Bank intermediation activity in a low interest rate environment

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Analysis of effects of low rates on bank business models and BIS research

❑ Two other papers on this topic:

✓ Borio C , L Gambacorta and B Hofmann (2017), "The influence of monetary policy on bank profitability?", *International Finance*, 20. Also published as BIS Working Papers, no 514.

✓ Borio C and L Gambacorta (2017), "Monetary policy and bank lending in a low interest rate environment: diminishing effectiveness?", *Journal of Macroeconomics*, 54B. Also published as BIS Working Papers, no 612.

❑ New paper on the link between low interest rates, price to book ratio and bank dividend:

✓ Gambacorta L, T Oliviero and HS Shin (2020), "Low price-to-book ratios and bank dividend payout policies", BIS Working Papers, forthcoming.

The paper in a nutshell

This paper examines – in a comprehensive way - how the long period of low interest rates has affected the business activities of banks.

We use data for 113 large international banks headquartered in 14 major advanced economies for the period 1994–2015. The analysis distinguishes between three types of effect on banks from short-term interest rates – on their income, balance sheets and risk exposures.

We find that low interest rates induce banks to:
- Shift their activities from interest-generating to fee-related and trading
- Adjust their funding structure towards deposits
- Reduce risk-weighted asset ratio and loan-loss provisions

Data

- Annual frequency: 1994-2015 (FitchConnect).

- 113 international banks in 14 countries : AT, AU, BE, CA, CH, DE, FR, IT, JA, NE, SP, SW, UK and US.

- We control for 184 mergers and acquisitions by constructing pro-forma entities at the bank holding company level.

- We approximate funding costs by estimating the funding composition by currency, weighing the corresponding amount by the monetary policy indicators – ie the short term rate, the long-term rate and therefore also the yield curve slope.

- Sample covers 70% of worldwide banking assets.

Empirical strategy

$$Y_{k,j,t} = \delta Y_{k,j,t-1} + \alpha_0 r_{j,t} + \alpha_1 r_{j,t}^2 + \Phi' C_{k,j,t} + \Psi' X_{k,j,t-1} + \vartheta_k + \varepsilon_{k,j,t}$$

- where Y are various income and balance sheet indicators, r is the short term interest rate. C includes macro controls, X contains bank-specific characteristics, and θ is a set of bank fixed effects. We index banks with k, countries where banks are headquartered with j and years with t.

- As dependent variable Y, we use 12 indicators in separate regressions on: (i) income diversification, (ii) fees and commissions, (iii) net interest income, (iv) trading profit, (v) lending, (vi) liquid asset holdings, (vii) asset diversification, (viii) deposit funding, (ix) short-term funding, (x) off-balance sheet activity, (xi) density function (risk-weighted assets over total assets), and (xii) loan loss provisions.

- Dynamic System Generalised Method of Moments (S-GMM) panel methodology.

- In robustness checks, the model is augmented with interactions between the short term interest rate and a dummy variable for banks that are capital-constrained.
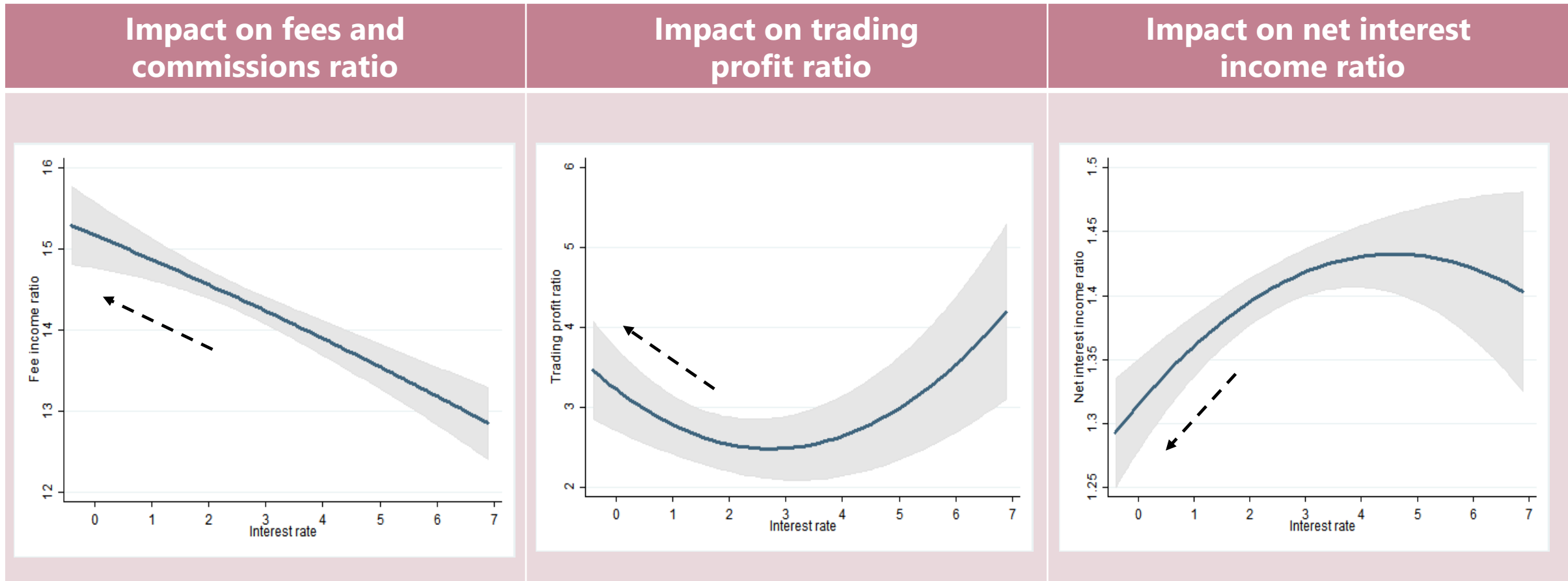
Database (1994-2015)

Country where bank is headquartered	Total assets, USD billion, end-2015	Short-term interest rate	Slope of the yield curve	CPI inflation	Non-interest income/ total income	Total loans/ total assets	Total equity/ total assets	Location of the ultimate borrower		No. of banks	No. of rescued banks	No. of M&A	No. of crisis years
								Domestic	Other				
Austria	510	2.05	1.44	1.85	20.77	47.28	6.26	52.3	47.7	6	4	4	5
Australia	2042	4.84	0.52	2.59	17.67	69.20	6.23	75.0	25.0	7	0	4	0
Belgium	543	2.17	1.69	1.91	5.54	44.28	3.33	57.5	42.5	5	3	5	5
Canada	3165	2.82	1.41	1.97	30.99	46.01	4.49	57.1	42.9	6	0	3	0
Switzerland	2012	1.79	1.29	1.17	30.79	48.04	5.28	53.5	46.5	5	1	4	5
Germany	4159	2.19	1.18	1.56	10.86	41.64	3.43	71.3	28.7	15	4	10	5
Spain	3579	2.18	2.08	2.14	18.35	59.16	5.92	54.6	45.4	14	10	37	5
France	7121	2.20	1.37	1.52	22.73	29.06	3.66	58.5	41.5	6	5	16	5
Italy	2538	2.54	1.88	1.96	24.09	53.81	7.87	77.9	22.1	14	7	36	5
Japan	6012	0.64	0.95	0.40	20.25	43.69	4.50	78.3	21.7	7	1	7	5
Netherlands	2234	2.10	1.34	1.85	12.82	64.46	3.98	54.3	45.7	5	3	1	5
Sweden	1553	3.00	1.11	1.23	20.85	48.12	4.39	47.9	52.1	4	1	5	7
UK	7404	3.27	0.88	2.01	23.86	53.06	4.79	45.4	54.6	6	2	15	6
USA	10007	2.45	1.42	2.09	40.31	42.85	9.25	78.4	21.6	13	11	37	6
Average/sum*	52879*	2.45	1.33	1.73	21.42	49.33	5.24	61.57	38.43	113*	52*	184*	64*

Note: Unweighted averages across banks per country. "Average/sum*" indicates unweighted averages or sums (*) over countries. Location of the ultimate borrower is estimated by merging Fitch Connect information with data from the BIS international banking statistics. No. of M&A indicates the number of mergers and acquisitions that have been taken into account in the construction of pro forma banks. No. of crisis years counts the number of years in which a financial crisis occurred and in all the subsequent years of falling real GDP, based on Borio and Drehmann (2009), Laeven and Valencia (2012) and Reinhart and Rogoff (2009).

Sources: Fitch Connect; BIS consolidated banking statistics by ultimate borrower.

Results (1): Impact on the composition of bank income

Impact on fees and commissions ratio	Impact on trading profit ratio	Impact on net interest income ratio

- In a low interest rate environment, banks' non-interest income tends to increase. This pattern is accounted for by increases in fee and commission income and trading revenues. The increase in non-interest income offsets in part the negative effect of low interest rates on banks' NIM.

Results (2): Impact on the composition of bank balance sheets

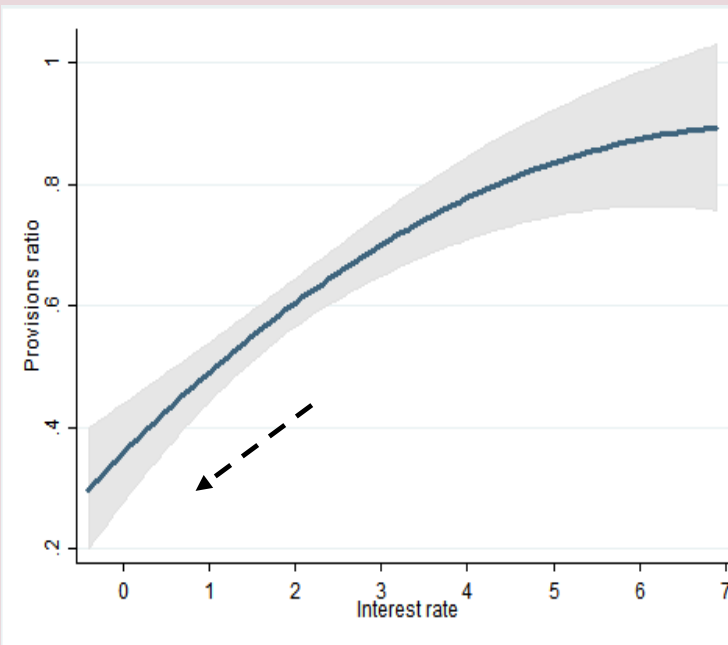| Impact on liquidity ratio	Impact on deposit funding ratio	Impact on short term funding ratio
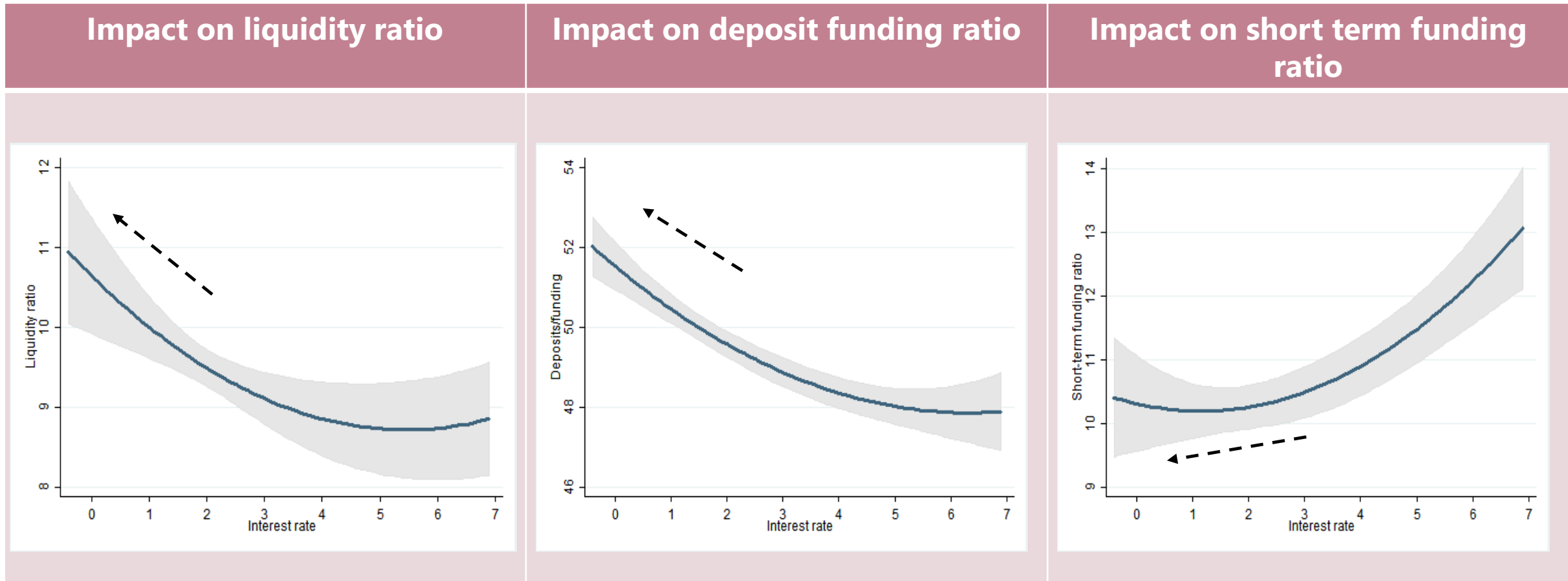
- Liquid asset holdings increase in a low interest rate environment across all banks, which is presumably due to the absorption of central bank liquidity. On the funding side, banks tend to increase the share of deposits and reduce that of short-term and money market funding.

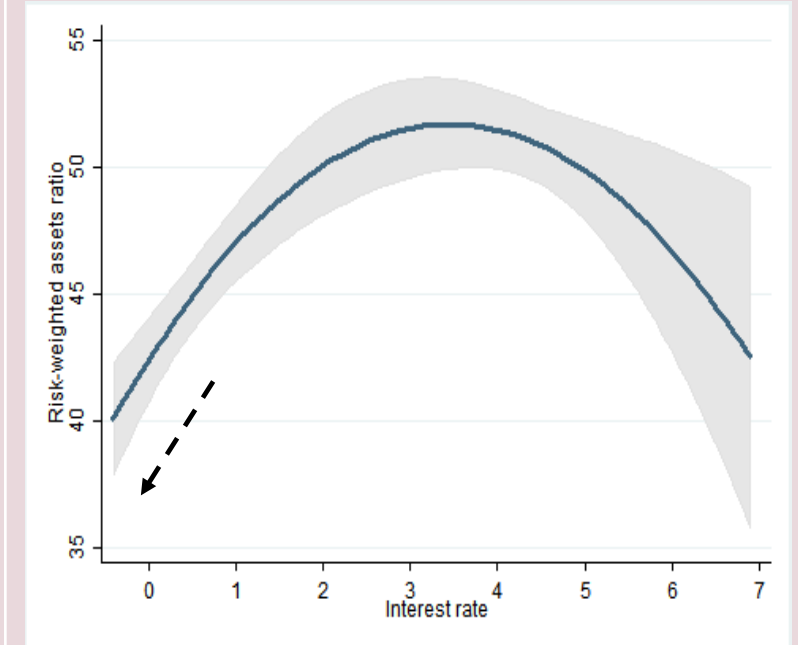# Results (3): Impact on bank risks
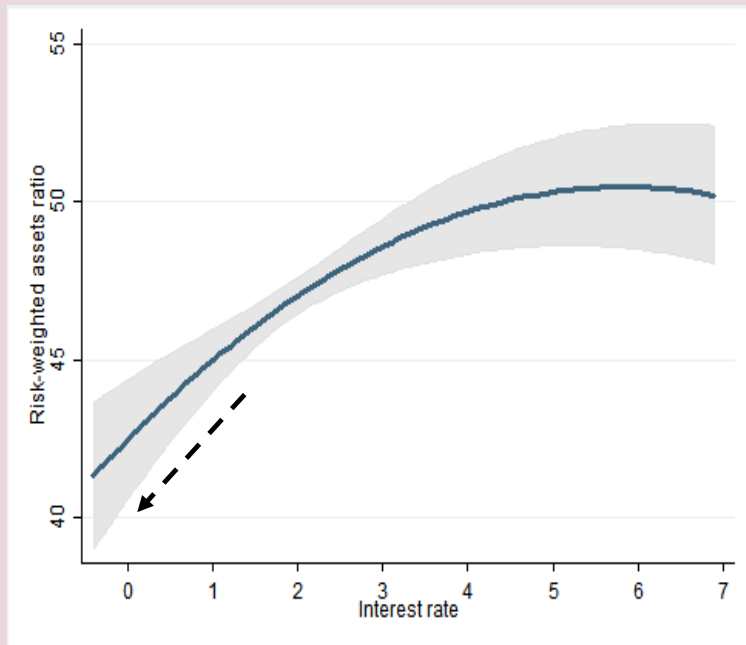
| Impact on risk density function	Impact on provision ratio	Impact on risk density function Low capitalised banks

- We observe a drop in the risk density function (risk-weighted assets divided by total exposure). Loan loss provisions also decline, possibly a sign of evergreening. These two results are stronger for capital-constrained banks, which have more incentives to restore prudential capital ratios by adjusting their portfolio towards assets with lower risk weights.

Low price-to-book ratio creates incentive to pay out equity
## (Gambacorta L, T Oliviero and H S Shin, forthcoming)

Lower bank profitability since the GFC

Return on assets:[1] ▰ 10th–90th percentiles — Average — Euro area
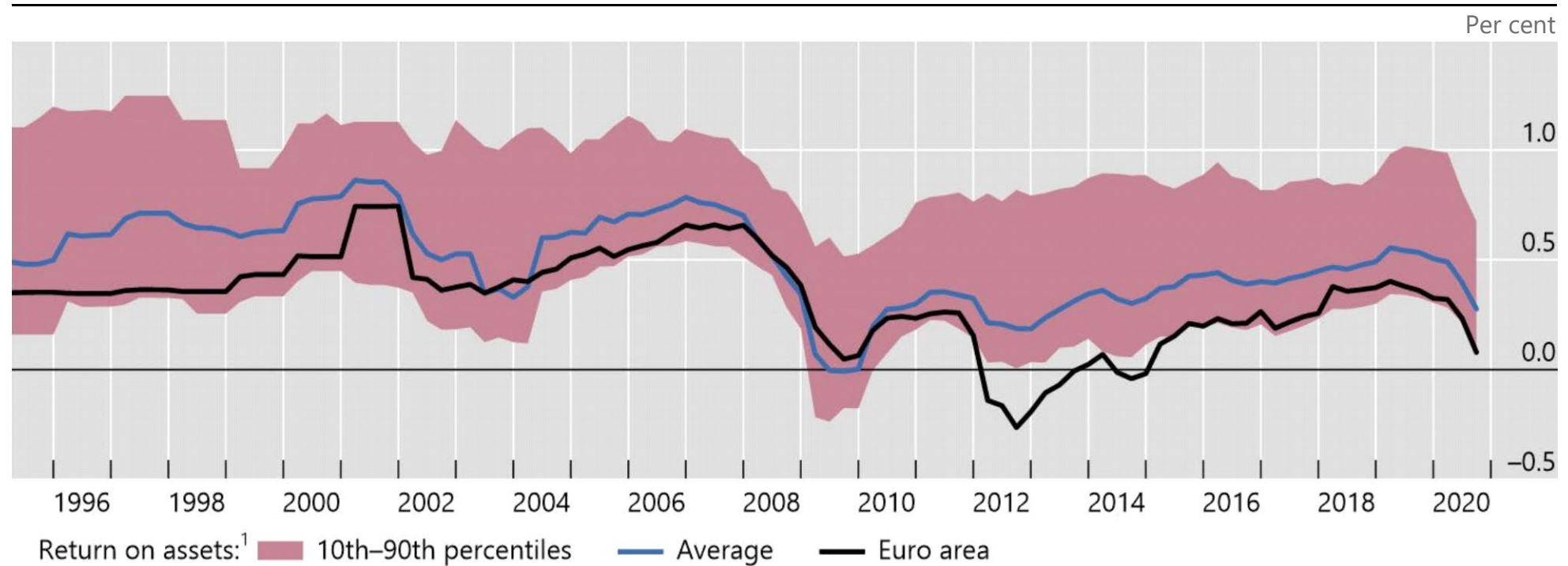
[1] Asset-weighted average of AU, CA, DK, EA, GB, JP, NO, SE and US.

Sources: Datastream; Datastream Worldscope; authors' calculations.

Low price-to-book ratio for banks

Bank price-to-book ratios:[1] ▬ 10th–90th percentiles ▬ Average ▬ Euro area
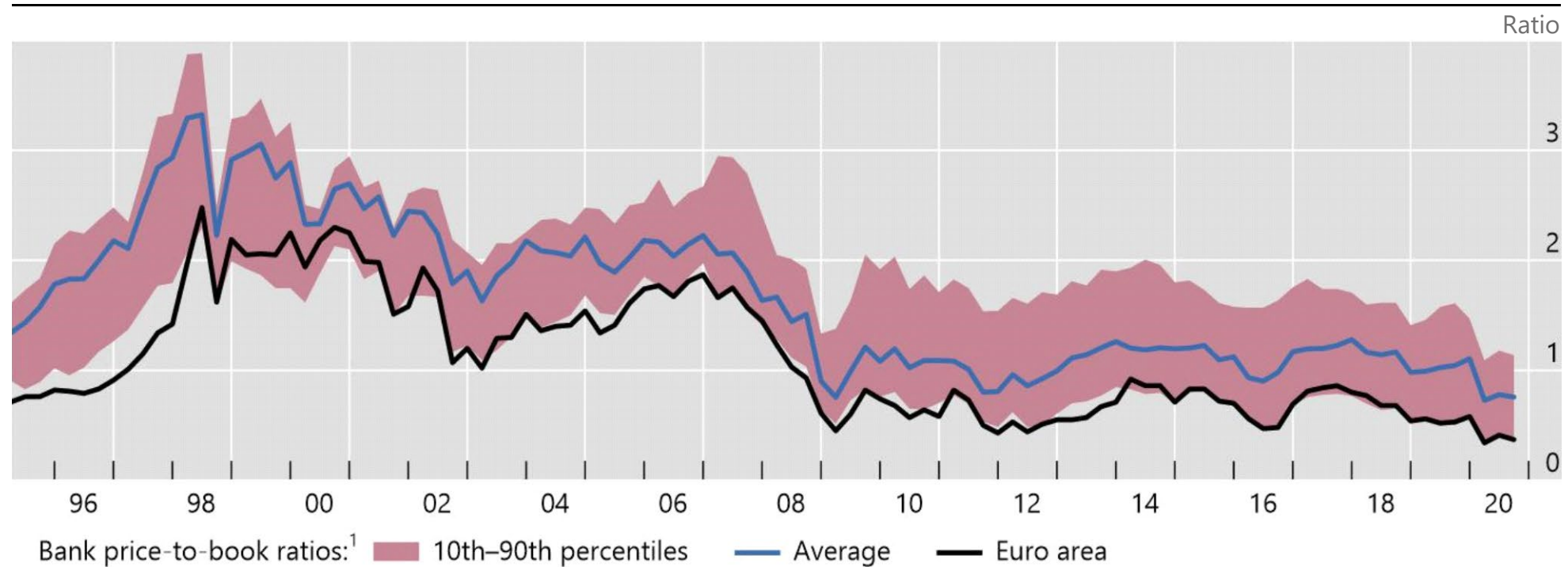
[1] Asset-weighted average of AU, CA, CH, EA, GB, JP, SE and US.

Sources: Datastream; Datastream Worldscope; authors' calculations.

Low price-to-book ratio increases incentive to pay dividends

- Intuition from Tobin's Q theory of investment

  - When book value of equity exceeds market value of equity, the owner of the firm has incentive to liquidate the firm
  - Dividends provide a way to convert book equity into short-term market returns

- Time-varying determinants of the likelihood of paying dividends considered by Fama and French (2000):

  1) Bank profitability: the return on equity (ROE);
  2) Investment opportunities: the growth rate of total assets;
  3) Size: the log of market capitalisation;
  4) Tobin's Q : the price-to-book ratio.

BIS

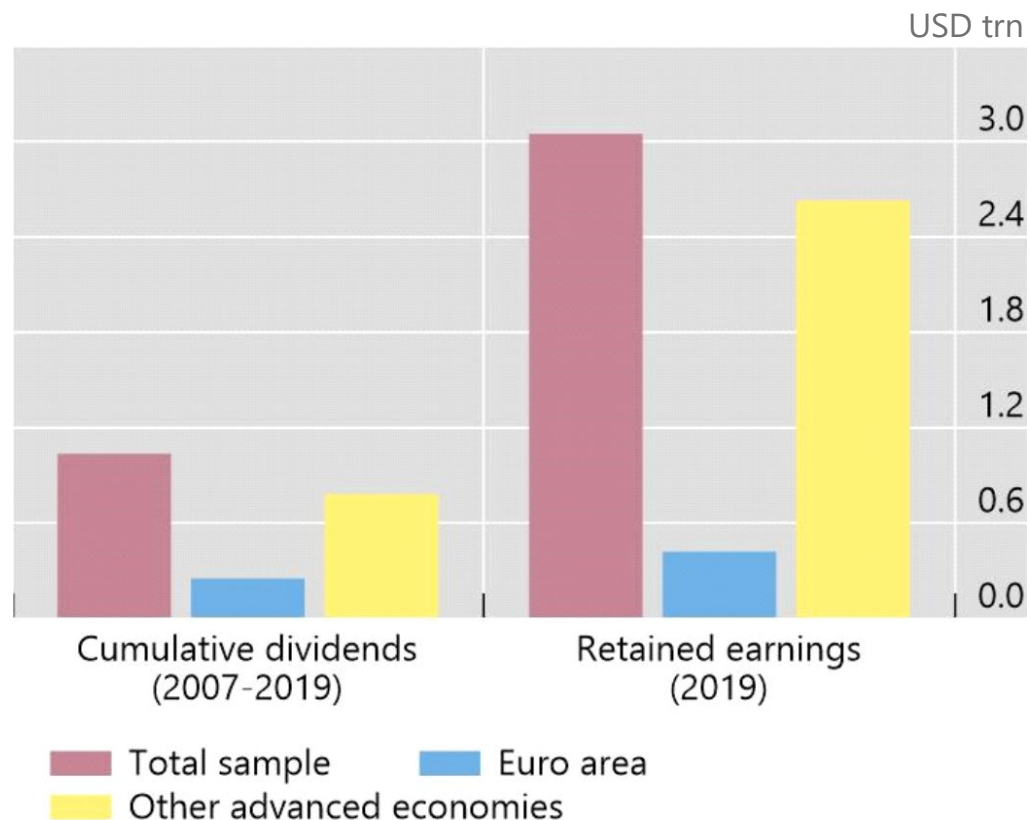# Effect on the probability of distributing dividends
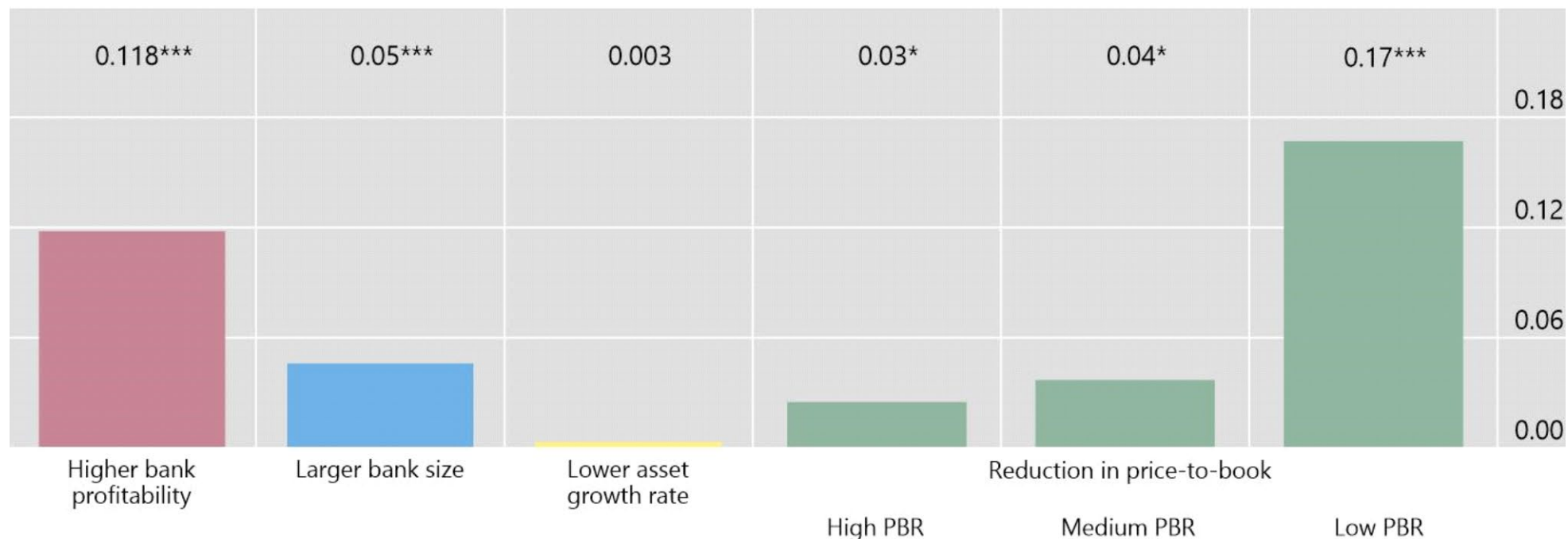
The bars visualise the average estimated change in the probability of distributing dividends from a one standard deviation shock in the respective variables. ***/**/* denotes results significant at the 1/5/10% level.
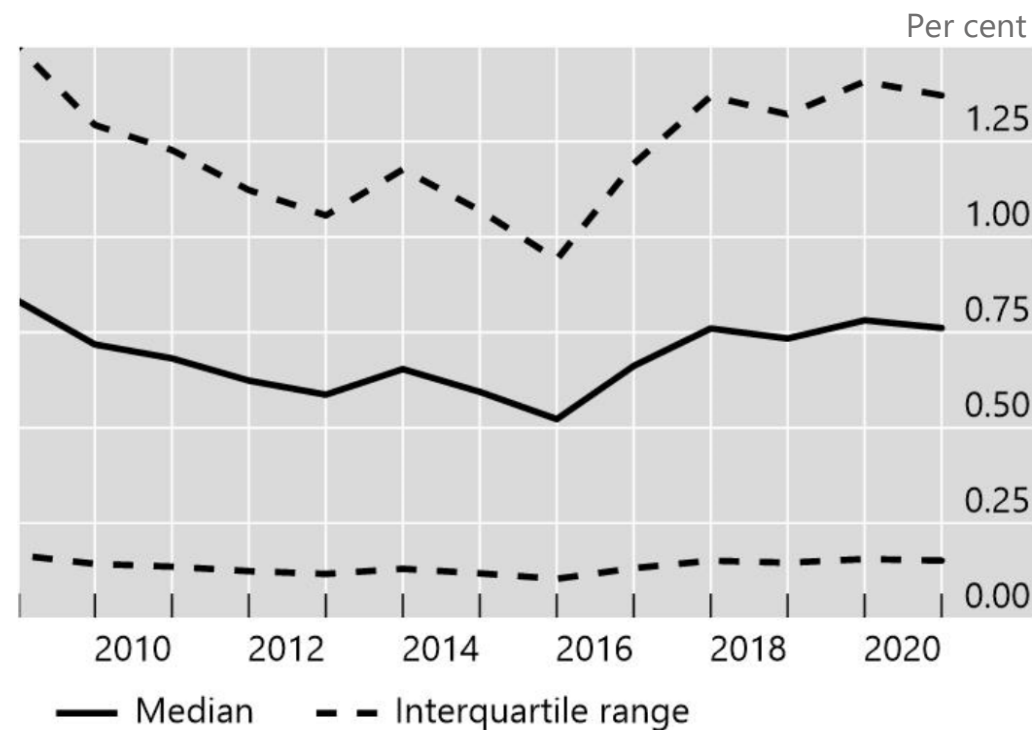
Source: Authors' calculations.

Effects on lending capacity in the case of no dividend distribution

Cumulative dividends since 2007 have eroded equity[1]

USD trn

Effects on the growth rate of lending[2]

Per cent

Total sample — Euro area — Other advanced economies

Median — — Interquartile range

[1] The sample includes 271 banks headquartered in 30 advanced economies. Data on dividends for 2019 are not included in the cumulate for banks not still reporting such figure. Retained earnings for 2019 are imputed as in 2018 for those banks still not reporting such figure. [2] The figure reports the effects on the growth rate of lending of an increase in capital due to no dividend distribution. The calculation is based on the coefficients of 26 models reported in FRAME. The median effect is indicated by the continuous line. The dotted lines indicate the interquartile range of the effects obtained dropping the first and the last quartile of the studies.

Sources: S&P Capital IQ; FRAME. Gambacorta, Oliviero and Shin (2020).

Main takeaways

- Low interest rates induce banks to rebalance their activities from interest-generating to fee-generating and trading activities

- On the funding side, banks rely more on deposits and less on short-term market funding

- There is also some evidence of a decline in the risk-weighted asset ratio and a reduction in loan-loss provisions. This rebalancing is stronger for low capitalised banks

- The low interest rate environment and economic downturn put pressure on bank's price-to-book ratio and increase the propensity of banks to distribute dividends. This could have effects on future banks' lending capacity