Corporate Lending in Face of Domestic and Foreign Monetary Policy: Insights from AnaCredit

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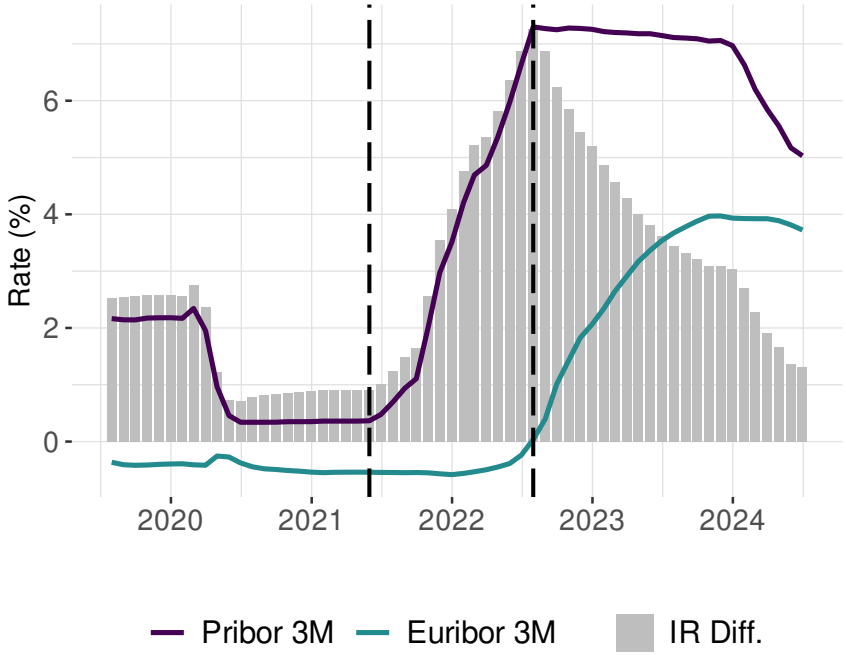
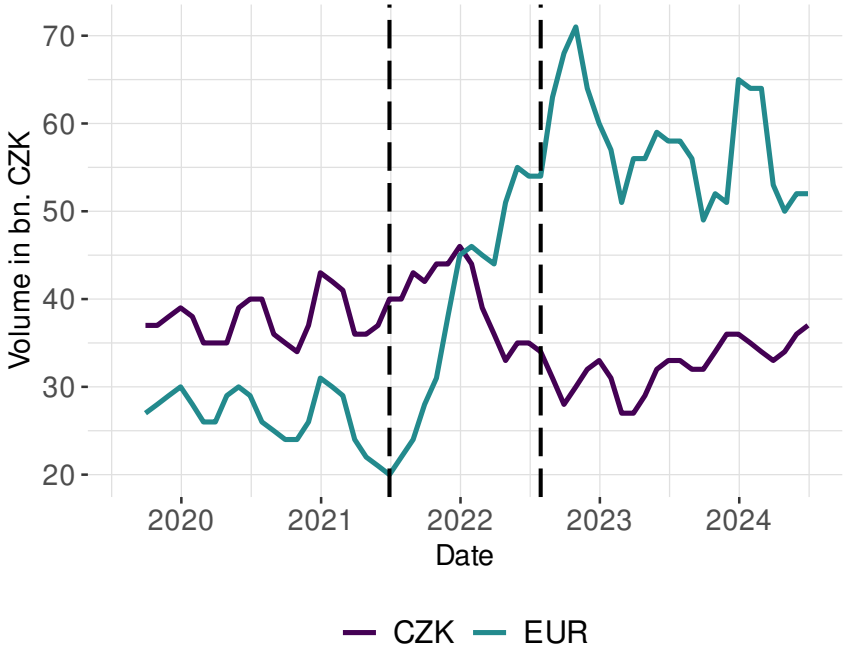
The views expressed are those of the authors and not necessarily those of the Czech National Bank.

Motivation: Euroization of the Czech Economy

Panel A: CNB and ECB rates



Panel B: New loans of Czech NFCs



- EUR-denominated loans remained stable until 2021, with the maximum interest rate differential at 2 pp and about one-third of new corporate loans in euros.
- The interest rate differential increased after 2021, peaking at about 6 pp in Q2-Q3 2022, with nearly half of the new corporate loans being in euros by 2022.

Introduction: What Do We Do

- Our contribution: Use AnaCredit loan-level data to show how CNB–ECB rate differentials reallocate credit between CZK and EUR, and how this shift persists over time, driven by banks' supply decisions.
- We also explore heterogeneity across banks (size, capital headroom) and firms (size, leverage), and role of the exchange rate.

- Adding to the literature: Builds on work on the bank-lending channel (Bernanke & Gertler, 1995; Kashyap & Stein, 2000) and its weakening in open economies (Cetorelli & Goldberg, 2012). Closest to Ongena *et al.* (2021); we extend by using AnaCredit loan-level data to capture flows vs. stocks, asymmetric adjustments, and bank–firm heterogeneity in a partially euroised economy.

Introduction: What We Have Found

- Baseline effect: Wider PRIBOR–EURIBOR differential reallocates new lending *from CZK to EUR*. Effect strong for flows (new loans), muted for stocks (outstanding).
- Asymmetry: Widening spreads drive euroisation; narrowing spreads reverse it only partially.
- Heterogeneity: Strongest for loans with 1–5Y maturity, large/capital-constrained banks, and larger/low-leverage firms. No strong role for exporters vs. services or exchange-rate fluctuations.
- Robustness: Results hold under alternative FE structures, loan types, top banks, Covid loans, OIS rates, and IV approach + extensive margin

AnaCredit Data

- AnaCredit: Credit instruments granted/serviced by domestic banks and foreign branches from other EA/EU countries.
- Borrowers: resident and non-resident legal entities (excl. households).
- Monthly data (some attributes quarterly, e.g. counterparty risk); CZ data since June 2019 (voluntary, EA mandatory).
- Our data treatment:
  - Outstanding loans = monthly sum for each bank–firm-currency pair, incl. off-balance sheet, converted to CZK; split by orig. currency (all / CZK / EUR).
  - New loans = first appearance in AnaCredit.
  - Instruments: 02 overdrafts, 04 other revolving, 05 term, 19 other; only to Czech NFCs.
- Additional sources: RIAD, FINREP, COREP.

Quick Overview of the Data (1/2)

- Period of July 2019–June 2024.
- Panel of 23 banks granting loans to total of 122 thousand Czech NFCs, resulting in almost 5.6 million outstanding-loans and almost 201 thousand new loans observations.
- CZK loans dominate the datasets (but only in terms of number of loans).
- EUR loans are less numerous with share of 7% (outstanding loans) and 17% (new loans)

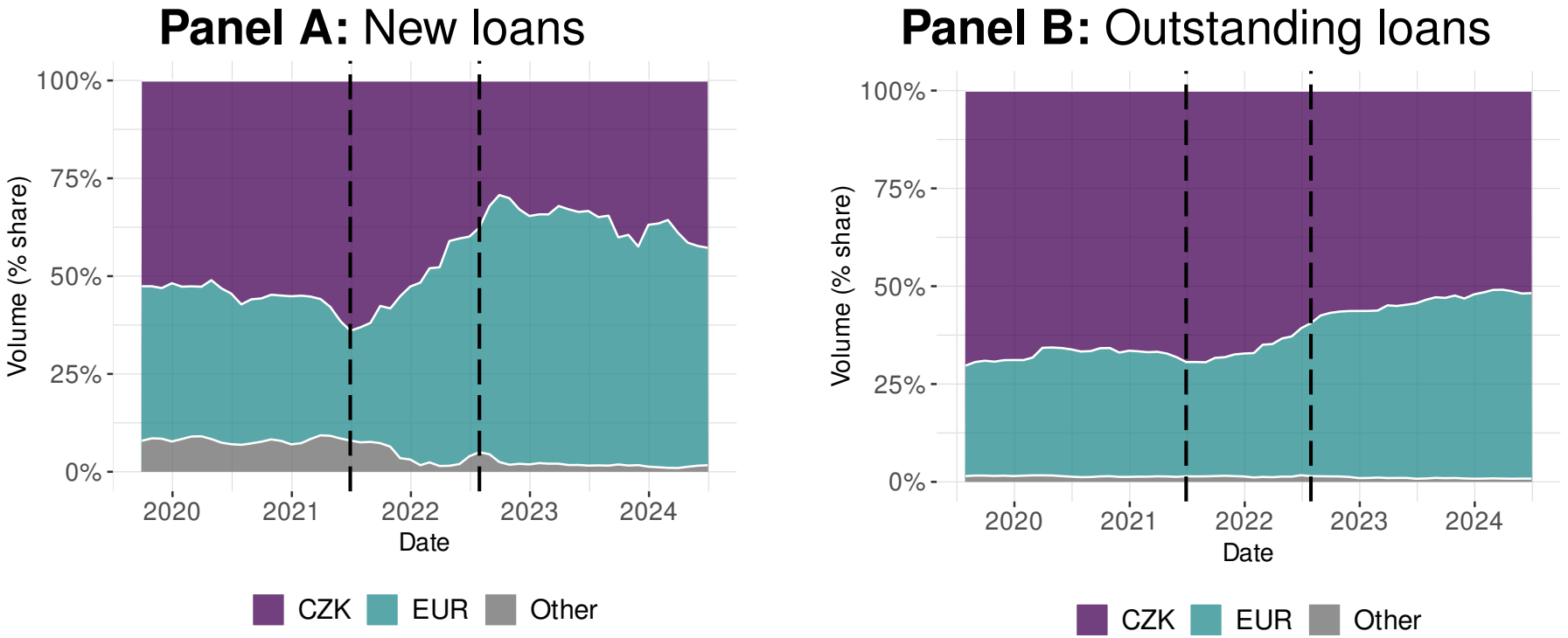
Table: Total Number of Banks, Firms and Loans (Observations)

Dataset:	New loans			Outstanding loans		
	Banks	Firms	Loans (Obs.)	Banks	Firms	Loans (Obs.)
All-currency loans	23	74,075	201,958	23	122,474	5,682,937
CZK loans	23	70,763	172,027	23	119,638	5,501,468
EUR loans	23	7,930	33,818	23	10,066	363,464

Quick Overview of the Data (2/2)

- Mean CZK loan: 13 mil. CZK (∼0.6 mil. EUR) X Mean EUR loan: 76 mil. CZK (∼3 mil. EUR).
- Since mid-2021 (CNB hikes), EUR share of new loans nearly doubled to 70%, indicating reallocation from CZK.

Figure: Volume Share on Total by Currency



Model (1/2)

$$Y_{f,b,c,t} = [\beta_1 + \beta_2 D^{EUR}_{f,b,c,t}] \times IRdiff_{t-1} + \gamma' X_{b,t-1} + \alpha_b + \alpha_{ILS-q} + \epsilon_{f,b,c,t}$$

- $Y_{f,b,c,t}$: log volume of new or outstanding loans from bank b to firm f in currency c at time t
- $IRdiff_{t-1}$: lagged CZK–EUR 3M money-market rate spread (PRIBOR–EURIBOR)
- $D^{EUR}_{f,b,c,t}$: dummy = 1 if loan is denominated in EUR
- $X_{b,t-1}$: lagged bank-level controls (size, liquidity, profitability, risk, funding)
- α_b: bank fixed effects
- α_{ILS-q}: industry–location–size–quarter fixed effects (keeps single-bank firms, rules out demand-side shifts), following Degryse *et al.* (2019) or Behn *et al.* (2024).

- Estimated with OLS and 2SLS (IVs: high-frequency EA monetary policy shocks à la Jarociński & Karadi (2020)), clustered SEs on bank-level

Model (2/2)

Testing heterogeneity in CZK–EUR reallocation

$$Y_{f,b,c,t} = [\beta_1 + \beta_2 D^{EUR}_{f,b,c,t} + \beta_3 D_k + \beta_4 (D^{EUR}_{f,b,c,t} \times D_k)] \times IRdiff_{t-1} + \gamma' X_{b,t-1} + \alpha_b + \alpha_{ILS-q} + \epsilon_{f,b,c,t} \quad (1)$$

- Focus on new loans only
- D_k: dummy capturing heterogeneity:
  - **Bank-level:** size, capital headroom, IRB status.
  - **Firm-level:** size, leverage, relationship length.
  - **Macro-level:** exchange rate conditions.
- Triple interaction tests whether IR diff. effect on EUR lending is amplified or muted for these groups.

Baseline Results

Dependent Variable:	log(New loans)		log(Outstanding loans)	
Model:	(1)	(2)	(3)	(4)
$IRdiff_{t-1}$	0.0201	-0.0073	-0.0031	-0.0072
	(0.0358)	(0.0373)	(0.0034)	(0.0042)
D_t^{EUR}		0.6032**		0.9321***
		(0.2453)		(0.0954)
$IRdiff_{t-1} \times D_t^{EUR}$		0.0822***		0.0581***
		(0.0263)		(0.0181)
Bank-level controls	Yes	Yes	Yes	Yes
Bank FEs	Yes	Yes	Yes	Yes
ILS-quarter FEs	Yes	Yes	Yes	Yes
Observations	182,054	185,441	5,318,051	5,457,251
R^2	0.84380	0.84190	0.66210	0.66765

Standard errors, shown in parentheses, are clustered at the bank level. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

- Overall aggregate credit supply neither expands nor contracts.
- Clear reallocation between CZK- and EUR-denominated loans.
- Flows respond strongly (1 pp increase in the differential $\Rightarrow$ 8% rise in EUR loans relative to CZK), while stocks adjust only gradually.

Asymmetry: Widening vs. Narrowing Interest-Rate Differentials

Specification:	log(New loans)				log(Outstanding loans)			
	↑ IR diff.		↓ IR diff.		↑ IR diff.		↓ IR diff.	
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$IRdiff_{t-1}$	0.0975	0.0599	-0.065***	-0.074***	-0.0037	-0.0087	-0.0003	0.0008
	(0.0779)	(0.0722)	(0.0214)	(0.0215)	(0.0062)	(0.0070)	(0.0027)	(0.0022)
D_t^{EUR}		0.6129		0.6206**		0.7723***		1.056***
		(0.3670)		(0.2189)		(0.0900)		(0.0958)
$IRdiff_{t-1} \times D_t^{EUR}$		0.0843**		0.0683		0.0498**		0.0321
		(0.0316)		(0.0487)		(0.0195)		(0.0191)
Bank-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ILS-quarter FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	84,291	85,835	97,763	99,606	2,448,354	2,499,824	2,869,697	2,957,427
R^2	0.85946	0.85655	0.84818	0.84653	0.66514	0.66729	0.66303	0.67032

Standard errors, shown in parentheses, are clustered at the bank level. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

- Asymmetric response: Widening spreads ⇒ strong shift into EUR loans (≈8% rise in flows, 5% in stocks); narrowing spreads ⇒ only partial reversal (relative increase in CZK loans).
- Adjustment concentrated in new lending; outstanding portfolios remain inert, and the overall stock of corporate debt stays tilted toward euros.

Extensive Margin

Dependent Variable:	New Entrant		Additional Bank		Any New Link	
Model:	(1)	(2)	(3)	(4)	(5)	(6)
$IRdiff_{t-1}$	0.0011	0.0010	0.0004*	0.0004*	0.0015*	0.0014
	(0.0007)	(0.0007)	(0.0002)	(0.0002)	(0.0008)	(0.0008)
D_t^{EUR}		-0.0070***		-0.0014***		-0.0084***
		(0.0013)		(0.0005)		(0.0014)
$IRdiff_{t-1} \times D_t^{EUR}$		0.0076***		0.0008***		0.0084***
		(0.0008)		(0.0001)		(0.0009)
Bank-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank FEs	Yes	Yes	Yes	Yes	Yes	Yes
ILS-quarter FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,077,636	5,212,237	5,077,636	5,212,237	5,077,636	5,212,237
R^2	0.22423	0.21713	0.14001	0.13493	0.20593	0.20100

Standard errors, shown in parentheses, are clustered at the bank level. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

- Test whether IR differentials affect new bank–firm relationships, not only loan volumes (following De Jonghe *et al.* (2020); Behn *et al.* (2024).
- Confirms that intensive-margin reallocation is mirrored at the extensive margin.

Robustness Checks

- Alt. FEs: Firm–quarter (Khwaja & Mian, 2008) vs. ILS–quarter — core effect intact in outstanding loans, insignificant for new loans (Table 1).
- Loan types: Term & Other (excl. overdrafts/credit lines) — similar results (Table 1).
- Bank scope: Top-5 banks only — effect persists (Table 1).
- Rate measure: OIS spread (EA–CZ) instead of PRIBOR–EURIBOR — consistent (Table 2).
- Identification: 2SLS with EA MP surprises (Jarociński & Karadi, 2020) — same sign/significance (Table 2).
- Coverage: Including government Covid-19 loans — unchanged (Table 2).
- Bottom line: $IRdiff \times D^{EUR}$ remains positive and (mostly) significant across all checks.

Maturity of Loans

Dependent Variable:	log(New loans)			
Maturity:	$\leq$ 1Y	1Y–5Y	5Y–10Y	$>$ 10Y
Model:	(1)	(2)	(3)	(4)
$IRdiff_{t-1}$	-0.0004	-0.0747***	0.0484	0.0220
	(0.0381)	(0.0196)	(0.0728)	(0.0826)
D_t^{EUR}	0.4538*	0.2982	0.6904	0.1623
	(0.2460)	(0.3580)	(0.6449)	(0.2461)
$D_t^{EUR} \times IRdiff_{t-1}$	-0.0120	0.1322***	0.1213	0.0910*
	(0.0760)	(0.0452)	(0.0847)	(0.0460)
Bank-level controls	Yes	Yes	Yes	Yes
Bank FEs	Yes	Yes	Yes	Yes
ILS-quarter FEs	Yes	Yes	Yes	Yes
Observations	46,369	72,240	40,359	19,645
R^2	0.93472	0.88641	0.91501	0.90042

Standard errors, shown in parentheses, are clustered at the bank level. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

- 1–5 years: Full substitution pattern — CZK lending falls, EUR rises strongly; this is the modal maturity segment.
- $>$10 years: EUR lending rises but CZK does not fall significantly $\Rightarrow$ no net substitution, likely reflecting a new segment of large long-term loans.

Banks' Heterogeneity

Dependent Variable:	log(New loans)				
Specification:	Smaller Bank	Larger Bank	Capital Headroom ≤Q50	Capital Headroom >Q50	IRB Bank
Model:	(1)	(2)	(3)	(4)	(5)
$IRdiff_{t-1}$	-0.1540	0.0006	-0.0356	0.0162	0.0015
	(0.1154)	(0.0411)	(0.0296)	(0.0609)	(0.0433)
D_t^{EUR}	-0.0848	0.6258*	0.1166	0.8344***	0.6369**
	(0.5764)	(0.2928)	(0.0914)	(0.1613)	(0.2804)
$IRdiff_{t-1} \times D_t^{EUR}$	0.1682	0.0834**	0.0862**	0.0778	0.0754**
	(0.1705)	(0.0300)	(0.0265)	(0.0517)	(0.0290)
Bank-level controls	Yes	Yes	Yes	Yes	Yes
Bank FEs	Yes	Yes	Yes	Yes	Yes
ILS-quarter FEs	Yes	Yes	Yes	Yes	Yes
Observations	11,218	174,213	46,589	130,071	163,603
R^2	0.91178	0.84766	0.89652	0.85993	0.85297

Standard errors, shown in parentheses, are clustered at the bank level. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

- Only Large banks expand EUR lending when spreads widen; Banks with low capital headroom show stronger reallocation.
- Triple interactions with other bank traits (liquidity, ROA, NPLs, size) are small/insignificant; Exception: equity-to-asset ratio

Firms' Heterogeneity

- Size matters: Smaller firms borrow mainly in CZK; EUR reallocation is concentrated in medium/large firms (likely due to higher fixed costs and collateral requirements of EUR borrowing).
- Leverage: Low-leverage firms receive relatively more EUR credit as spreads widen (≈60% stronger response in bottom decile).
- Other dimensions: Relationship length and sector orientation ⇒ little effect (triple interactions insignificant).
- Tab.1 Tab.2

Conclusions

- Monetary policy differentials matter: Domestic tightening weakens the bank-lending channel in the NFC sector, as banks shift lending from CZK to euro loans, reducing pass-through to local credit conditions.
- Adjustment is asymmetric: Euro lending persists even after spreads narrow, embedding structural euroisation and raising firms' FX risk. This challenges both MP and MaPP.
- Concentrated in medium/longer maturities, large, capital-constrained banks, and larger, low-leverage firms.

Thank you for your attention

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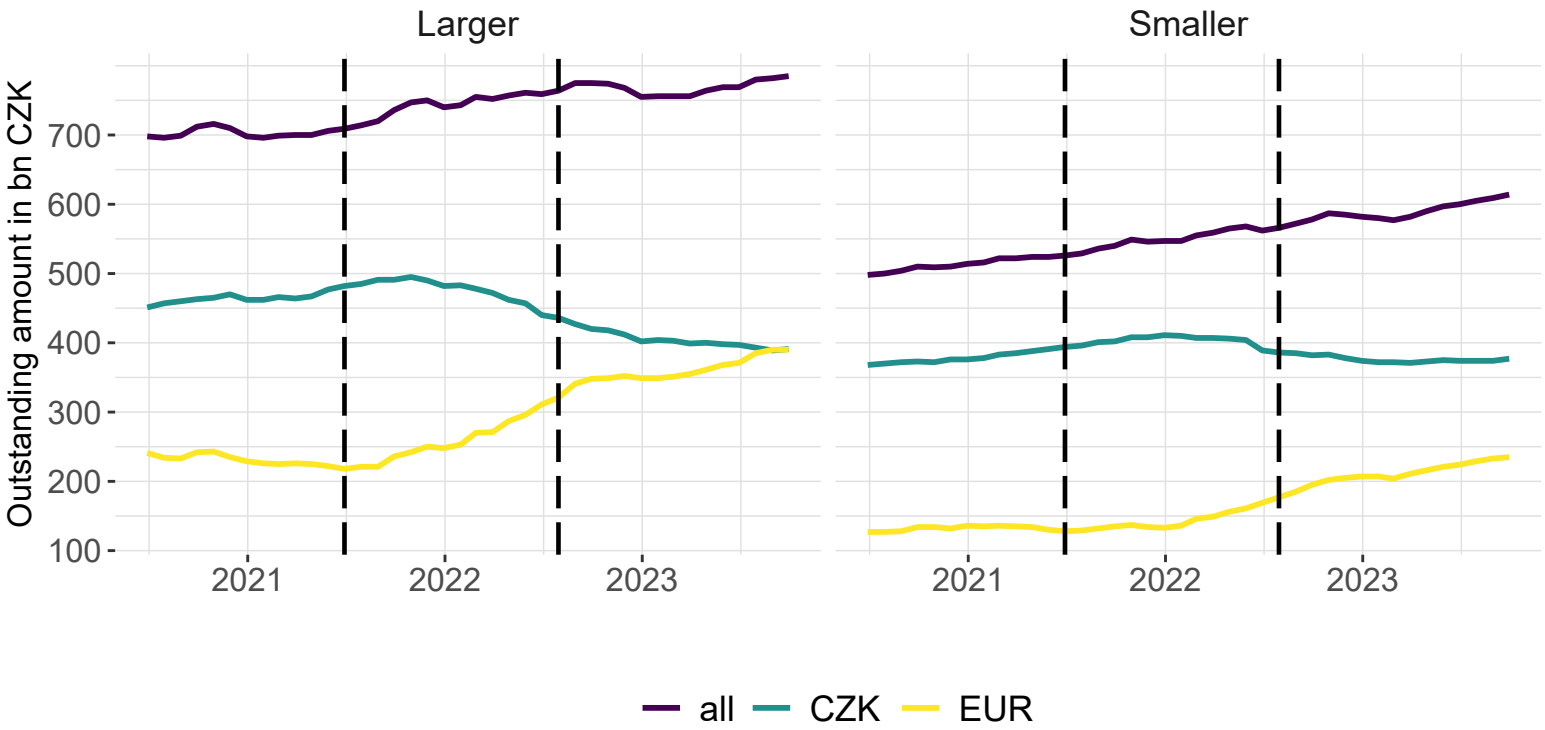
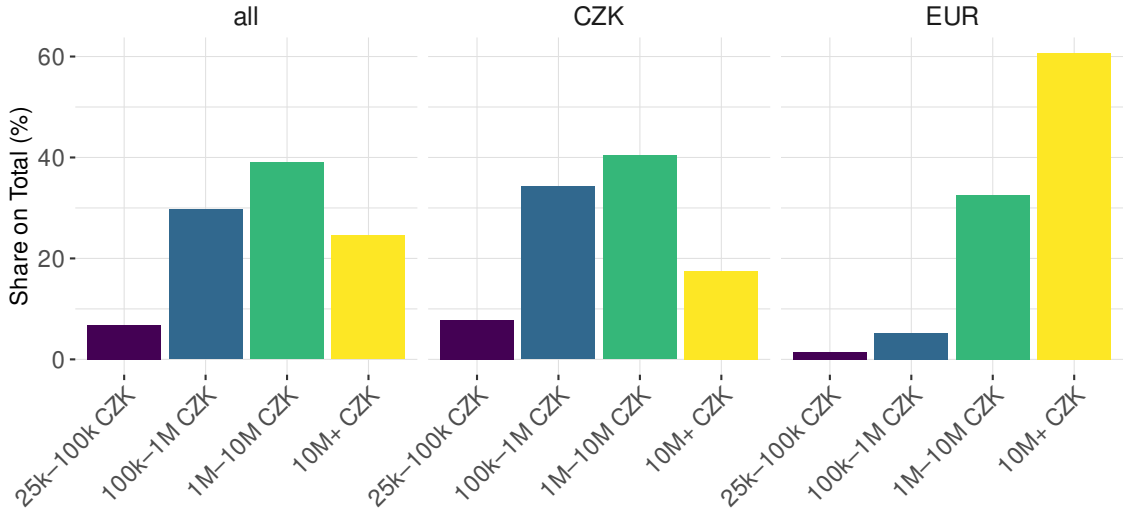
Back-up slides

Total Outstanding Amounts: Firms'

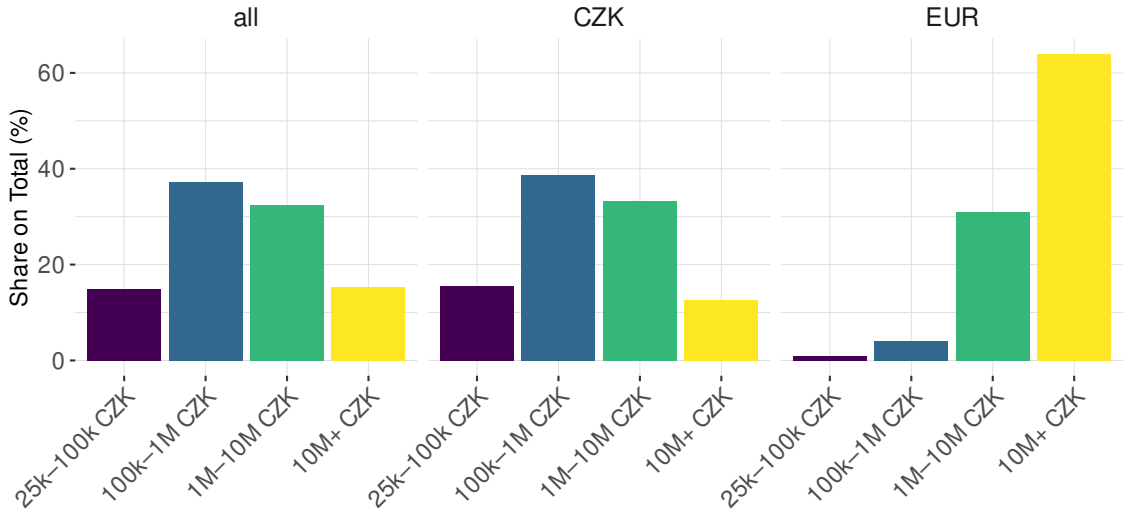


Volume Distribution by Currency

Panel A: New loans



Panel B: Outstanding loans



Firms' Heterogeneity (1/2)

Back

Dependent Variable:	log(New loans)					
D_f Category:	Firm size				Relationship length	
D_f:	Micro	Small	Medium	Large	New client	Old client
Model:	(1)	(2)	(3)	(4)	(5)	(6)
$IRdiff_{t-1}$	-0.0082	-0.0314	-0.0248	-0.0304	-0.0005	-0.0198
	(0.0253)	(0.0383)	(0.0405)	(0.0385)	(0.0358)	(0.0388)
D_t^{EUR}	0.6658**	1.243***	1.311***	1.202***	0.5854**	0.7545***
	(0.2501)	(0.2763)	(0.2562)	(0.2183)	(0.2553)	(0.2473)
D_f	-1.525***	0.6029***	1.322***	1.837***	0.0785	-0.0565
	(0.2815)	(0.0967)	(0.2221)	(0.4845)	(0.2153)	(0.1890)
$IRdiff_{t-1} \times D_t^{EUR}$	0.0583**	0.1026***	0.0926**	0.0827**	0.0741**	0.0838**
	(0.0242)	(0.0313)	(0.0381)	(0.0302)	(0.0265)	(0.0372)
$IRdiff_{t-1} \times D_f$	-0.0198	0.0258	0.0135	0.0703	-0.0696*	0.0529***
	(0.0210)	(0.0151)	(0.0338)	(0.0493)	(0.0358)	(0.0096)
$D_t^{EUR} \times D_f$	1.114***	-0.6782***	-0.8459***	-0.9825***	0.7603*	-0.4843**
	(0.3122)	(0.1953)	(0.1650)	(0.3361)	(0.3881)	(0.1958)
$IRdiff_{t-1} \times D_t^{EUR} \times D_f$	0.0260	-0.0440*	-0.0513	0.0051	0.0806	-0.0198
	(0.0228)	(0.0246)	(0.0524)	(0.0464)	(0.0767)	(0.0419)
Bank-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank FEs	Yes	Yes	Yes	Yes	Yes	Yes
IL-quarter FEs	Yes	Yes	Yes	Yes		
ILS-quarter FEs					Yes	Yes
Observations	185,438	185,438	185,438	185,438	185,441	185,441
R^2	0.76386	0.73275	0.74083	0.74187	0.84238	0.84249

Note: Each column uses a firm-level dummy D_f interacted with $IRdiff_{t-1} \times D_t^{EUR}$. Standard errors clustered at bank level. Significance: *** 0.01, ** 0.05, * 0.1.

Firms' Heterogeneity (2/2)

Back

Dependent Variable:	log(New loans)					
D_f Category:	Firm's leverage				Sector orientation	
D_f:	$< Q10$	$< Q50$	$> Q75$	$> Q90$	Export	Services
Model:	(7)	(8)	(9)	(10)	(11)	(12)
$IRdiff_{t-1}$	-0.0071	0.0022	-0.0086	-0.0055	-0.0122	-0.0116
	(0.0395)	(0.0264)	(0.0278)	(0.0222)	(0.0240)	(0.0131)
D_t^{EUR}	0.5803**	0.4862**	0.1720	0.2887	1.464***	0.8817***
	(0.2426)	(0.1956)	(0.2805)	(0.2156)	(0.3735)	(0.1898)
D_f	-2.457***	-1.816***	1.939***	2.415***	0.1048**	-0.0309
	(0.1947)	(0.0575)	(0.0691)	(0.4062)	(0.0395)	(0.0418)
$IRdiff_{t-1} \times D_t^{EUR}$	0.0828***	0.0660*	0.1067***	0.0828***	0.0505	0.0543***
	(0.0259)	(0.0372)	(0.0333)	(0.0156)	(0.0467)	(0.0138)
$IRdiff_{t-1} \times D_f$	-0.0698	-0.0127	0.0133	0.0204	-0.0037	-0.0091
	(0.0575)	(0.0202)	(0.0183)	(0.0304)	(0.0163)	(0.0199)
$D_t^{EUR} \times D_f$	-4.733***	-0.5872**	0.2685	0.0879	-0.6035**	0.6502**
	(1.473)	(0.2491)	(0.2456)	(0.2257)	(0.2428)	(0.2497)
$IRdiff_{t-1} \times D_t^{EUR} \times D_f$	0.6062*	0.1123*	-0.0499	-0.0330	0.0068	0.0052
	(0.3273)	(0.0602)	(0.0590)	(0.0626)	(0.0436)	(0.0461)
Bank-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank FEs	Yes	Yes	Yes	Yes	Yes	Yes
ILS-quarter FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	185,441	185,441	185,441	185,441	184,309	184,309
R^2	0.84461	0.87422	0.87644	0.86930	0.61615	0.61635

Note: Each column uses a firm-level dummy D_f interacted with $IRdiff_{t-1} \times D_t^{EUR}$. Standard errors clustered at bank level. Significance: *** 0.01, ** 0.05, * 0.1.

Robustness: New Loans (Alt. FEs, Loan Types, Top 5 Banks)

Back

Dependent Variable:	log(New loans)					
Specification:	Alternative FEs		Term & Other loans		Top 5 Banks	
Model:	(1)	(2)	(3)	(4)	(5)	(6)
$IRdiff_{t-1}$	0.0305	-0.0017	0.0124	-0.0111	0.0281	0.0025
	(0.0304)	(0.0271)	(0.0232)	(0.0224)	(0.0479)	(0.0482)
D_t^{EUR}		0.0754		0.5723*		0.6278
		(0.3267)		(0.2982)		(0.3040)
$IRdiff_{t-1} \times D_t^{EUR}$		0.0895		0.0683**		0.0733*
		(0.0657)		(0.0293)		(0.0343)
Bank-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank FEs	Yes	Yes	Yes	Yes	Yes	Yes
ILS-quarter FEs			Yes	Yes	Yes	Yes
Firm-quarter FEs	Yes	Yes				
Observations	182,054	185,441	123,375	125,829	159,339	162,725
R^2	0.97087	0.96189	0.86416	0.86018	0.85375	0.85156

Note: Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Robustness: OIS, IV, Covid loans

Back

Dependent Variable:	log(New loans)					
Specification:	OIS diff.		IV		+Covid loans	
Model:	(7)	(8)	(9)	(10)	(11)	(12)
$OISdiff_{t-1}$	0.0429	0.0108				
	(0.0820)	(0.0795)				
$IRdiff_{t-1}$			0.9765	0.7850	0.0249	0.0005
			(0.6094)	(0.5636)	(0.0359)	(0.0369)
D_t^{EUR}		0.6412**		-0.3466		0.6045**
		(0.2328)		(0.4544)		(0.2398)
$OISdiff_{t-1} \times D_t^{EUR}$		0.0821***				
		(0.0273)				
$IRdiff_{t-1} \times D_t^{EUR}$				0.3416**		0.0752**
				(0.1453)		(0.0313)
Bank-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank FEs	Yes	Yes	Yes	Yes	Yes	Yes
ILS-quarter FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	174,095	177,314	156,510	159,441	188,866	192,384
R^2	0.84363	0.84185	0.83879	0.83698	0.84344	0.84151

Note: Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

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