Bank's interest rate pass-through: Frictions and Heterogeneity

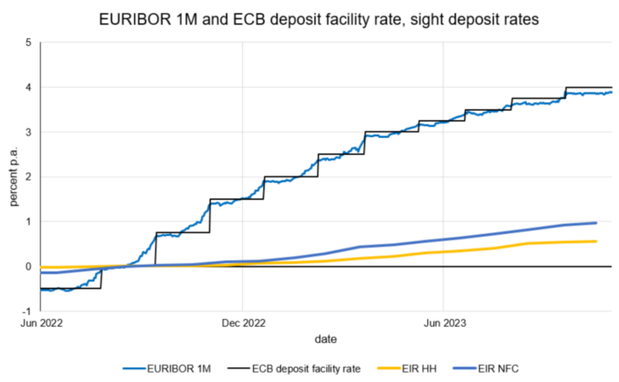
Victoria Böhnke (Deutsche Bundesbank), Lotta Heckmann-Draisbach (Deutsche Bundesbank) and Helge Littke (Deutsche Bundesbank)

DEUTSCHE BUNDESBANK EUROSYSTEM

Motivation and Research Question

Understanding interest rate pass-through is crucial for targeted, effective monetary policy

- After a long period of low interest rates, starting mid-2022, the ECB increased monetary policy rates in 10 subsequent steps
- However, banks' loan and (sight) deposit rates to households (HH) and non-financial corporations (NFC) adjusted at a much slower pace
- This phenomenon is accompanied by substantial heterogeneity across banks in their transmission of interest rates



Development of interest rates from July 2022 to October 2023.

Research questions:

- How do banks' interest rates respond to changes in the macroeconomic and/or interest rate environment?
- How do banks intend to a priori set their rates in a shock scenario?
- How do banks transmit interest rate changes to their deposit and loan rates and what drives this transmission?

Our contribution:

- Exploring the heterogeneity across portfolios and individual banks
- Investigating hypothetical and actual pass-through rates
- Taking advantage of unique and very granular bank-specific data taken from the German LSI stress test and the information on market rates from the MFI interest rate statistics

Research Design

Methodology

1) Changes in the interest rate environment and pass-through in interbank market

How do market rates respond to changes in monetary policy rates?

We identify the points in time when significant changes in the monetary policy rates became effective. We then analyse interbank market rates (EURIBOR with maturity of 1 week to 12 months) and quantify the "delay" until the monetary policy rate increases have manifested in the respective rate.

2) Pass-through of changes by banks

How do banks transmit changes in the interest rate environment to their loan and deposit rates?

We first consider the hypothetical pass-through, namely how banks planned to pass-through interest rate hikes to customers, when they were asked before the interest rate environment did change. This is done for several portfolios. Then we analyse the actual pass-through in the past (i.e. between 2003 and 2023).

To investigate differences in pass-through across individual banks (and portfolios) through a cross-sectional analysis, we run the following panel regression:

$$EIR_{i,j,t} = \alpha RR_{j,t} + \beta X_i + \gamma Y_t + \epsilon \quad (1)$$

For bank i and portfolio j at time t, we denote the effective interest rate with $EIR_{i,h,t}$. We furthermore use the reference rate $RR_{j,t}$ which is the corresponding EURIBOR rate. X_i denotes bank-specific control variables (logarithmic total assets, deposit strength, liquidity, credit relationship, volume change of the specific portfolio). Y_t are macroeconomic variables (GDP or unemployment rate).

Data

Data from MFI interest rate statistics and the German LSI stress tests

- LSI stress tests:
  - Compulsory for German small- and medium-sized banks
  - Conducted in 2015, 2017, 2019, and 2022
  - This analysis particularly focuses on hypothetical pass-through by banks across 1 year under a +200bp shock:
    - 2015 wave: for saving deposits, term deposits, loans and loans for residential real estate
    - 2017 wave: for loans to central banks, interbank loans, loans to non-banks, deposits from banks and central banks, sight deposits from non-banks and other deposits from non-banks
- MFI interest rate statistics:
  - The MFI interest rate statistics are collected in Europe on a monthly basis since 2003
  - For Germany, data is collected from a representative sample composed of around 230 German banks

Descriptive Statistics

Descriptive Statistics

Variable	N	Mean	St. Dev.	Pctl(25)	Median	Pctl(75)
EIR_{HH}	44,875	0.471	0.689	0.003	0.138	0.737
EIR_{NFC}	44,861	0.526	0.802	0.000	0.121	0.881
RR	48,337	0.728	1.393	−0.360	0.090	2.020
ΔVol_{HH}	46,346	0.206	10.817	−0.008	0.005	0.018
ΔVol_{NFC}	45,774	0.561	49.677	−0.036	0.005	0.050
$\log(TA)$	40,646	22.874	1.303	22.019	22.528	23.346
cr_rel	40,533	0.773	0.232	0.778	0.851	0.896
dep_str	40,640	0.704	0.251	0.610	0.795	0.881
liq	28,762	0.045	0.044	0.014	0.032	0.061
gdp	48,337	735.605	124.311	630.693	721.167	839.581
$unemp$	48,337	7.170	1.908	5.700	6.800	8.000

EIR = Effective Interest Rate, RR = Reference Rate, ΔVol = change in volume for households (HH) and non-financial corporations (NFC), TA = Total Assets, cr_rel = credit relationship, dep_str = deposit strength, liq = liquidity, gdp = GDP, unemp = unemployment rate

Results

Dynamics of Interest Rate Changes

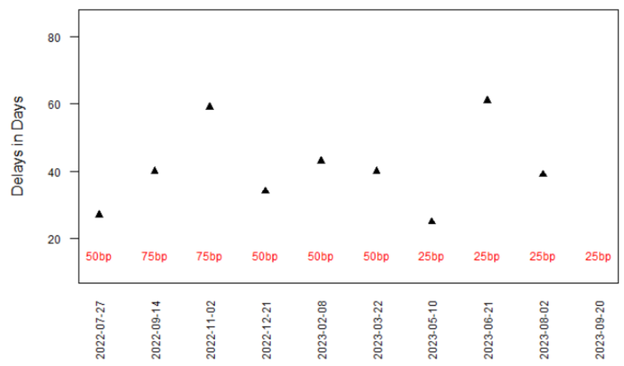
We observe the following qualitative facts:

- Delay varies across dates and maturities
- 26th June 2022: First day when the term structure is no longer monotonously increasing
- 24th November 2022: First day when the term structure is inverted

ECB interest rate changes during 2022 and 2023

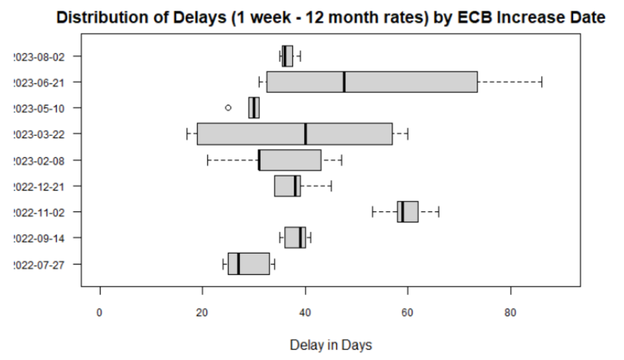
Date (press release)	Date (with effect from)	Shift
21/07/2022	27/07/2022	+ 50 bp
08/09/2022	14/09/2022	+ 75 bp
27/10/2022	02/11/2022	+ 75 bp
15/12/2023	21/12/2022	+ 50 bp
02/02/2023	08/02/2023	+ 50 bp
16/03/2023	22/03/2023	+ 50 bp
04/05/2023	10/05/2023	+ 25 bp
15/06/2023	21/06/2023	+ 25 bp
27/07/2023	02/08/2023	+ 25 bp
14/09/2023	20/09/2023	+ 25 bp

Transmission delays for the 3-month EURIBOR



Time span between the effective change in monetary policy rates and the point in time when the 3M EURIBOR changed by the same amount.

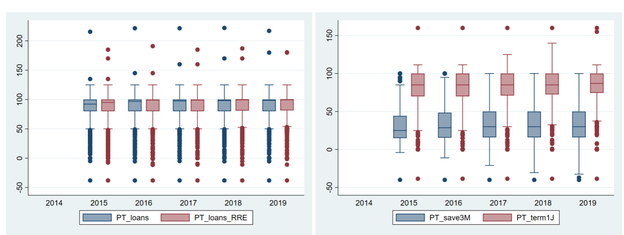
Distribution of Delays (1 week - 12 month rates)



Distributions of the time span between effective change in monetary policy rates and the point in time when the market rate changed by the same amount by ECB Increase Date. The distribution is shown for maturities between 1 week and 12 months.

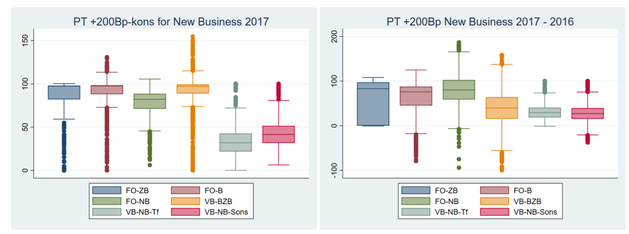
Hypothetical pass-through

Pass-through for assets and liabilities: LSI stress test 2015



Included portfolios: loans and loans for residential real estate (left-hand side), and saving deposits (notice period of 3 months) and term deposits (notice period > 1 year) (right-hand side)

Pass-through for assets and liabilities: LSI stress test 2017



Included portfolios: loans to central banks (FO ZB), interbank loans (FO B), loans to non-banks (FO NB), deposits from banks and central banks (VB BZB), sight deposits from non-banks (VB Nb Tf) and other deposits from non-banks (VB NB sons)

Heterogeneity across banks in actual pass-through

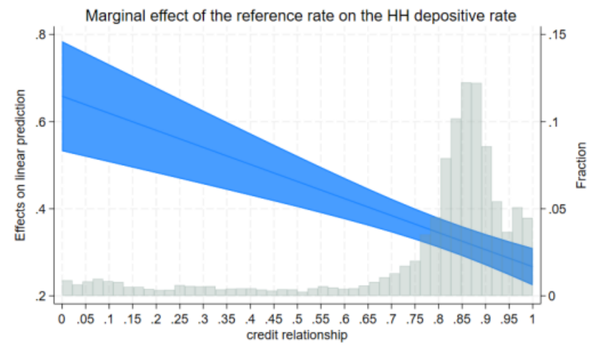
Regression results for sight deposits

	(1) EIR^{HH}_{SD}	(2) EIR^{NFC}_{SD}
RR	0.338***	0.438***
	(0.0184)	(0.0176)
ΔVOL^{HH}_{SD}_w	0.0103	
	(0.0320)	
ΔVOL^{NFC}_{SD}_w		0.0327**
		(0.0128)
$\log(TA)$	-0.103	-0.130*
	(0.0720)	(0.0731)
cr_rel	-0.538	-0.560
	(0.386)	(0.347)
dep_str	-0.274	-0.779***
	(0.243)	(0.283)
liq	-0.524	-0.651
	(0.669)	(0.508)
idp_g_yoy	-0.924***	-0.898***
	(0.0827)	(0.0831)
$unemp\_d\_yoy$	-0.0299***	-0.0578***
	(0.0115)	(0.00964)
$\_cons$	3.228**	4.229***
	(1.568)	(1.604)
N	27,819	28,195
R^2	0.685	0.806
$r2\_a$	0.685	0.806

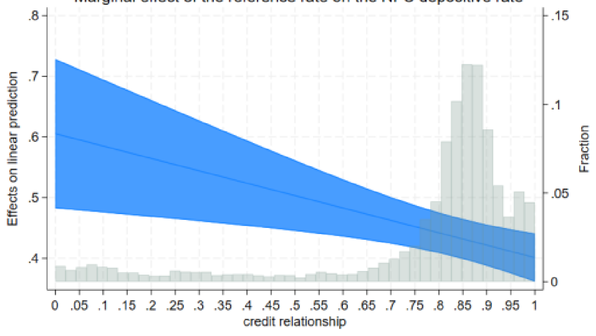
Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Regression results from equation (1); robust to month and year-fixed effects. EIR = Effective Interest Rate, RR = Reference Rate, ΔVol = growth rate of volume of deposits for households (HH) and non-financial corporations (NFC), TA = Total Assets, idp_g_yoy = industrial production year-on-year growth, alq_d_yoy = unemployment rate year-on-year difference

Marginal effect of an increase in the reference rate on private households' deposit rates conditional to the degree of relationship lending



Marginal effect of an increase in the reference rate on non-financial corporations' deposit rates conditional to the degree of relationship lending



Conclusion

- The delays in the pass-through to interbank rates vary across maturity and points in time, appearing to be influenced by the term structure
- In the hypothetical pass-through, the pass-through for saving deposits is much lower and differences across banks are larger than for loans
- Investigating the effective interest rate of sight deposits in the actual pass-through, we find the reference rate to be a highly significant explanatory variable for both NFCs and households
- The estimated beta for NFCs is with 0.44 slightly higher than for households with 0.34
- Based on our interaction models, we observe for both household and NFC deposits that a higher degree of credit relationship decreases the impact of the reference rate. This marginal effect appears to be slightly stronger for households than for NFCs