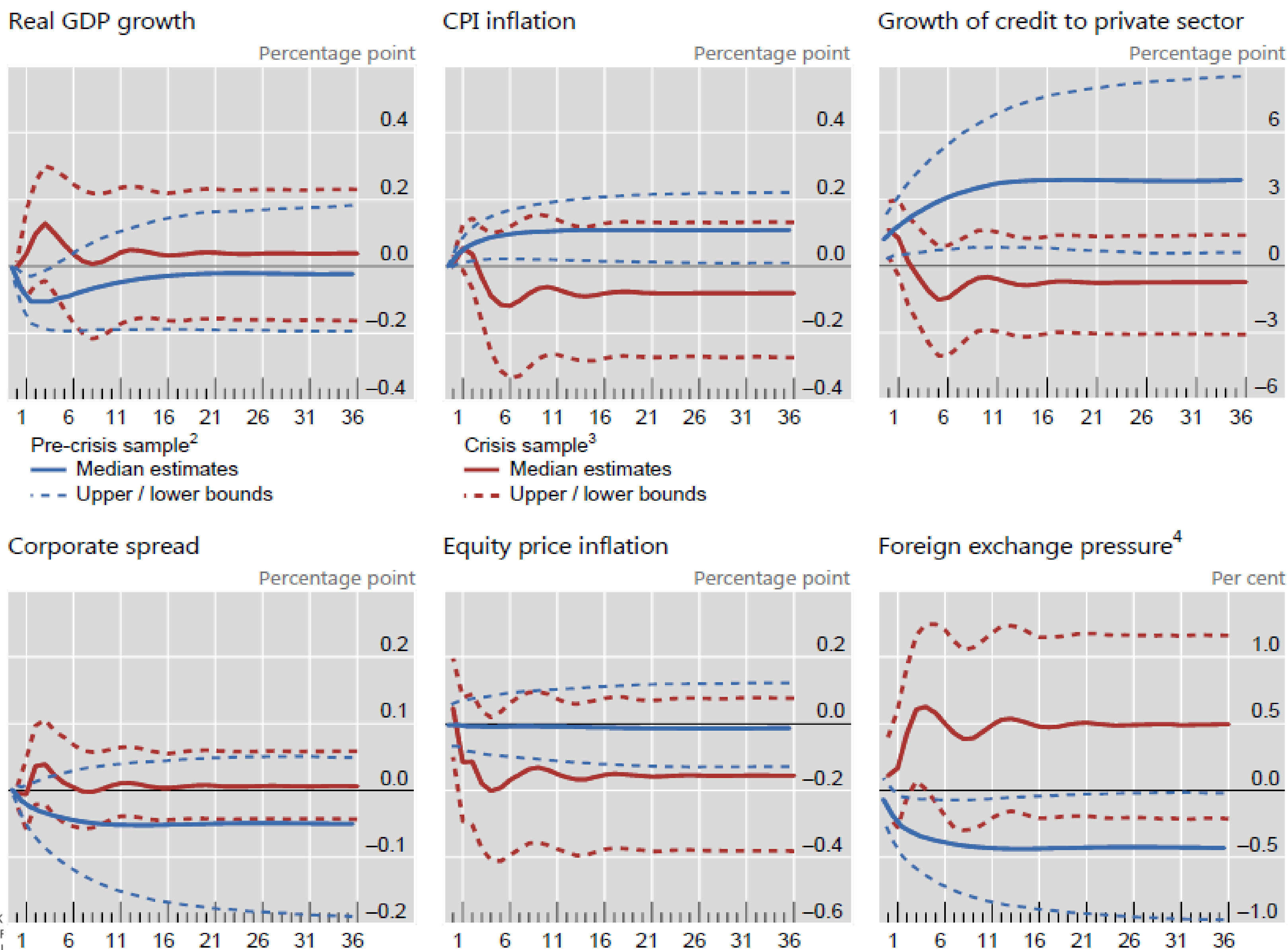
Impulse responses: domestic effects

Reduction in US corporate spread (22.9 basis points)



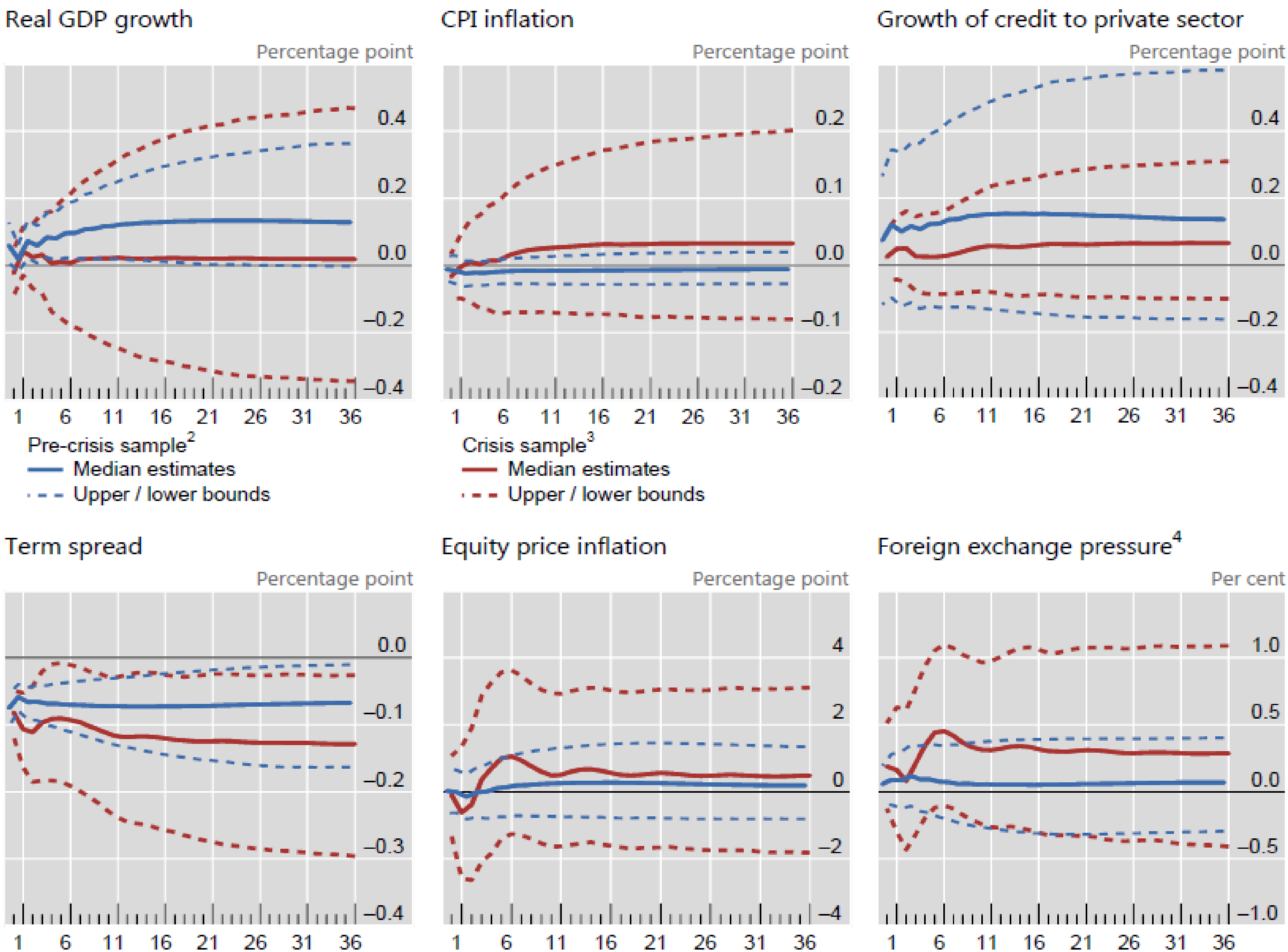
Impulse responses: domestic effects

Reduction in US VIX (10% change in natural logarithm)



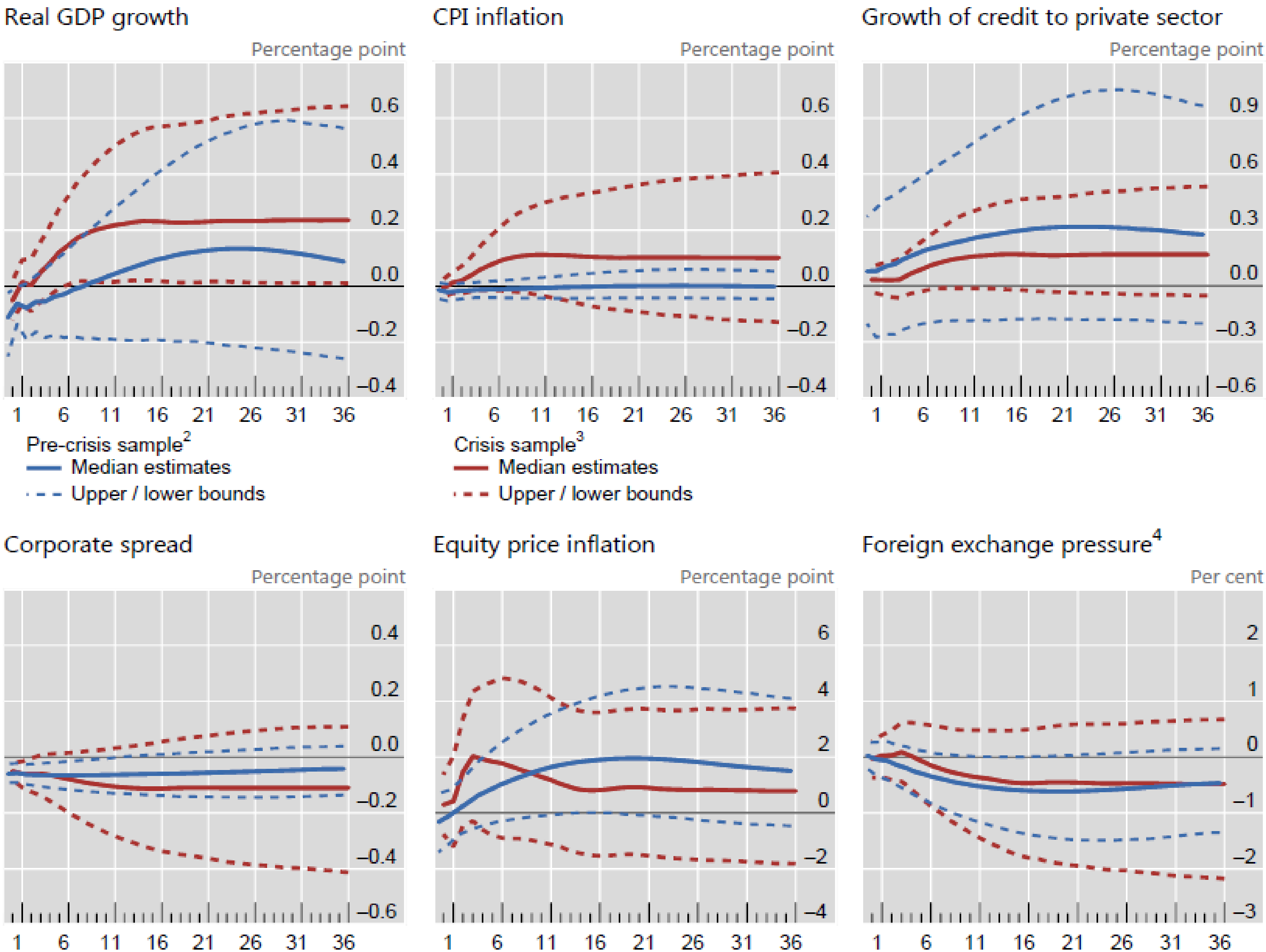
Impulse responses: euro area

Reduction in US term spread (14.6 basis points)



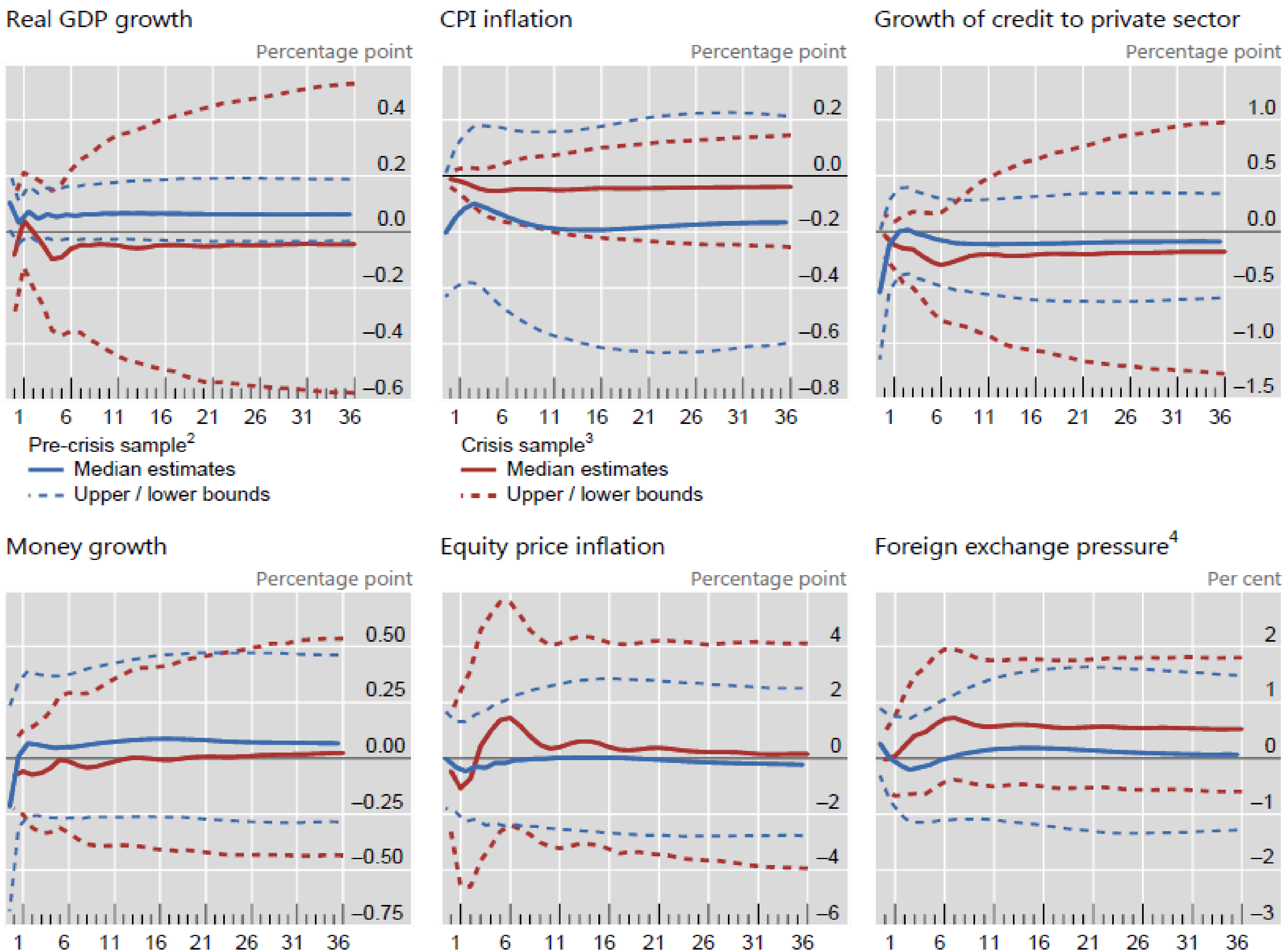
Impulse responses: euro area

Reduction in US corporate spread (22.9 basis points)



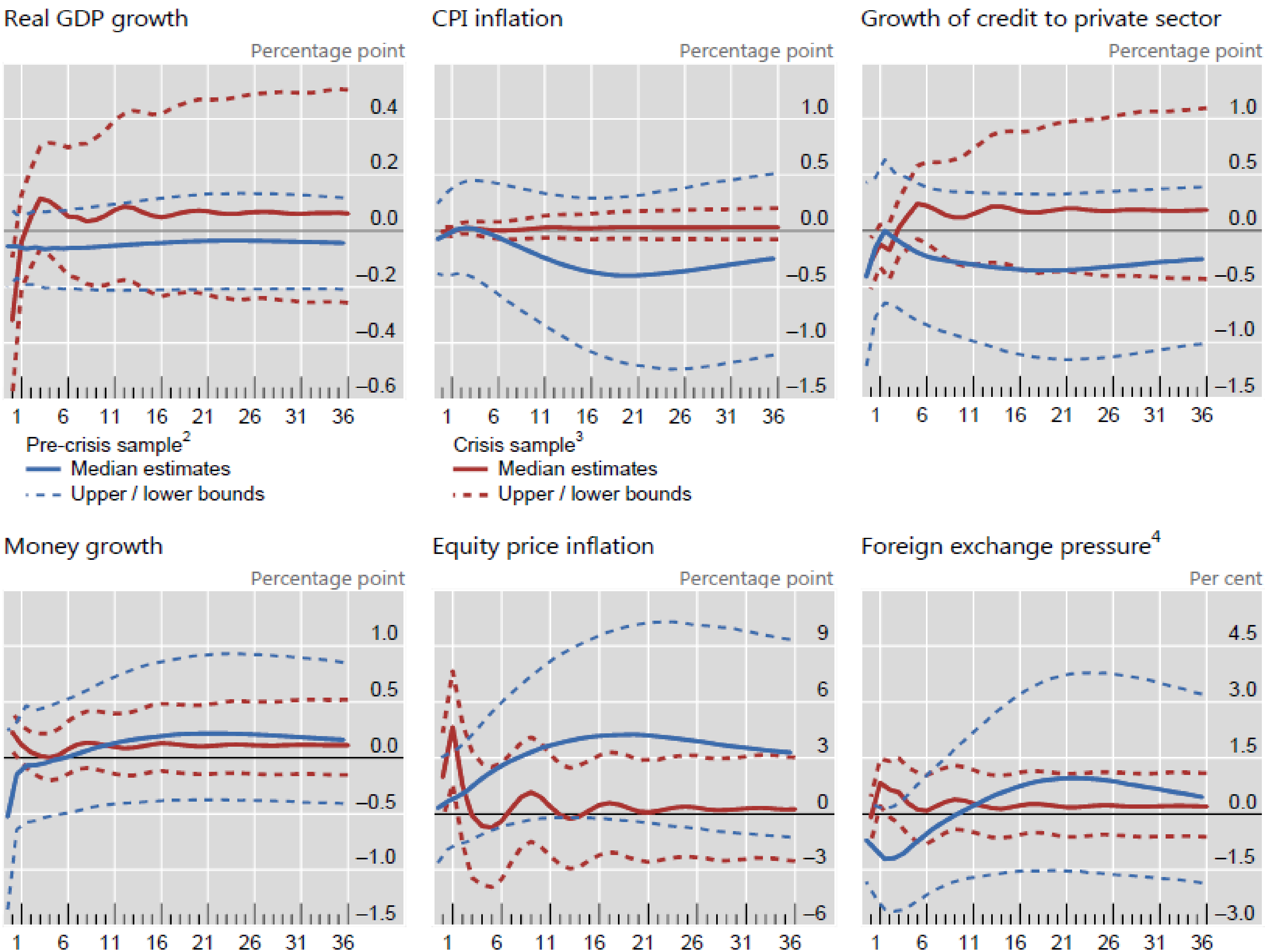
Impulse responses: Brazil

Reduction in US term spread (14.6 basis points)



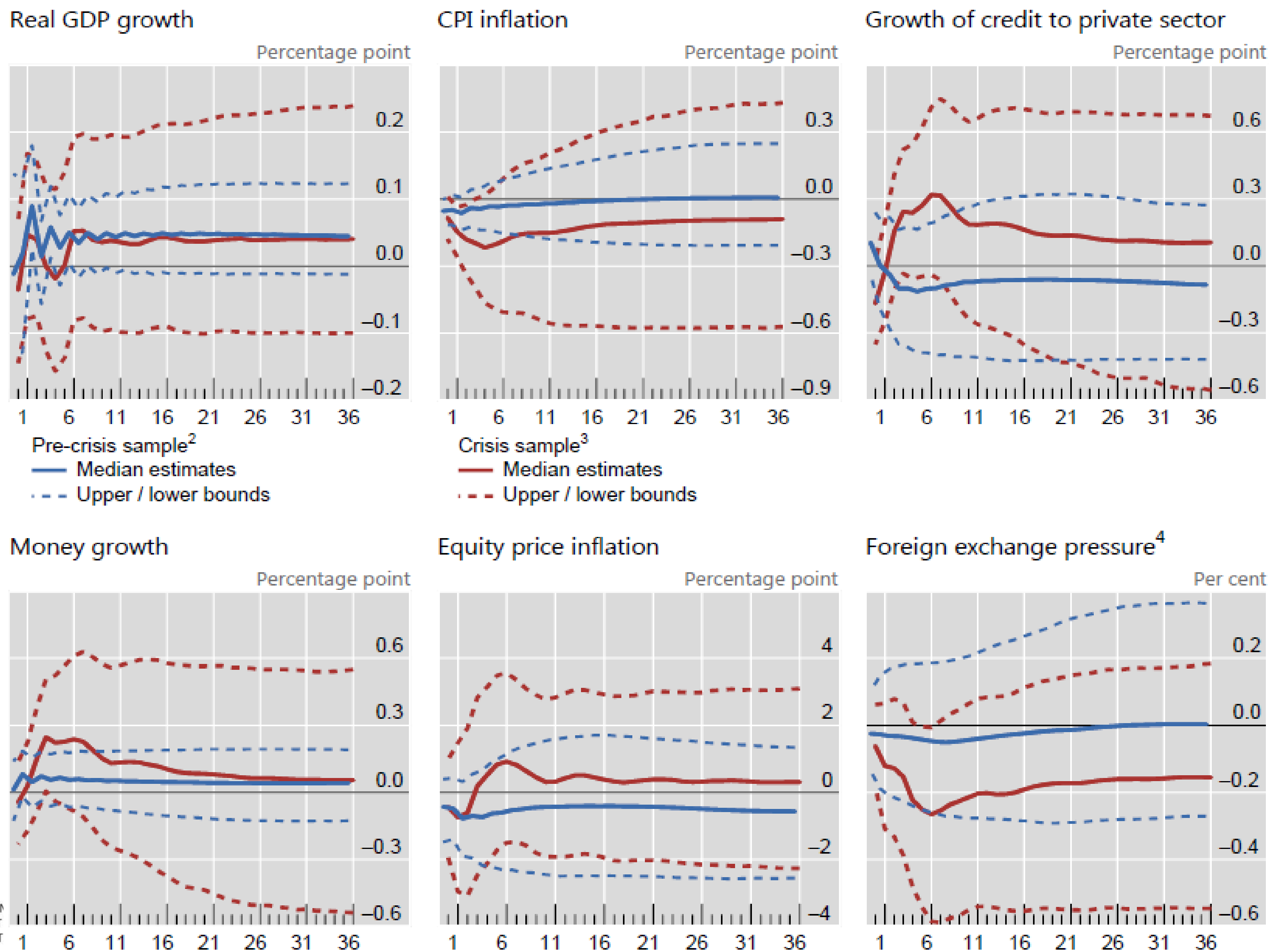
Impulse responses: Brazil

Reduction in US corporate spread (22.9 basis points)



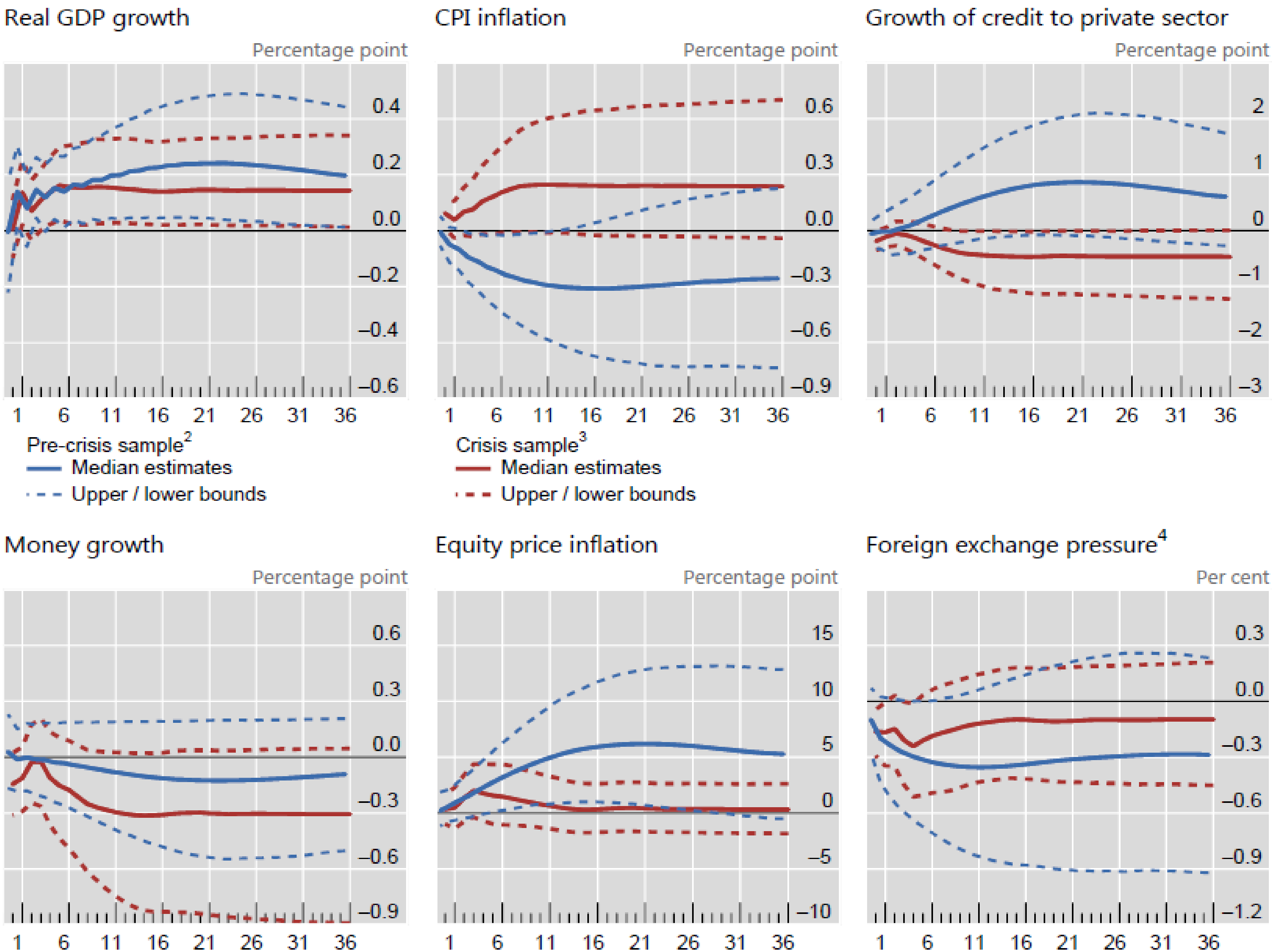
Impulse responses: China

Reduction in US term spread (14.6 basis points)



Impulse responses: China

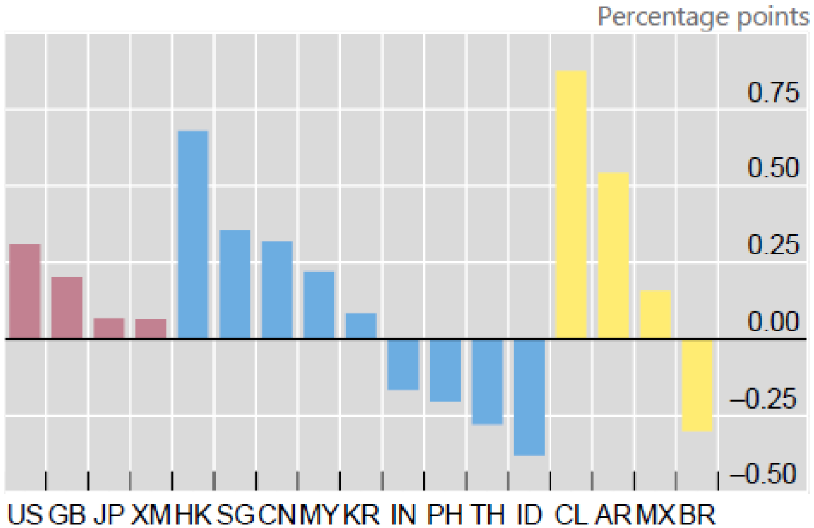
Reduction in US corporate spread (22.9 basis points)



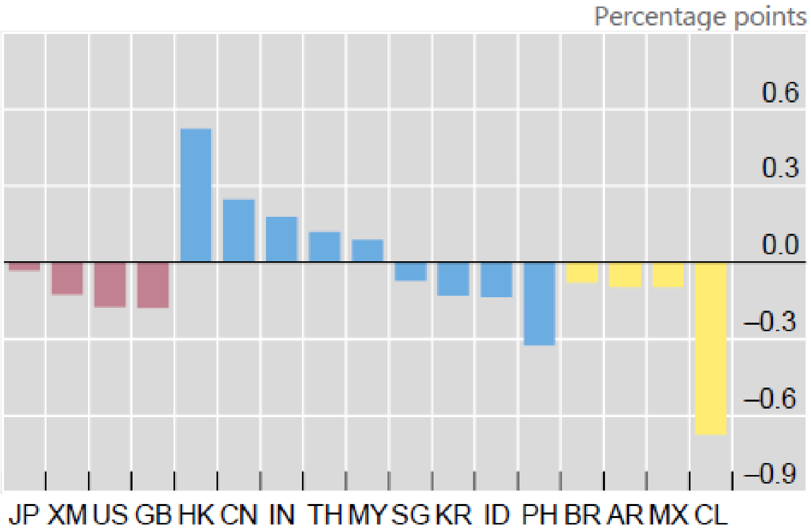
Maximum impulse responses

Reduction in US term spread (14.6 basis points)

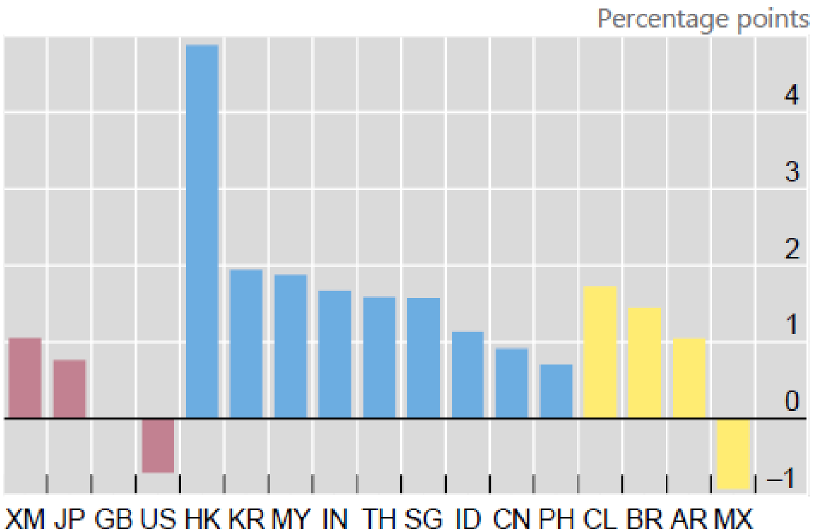
Credit growth to the private sector



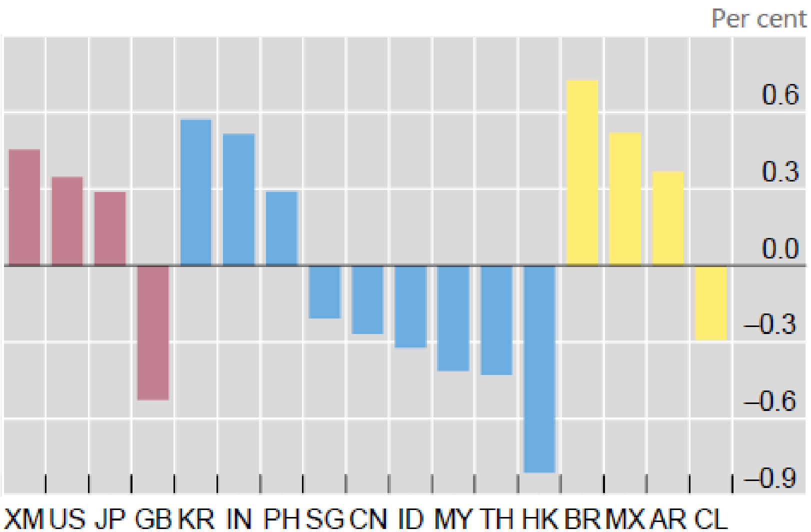
Monetary policy indicator[3]



Equity price inflation



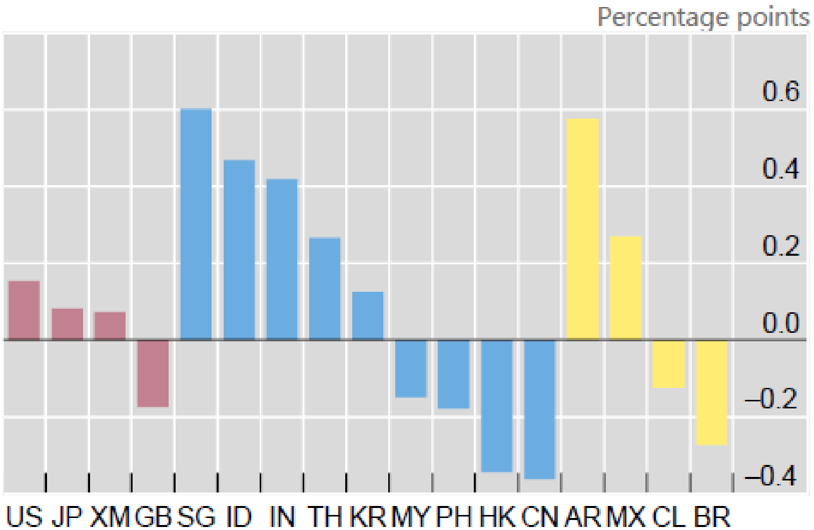
Foreign exchange pressure[4]



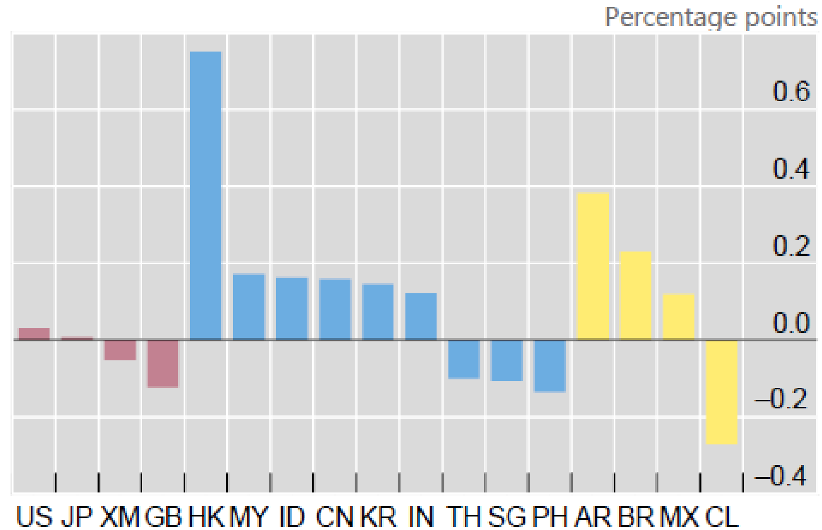
Maximum impulse responses

Reduction in US VIX (8.7%)

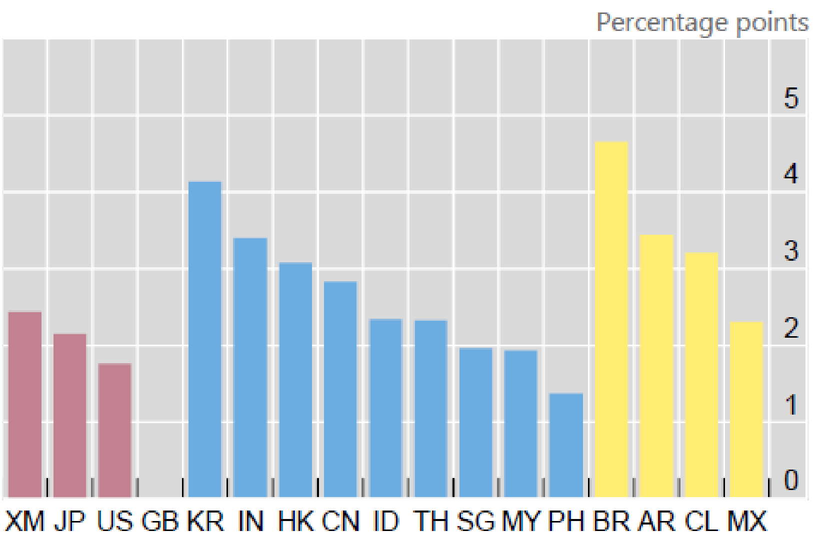
Credit growth to the private sector[3]



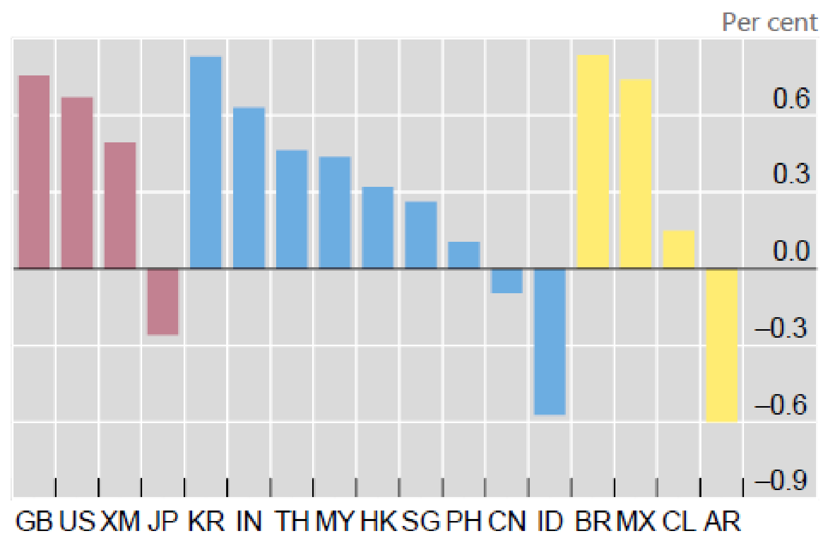
Monetary policy indicator[3]



Equity price inflation



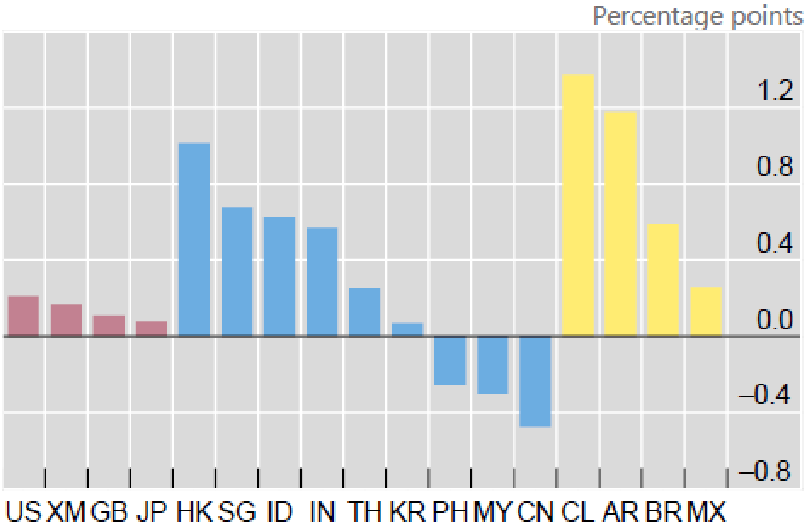
Foreign exchange pressure[4]



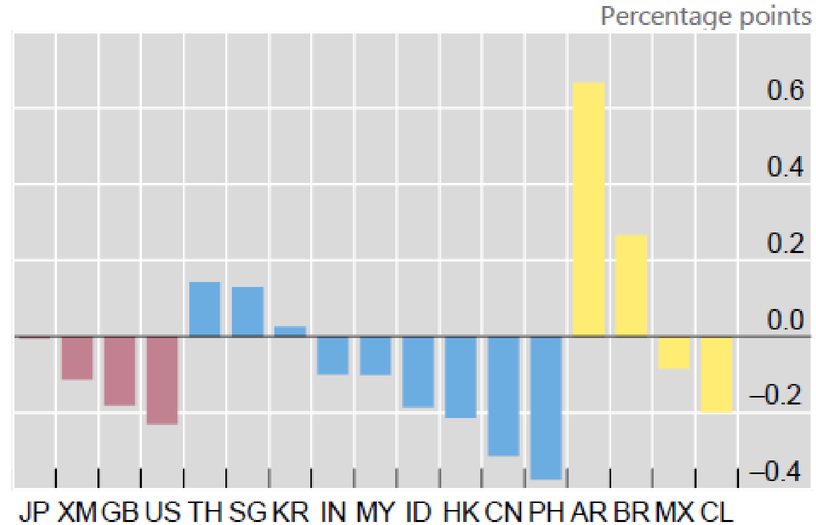
Maximum impulse responses

Reduction in US corporate spread (22.9 basis points)

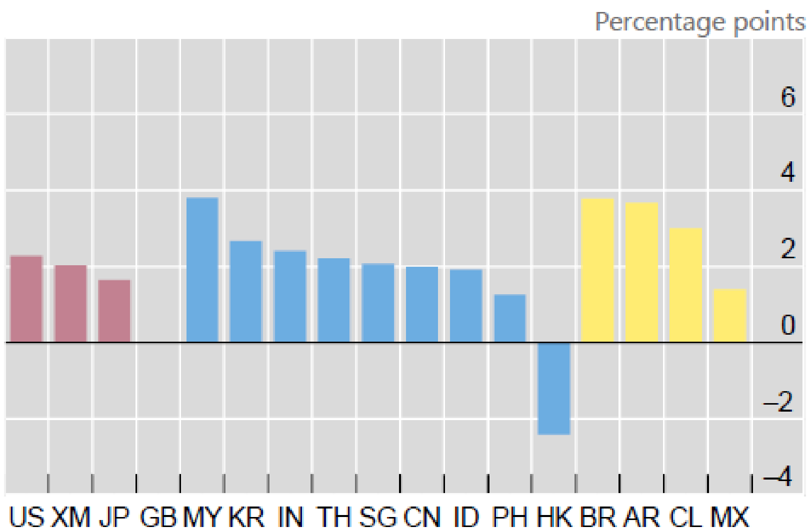
Credit growth to the private sector



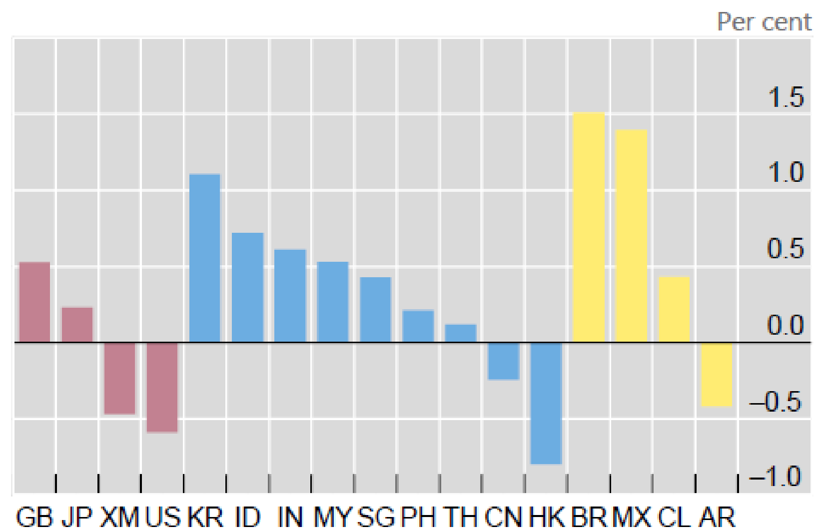
Monetary policy indicator[3]



Equity price inflation



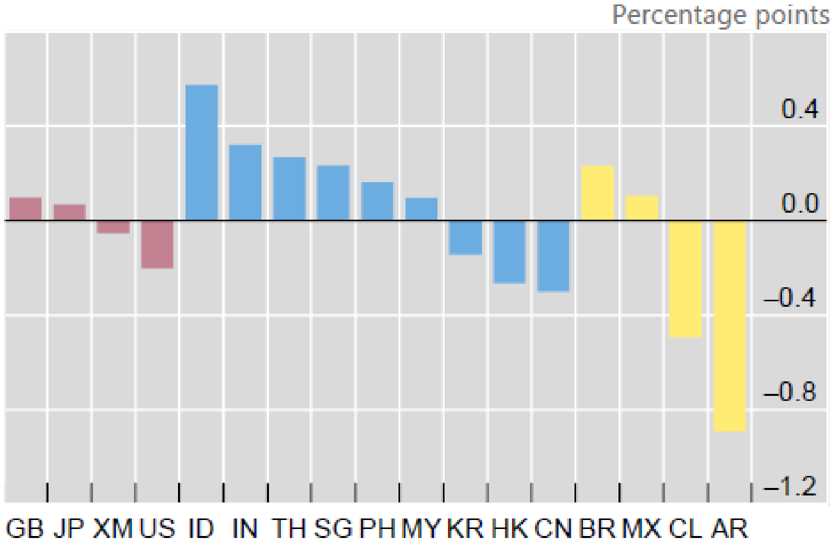
Foreign exchange pressure[4]



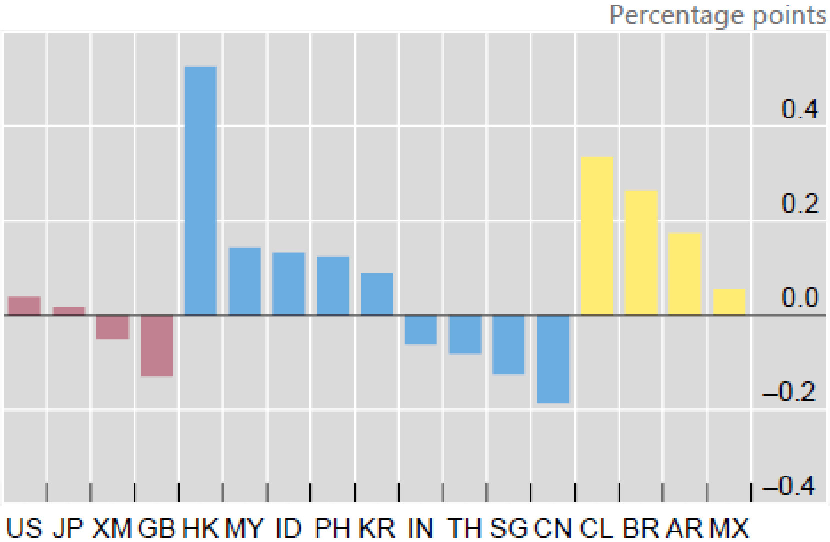
Maximum impulse responses

Reduction in US VIX (10%)

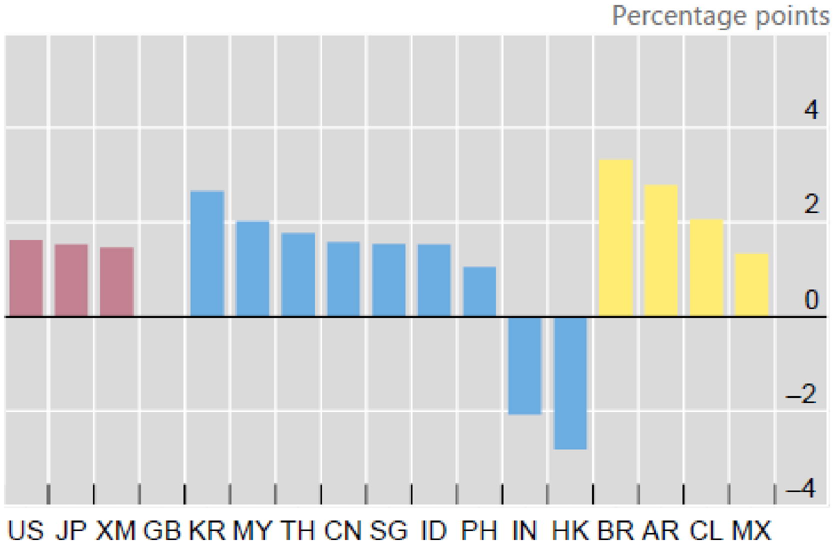
Credit growth to the private sector



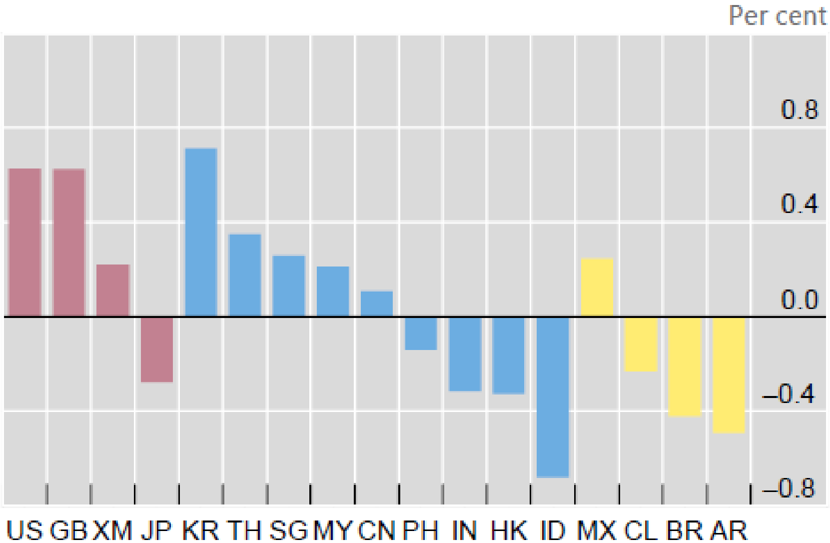
Monetary policy indicator[3]



Equity price inflation



Foreign exchange pressure[4]



Impulse responses

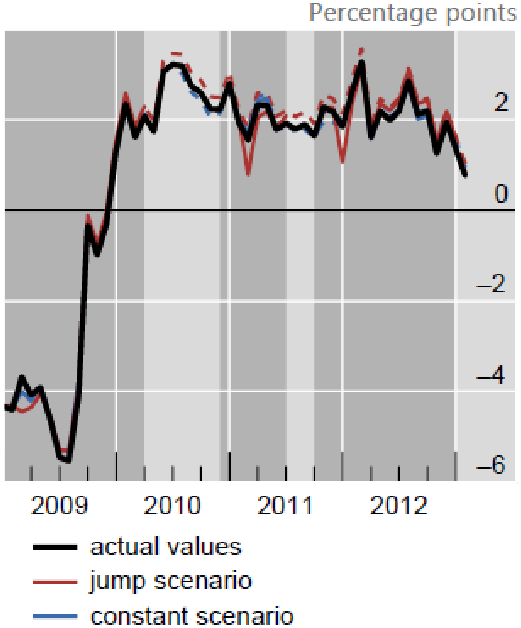
- Crisis-period impact of FRB QE: statistically significant
  - Domestic impact on credit (term) and output growth (VIX, corporate)
  - Impact on euro area output growth (corporate)
  - Early impact on Brazil's money growth, equity returns, FX pressure, credit & output growth (corporate)
  - Impact on China's FX pressure and credit & output growth (corporate)
- Impact varies across economies
  - Distinct monetary policy and FX responses
  - Positive on asset prices, generally more positive on credit growth and FX (corporate)
  - Greater & more diverse impact in many EMEs than in US & other advanced

Counterfactual Analysis

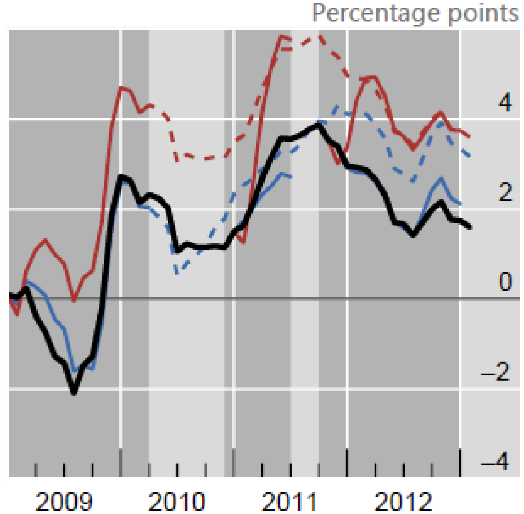
- What would have happened without FRB QE?
  - Construct counterfactual scenarios based on different paths for US VIX, term & corporate for LSAP1, LSAP2 & MEP+LSAP3
- Scenario “constant”
  - Term or corporate spread constant within each QE period, at the value of the month before each programme
- Scenario “increasing”
  - Term or corporate spread rises by 10 basis points in each & every month in each QE period
- Scenario “jump”
  - Term or corporate spread jumps by 200 basis points at beginning of each QE period and then stays 200 basis points above the actual path.

Counterfactual: US domestic impact (ts)

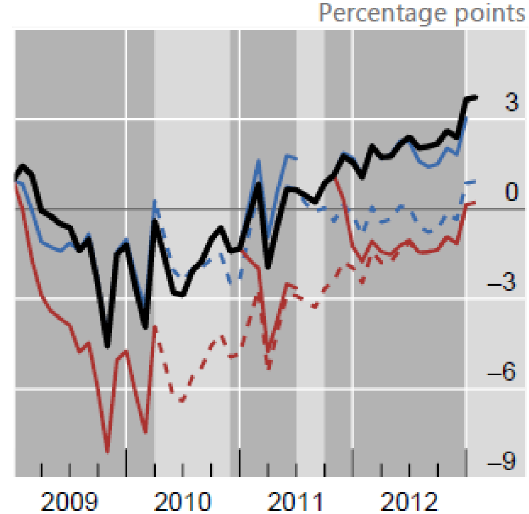
Real GDP growth



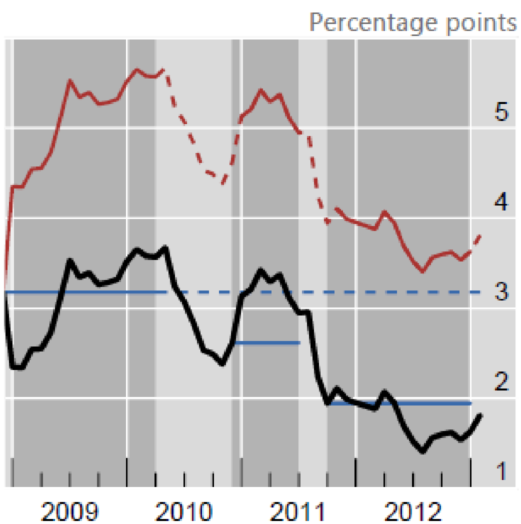
CPI Inflation



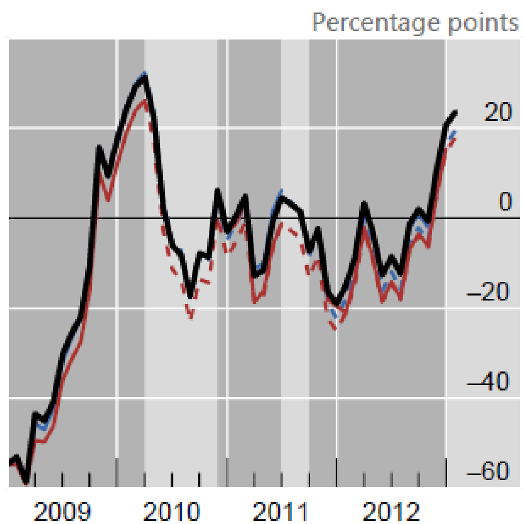
Credit to the private sector



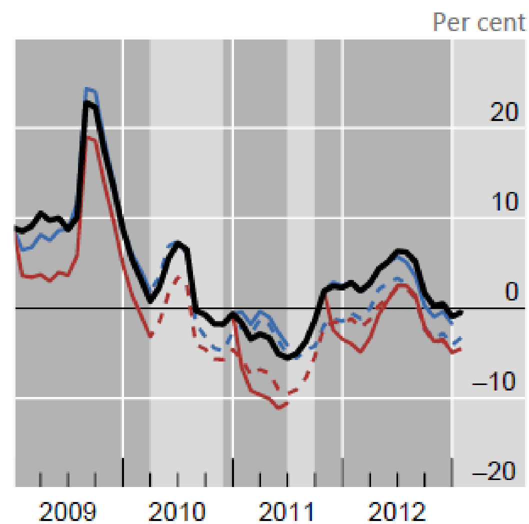
Term spread



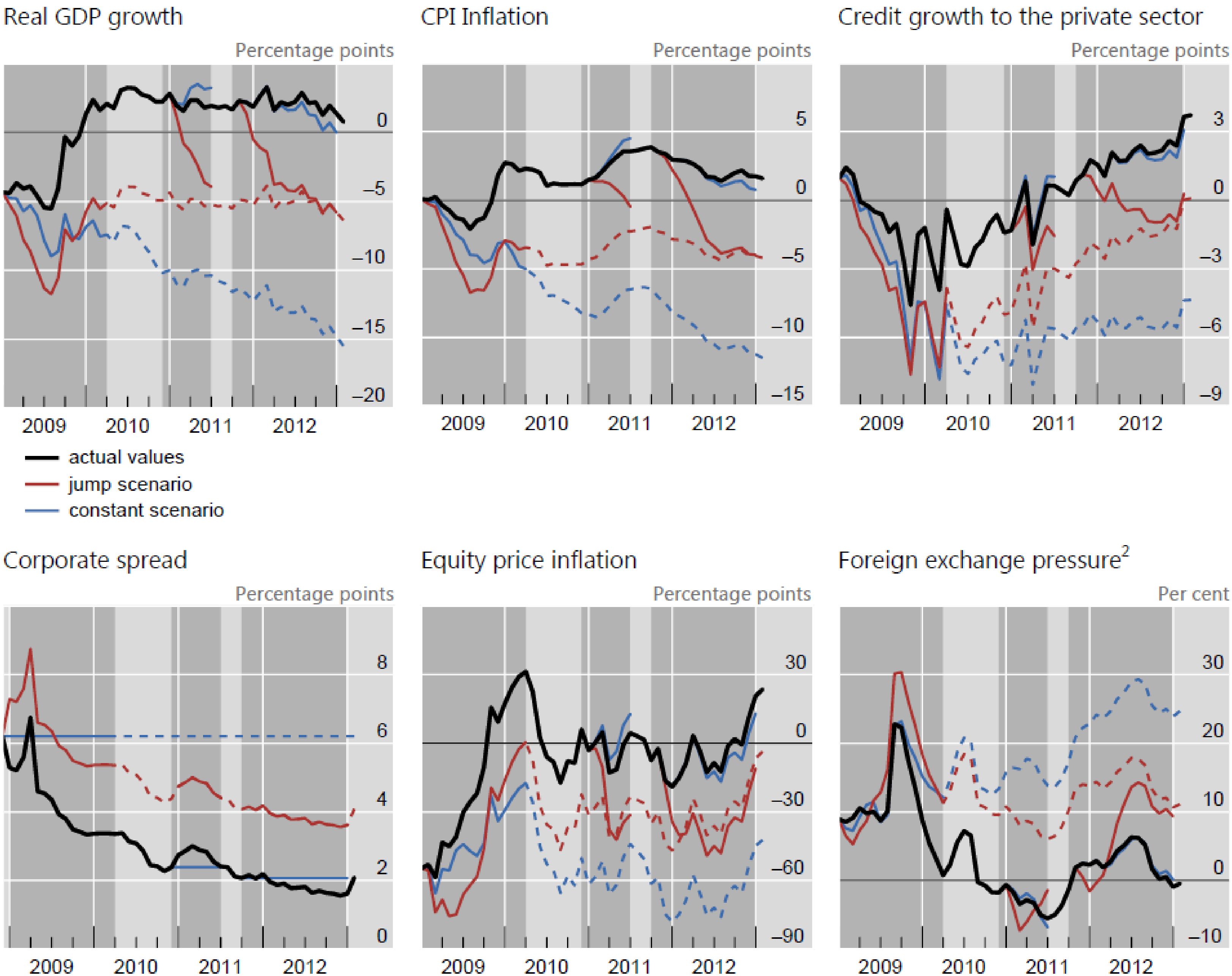
Equity price inflation



Foreign exchange pressure[2]

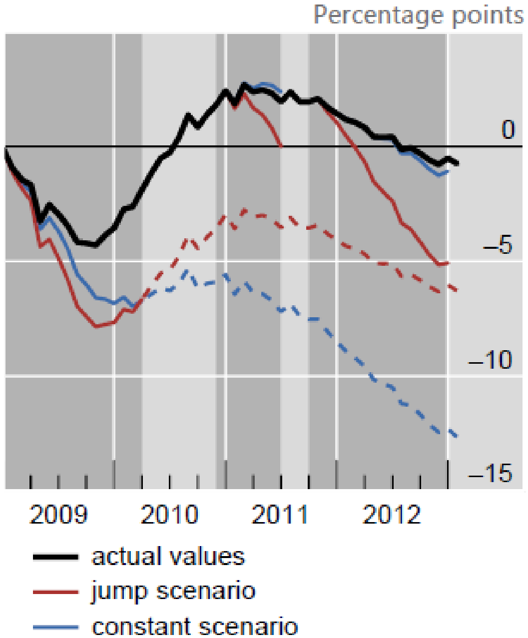


Counterfactual: US domestic impact (cs)

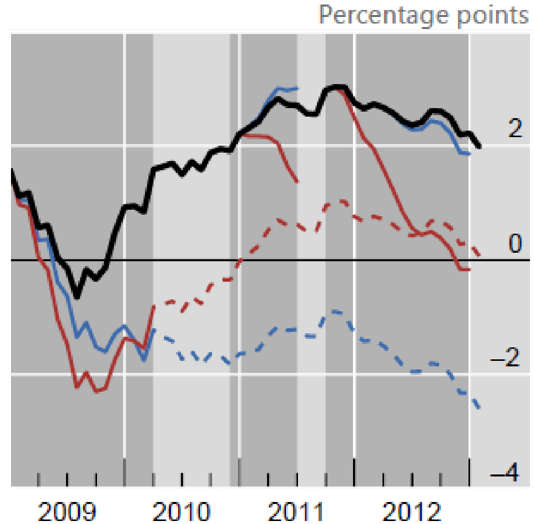


Counterfactual: spillover to euro area (cs)

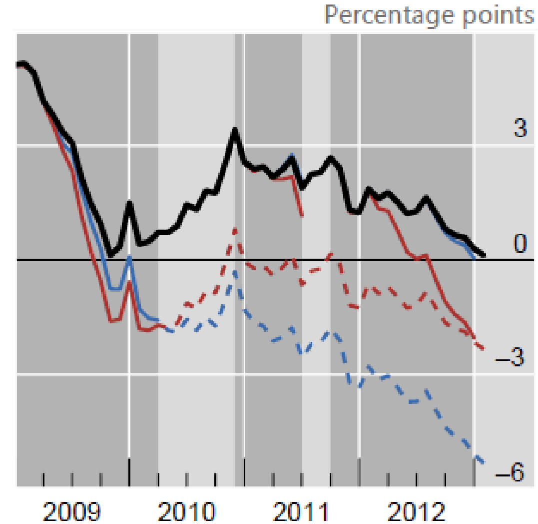
Real GDP growth



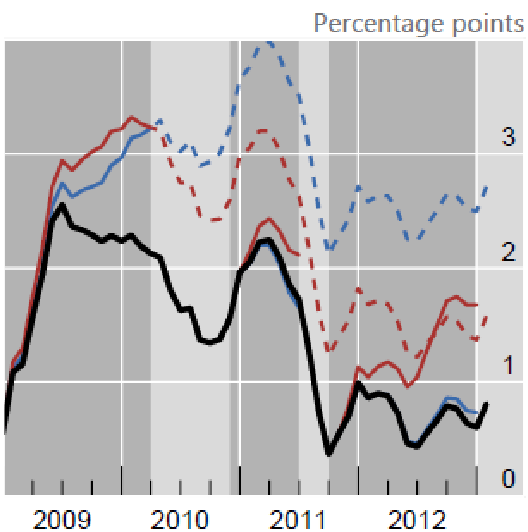
CPI Inflation



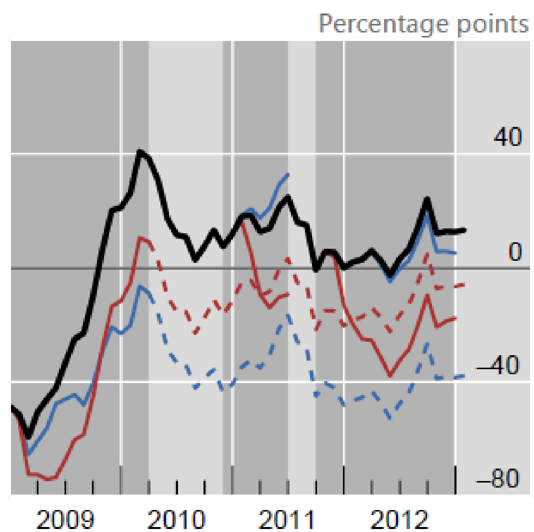
Credit growth to the private sector



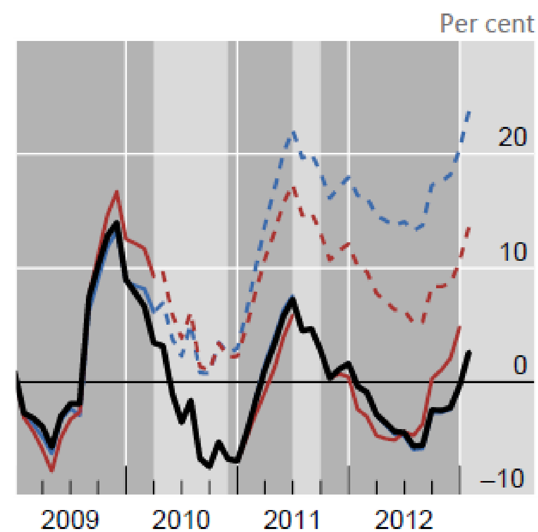
Corporate spread



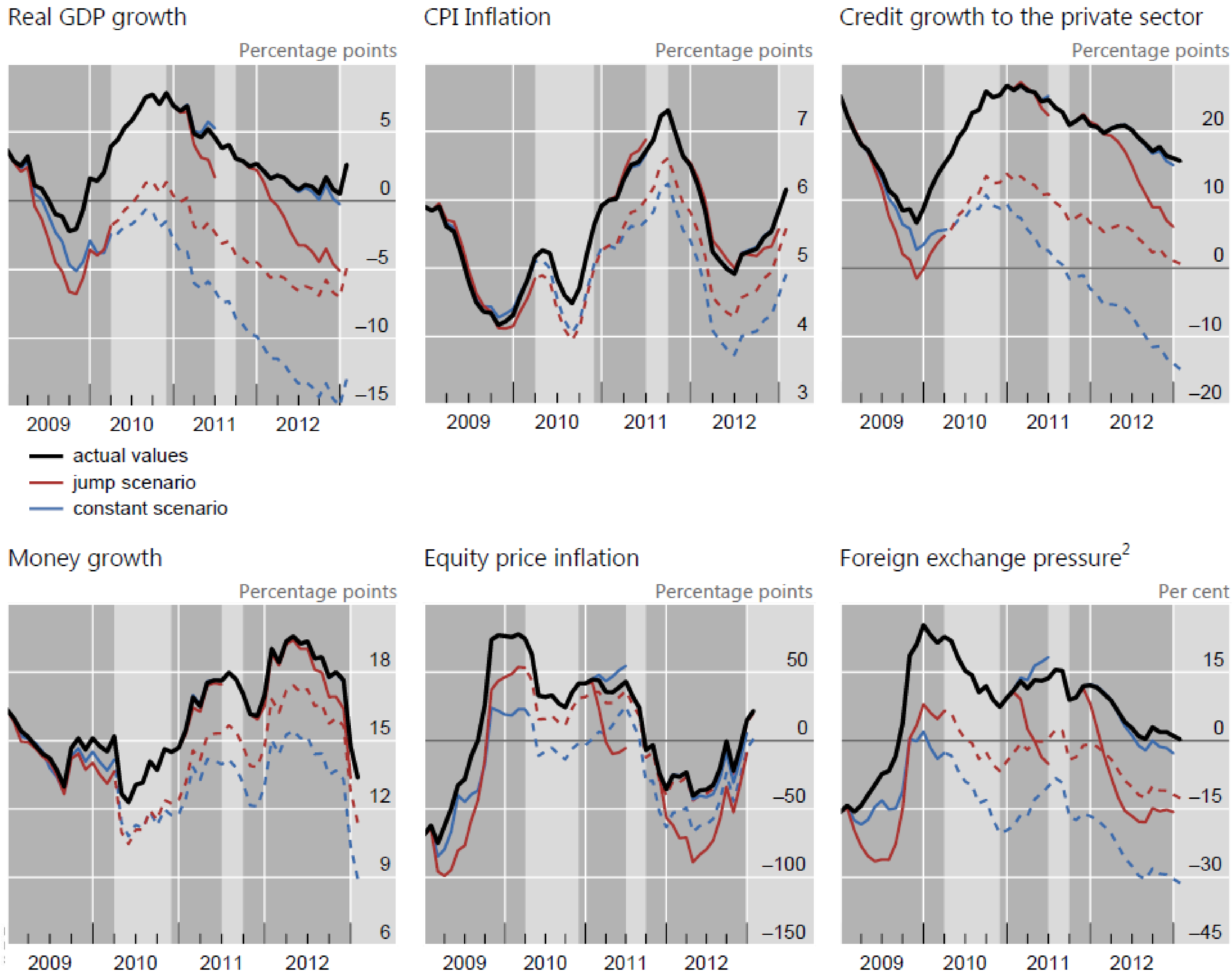
Equity price inflation



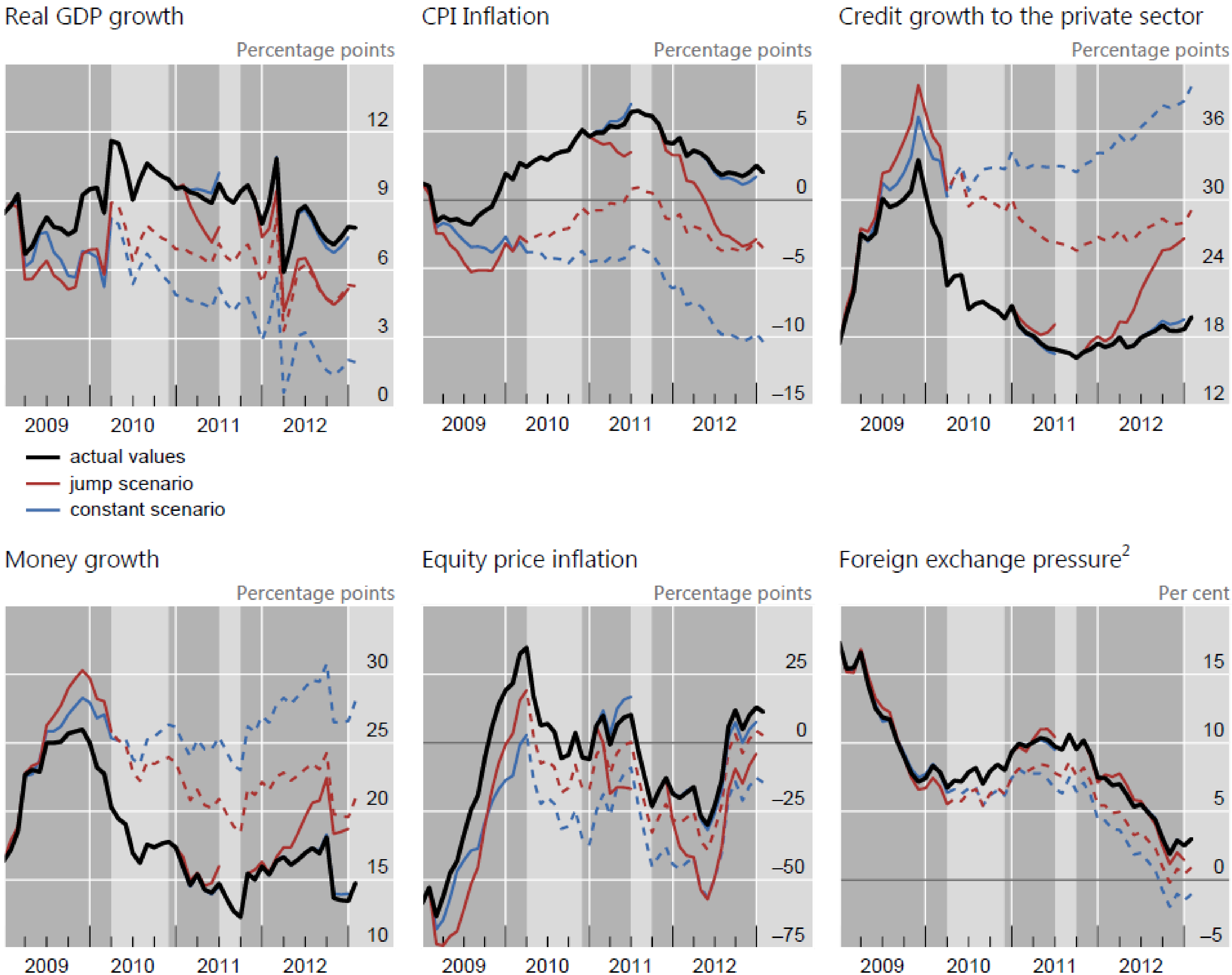
Foreign exchange pressure[2]



Counterfactual: spillover to Brazil (cs)



Counterfactual: spillover to China (cs)



Conclusion

- Marked & varied announcement effects on global markets
  - US MEP "puzzle"
- QE helped stabilise US & global financial markets boosting asset prices and lowering borrowing costs
- US QE prevented prolonged recession & severe deflation in US & euro area
- US QE had greater impact when it managed to lower corporate spreads and market volatility
  - Buying government bonds just to lower term spread or twist yield curve may not be best option

Conclusion

- Cross-border effects differed in EMEs depending on policy responses, but generally greater than in US
  - Whether QE effects are beneficial depends also on cyclical conditions of impacted economies
    - US QE supported recovery in 2009 & 2012
    - But contributed to overheating in Brazil, China & other EMEs in 2010-2011
  - Costs and benefits unevenly distributed
- QE can pose difficult policy challenges for EMEs
  - US QE Tapering and eventual exit
  - But QE deepening in other advanced economies?