

SUOMEN PANKKI
EUROJÄRJESTELMÄ



FINLANDS BANK
EUROSYSTEMET

Effect of the countercyclical capital buffer on firm loans - Evidence from Germany

Eesti Pank
March 26, 2026

SUOMEN PANKKI

Eeva Kerola (BoF), Anni Norring (IMF)
Bank of Finland

ANDS BANK

Disclaimer: The views expressed in this presentation are those of the authors and do not necessarily reflect those of the Bank of Finland or the International Monetary Fund.



Motivation

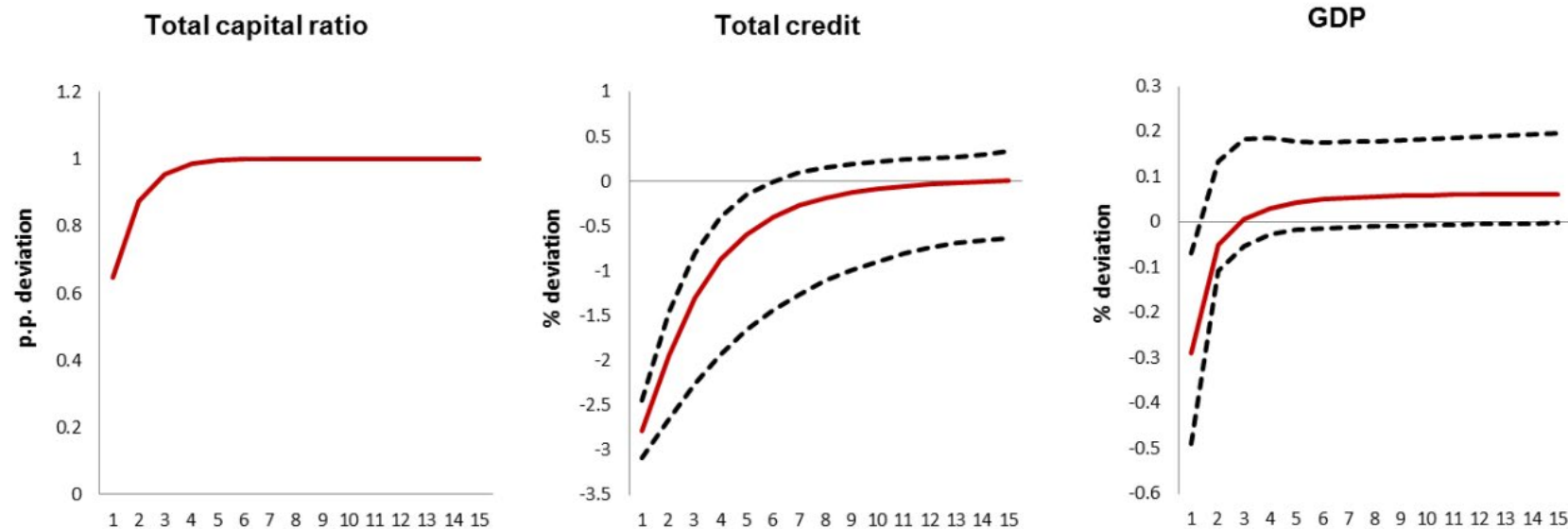
Eeva Kerola (BoF), Anni Norring (IMF)
Bank of Finland



Capital measures are found to be effective in curbing credit growth

Transitional macro impact of capital measures

Transitory effects of 1 p.p. increase in level of capital requirements



Notes: The implementation of higher capital requirements is announced and occurs over 4 quarters (1 year), according to the path represented in the left-hand panel. Red line: euro area average. Dotted black lines: range of responses across the 12 euro area countries covered in the exercise.

Source: ECB staff calculations using the 3D DSGE model by [Clerc et al. \(2015\)](#).

- Short run: lower GDP and total credit

www.eui.eu

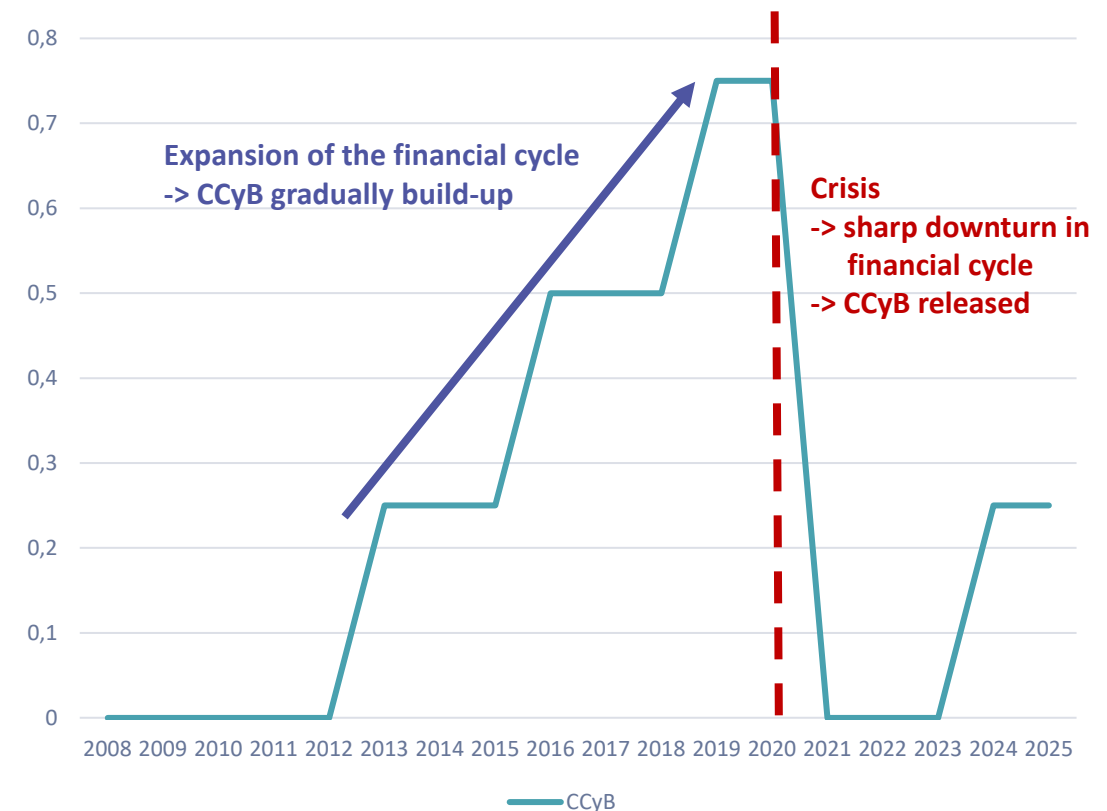
But existing literature still has gaps to fill

1. Tool-specific evidence at granular level is scarce – existing studies often pool many macroprudential instruments
2. Distributional consequences of macroprudential tightening – who bears the burden – poorly understood
3. Announcement effects are largely overlooked – most empirical work focus on implementation and ignore anticipatory adjustments

This paper focuses on a single macropru measure: CCyB

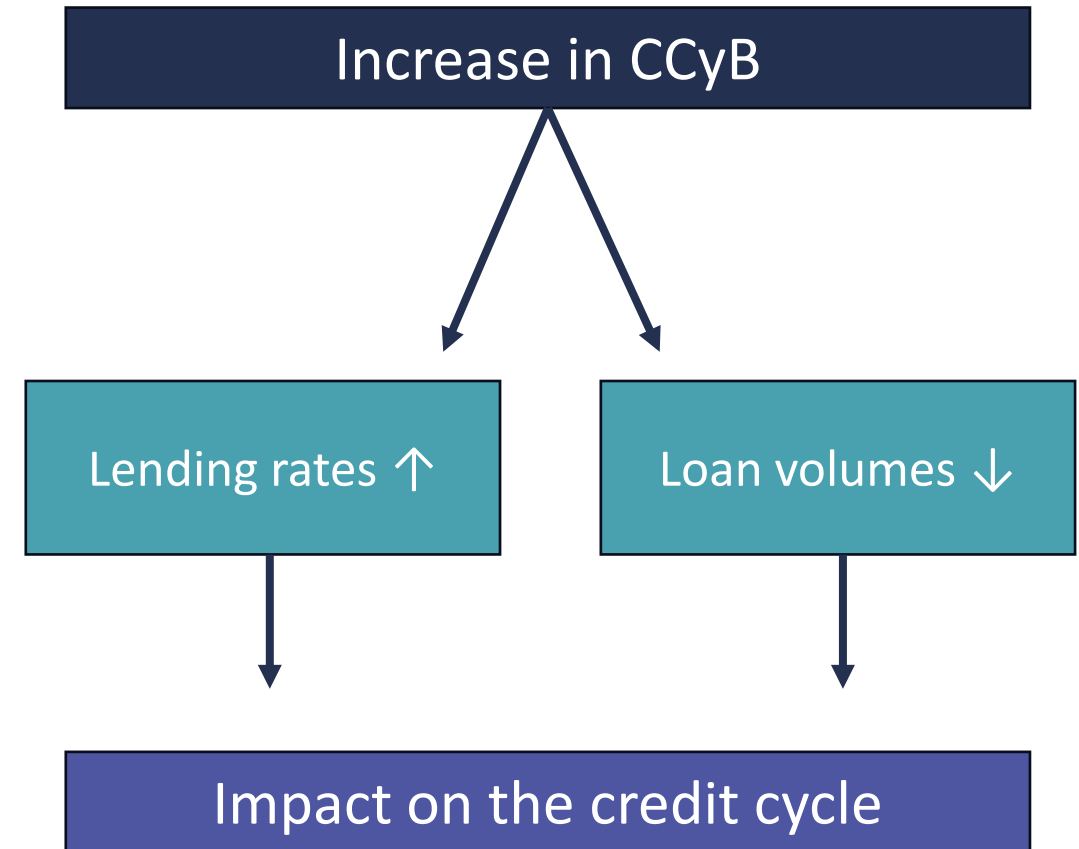
Countercyclical capital buffer

- Designed to counter procyclicality in the financial system
- CCyB is harmonized through Basel III → comparable across countries and years, enabling clean identification
- Growing policy relevance: positive neutral CCyB gaining traction → more countries adopting early CCyB build-up



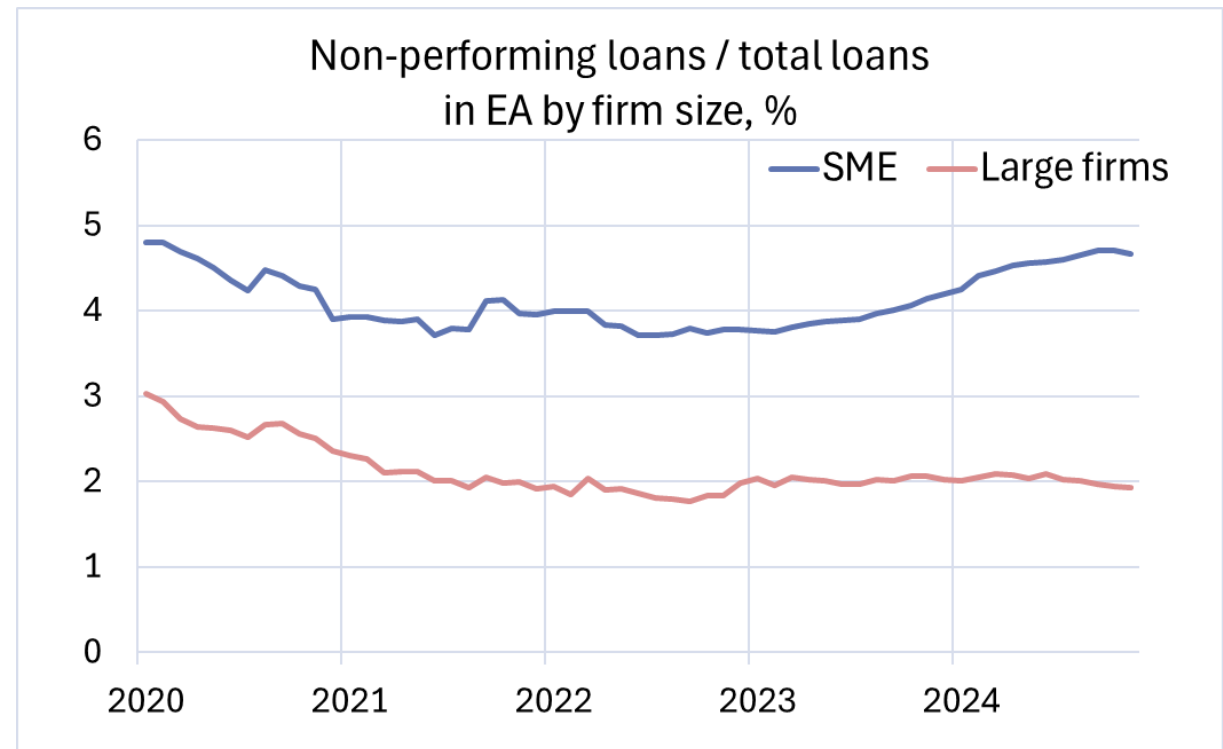
How does CCyB affect the loan market?

- If raising capital is not an option, banks have different options to address a shortfall in capital requirements
- Focusing on the loan market, banks can:
 - Reprice loans by increase lending spreads or
 - Reduce assets, especially with high RWA (risk-weighted assets)



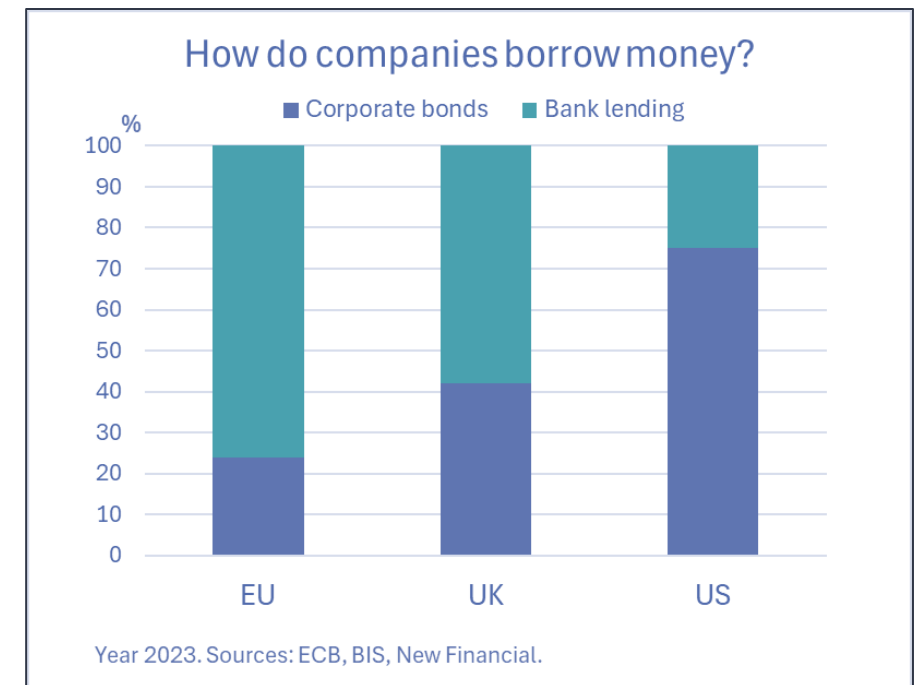
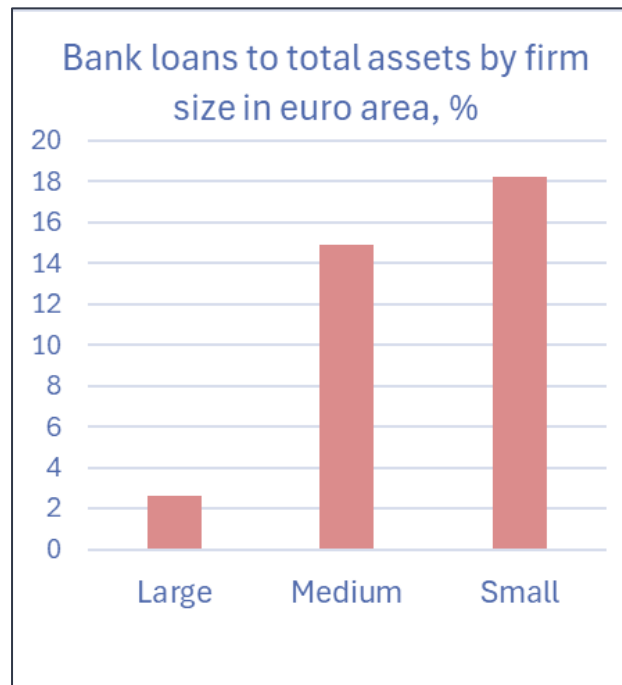
The role of firm size

- SMEs often end up with higher risk weights (RW)
 - Standardised Approach: RW depend mainly on external credit ratings
 - SMEs look riskier because they are usually unrated → 100% RW, compared with rated large corporates (20-75%)
 - Internal Ratings-Based Approach: RW depend on banks' own estimates
 - SMEs usually have higher estimated PDs and LGDs, leading automatically to higher RW



The role of firm size

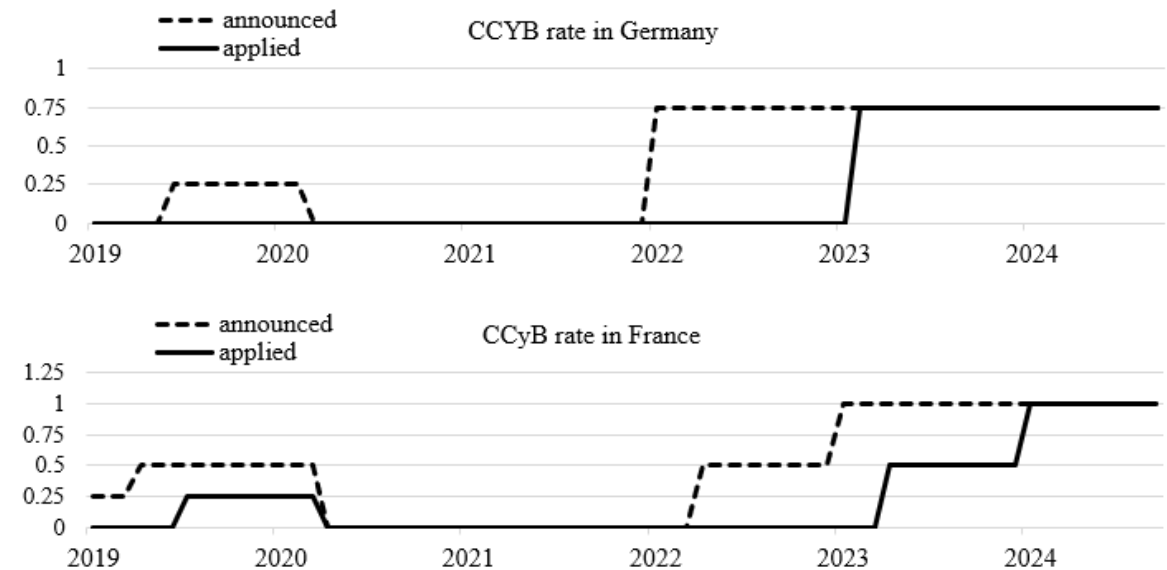
- Access to finance is important for firms and their growth, especially for small firms (Beck & Demirguc-Kunt, 2006)
- SMEs in euro area especially dependent on bank financing (Al-Eyed et al., 2015)



Timing of the effect

- Macroprudential tools are announced early so banks can adjust behaviour before requirements take effect
 - CCyB tightening announced typically 12 months before application
 - Anticipation → adjustment start as soon as banks know about upcoming requirements
 - Most existing studies only capture application effects or even treat application as a macroprudential shock

Announced and applied rates can differ for extensive periods:





Research questions and hypotheses

Eeva Kerola (BoF), Anni Norring (IMF)
Bank of Finland



What we want to know

1. How do changes in countercyclical capital buffers (CCyB) influence bank lending?
2. Do effects differ by firm size?
3. Do effects occur already after the announcement?

Our hypotheses

1. How do changes in countercyclical capital buffers (CCyB) influence bank lending?
 - Increase in CCyB reduces bank lending and lending rates rise
2. Do effects differ by firm size?
 - The effects are stronger for SMEs than for large companies
3. Do effects occur already after the announcement?
 - Banks adjust their behaviour already after the announcement

Contribution to the literature

1. How do changes in countercyclical capital buffers (CCyB) influence bank lending?
 - Existing literature: often relies on less granular data, pools multiple instruments or focuses on differences across banks within a single country (Jiménez et al., 2017; Gropp et al., 2019; De Jonghe et al., 2020; Degryse et al., 2021; Illueca et al., 2022; Gropp et al., 2024; Drehmann & Gambacorta, 2012; Benes & Kumhof, 2015; Dursun-de-Neef et al., 2023; Bedayo & Galán, 2024; Marek & Stein, 2022; Auer et al., 2022; Basten, 2020)
 - *Our contribution*: use granular ECB data to identify the effect of a single clean CCyB tightening in a major EA country, estimating the average impact for all banks in the treated sector
2. Do effects differ by firm size?
 - Existing literature: Evidence on size-heterogeneous effects is limited and mixed (Ćehajić & Košak, 2022; Ayyagari, 2018; Marek & Stein, 2022; Auer et al., 2022; Shahosseini, 2022; Amado, 2022)
 - *Our contribution*: concentrating on a single decision and using granular datasets we can precisely identify borrower firms' size and unveil the dynamic effects on lending

Contribution to the literature

3. Do effects occur already after the announcement?

- Existing literature: Announcement effects largely overlooked (Meuleman & Vander Vennet, 2020; Forbes, 2021; Čehajić & Košak, 2022; Bergant et al., 2024) with two exceptions (Auer et al., 2020 and Bedayo & Galán, 2024)
- *Our contribution*: clean identification of announcement vs. application effects, allowing to determine if one or the other dominates



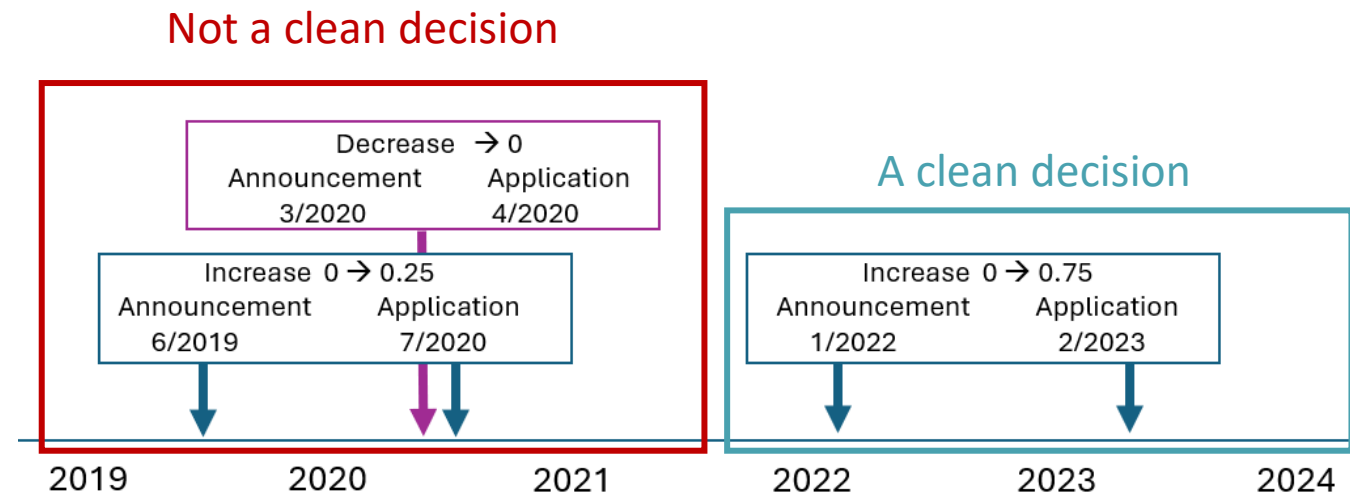
Design and data

Eeva Kerola (BoF), Anni Norring (IMF)
Bank of Finland



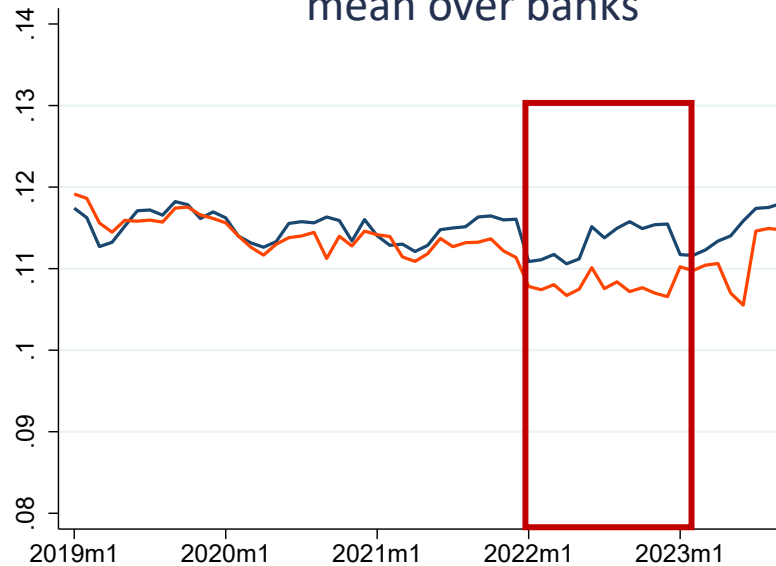
What we do

- Use difference-in-differences approach with two post-treatment periods: *post-announcement and post-application*
- Use a clean CCyB decision to properly identify effects of announcement vs. application: *Germany in 2022-23*
- Find a control country with no positive CCyB and similar pre-treatment parallel trends in banking sector characteristics, policy environment and response variables: *Austria*

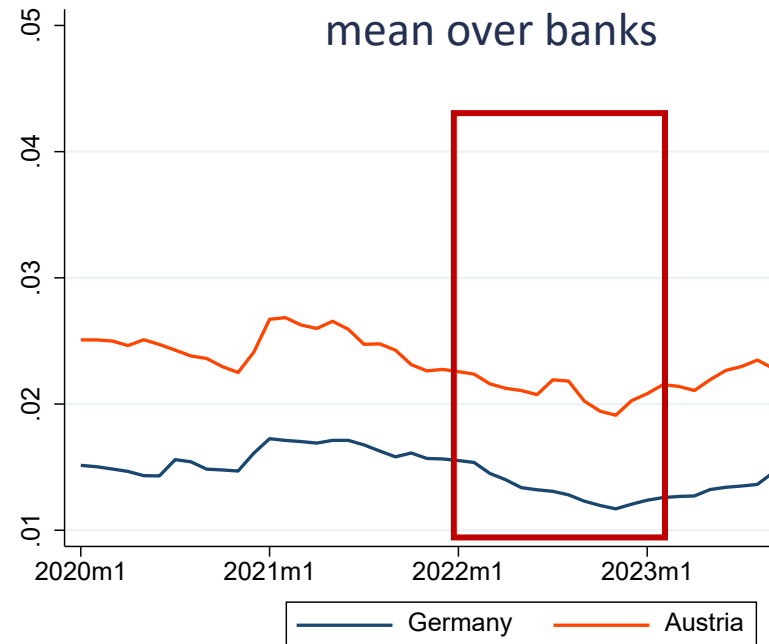


Germany vs. Austria: bank characteristics

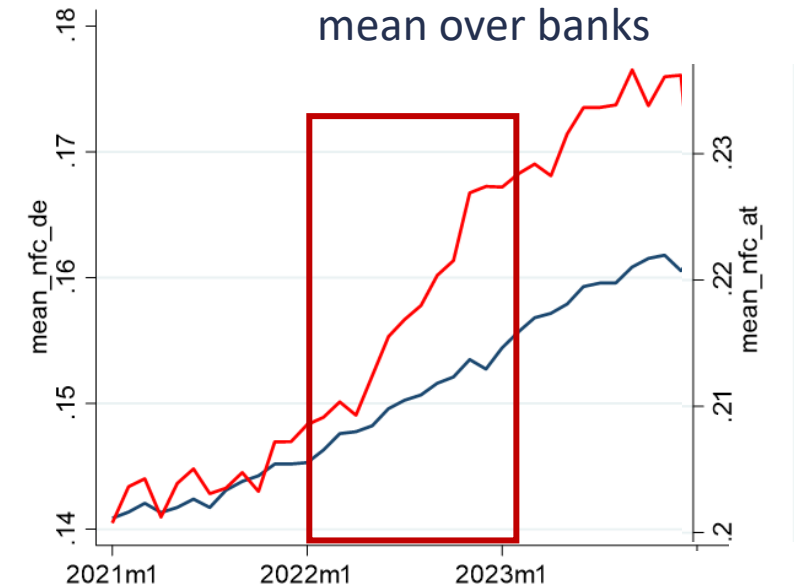
Capital / total assets,
mean over banks



NPLs/ total NFC loan stock,
mean over banks



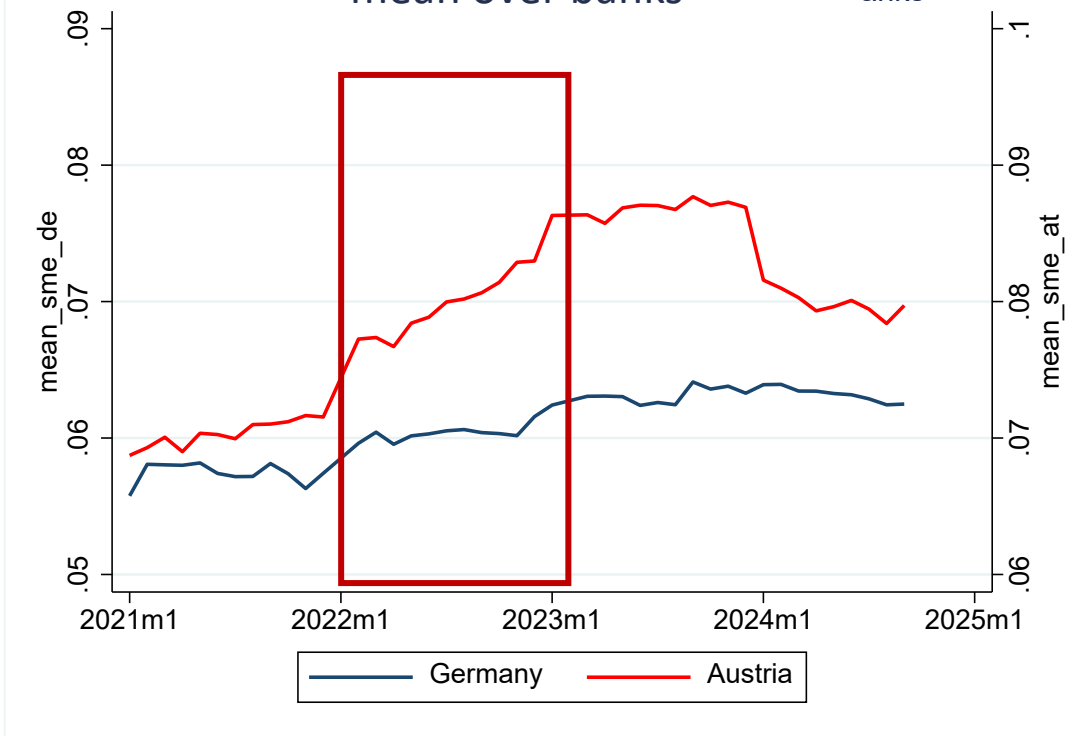
Total NFC lending/ total assets,
mean over banks



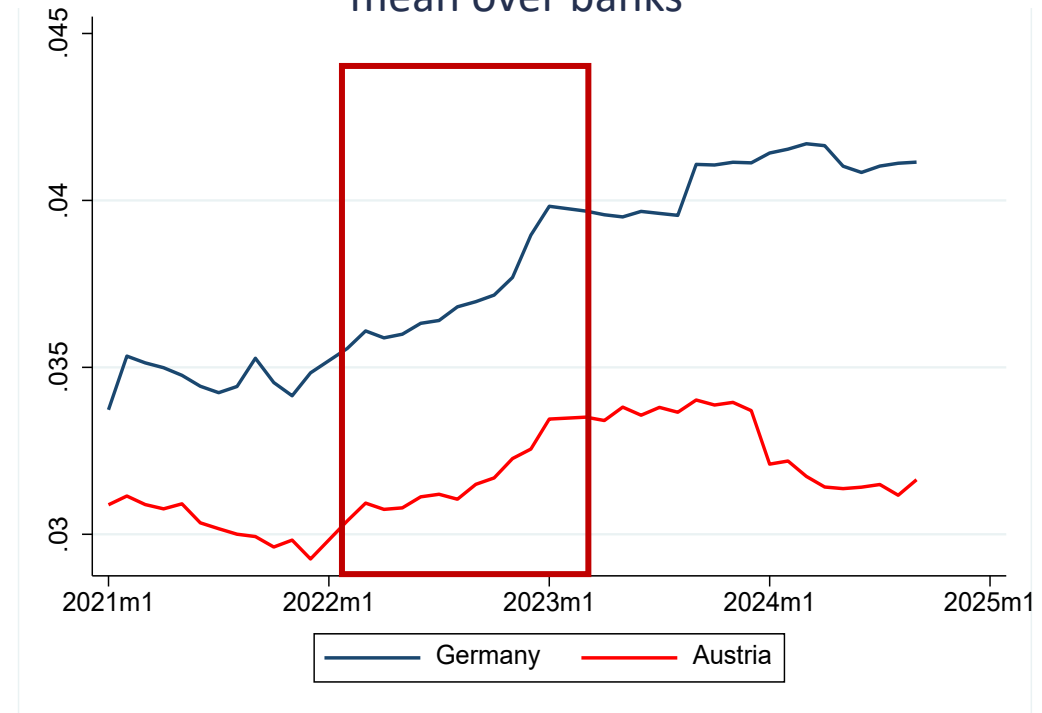
Announcement-to-Application period
Jan 2022 – Feb 2023

Germany vs. Austria: lending to SMEs and large companies

SME lending/ total assets,
mean over banks



Large company lending/ total assets,
mean over banks



Announcement-to-Application period
Jan 2022 – Feb 2023

DATA: January 2021 – December 2023

3 confidential ECB datasets on bank lending

1. iBSI (individual Bank balance sheet information)

→ Bank total assets, capitalization, total NFC loan stock (including companies of all sizes)

2. iMIR (individual Monetary and Financial institutions' Interest rates)

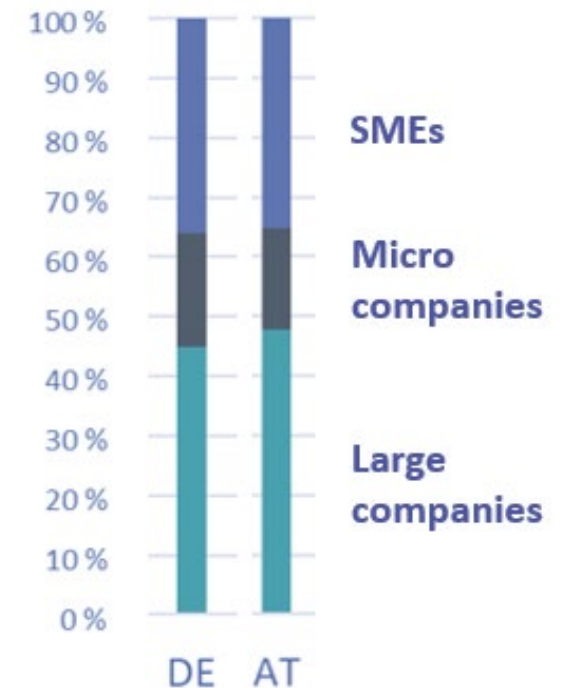
→ Aggregate price of new NFC loans (including companies of all sizes)

3. Anacredit (Analytical Credit dataset)

- Harmonised loan-level data on euro-area lending, all loans above €25 000
- Uniquely identify the bank and the borrower

→ Loan stock and price of new loans, looking at SMEs and large companies separately

Bank loan stock by firm size



A balanced panel of bank-month observations

Germany:
963 banks' lending
to 228 168 SMEs
and 34 360 large
companies

Austria:
456 banks' lending
to 41 157 SMEs
and 6 569 large
companies

Variable	Source	# obs	Mean	Std dev	Min	Max
Total assets (EUR mln)	iBSI	60,763	8810	68100	0	1590000
Bank size (log of total assets)	Authors' calculations based on iBSI	60,671	21	1.61	9.68	28.09
Capitalization (equity/total assets)	iBSI	60,073	0.11	0.08	0.00	1.13
Large company lending (EUR mln)	AnaCredit	38,117	442	2110	0	54300
SME lending (EUR mln)	AnaCredit	39,500	326	1090	0	21900
Large company + SME lending (EUR mln)	AnaCredit	40,308	1040	3980	0	66200
NFC aggregate lending (EUR mln)	iBSI	60,760	1320	10600	0	324000
Large company lending to total assets	Authors' calculations based on AnaCredit and iBSI	38,117	0.04	0.04	0.00	0.48
SME lending to total assets	Authors' calculations based on AnaCredit and iBSI	39,500	0.07	0.04	0.00	0.56
Large company + SME lending to total assets	Authors' calculations based on AnaCredit and iBSI	38,900	0.11	0.07	0.00	0.98
NFC aggregate lending to total assets	Authors' calculations based on iBSI	60,668	0.17	0.12	0.00	0.96
Loan rate for new loans to large companies	AnaCredit	1,032	3.59	2.27	0.01	11.66
Loan rate for new loans to SMEs	AnaCredit	6,477	3.48	1.84	0.01	13.71
Loan rate for new loans to large companies + SMEs	AnaCredit	6,795	3.14	1.75	0.01	13.71
Loan rate for new loans to NFCs in aggregate	iMIR	2,093	2.81	1.70	0.00	11.28

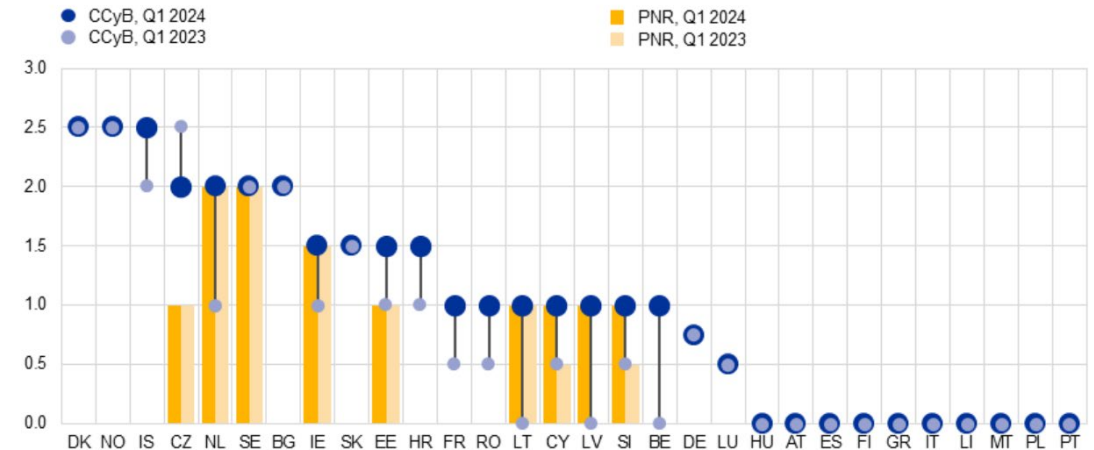
Germany and Austria, data from January 2021 to December 2023

Data on the treatment: CCyB

- ESRB database of macroprudential decisions
- What the data tells us:
 - Whether a decision related to CCyB was an implementation, tightening or easing
 - Level of the CCyB rate
 - When a decision was announced and when it was applied – and whether it eventually came into force

CCyB rates in EEA countries

(percentages)



Source: ESRB.

Notes: The chart shows the CCyB rates in effect at the end of the first quarter of 2023 and of the first quarter of 2024. CCyB stands for countercyclical capital buffer and PNR for positive neutral rate.



Estimations

Eeva Kerola (BoF), Anni Norring (IMF)
Bank of Finland



Estimated equation

$$Y_{i,t} = \beta_0 + \beta_{1A}(\text{post ann}_t * DE_i) + \beta_{1B}(\text{post app}_t * DE_i) + \beta_2 DE_i + \beta_{3A} \text{post ann}_t + \beta_{3B} \text{post app}_t + X_{i,t-1} + \delta_i + \theta_{c,t} + u_{i,t}$$

- Where $Y_{i,t}$ = in turn log(loan stock), loans to total assets, price of new loans
- Two post-treatment periods: post-announcement (=1 for 2/22 – 1/23) and post-application (=1 for 3/23 – 12/23)
- Lagged bank-specific controls: size and capitalization
- Bank FE, country-month FE. SEs clustered at the bank level

Estimated equation

Post-announcement and post-application effects

$$Y_{i,t} = \beta_0 + \beta_{1A}(post\ ann_t * DE_i) + \beta_{1B}(post\ app_t * DE_i) + \beta_2 DE_i + \beta_{3A} post\ ann_t + \beta_{3B} post\ app_t + X_{i,t-1} + \delta_i + \theta_{c,t} + u_{i,t}$$

- Where $Y_{i,t}$ = in turn log(loan stock), loans to total assets, price of new loans
- Two post-treatment periods: post-announcement (=1 for 2/22 – 1/23) and post-application (=1 for 3/23 – 12/23)
- Lagged bank-specific controls: size and capitalization
- Bank FE, country-month FE. SEs clustered at the bank level

Impact on the volume of outstanding loans

	(1)	(2)	(3)	(4)
Dependent variable: ln(loan stock)	Total NFC lending	SME lending	Large company lending	SME + large company lending
Post-announcement effect	-0.069*** (0.018)	-0.166*** (0.032)	0.030 (0.046)	-0.123*** (0.023)
Post-application effect	-0.119*** (0.027)	-0.141*** (0.036)	0.094* (0.053)	-0.080** (0.040)
Observations	53,247	36,162	34,876	35,578
R-squared	0.228	0.138	0.118	0.146
Number of banks	1,642	1,140	1,112	1,123
Bank controls	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES
Country_time FE	YES	YES	YES	YES

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Impact on the volume of outstanding loans

- Banks facing CCyB tightening decrease the amount of lending compared to non-treated banks

	(1)	(2)	(3)	(4)
Dependent variable: ln(loan stock)	Total NFC lending	SME lending	Large company lending	SME + large company lending
Post-announcement effect	-0.069*** (0.018)	-0.166*** (0.032)	0.030 (0.046)	-0.123*** (0.023)
Post-application effect	-0.119*** (0.027)	-0.141*** (0.036)	0.094* (0.053)	-0.080** (0.040)
Observations	53,247	36,162	34,876	35,578
R-squared	0.228	0.138	0.118	0.146
Number of banks	1,642	1,140	1,112	1,123
Bank controls	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES
Country_time FE	YES	YES	YES	YES

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Impact on the volume of outstanding loans

- Banks facing CCyB tightening decrease the amount of lending compared to non-treated banks
- The effect is driven by loans to SMEs

	(1)	(2)	(3)	(4)
Dependent variable: ln(loan stock)	Total NFC lending	SME lending	Large company lending	SME + large company lending
Post-announcement effect	-0.069*** (0.018)	-0.166*** (0.032)	0.030 (0.046)	-0.123*** (0.023)
Post-application effect	-0.119*** (0.027)	-0.141*** (0.036)	0.094* (0.053)	-0.080** (0.040)
Observations	53,247	36,162	34,876	35,578
R-squared	0.228	0.138	0.118	0.146
Number of banks	1,642	1,140	1,112	1,123
Bank controls	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES
Country_time FE	YES	YES	YES	YES

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Impact on the volume of outstanding loans

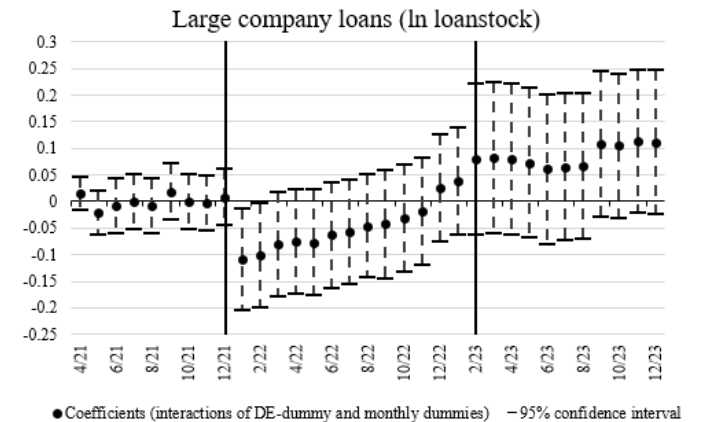
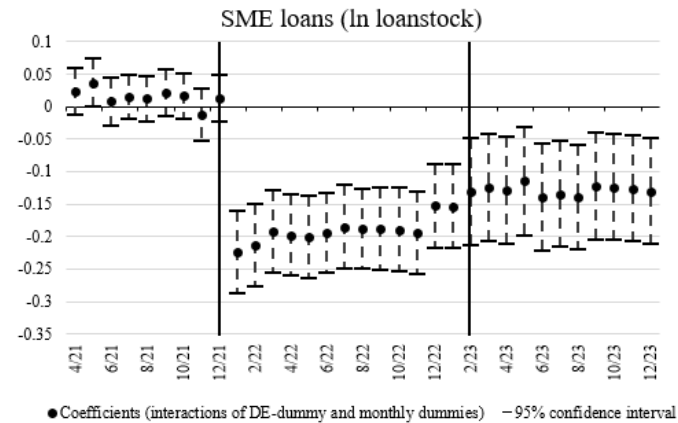
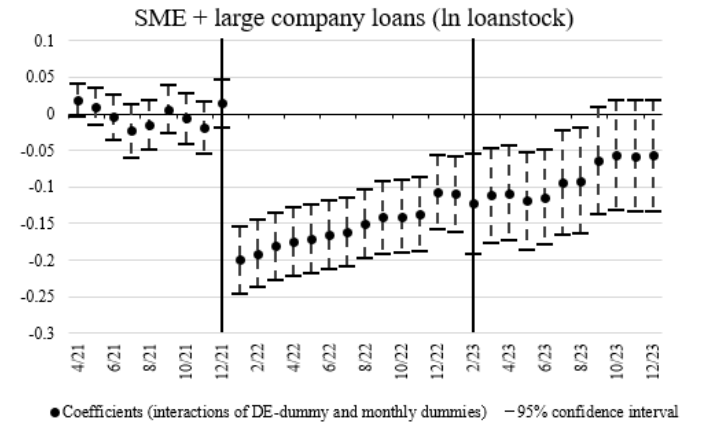
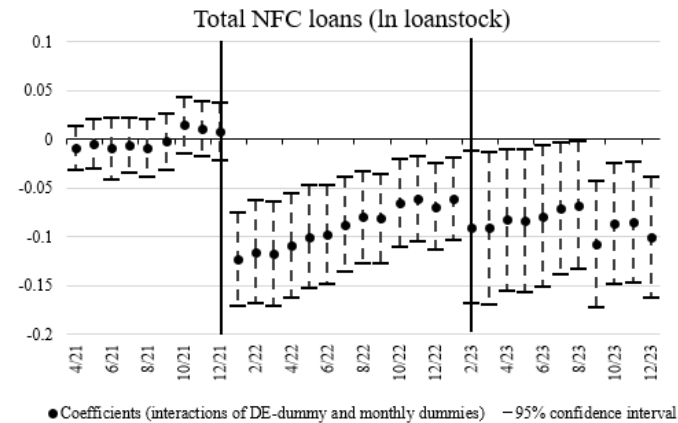
- Banks facing CCyB tightening decrease the amount of lending compared to non-treated banks
- The effect is driven by loans to SMEs
- Banks adjust their lending already post-announcement

	(1)	(2)	(3)	(4)
Dependent variable: ln(loan stock)	Total NFC lending	SME lending	Large company lending	SME + large company lending
Post-announcement effect	-0.069*** (0.018)	-0.166*** (0.032)	0.030 (0.046)	-0.123*** (0.023)
Post-application effect	-0.119*** (0.027)	-0.141*** (0.036)	0.094* (0.053)	-0.080** (0.040)
Observations	53,247	36,162	34,876	35,578
R-squared	0.228	0.138	0.118	0.146
Number of banks	1,642	1,140	1,112	1,123
Bank controls	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES
Country_time FE	YES	YES	YES	YES

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Impact on the volume of outstanding loans

- Replacing post-treatment dummy interactions with month dummy interactions
- reveals the dynamics of the impact
- formally tests pre-treatment parallel trend assumption



The first vertical line indicates the month of the announcement (1/22), and the second the month of application (2/23).

Impact on banks' loan portfolio composition

	(1)	(2)	(3)	(4)
Dependent variable:	Total NFC		Large company	SME +
loans / total assets	lending	SME lending	lending	large company lending
Post-announcement effect	-0.014*** (0.002)	-0.011*** (0.002)	0.001 (0.001)	-0.012*** (0.002)
Post-application effect	-0.018*** (0.003)	-0.010*** (0.002)	0.002* (0.001)	-0.009*** (0.003)
Observations	55,602	36,170	34,889	35,643
R-squared	0.133	0.135	0.086	0.126
Number of banks	1,688	1,141	1,112	1,124
Bank controls	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES
Country time FE	YES	YES	YES	YES

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Impact on banks' loan portfolio composition

- Banks facing CCyB tightening decrease the share of NFC loans on their balance sheets compared to non-treated banks

	(1)	(2)	(3)	(4)
Dependent variable: loans / total assets	Total NFC lending	SME lending	Large company lending	SME + large company lending
Post-announcement effect	-0.014*** (0.002)	-0.011*** (0.002)	0.001 (0.001)	-0.012*** (0.002)
Post-application effect	-0.018*** (0.003)	-0.010*** (0.002)	0.002* (0.001)	-0.009*** (0.003)
Observations	55,602	36,170	34,889	35,643
R-squared	0.133	0.135	0.086	0.126
Number of banks	1,688	1,141	1,112	1,124
Bank controls	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES
Country time FE	YES	YES	YES	YES

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Impact on banks' loan portfolio composition

- Banks facing CCyB tightening decrease the share of NFC loans on their balance sheets compared to non-treated banks
- The effect is driven by loans to SMEs

	(1)	(2)	(3)	(4)
Dependent variable: loans / total assets	Total NFC lending	SME lending	Large company lending	SME + large company lending
Post-announcement effect	-0.014*** (0.002)	-0.011*** (0.002)	0.001 (0.001)	-0.012*** (0.002)
Post-application effect	-0.018*** (0.003)	-0.010*** (0.002)	0.002* (0.001)	-0.009*** (0.003)
Observations	55,602	36,170	34,889	35,643
R-squared	0.133	0.135	0.086	0.126
Number of banks	1,688	1,141	1,112	1,124
Bank controls	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES
Country time FE	YES	YES	YES	YES

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

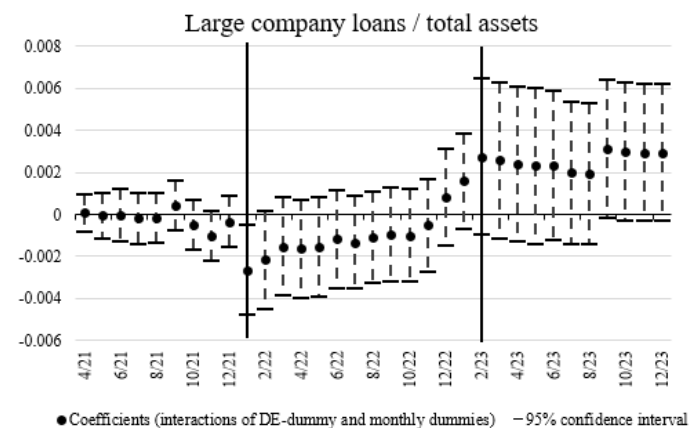
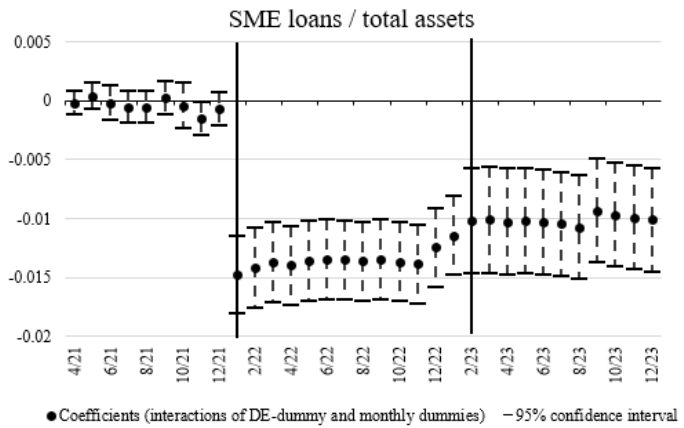
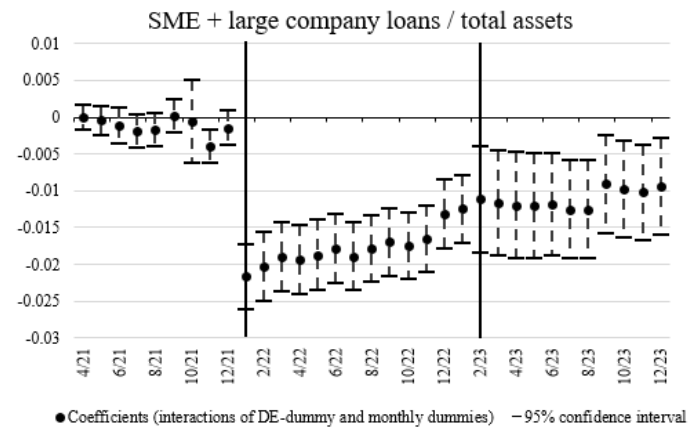
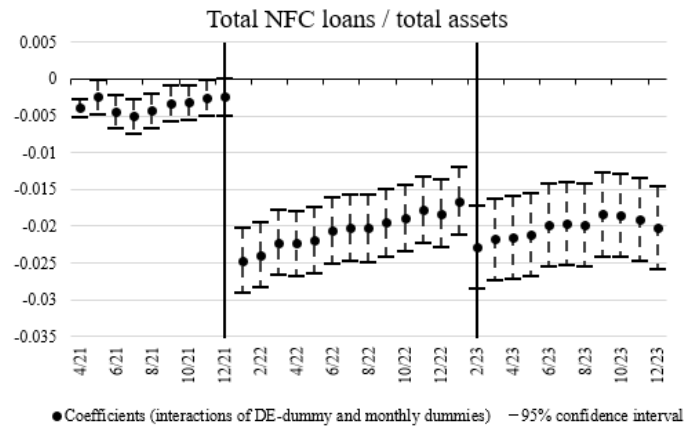
Impact on banks' loan portfolio composition

- Banks facing CCyB tightening decrease the share of NFC loans on their balance sheets compared to non-treated banks
- The effect is driven by loans to SMEs
- Banks adjust their lending already post-announcement

	(1)	(2)	(3)	(4)
Dependent variable:	Total NFC		Large company	SME +
loans / total assets	lending	SME lending	lending	large company lending
Post-announcement effect	-0.014*** (0.002)	-0.011*** (0.002)	0.001 (0.001)	-0.012*** (0.002)
Post-application effect	-0.018*** (0.003)	-0.010*** (0.002)	0.002* (0.001)	-0.009*** (0.003)
Observations	55,602	36,170	34,889	35,643
R-squared	0.133	0.135	0.086	0.126
Number of banks	1,688	1,141	1,112	1,124
Bank controls	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES
Country time FE	YES	YES	YES	YES

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Impact on banks' loan portfolio composition



The first vertical line indicates the month of the announcement (1/22), and the second the month of application (2/23).

Impact on the price of new loans

	(1)	(2)	(3)	(4)
Dependent variable: loan rate for new loans	New loans to all NFCs	New loans to SMEs	New loans to large companies	New loans to SMEs + large companies
Post-announcement effect	0.228 (0.170)	0.465** (0.193)	-0.179 (1.039)	0.299*** (0.080)
Post-application effect	0.261 (0.175)	-0.148 (0.277)	-2.709 (1.717)	0.007 (0.071)
Observations	2,031	6,475	1,030	6,705
R-squared	0.888	0.708	0.574	0.763
Number of banks	63	952	457	1,109
Bank controls	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES
Country_time FE	YES	YES	YES	YES

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Impact on the price of new loans

- Banks facing CCyB tightening increase the price of lending to firms compared to non-treated banks

	(1)	(2)	(3)	(4)
Dependent variable: loan rate for new loans	New loans to all NFCs	New loans to SMEs	New loans to large companies	New loans to SMEs + large companies
Post-announcement effect	0.228 (0.170)	0.465** (0.193)	-0.179 (1.039)	0.299*** (0.080)
Post-application effect	0.261 (0.175)	-0.148 (0.277)	-2.709 (1.717)	0.007 (0.071)
Observations	2,031	6,475	1,030	6,705
R-squared	0.888	0.708	0.574	0.763
Number of banks	63	952	457	1,109
Bank controls	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES
Country_time FE	YES	YES	YES	YES

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Impact on the price of new loans

- Banks facing CCyB tightening increase the price of lending to firms compared to non-treated banks
- The effect is driven by loans to SMEs

	(1)	(2)	(3)	(4)
Dependent variable: loan rate for new loans	New loans to all NFCs	New loans to SMEs	New loans to large companies	New loans to SMEs + large companies
Post-announcement effect	0.228 (0.170)	0.465** (0.193)	-0.179 (1.039)	0.299*** (0.080)
Post-application effect	0.261 (0.175)	-0.148 (0.277)	-2.709 (1.717)	0.007 (0.071)
Observations	2,031	6,475	1,030	6,705
R-squared	0.888	0.708	0.574	0.763
Number of banks	63	952	457	1,109
Bank controls	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES
Country_time FE	YES	YES	YES	YES

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

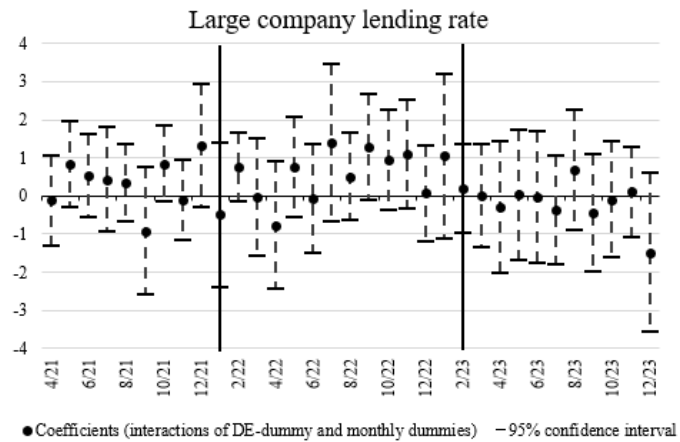
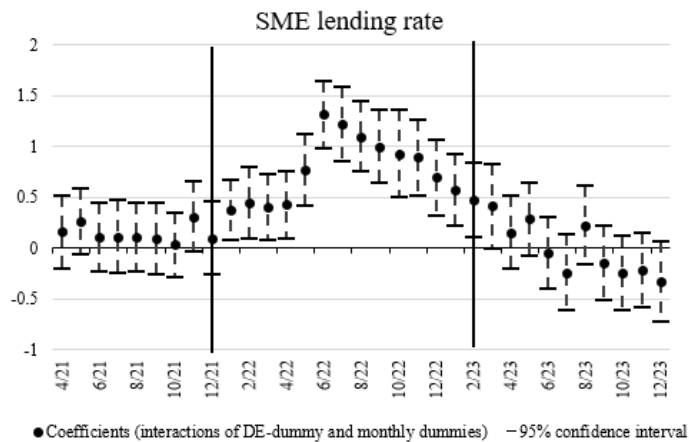
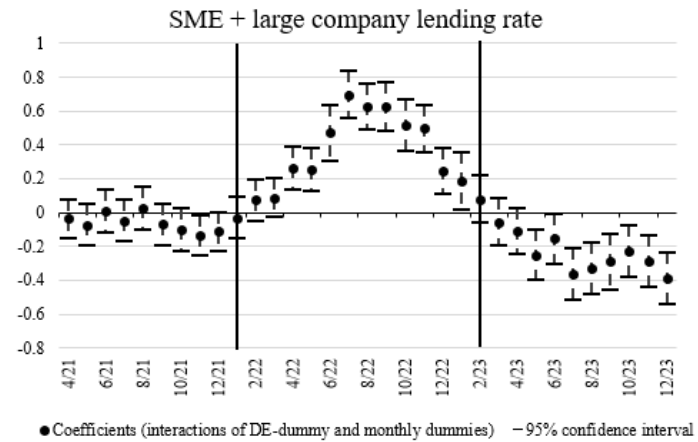
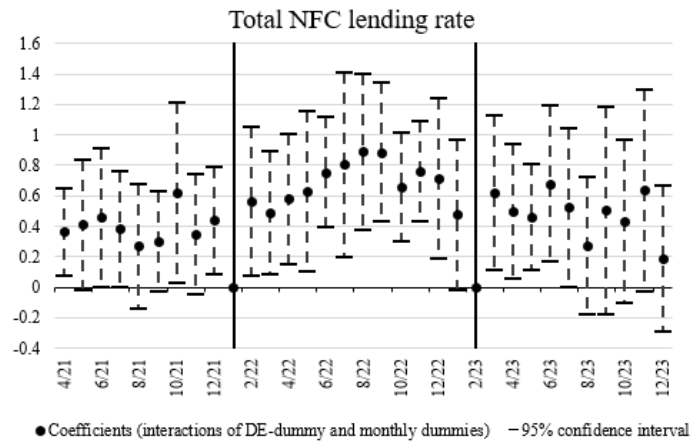
Impact on the price of new loans

- Banks facing CCyB tightening increase the price of lending to firms compared to non-treated banks
- The effect is driven by loans to SMEs
- Banks adjust their lending post-announcement, effect disappears after application

	(1)	(2)	(3)	(4)
Dependent variable: loan rate for new loans	New loans to all NFCs	New loans to SMEs	New loans to large companies	New loans to SMEs + large companies
Post-announcement effect	0.228 (0.170)	0.465** (0.193)	-0.179 (1.039)	0.299*** (0.080)
Post-application effect	0.261 (0.175)	-0.148 (0.277)	-2.709 (1.717)	0.007 (0.071)
Observations	2,031	6,475	1,030	6,705
R-squared	0.888	0.708	0.574	0.763
Number of banks	63	952	457	1,109
Bank controls	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES
Country_time FE	YES	YES	YES	YES

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Impact on the price of new loans



The first vertical line indicates the month of the announcement (1/22), and the second the month of application (2/23).

Robustness checks

1. Separately analyse post-announcement and post-application periods
2. Replace Austrian banks with a synthetic control composed of all EA countries with CCyB at 0%
3. Cross-border dimension (lending of Austrian banks to domestic vs. German firms)

Separate post-announcement and post-application effects: outstanding loans

Panel A	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable: ln (loan stock)	Total NFC lending		SME lending		Large company lending		SME + large company lending	
Post-announcement effect	-0.081*** (0.016)		-0.173*** (0.033)		0.012 (0.046)		-0.138*** (0.020)	
Post-application effect		-0.108*** (0.029)		-0.136*** (0.037)		0.111** (0.055)		-0.068* (0.039)
Observations	37,086	33,913	25,225	23,015	24,312	22,153	24,820	22,612
R-squared	0.235	0.249	0.120	0.175	0.083	0.154	0.146	0.149
Number of banks	1,631	1,641	1,131	1,140	1,106	1,108	1,116	1,122
Bank controls	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Country_time FE	YES	YES	YES	YES	YES	YES	YES	YES

Separate post-announcement and post-application effects: balance sheet composition

Panel B	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable: loans / total assets	Total NFC lending		SME lending		Large company lending		SME + large company lending	
Post-announcement effect	-0.014*** (0.002)		-0.012*** (0.002)		0.001 (0.001)		-0.012*** (0.002)	
Post-application effect		-0.018*** (0.003)		-0.010*** (0.002)		0.003** (0.001)		-0.008*** (0.003)
Observations	38,742	35,395	25,226	23,023	24,316	22,163	24,867	22,650
R-squared	0.082	0.162	0.108	0.158	0.064	0.105	0.067	0.135
Number of banks	1,686	1,688	1,131	1,141	1,106	1,108	1,116	1,123
Bank controls	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Country_time FE	YES	YES	YES	YES	YES	YES	YES	YES

Separate post-announcement and post-application effects: price of new loans

Panel C	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable: loan rate for new loans	Total NFC lending		SME lending		Large company lending		SME + large company lending	
Post-announcement effect	0.258 (0.173)		0.400* (0.208)		-0.802 (1.155)		0.294*** (0.080)	
Post-application effect		0.201 (0.187)		-0.403 (0.301)		-2.652 (1.762)		0.006 (0.071)
Observations	1,422	1,291	4,132	3,817	2,230	2,016	21,030	19,181
R-squared	0.776	0.917	0.475	0.767	0.308	0.661	0.517	0.823
Number of banks	63	63	910	910	370	335	1,101	1,108
Bank controls	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Country_time FE	YES	YES	YES	YES	YES	YES	YES	YES

Synthetic control: impact on the volume of outstanding loans

Panel A	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable: ln (loan stock)	Total NFC lending		SME lending		Large company lending		SME + large company lending	
Post-announcement effect	0.019** (0.008)		-0.034* (0.018)		0.033 (0.024)		-0.048*** (0.012)	
Post-application effect		0.011 (0.020)		-0.101*** (0.030)		0.014 (0.041)		-0.095*** (0.023)
Observations	42,850	39,422	27,200	25,024	25,850	23,736	26,850	24,633
Bank controls	YES	YES	YES	YES	YES	YES	YES	YES

Synthetic control: impact on the balance sheet composition

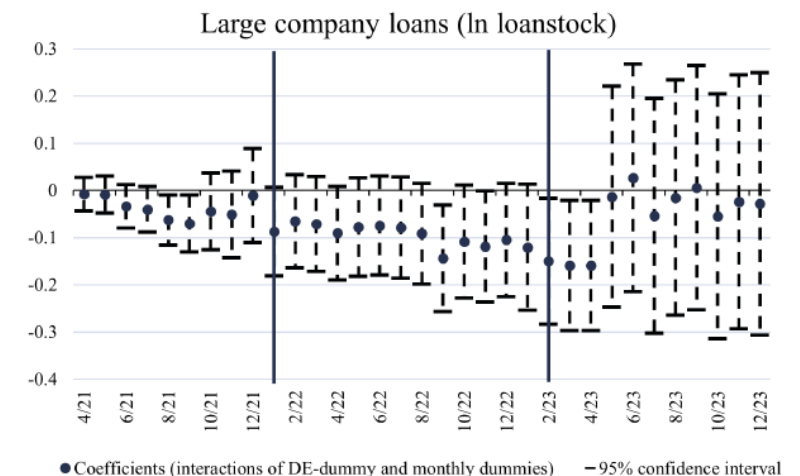
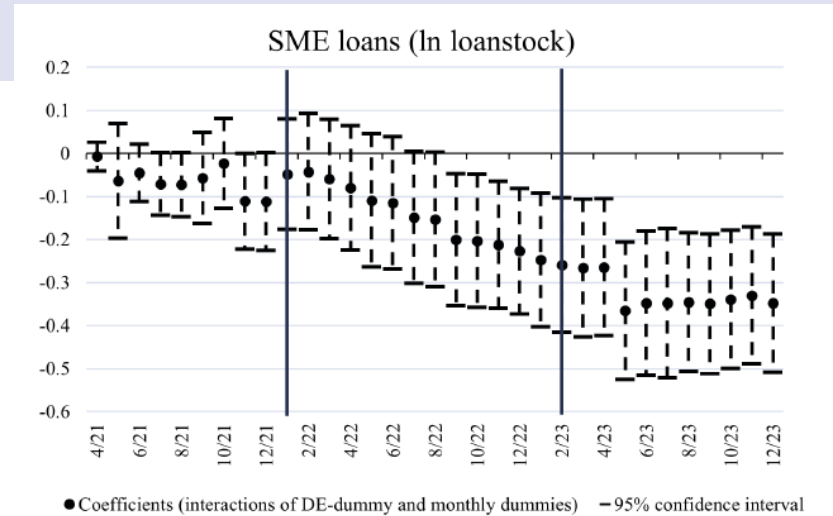
Panel B	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable: loans / total assets	Total NFC lending		SME lending		Large company lending		SME + large company lending	
Post-announcement effect	-0.003*** (0.001)		-0.004*** (0.001)		0.000 (0.000)		-0.004*** (0.001)	
Post-application effect		-0.005*** (0.002)		-0.007*** (0.001)		0.001 (0.001)		-0.007*** (0.001)
Observations	45,775	42,113	27,200	25,024	25,850	23,782	26,850	24,702
Bank controls	YES	YES	YES	YES	YES	YES	YES	YES

Synthetic control: impact on the price of new loans

Panel C	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable: loan rate for new loans	Total NFC lending		SME lending		Large company lending		SME + large company lending	
Post-announcement effect	0.201** (0.080)		0.187*** (0.051)		-0.241 (0.173)		0.267*** (0.035)	
Post-application effect		0.227* (0.126)		-0.001 (0.096)		-0.635** (0.260)		0.005 (0.071)
Observations	2,450	2,254	4,625	4,255	1,500	1,380	10,500	9,660
Bank controls	YES	YES	YES	YES	YES	YES	YES	YES

Cross-border dimension: lending of Austrian banks to German vs. domestic firms

- Reciprocity requirement means that also foreign banks must apply CCyB to their German exposures
- Sample now restricted to Austrian banks
 - Lending to German firms makes ~7.5% of total lending portfolios
 - concentrated to a small number of banks: ~20 banks account for over 90% of German lending
- Results strengthen our main conclusions



Additional robustness checks and considerations

- Results robust to extending post-treatment period
- Results robust to including additional bank-specific controls (share of non-performing loans, share of loans/assets)
- Other macroprudential changes in 2022-23 not likely to confound our results
- Possible differences in monetary policy transmission between countries not likely to confound our results – if anything our effects are lower bounds



Conclusions

Eeva Kerola (BoF), Anni Norring (IMF)
Bank of Finland



Conclusion

- Following a CCyB tightening in Germany, we find robust evidence that:
 - German banks decreased the amount and share of lending to firms and increased the cost of new credit relative to the Austrian control group
 - The effects were driven by lending to SMEs
 - Banks adjusted their balance sheets and loan pricing already post-announcement

Conclusion

- Negative impact on SME may be an unintended consequence that policy makers should be aware of

→ Burden falling disproportionately on SMEs is not ideal, given their strong reliance on bank financing and their central role in the economy





Thank you!

Eeva Kerola (BoF), Anni Norring (IMF)
Bank of Finland

