



BANK FOR INTERNATIONAL SETTLEMENTS

Is monetary policy less effective when interest rates are persistently low?

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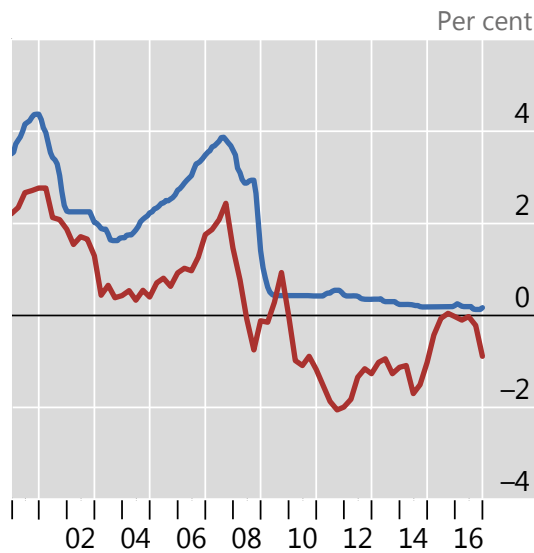


Interest rates have been persistently low....

Low interest rates in the core advanced economies

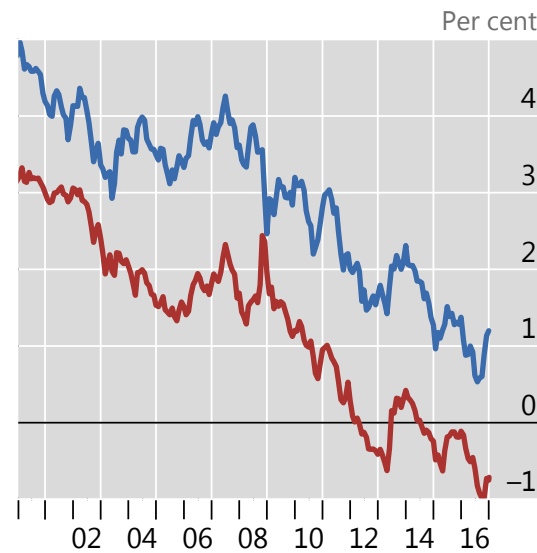
Graph 1

Short-term interest rates¹

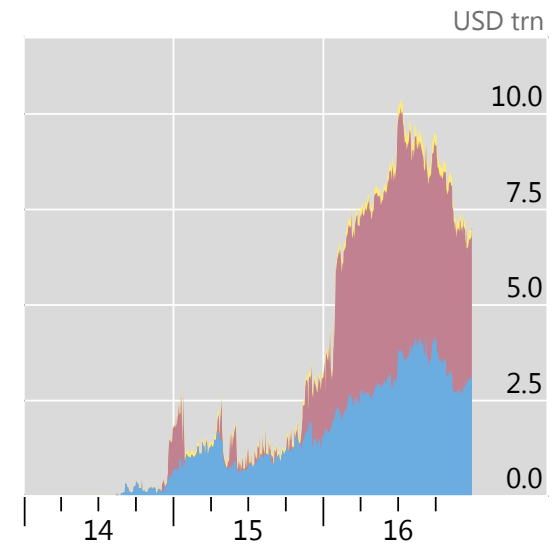


— Nominal — Real

Long-term interest rates²



Stock of government bonds with negative yields³



— Euro area — Japan — Rest of the world

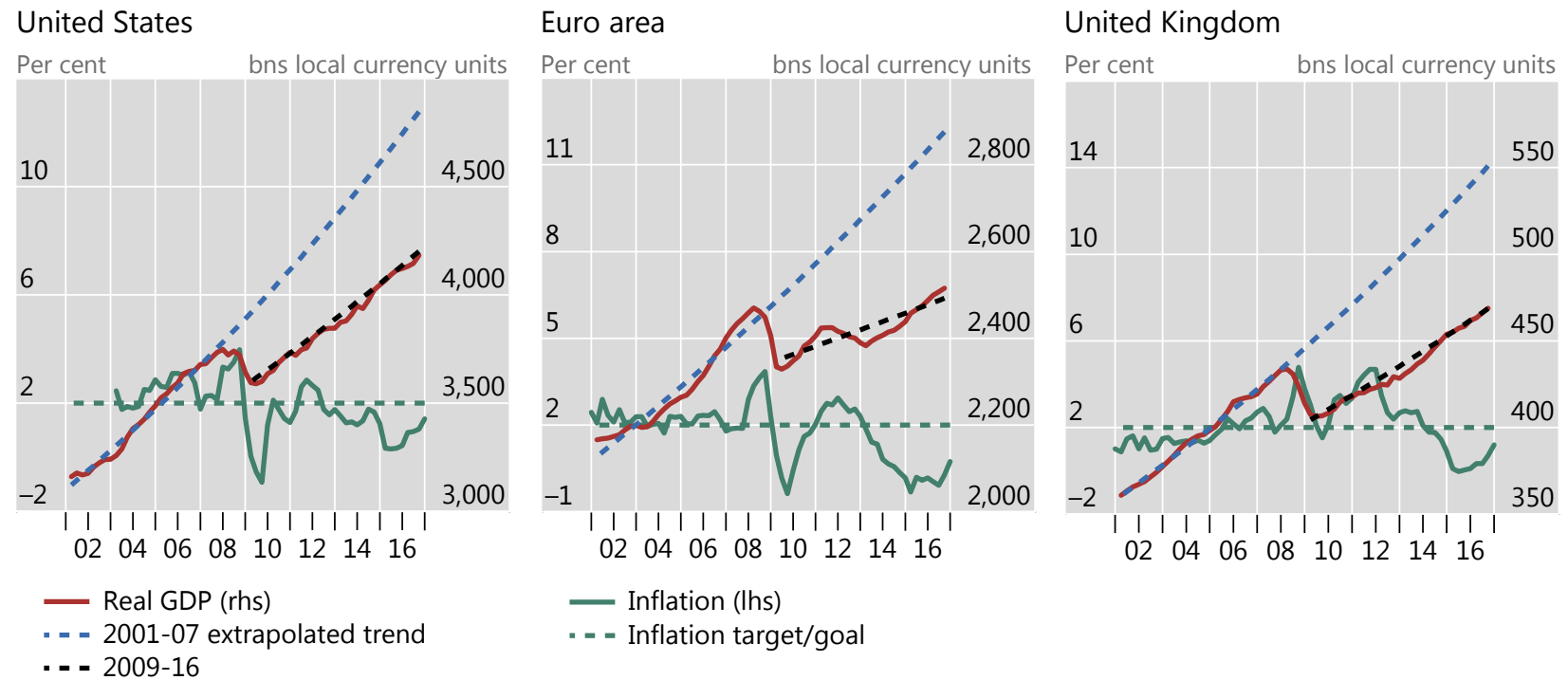
¹ Simple average of Japan, euro area, the United Kingdom and the United States. ² Simple average of France, the United States and the United Kingdom. ³ Analysis based on the constituents of the Bank of America Merrill Lynch World Sovereign index.

Sources: Bank of America Merrill Lynch; Bloomberg; Datastream; BIS calculations; national data.

....but the recovery has been disappointing

Output¹ and inflation post-crisis

Graph 3



¹ Seasonally adjusted, on a logarithmic scale.

Sources: National data; BIS calculations.

Potential mechanisms reducing transmission at low rates

- Headwinds blowing after balance-sheet recessions
 - Persistent low rates often prevail when macro-financial headwinds blow after balance-sheet recessions
 - Less effective monetary policy in an environment of low rates, but because of headwinds
- Non-linearities linked to the level of interest rates
 - Persistent low rates may have specific effects that mitigate the transmission of monetary stimulus
 - Less effective monetary policy because of low rates themselves

Headwinds sapping monetary transmission

- Debt overhangs may force borrowers to retrench; priority for balance sheet repair may dampen impact of low rates
- Impaired banks may not pass through monetary stimulus
- High uncertainty/low confidence may reduce sensitivity of spending to low rates
- Adverse supply side conditions through resource misallocations may limit effects of stimulus

Non-linearities at persistent low rates sapping transmission

- Net interest margins
 - Net interest margins get squeezed at low rates as deposit rate mark-down becomes compressed (retail deposits endowment effect)
 - May depress bank profitability and credit supply
- Consumption and saving
 - Saving may *increase* if persistent low rates render planned saving insufficient to ensure old age standard of living
- Uncertainty
 - Persistent low rates could signal dark economic prospects; may raise concerns about (defined-benefit) pension funds and life insurances
- Resource misallocation
 - Low rates may create disincentives to address debt overhang and resource misallocation (eg evergreening by banks)

Evidence on weaker transmission at low rates

- Coexistence of low rates and economic weakness no evidence of policy ineffectiveness
 - Familiar identification problem
- Evidence for weaker transmission in low rate environment at the aggregate level does not tell anything about the factors at work
- Evidence on individual channels in turn leave open the relevance of the effects at the aggregate level

Evidence on headwinds and monetary transmission

- Evidence that headwinds sap effectiveness of monetary policy
 - High debt and high uncertainty reduce the impact of monetary impulses (Alpanda and Zubeiry (2016), Bloom et al (2007), Aastveit et al (2013))
 - More general evidence that monetary transmission is weaker in the recovery from balance-sheet recessions
 - Janssen et al (2015): monetary transmission weaker in recovery from financial crisis
 - Bech et al (2014): monetary policy less effective in recoveries from recessions coinciding with financial crisis

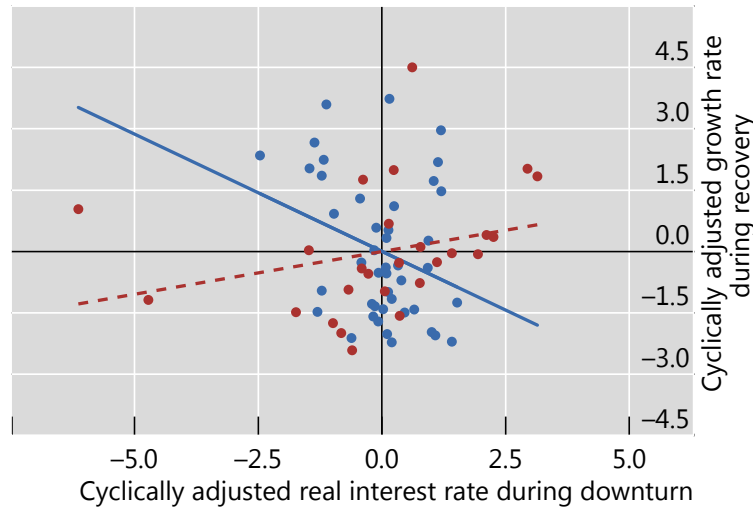
Weaker effects of monetary policy in recoveries from balance-sheet recessions (Bech et al (2014))

Monetary policy, deleveraging and economic recoveries¹

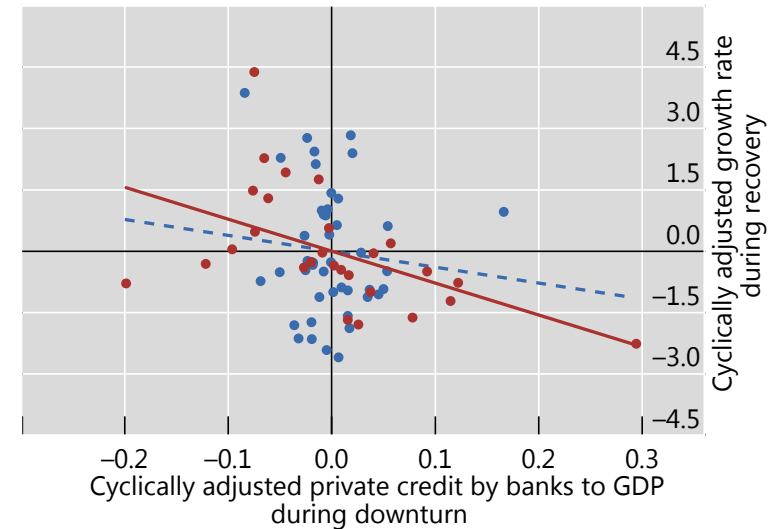
In per cent

Graph 4

Cyclical recoveries and monetary policy stance



Cyclical recoveries and deleveraging



- Cycles with financial crises
- Cycles without financial crises

¹ The solid (dashed) regression lines indicate that the relationship is statistically significant (insignificant). For a sample of 24 economies since the mid-1960s. Downturns are defined as periods of declining real GDP and recoveries as periods ending when real GDP exceeds the previous peak. The data cover 65 cycles, including 28 cycles with a financial crisis just before the peak. Data points for cycles are adjusted for the depth of the preceding recession and the interest rate at the cyclical peak. See Bech et al (2014) for details.

Sources: M Bech, L Gambacorta and E Kharroubi, "Monetary policy in a downturn: are financial crises special?", *International Finance*, vol 17, Spring 2014, pp 99–119 (also available in BIS Working Papers, no 388, at www.bis.org/publ/work388.pdf); OECD; Datastream; national data; BIS calculations.

Weaker effects of QE in recovery from GFC (Hesse, Hofmann and Weber (2017))

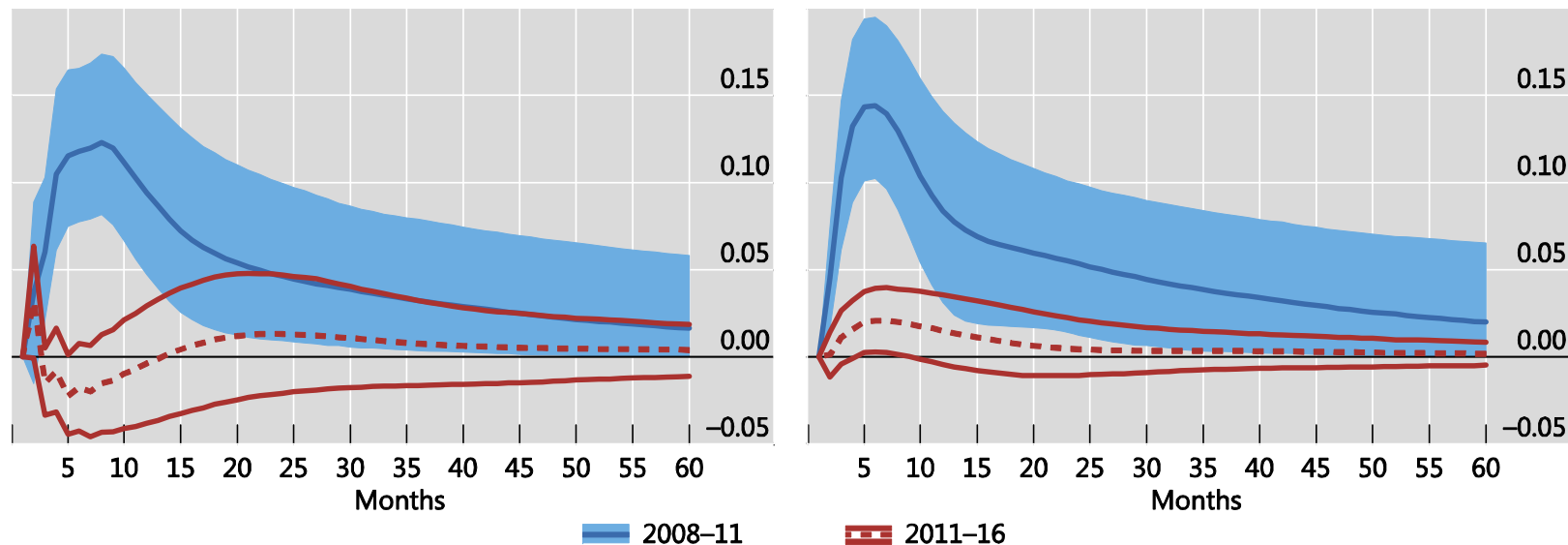
The macroeconomic impact of asset purchase shocks in the United States¹

In per cent

Graph 5

Effect on output

Effect on the price level



¹ From Hesse, Hofmann and Weber (2017); impulse responses to the unexpected component of a \$100 billion asset purchase announcement in a Bayesian VAR for the United States, consisting of log real GDP, log CPI, the size of the announced asset purchases, the 10-year Treasury yield and the log S&P 500 (the set up closely follows that of Weale and Wieladek (2016)). Median and the 68% probability range of the impulse responses. The two subsamples considered are November 2008 to June 2011 (covering two large-scale asset purchase programmes, LSAP1 and LSAP2) and July 2011 to June 2016 (covering the maturity extension programme (MEP) and LSAP3).

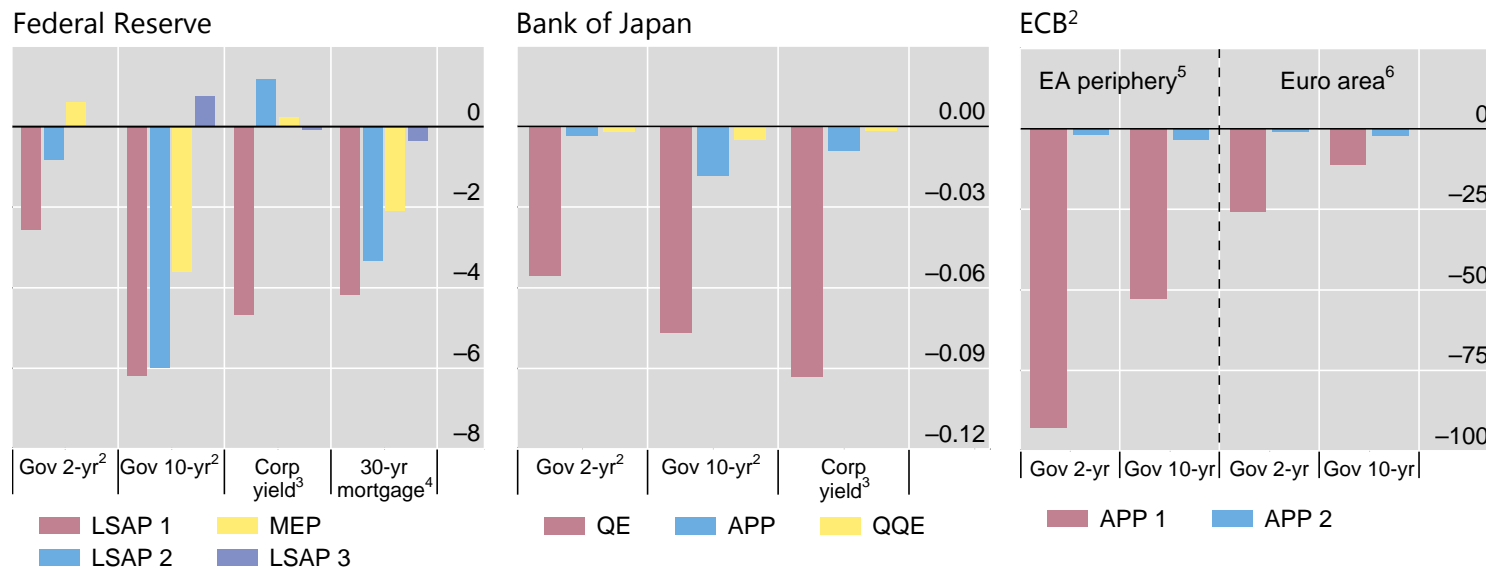
Sources: H Hesse, B Hofmann and J Weber, "The macroeconomic effects of asset purchases revisited", BIS, mimeo, 2017.

Lower effectiveness of QE may reflect reduced market impact

Financial market impact of asset purchase announcements

Impact per 100 billion units of local currency¹

Graph 6



APP = asset purchase programme; LSAP = large-scale asset purchases; MEP = maturity extension programme; QE = quantitative easing; QQE = Quantitative and Qualitative Monetary Easing.

¹ For each programme, the cumulative two-day change in basis points around the announcement dates, divided by the total size of each programme in local currency. For open-ended programmes, divided by the estimated size of the programme assuming an unchanged pace of purchases until December 2017. For terminated programmes, the total amount of purchases at the time of termination. ² Government bond yields; for the ECB, weighted averages based on rolling GDP and PPP exchange rates of the economies listed in footnotes 5 and 6. ³ Merrill Lynch corporate bond yields. ⁴ Thirty-year fixed mortgage rate. ⁵ Greece, Ireland, Italy, Portugal and Spain. ⁶ Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal and Spain.

Sources: Bank of America Merrill Lynch; Bloomberg; national data; BIS calculations.

Evidence on non-linearities linked to low rates

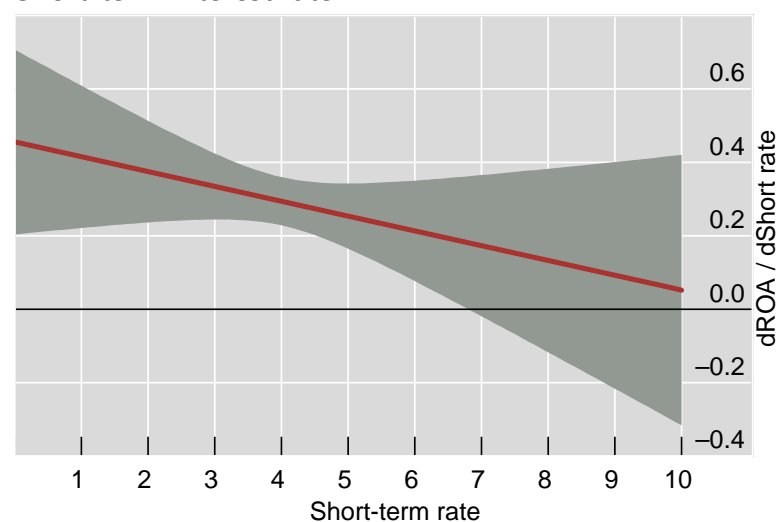
- Literature is scant and scattered
 - Evidence on adverse effects of low rates on net interest margins, bank profitability and bank lending (Borio et al (2016), Borio and Gambacorta (2017), Claessens et al (2015))
 - Some evidence of lower interest rate sensitivity of consumption at low rates (Hofmann and Kohlscheen (2017))
 - Evidence of zombie lending in low rate environments (Caballero et al (2008), Adelet McGowan (2017), Acharya et al (2016)), but no specific evidence on causal role of low rates

Low rates and bank profitability (Borio et al (2016))

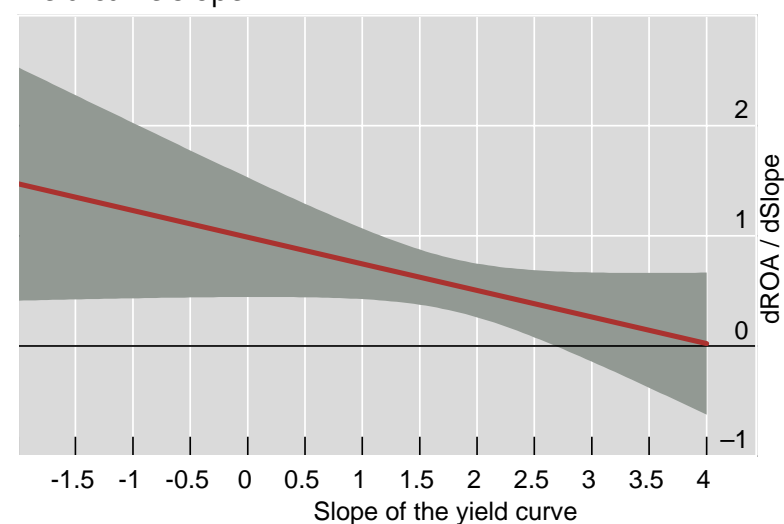
Effect of the short-term interest rate and the slope of the yield curve on bank profitability

Graph 7

Short-term interest rate



Yield curve slope



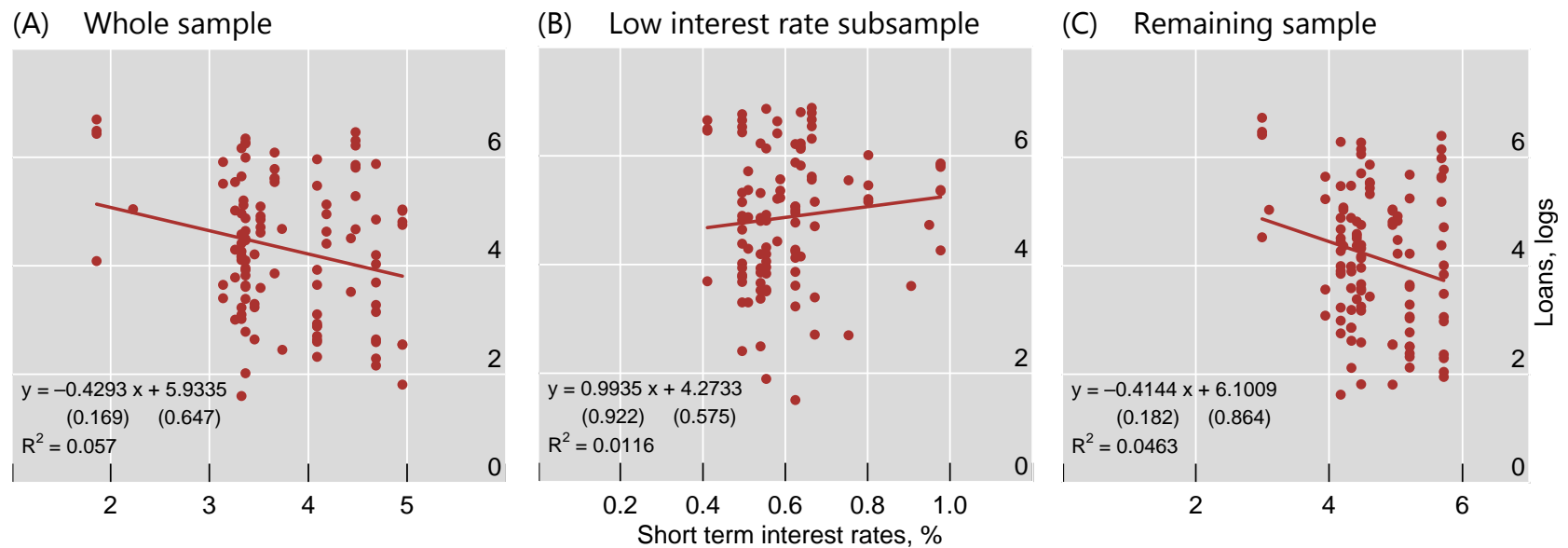
Note: The horizontal axis shows respectively possible values for the level of the short-term interest rate (three month interbank rate) and the slope of the yield curve (the difference between the 10-year government bond and the three-month interbank rate, in percentage points). The vertical axis shows the derivative of bank profitability (return on assets) respectively with respect to the short-term rate and the slope. The shaded area indicates 95% confidence bands.

Source: Authors' calculations.

Low rates and bank lending (Borio and Gambacorta (2017))

Semi-elasticity of bank lending to the short-term interest rate¹

Graph 8



¹ Scatter plots of the average level of lending (in logs) against the level of the short-term interest rate for a group of 108 international banks; the interest rate is the average for the currencies in which each bank obtains funding. The dots thus refer to semi-elasticities. The left-hand panel covers the whole sample (1995–2014); the centre panel only periods in which the average interest was very low (last quartile of the distribution, below 1.25 percentage points); and the right-hand panel the rest of the sample. Standard errors are shown in brackets.

Sources: BankScope; authors' calculations.

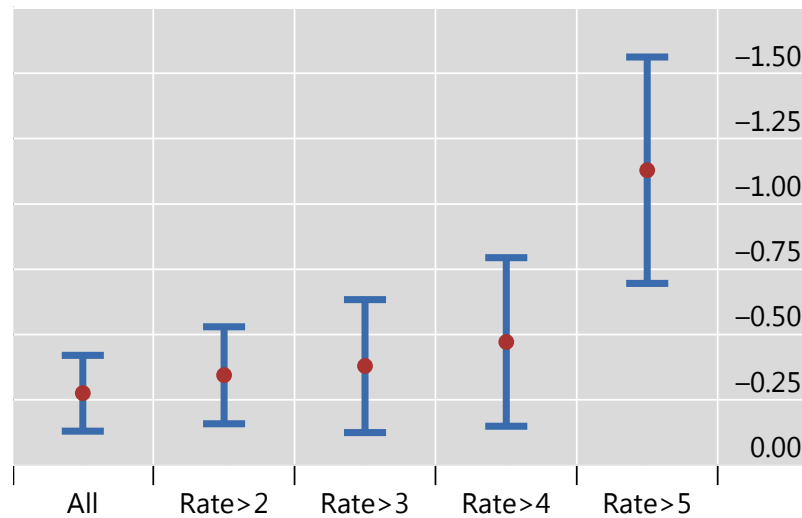
Interest rate semi-elasticities (Hofmann and Kohlscheen (2017))

Interest rate semi-elasticity of consumption and GDP growth¹

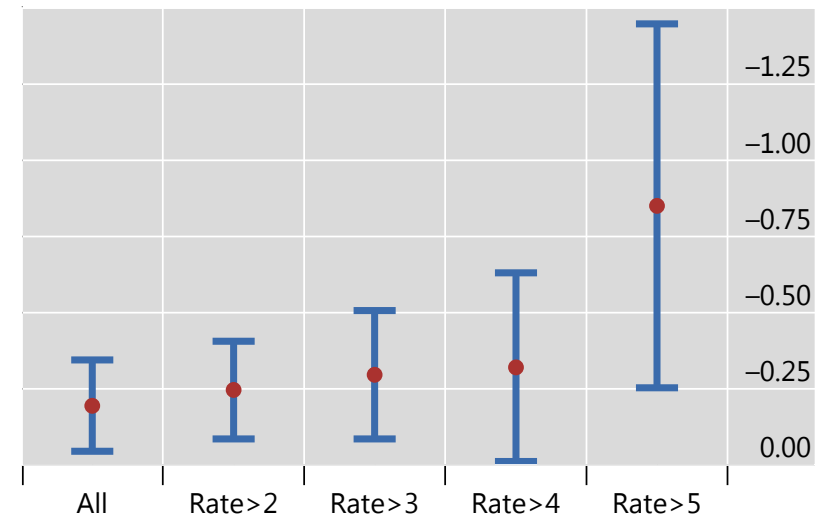
In percentage points

Graph 9

Impact on real consumption growth



Impact on real GDP growth



● Mean effect — 10% confidence interval

¹ Estimated semi-interest rate elasticities from reduced-form empirical Euler equations linking real consumption and real GDP growth to the level of the nominal short-term interest rate. The analysis is based on annual data for a panel of 31 countries over the period 1995-2015. Non-linearities are modelled through piece-wise regressions, allowing the interest rate semi-elasticity to vary across different interest rate level thresholds.

Source: Hofmann and Kohlscheen (2017), mimeo, Bank for International Settlements.

Conclusions

- Literature on transmission at low rates is scant
- Review suggests two reasons why transmission may be weaker when interest rates are persistently low
 - Headwinds after balance sheet recessions coinciding with persistent low rates
 - Non-linearities kicking in at low rates and weakening transmission
- Evidence for both mechanisms, but hard to distinguish between the two effects
- More research is needed