Business Inflation Exposure and Bank Lending

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Banca d'Italia
June 25, 2025

*The views stated herein are those of the authors and are not necessarily those of the Federal Reserve Board or the Federal Reserve System.

Motivation

- Inflation surged in 2021, affected firms and banks differently.

- Firms differed in their ability to pass-through input price inflation to output prices:

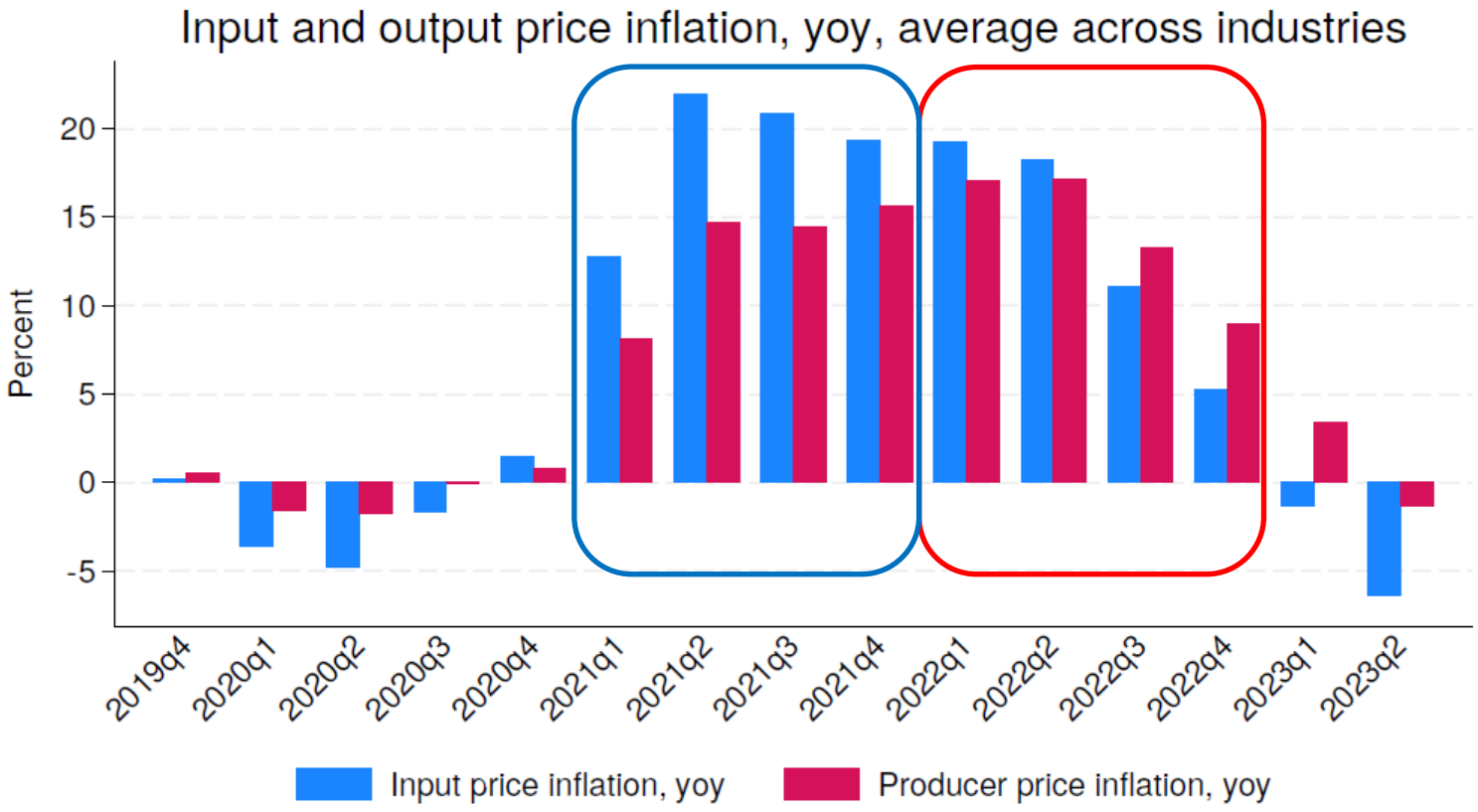
  - High pass-though firms experienced relatively better profitability, an improvement in creditworthiness, and more access to bank credit.

- Banks differed in their exposures to inflation, depending on the distribution of their loan portfolios across low vs. high pass-through firms.

  - Banks with higher exposures to low pass-through borrowers may have had concerns about asset quality of their portfolio and rebalances their lending.

Motivation

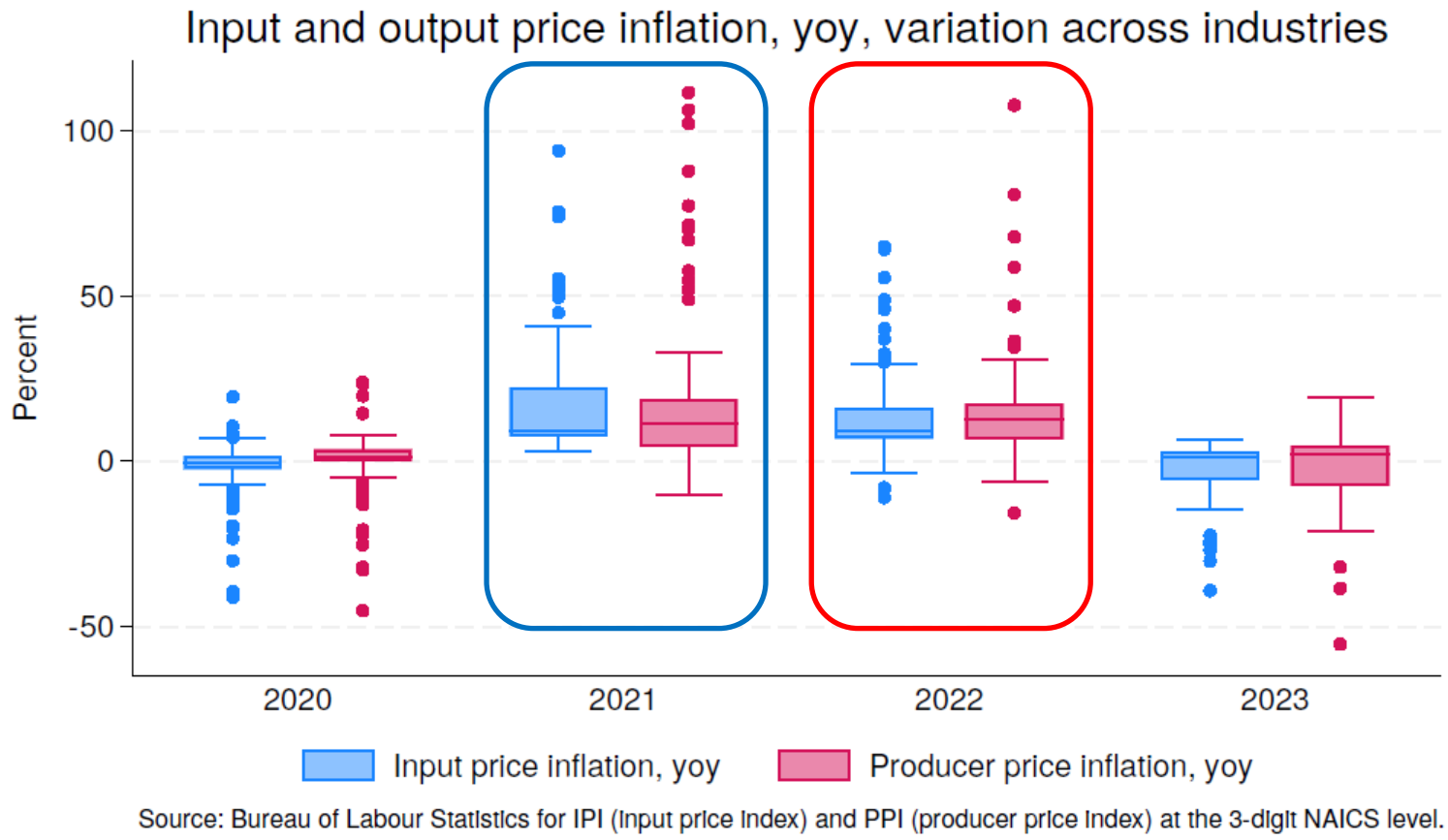
- Pass-through of input price inflation to output prices was initially incomplete, varied over time.



Source: Bureau of Labour Statistics for IPI (Input price Index) and PPI (producer price index) at the 3-digit NAICS level.

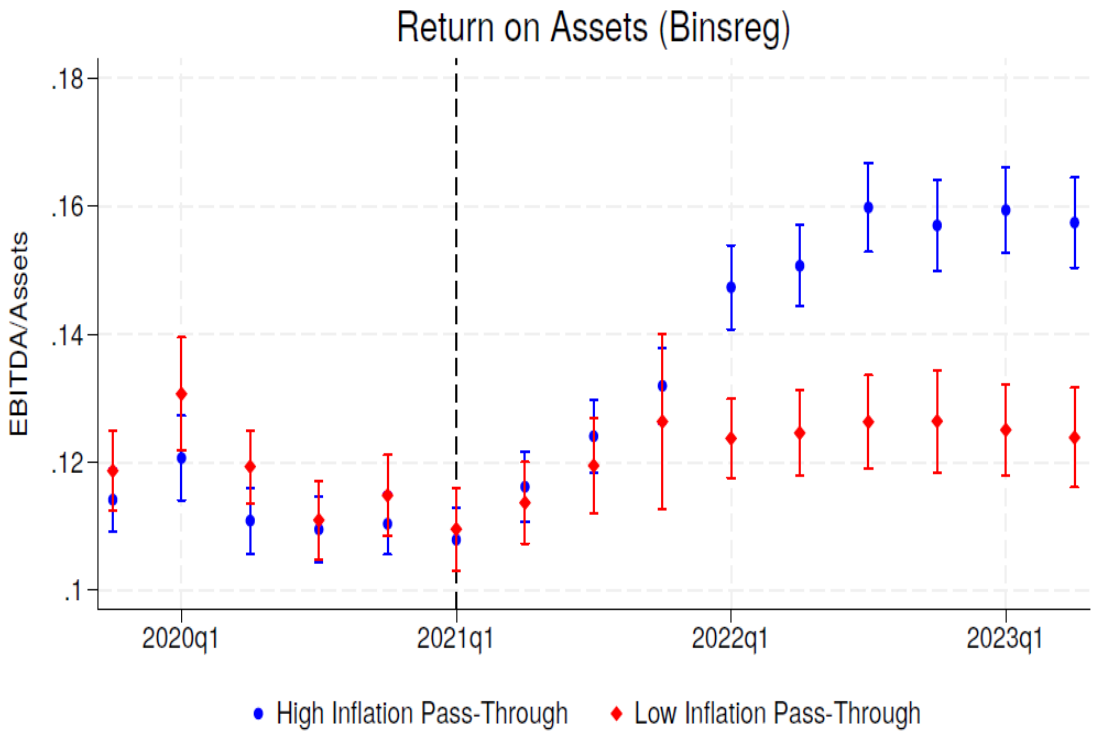
Motivation

- Pass-through of input price inflation to output prices varied over 3-digit NIACS industries.

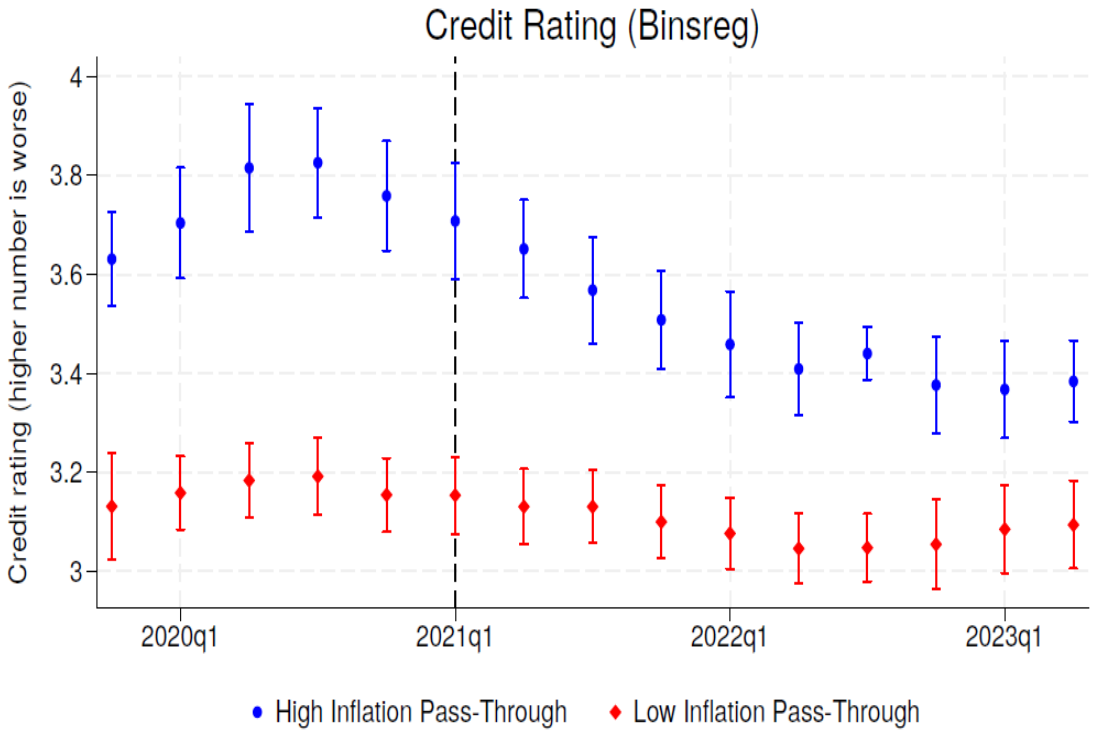


Motivation

- High pass-through firms become more profitable, more creditworthy, and experience more rapid loan growth.



Note: High/Low Inflation Pass-Through: firms in 3-digit NAICS industries with positive/negative difference between PPI and IPI inflation year-on-year for at least six quarters post-2021q1



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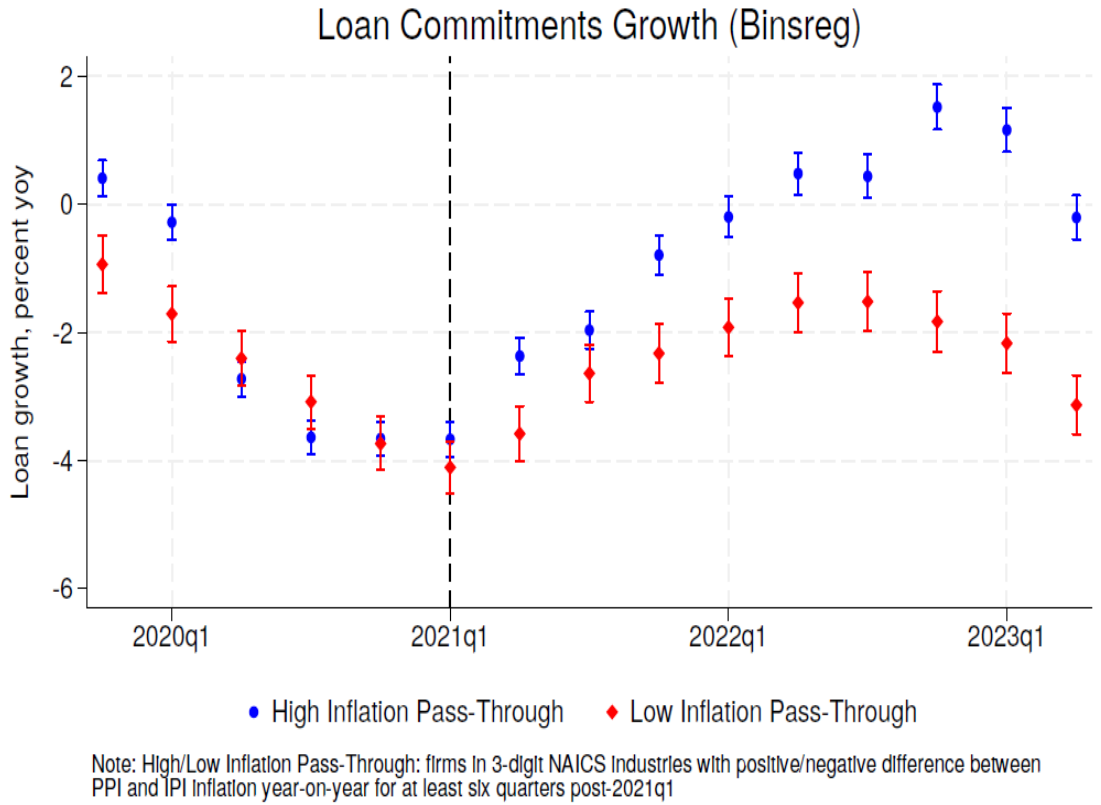

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Research questions

1. Did banks' exposure to inflation (i.e., through low pass-through borrowers) affect their lending post-2021?

2. What mechanism connects inflation to bank lending?

3. Were there real effects on borrowers that lost access to bank credit?

Findings

1. Banks more exposed to inflation cut lending and increased spreads post-2021, especially for firms in low-pass through industries.

2. This effect is stronger for banks with lower capital ratios.

3. There were real effects for firms in low pass-through industries that borrowed from banks exposed to inflation:

   - Post-2021, these firms had lower profitability, lower interest coverage ratios, weaker credit ratings, and higher utilization rates.

→ Overall, banks exposed to corporate inflation cut lending to low pass-through firms.

Literature

- Impact of inflation on bank intermediation.

Agarwal and Baron (JFE 2023):

- During the unexpected rise in U.S. inflation in the 1970s, banks exposed to inflation reduced lending more, through lower bank net worth, loan misallocation, and deposit outflows.

Boyd, Levine, Smith (JME 2001):

- At low-to-moderate rates of inflation, there is a strong negative association between inflation and lending by the financial sector to the private sector.

Jain and Converse (2023)

- Bank stock prices outperform the broader stock market on higher-than-expected consumer price inflation prints.
- Channel: higher-than-expected inflation causes interest rates to rise, and consequently, bank profits to rise due to incomplete passthrough of higher rates into bank deposit rates.

Literature

- Impact of inflation on firms' balance sheets.

  Brunnermeier et al. (2023):
  - The German hyper-inflation of 1919-1923 reduced the real debt burdens and incidence of bankruptcy for levered firms, increased equity values and employment (the debt-inflation channel)

  Coiboin, Gorodnichenko, Ropele (QJE 2020):
  - Firm with higher inflation expectations increase prices, increase demand for credit, reduce employment and capital.

→ We focus on the impact of inflation on bank credit supply while controlling for the monetary policy response;

→ Exploit the heterogeneous impact of inflation across industries.

Literature

- Firms' willingness/ability to pass through cost shocks to prices.

Brauning, Fillat, Joaquim (Boston Fed WP, 2023):

- Larger pass-through of cost shocks into prices in more concentrated industries, by industry leader firms (Compustat, BLS data for the U.S.).

Acharya, Crosignani, Eisert, Eufinger (NBER, 2023):

- Localized pass-through of supply chain constraints to PPI and CPI; to inflation expectations more broadly (European data).
- In response, firms with higher market power raise markups by more (conditional on demand).

L'Huillier and Phelan (2024)

- Shock dependence in price adjustments explains flat Phillips Curve: prices adjust fully to supply shocks but not to demand shocks.

Boissay, Collard, Manea, Shapiro (BIS WP, 2024)

- After MP tightening, financial stress flares up if inflation is supply- rather than demand-driven.

Core, De Marco, Eisert, Schepens (2025)

- Rate hikes are associated with firm's pricing decision, especially for borrowers with floating-rate loans

Measurement

Data sources

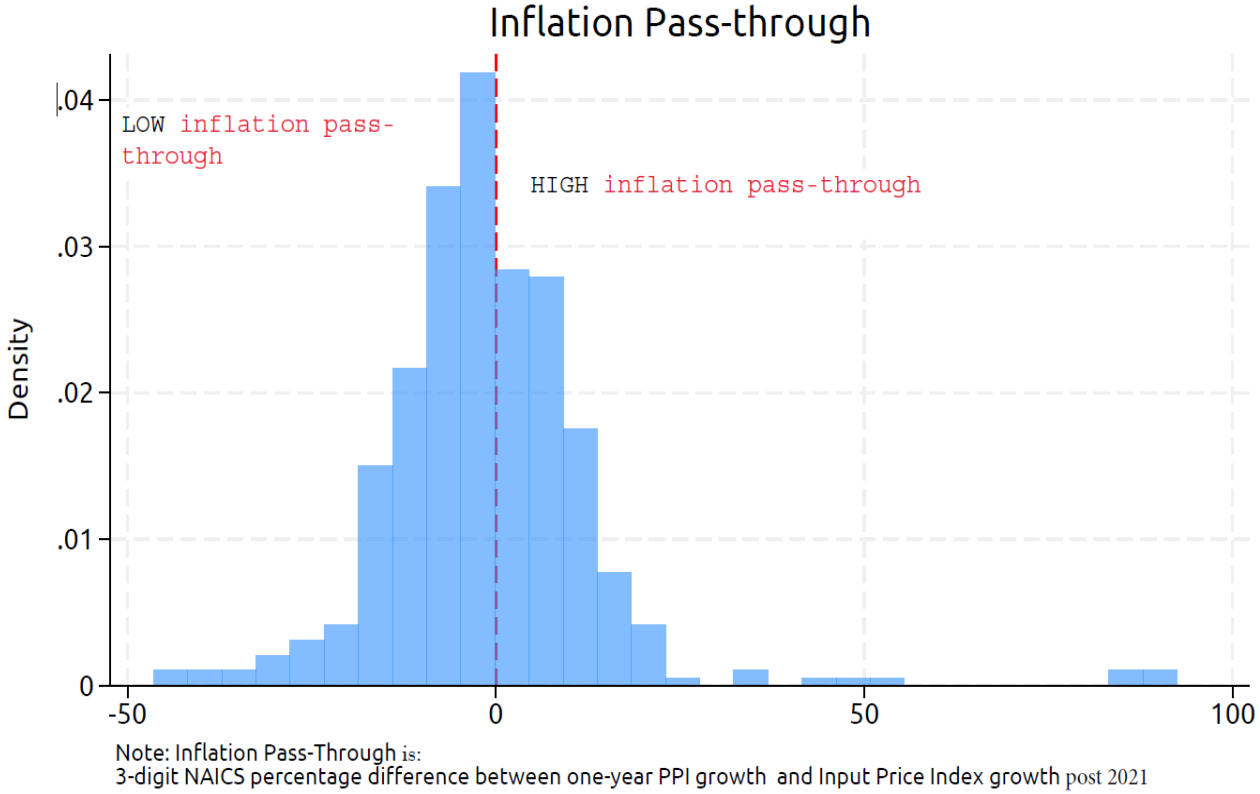
- **Bureau of Labor Statistics:** Input Price and Producer Price Index (IPI, PPI) at 3-digit NAICS
  - PPI for 51 industries, 1975q1-present; IPI for 59 industries, 2018q4-present.
  - IPI captures the cost of domestic and imported inputs; excludes the cost of capital and labor.
- **Y-14Q H1:** bank loan level data from credit registry, 2018Q1-2023Q2
  - Loan amount and loan spreads
  - Borrower information: name, industry, firm characteristics, location
  - We match Y-14Q with the BLS data at the 3-digit NAICS level
- **Y-9C:** quarterly bank level data

Data sources

- **U.S. Census Bureau:**
  - U.S. industry concentration at the 3-digit NAICS level, 2017
- **U.S. Bureau of Economic Analysis,** Fixed Assets Accounts Tables:
  - IK ratio = net stock of private intellectual property products / private structures, by industry
  - Higher IK ratio reflects lower tangibility
- **Drechsler et al. (2017, 2021)**:
  - Bank deposit and interest expense betas, 1984-2022 averages.

Firm and industry exposure to inflation

- Low pass-through: PPI inflation – IPI inflation < 0 (for at least 6 quarters post-2021)
- High pass-through: PPI inflation – IPI inflation > 0



	Total Outstanding Loans ($billion)				
	2023Q2	2023Q1	2021Q1	2019Q1	number of industries
High pass-through firm	842	851	783	703	21
Low pass-through firm	867	873	814	753	19
Total	1709	1724	1597	1456	40

Firm and industry exposure to inflation

- Pass-through not correlated with industry concentration, tangibility.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Dependent variable:	PPI inflation - IPI Inflation									PPI inflation	IPI inflation
PPI inflation	0.435***										
	(0.030)										
IPI inflation		-0.332***									
		(0.035)									
IPI Goods Inflation			-0.233***								
			(0.022)								
IPI Services Inflation				-0.501***							
				(0.078)							
IPI Imports Inflation					-0.117***						
					(0.026)						
HHI (2017)						0.002				0.005*	0.004
						(0.003)				(0.003)	(0.003)
Top 4 Rev Ratio (2017)							-0.032				
							(0.031)				
Top 8 Rev Ratio (2017)								-0.016			
								(0.028)			
IK Ratio (annual)									-0.011		
									(0.009)		
Constant	-3.554***	2.120***	1.951***	2.748***	0.566	-0.137	0.511	0.284	0.002	5.246***	6.881***
	(0.507)	(0.567)	(0.543)	(0.715)	(0.572)	(0.782)	(0.878)	(1.015)	(0.626)	(0.683)	(0.839)
Observations	597	597	591	591	591	500	567	567	597	748	500
R-squared	0.26	0.13	0.16	0.07	0.03	0.00	0.00	0.00	0.00	0.01	0.00

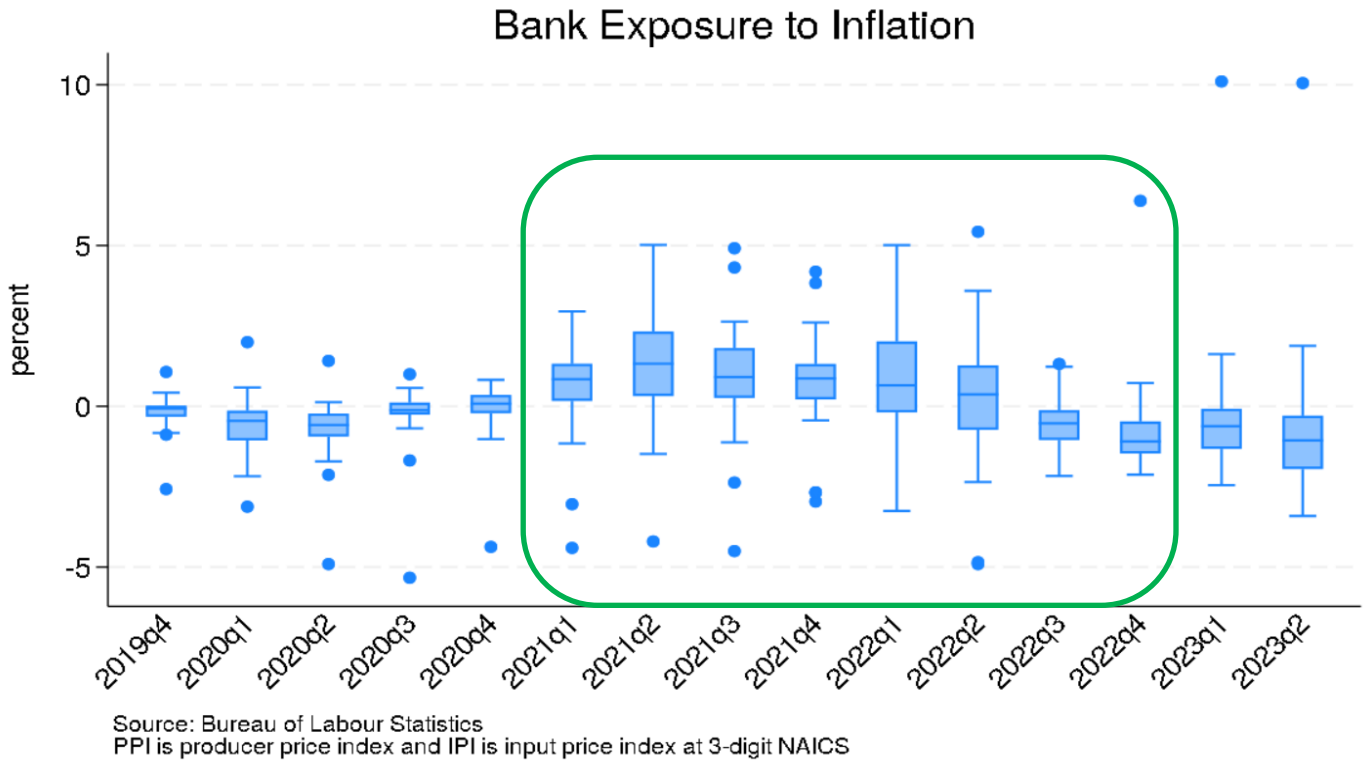
List of industries by pass-through

NAICS3	Low Pass-through
213	support activities for mining
221	utilities
311	food manufacturing
312	beverage and tobacco product
314	textile product mills
315	apparel manufacturing
325	chemical manufacturing
327	nonmetallic mineral product
333	machinery manufacturing
334	computer and electronic product manufacturing
336	transportation equipment manufacturing
339	miscellaneous manufacturing
481	air transportation
482	rail transportation
484	truck transportation
491	postal service
492	couriers and messengers
517	telecommunications
622	hospitals

NAICS3	High Pass-through
211	oil and gas extraction
212	mining (except oil and gas)
313	textile mills
316	leather and allied product manufacturing
321	wood product manufacturing
322	paper manufacturing
323	printing and related support activities,
324	petroleum and coal products
326	plastics and rubber products
331	primary metal manufacturing
332	fabricated metal product manufacturing
335	electrical equipment, appliance, and component
337	furniture and related product manufacturing
423	merchant wholesalers, durable goods
424	merchant wholesalers, nondurable goods
441	motor vehicle and parts dealers
444	building material and garden equipment and supplies dealers
445	food and beverage stores
483	water transportation
493	warehousing and storage
721	accommodation, including hotels and motels

Bank exposure to inflation

$$Bank\ Inflation\ Exposure_{bt} = -\sum_{j} \underbrace{\frac{Commitment_{bj}}{Commitment_{b}}}_{\text{Pre-inflation period 2018-19}} \underbrace{(PPI\ inflation_{jt} - IPI\ inflation_{jt})}_{\text{Inflation period 2021-onward}}$$



High values indicate that banks are exposed to inflation through their borrowers (i.e., they lend to low pass-through firms)

Main Results

Regression Specification # 1

- How do lending and loan spreads relate to bank inflation exposure?

$$Y_{fbt} = \beta_1 \, Bank \; Inflation \; Exposure_{bi} \times Post \; 2021_t +$$
$$+ \beta_2 \, Bank \; Inflation \; Exposure_{bi} +$$
$$+ \beta_3 \, Bank \; controls_{bt} + \beta_4 \, Bank \; controls_{bt} \times Post \; 2021_t + \delta_{ft} + \gamma_b + \theta_{bf} + \epsilon_{fbt}$$

Y_{fbt} Firm-bank loan growth/ loan spread

δ_{ft} Firm*time fixed effects

γ_b Bank fixed effects

θ_{bf} Bank-firm fixed effects

$$Bank \; Inflation \; Exposure_{bi} = -\sum_{j \neq i} \underbrace{\frac{Commitment_{bj}}{Commitment_b}}_{\text{Pre-inflation period 2018-19}} \underbrace{(PPI \; inflation_j - IPI \; inflation_j)}_{\text{Inflation period 2021-onward}}$$

Regression Specification # 2

- How do lending and spreads relate to (i) bank inflation exposure and (ii) borrower pass-through?

$$
\begin{aligned}
Y_{fbt} = {} & \beta_1 \, Bank\ Inflation\ Exposure_{bi} \times Post\ 2021_t + \\
& + \beta_2 \, Bank\ Inflation\ Exposure_{bi} \times Post\ 2021_t \times Low\ pass\ through_f + \\
& + \beta_3 \, Low\ pass\ through_f \times Post\ 2021_t + \beta_4 \, Low\ pass\ through_f \times Bank\ Inflation\ Exposure_{bi} + \\
& + \beta_5 \, Bank\ Inflation\ Exposure_{bi} + \beta_6 \, Low\ pass\ through_f + \\
& + \beta_7 \, Bank\ controls_{bt} + \beta_8 \, Bank\ controls_{bt} \times Post\ 2021_t + \delta_{ft} + \gamma_b + \theta_{bf} + \epsilon_{fbt},
\end{aligned}
$$

Results

Dependent variable:	(1) log(Commitments)	(2) log(Commitments)	(3) gr(Commitments)	(4) gr(Commitments)	(5) Loan Spreads	(6) Loan Spreads
Bank Inflation Exposure × Post 2021	-0.011***	0.004	-0.017***	0.003	0.029***	0.013**
	(0.002)	(0.003)	(0.004)	(0.006)	(0.005)	(0.007)
Bank Inflation Exposure × Post 2021 × Low Pass-through Firm		-0.026***		-0.034***		0.030***
		(0.004)		(0.007)		(0.009)
Observations	327,093	327,093	327,098	327,098	248,906	248,906
R-squared	0.95	0.95	0.83	0.83	0.90	0.90
Bank controls ## Post 2021	Yes	Yes	Yes	Yes	Yes	Yes
FE bank	Yes	Yes	Yes	Yes	Yes	Yes
FE bank × firm	Yes	Yes	Yes	Yes	Yes	Yes
FE firm × time	Yes	Yes	Yes	Yes	Yes	Yes

- Bank controls: log(assets), uninsured deposits, L4.CET1/RWA, L4.ROA/Assets
- Impact: One st dev increase in bank inflation exposure (1.15%) translates into 2.5% decrease in committed amounts post-2021 to low pass-through firms: 1.15*(0.004-0.026)*100.

Results: Firm Size

	(1)	(2)	(3)	(4)	(5)	(6)
	Top 25 asset size firms			Bottom 75 asset size firms		
Dependent variable:	log(Comm)	gr(Comm)	Spread	log(Comm)	gr(Comm)	Spread
Bank Inflation Exposure × Post 2021	-0.016**	-0.043***	0.051***	0.015***	0.031***	-0.001
	(0.006)	(0.011)	(0.008)	(0.004)	(0.008)	(0.007)
Bank Inflation Exposure × Post 2021 × Low Pass-through Firm	-0.022**	-0.013	0.029**	-0.035***	-0.063***	0.030***
	(0.009)	(0.017)	(0.011)	(0.005)	(0.009)	(0.010)
Observations	66,316	66,317	54,739	200,729	200,733	159,750
R-squared	0.92	0.81	0.85	0.95	0.85	0.91
Bank controls ## Post 2021	Yes	Yes	Yes	Yes	Yes	Yes
FE bank	Yes	Yes	Yes	Yes	Yes	Yes
FE bank × firm	Yes	Yes	Yes	Yes	Yes	Yes
FE firm × time	Yes	Yes	Yes	Yes	Yes	Yes

- Is the industry-level pass-through (PT) relevant for smaller firms within each industry?
- Results hold for all firm sizes, not driven by larger firms with pricing power.

Results: Industry Concentration

	(1)	(2)	(3)	(4)	(5)	(6)
	High HHI industries			Low HHI industries		
Dependent variable:	log(Comm)	gr(Comm)	Spread	log(Comm)	gr(Comm)	Spread
Bank Inflation Exposure × Post 2021	-0.002	-0.002	0.043***	0.010**	0.011	-0.011
	(0.005)	(0.009)	(0.009)	(0.005)	(0.008)	(0.009)
Bank Inflation Exposure × Post 2021 × Low Pass-through Firm	-0.019***	-0.029**	0.003	-0.032***	-0.046***	0.056***
	(0.006)	(0.012)	(0.013)	(0.006)	(0.010)	(0.012)
Observations	160,326	160,331	130,036	147,425	147,425	104,815
R-squared	0.95	0.83	0.91	0.95	0.83	0.88
Bank controls ## Post 2021	Yes	Yes	Yes	Yes	Yes	Yes
FE bank	Yes	Yes	Yes	Yes	Yes	Yes
FE bank × firm	Yes	Yes	Yes	Yes	Yes	Yes
FE firm × time	Yes	Yes	Yes	Yes	Yes	Yes

- High concentration could boost (i) pass-through and (ii) access to bank loans.
- Results are similar for high and low concentration industries.

Results: Industry Tangibility

	(1)	(2)	(3)	(4)	(5)	(6)
	High IK/low tangibility industries			Low IK/high tangibility industries		
Dependent variable:	log(Comm)	gr(Comm)	Spread	log(Comm)	gr(Comm)	Spread
Bank Inflation Exposure × Post 2021	0.004	-0.001	0.001	-0.000	0.005	0.034***
	(0.004)	(0.007)	(0.008)	(0.006)	(0.012)	(0.011)
Bank Inflation Exposure × Post 2021 × Low Pass-through Firm	-0.025***	-0.029***	0.033***	-0.023***	-0.037***	0.027*
	(0.004)	(0.009)	(0.011)	(0.007)	(0.013)	(0.015)
Observations	184,145	184,146	146,179	142,948	142,952	102,727
R-squared	0.95	0.83	0.89	0.94	0.82	0.91
Bank controls ## Post 2021	Yes	Yes	Yes	Yes	Yes	Yes
FE bank	Yes	Yes	Yes	Yes	Yes	Yes
FE bank × firm	Yes	Yes	Yes	Yes	Yes	Yes
FE firm × time	Yes	Yes	Yes	Yes	Yes	Yes

- Low IK (tangible industries) could be (i) hit harder by IPI inflation and (ii) have more tangible capital to used as collateral for bank loans.
- Results are similar for low and high IK industries, not driven by industry tangibility.

Results: Firm and Loan Types

- Exposed banks *cut loans* to low pass-through borrowers:
  - Especially to smaller firms, with shorter-term relation.
  - Especially for credit lines and non-investment loans.
- Exposed banks *increase loan spreads* to low pass-through borrowers:
  - Especially to firms that are smaller, have shorter-term relation.
  - Especially for non-investment loans.
- See Appendix.

Results: PPI or IPI Inflation

- Bank Inflation Exposure = negative(weighted average of PPI inflation)

Dependent variable:	(1) log(Commitments)	(2) log(Commitments)	(3) gr(Commitments)	(4) gr(Commitments)	(5) Loan Spreads	(6) Loan Spreads
Bank Inflation Exposure × Post 2021	0.001	-0.000	0.001	-0.001	-0.029***	-0.024***
	(0.002)	(0.002)	(0.004)	(0.004)	(0.005)	(0.005)
Bank Inflation Exposure × Post 2021		0.003		0.010		-0.027***
× **Low PPI Inflation Firm**		(0.004)		(0.008)		(0.007)
Observations	262,326	262,326	262,331	262,331	201,939	201,939
R-squared	0.95	0.95	0.84	0.84	0.90	0.90

- Bank Inflation Exposure = weighted average of IPI inflation
- Higher BIE is worse in both cases.

Dependent variable:	(1) log(Commitments)	(2) log(Commitments)	(3) gr(Commitments)	(4) gr(Commitments)	(5) Loan Spreads	(6) Loan Spreads
Bank Inflation Exposure × Post 2021	-0.005***	0.002	-0.007**	0.002	0.052***	0.058***
	(0.002)	(0.003)	(0.003)	(0.005)	(0.003)	(0.006)
Bank Inflation Exposure × Post 2021		-0.011***		-0.013**		-0.010
× **High IPI Inflation Firm**		(0.004)		(0.006)		(0.007)
Observations	327,093	327,093	327,098	327,098	248,906	248,906
R-squared	0.95	0.95	0.83	0.83	0.90	0.90
Bank controls ## Post 2021	Yes	Yes	Yes	Yes	Yes	Yes
FE bank	Yes	Yes	Yes	Yes	Yes	Yes
FE bank × firm	Yes	Yes	Yes	Yes	Yes	Yes
FE firm × time	Yes	Yes	Yes	Yes	Yes	Yes

Mechanisms:
Borrower credit quality and bank capital

Mechanism: the role of borrowers' credit quality

Dependent variable:	(1) **Probability of Default**	(2) **Credit Rating (higher is worse)**
Bank Inflation Exposure × Post 2021	-0.000	0.011**
	(0.000)	(0.005)
Bank Inflation Exposure × Post 2021 × Low Pass-through Firm	0.001**	0.015***
	(0.001)	(0.006)
Observations	285,343	328,788
R-squared	0.82	0.92
Bank controls ## Post 2021	Y	Y
FE bank	Y	Y
FE bank × firm	Y	Y
FE firm × time	Y	Y

- Banks with high exposure to inflation report that low pass-through firms become less credit worthy, in relative terms, post-2021.

Mechanism: the role of bank capital

Dependent variable:	(1) log(Commitments)	(2) gr(Commitments)
Bank Inflation Exposure × Post 2021	0.065***	-0.034
	(0.022)	(0.042)
Bank Inflation Exposure × Post 2021 × Low Pass-through Firm	-0.148***	-0.125*
	(0.037)	(0.070)
Bank Inflation Exposure × Post 2021 × Low Pass-through Firm × Low Capital	-0.009***	-0.007
	(0.003)	(0.005)
Observations	327,093	327,098
R-squared	0.95	0.83
Lower level interactions	Yes	Yes
Bank controls ## Post 2021	Yes	Yes
FE bank	Yes	Yes
FE bank × firm	Yes	Yes
FE firm × time	Yes	Yes

- Given credit quality concerns, banks with low capital cut lending more to small firms.

Competing explanation: The role of monetary policy

Control for monetary policy tightening

- Fair value security losses:
  - Banks with larger security losses may cut lending more.
- Fixed-rate loans:
  - Banks with larger fixed-rate loan portfolio shares ex-ante may suffer lower profitability, cut lending more.
- Deposit betas (not shown):
  - Banks with lower betas may be more profitable, but lose more deposits.

Competing explanations: control for monetary policy

- Exposure to monetary tightening: security valuation losses and fixed rate loans.

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	log(Commitments)			Cumulative Growth of Commitments			Loan spreads		
Bank Inflation Exposure × Post 2021	0.000	0.002	0.000	-0.005	-0.002	-0.005	0.031***	0.046***	0.049***
	(0.005)	(0.005)	(0.005)	(0.014)	(0.013)	(0.014)	(0.009)	(0.009)	(0.010)
Bank Inflation Exposure × Post 2021	-0.042***	-0.036***	-0.041***	-0.071***	-0.058***	-0.069***	0.031**	0.040***	0.038***
× Low Pass-through Firm	(0.007)	(0.007)	(0.007)	(0.018)	(0.017)	(0.018)	(0.013)	(0.013)	(0.013)
Security Loss Exposure × Post 2021	-0.007		0.092***	-0.016		0.258***	-0.003		-0.037*
	(0.005)		(0.019)	(0.010)		(0.047)	(0.006)		(0.021)
Security Loss Exposure × Post 2021	0.064***		-0.006	0.178***		-0.013	-0.042**		0.015**
× Low Pass-through Firm	(0.018)		(0.005)	(0.044)		(0.010)	(0.020)		(0.006)
Fixed Rate Loan Exposure × Post 2021		-0.000	-0.001		-0.001	-0.003		-0.008***	-0.009***
		(0.001)	(0.001)		(0.002)	(0.002)		(0.002)	(0.002)
Fixed Rate Loan Exposure × Post 2021		0.002**	0.001*		0.003*	0.003*		0.027***	0.028***
× Low Pass-through Firm		(0.001)	(0.001)		(0.002)	(0.002)		(0.002)	(0.002)
Observations	318,584	318,584	318,584	315,967	315,967	315,967	238,556	238,556	238,556
R-squared	0.96	0.96	0.96	0.81	0.81	0.81	0.91	0.91	0.91
Lower-level interactions and controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls, in levels and interacted w/ Post 2021	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FE bank	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FE bank × firm	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FE firm × time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Real Effects

Real Effects: collapse Y-14Q data at the firm level

Dependent variable:	(1) ROA	(2) ICR	(3) Rating	(4) log(Utilization)	(5) Capex	(6) Cash
Avrg. Bank Inflation Exposure × Post 2021	-0.020***	-0.216**	0.035***	0.012***	0.000	0.001
× Low Pass-through Firm	(0.005)	(0.085)	(0.009)	(0.003)	(0.000)	(0.001)
Low Pass-through Firm × Post 2021	-0.089***	-2.062***	0.188***	0.054***	-0.001***	-0.011***
	(0.009)	(0.166)	(0.023)	(0.009)	(0.000)	(0.002)
Avrg. Bank Inflation Exposure × Post 2021	0.006	0.040	0.003	-0.014***	-0.000	-0.000
	(0.004)	(0.082)	(0.010)	(0.004)	(0.000)	(0.001)
Avrg. Bank Inflation Exposure × Low Pass-through Firm	0.004	-0.039	-0.018	-0.009	-0.003***	-0.004***
	(0.005)	(0.104)	(0.016)	(0.007)	(0.001)	(0.001)
Avrg. Bank Inflation Exposure	0.019***	0.530***	0.073***	0.014**	0.002***	0.006***
	(0.004)	(0.096)	(0.017)	(0.006)	(0.000)	(0.002)
Low Pass-through Firm (dummy)	0.043***	1.208***	-0.042	-0.022**	0.004***	0.003
	(0.011)	(0.278)	(0.028)	(0.009)	(0.001)	(0.002)
Observations	327,619	329,514	329,476	329,549	227,857	329,549
R-squared	0.73	0.68	0.72	0.75	0.62	0.79
Firm controls, in levels and interacted w/ Post 2021	Yes	Yes	Yes	Yes	Yes	Yes
Avrg. bank controls, in levels and interacted w/ Post 2021	Yes	Yes	Yes	Yes	Yes	Yes
FE firm	Yes	Yes	Yes	Yes	Yes	Yes
FE time	Yes	Yes	Yes	Yes	Yes	Yes

Dependent variables: ICR = EBITDA/Interest expense; Rating = higher is worse; Capex = capital expenditure/assets.
Firm controls: log(assets), sales growth yoy, cash/assets.

Conclusion

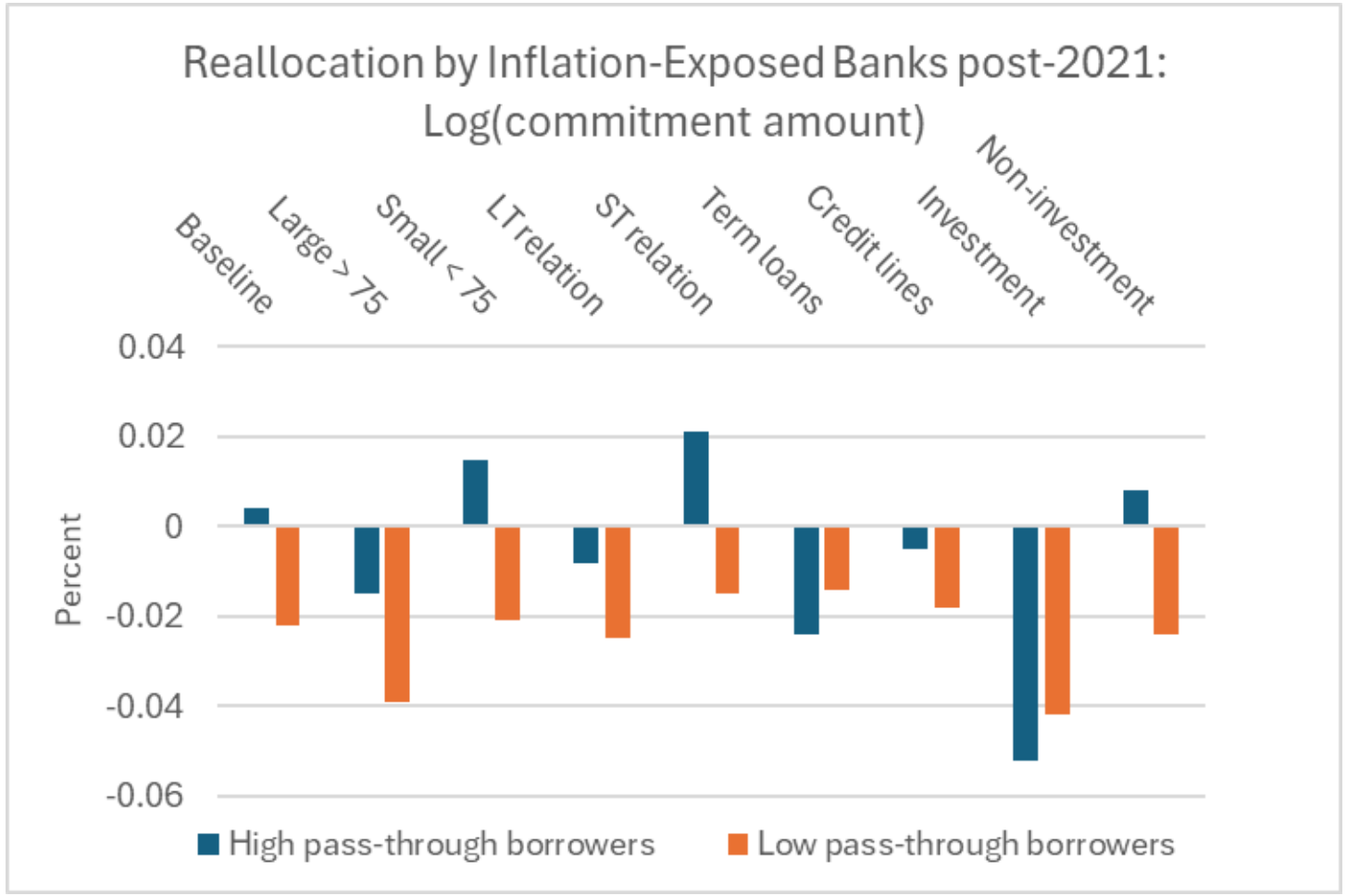
- Inflation impacted firms and industries differently.
  - Banks with high exposure to inflation cut credit to low pass-through firms.
- Low pass-through firms became relatively financially weaker.
  - Banks with lower capital cut lending more.
- Results are robust to controlling for monetary policy tightening.
- The reduction in credit had real effects.
  - Firms with low pass-through experienced lower profitability, interest coverage ratios, credit ratings, and increased utilization.

Thank you!

Appendix

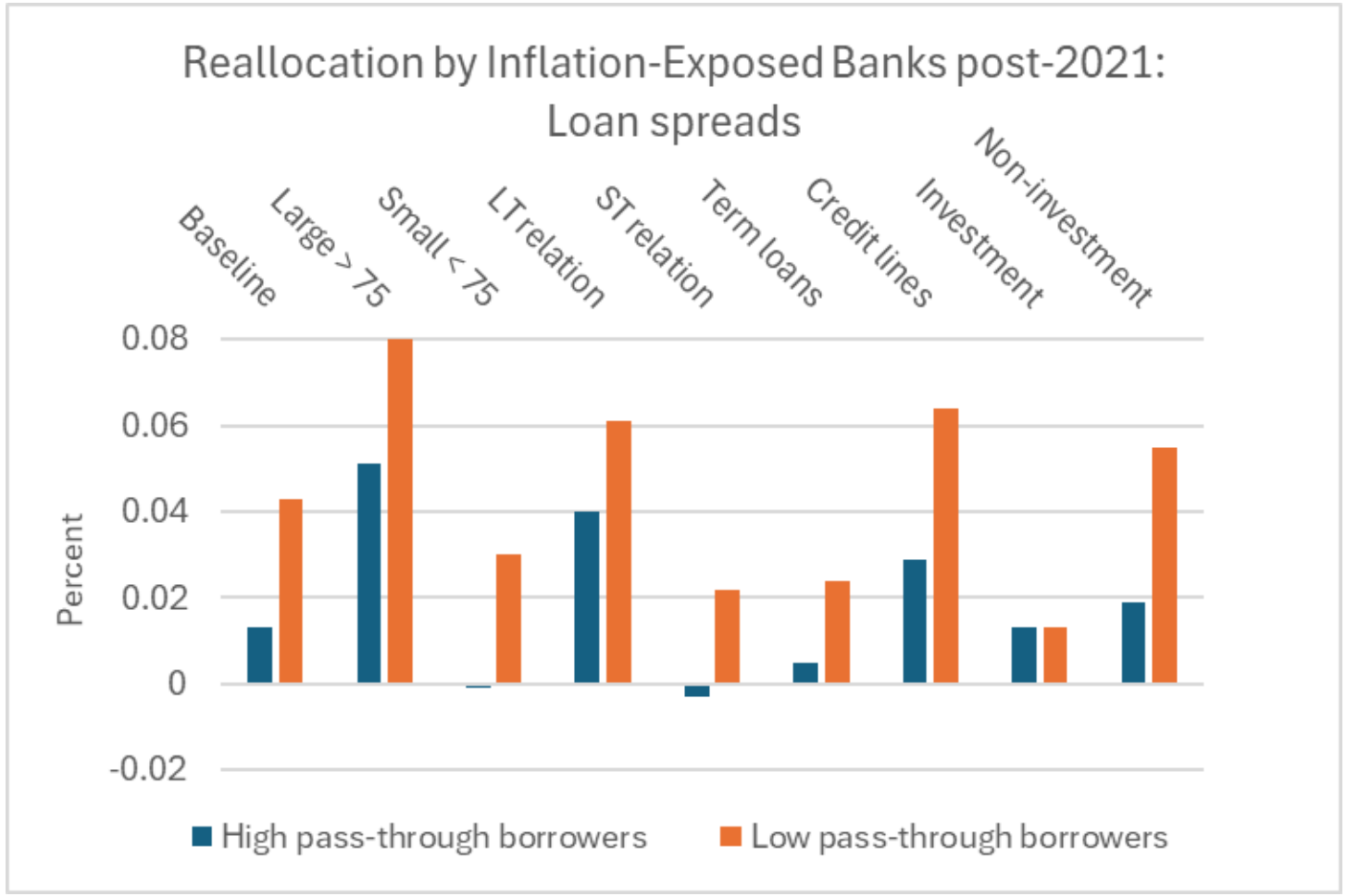
Results: Firm and Loan Types (Loan Amounts)

- Exposed banks cut loans away to low pass-through borrowers:
  - Especially to smaller firms, with shorter-term relation with bank.
  - Especially for credit lines and non-investment loans.



Results: Firm and Loan Types (Loan Spreads)

- Exposed banks increase loan spreads to low pass-through borrowers:
  - Especially to firms that are smaller, have shorter-term relation.
  - Especially for non-investment loans.



Data sources (continued)

- **Y-14Q H1 filters**

  1. Drop borrowers with one single bank and multiple industries.
  2. Drop borrowers in financial industries (NAICS 52).
  3. Drop borrowers assigned to >3 industries in any given quarter (by one or more banks).
  4. For borrowers assigned to <=3 industries in any given quarter, keep the industry with the largest committed amount over the entire sample period.
  5. Keep firms present for at least 15 quarters.
  6. Keep firm-bank pairs present for at least 12 quarters.

Sample characteristics

	mean	sd
bank-firm level (like loan level)		
loan size (million)	36	143
loan spread %	1.37	1.1
prob. of default %	1.9	7.7
investment grade (1/0)	0.43	0.49
Bank level		
Bank inflation exposure %	0.074	1.15
Tier 1 Capital %	13	2.08
ROA %	1.05	1.04
Uninsured Deposits/Total Deposits %	45	13
Assets (billion)	758	928
BLS price indexes		
PPI (Producer Price Index) %	5.71	12.9
Input Price Index (IPI) %	6.8	11.5

Pre/post-2021 firm characteristics

- Low inflation pass-through firms' quality deteriorates during the post-2021 inflation period

	Prob of default %	Past due (1/0)	Spread %	ROA (%)	Sales growth %
			Pre-2021		
Low-pass through firm	1.8	0.009	0.9	11	2.4
High-pass through firm	2.4	0.009	1.4	11	2.5
Difference (low -high)	-0.4***	0.0005	-0.5***	0	-0.1
			Post-2021		
Low-pass through firm	2.5	0.01	1.3	10	2.8
High-pass through firm	2.2	0.009	1.6	15	3.7
Difference (low -high)	0.03**	0.002**	-0.3***	-5.00***	-1.1**

Notes: Spread is % above base rate

Results

Dependent variable:	(1) log(Commitments)	(2) log(Commitments)	(3) gr(Commitments)	(4) gr(Commitments)	(5) Loan Spreads	(6) Loan Spreads
Bank Inflation Exposure × Post 2021	-0.011***	0.004	-0.017***	0.003	0.029***	0.013**
	(0.002)	(0.003)	(0.004)	(0.006)	(0.005)	(0.007)
Bank Inflation Exposure × Post 2021		-0.026***		-0.034***		0.030***
× Low Pass-through Firm		(0.004)		(0.007)		(0.009)
Uninsured Deposits Ratio	-0.205***	-0.204***	-0.307***	-0.306***	-0.480***	-0.481***
	(0.038)	(0.038)	(0.067)	(0.067)	(0.064)	(0.063)
Uninsured Deposits Ratio × Post 2021	-0.061**	-0.064**	-0.074*	-0.079*	0.320***	0.322***
	(0.026)	(0.026)	(0.045)	(0.045)	(0.042)	(0.042)
CET1 Ratio (4 lags)	0.004**	0.003**	0.005	0.004	-0.044***	-0.044***
	(0.002)	(0.002)	(0.003)	(0.003)	(0.004)	(0.004)
CET1 Ratio × Post 2021	-0.007***	-0.006***	-0.015***	-0.015***	0.054***	0.053***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.003)	(0.003)
ROA (4 lags)	0.002	0.001	-0.003	-0.004	0.011*	0.011*
	(0.003)	(0.003)	(0.005)	(0.005)	(0.006)	(0.006)
"ROA × Post 2021 "	0.004	0.005	0.016***	0.017***	-0.027***	-0.028***
	(0.004)	(0.004)	(0.006)	(0.006)	(0.007)	(0.007)
Log(Assets)	0.168***	0.168***	0.335***	0.334***	0.066***	0.065***
	(0.015)	(0.015)	(0.030)	(0.030)	(0.017)	(0.017)
Log(Assets) × Post 2021	-0.005**	-0.005***	-0.004	-0.004	-0.033***	-0.033***
	(0.002)	(0.002)	(0.004)	(0.004)	(0.004)	(0.004)
Observations	327,093	327,093	327,098	327,098	248,906	248,906
R-squared	0.95	0.95	0.83	0.83	0.90	0.90
Bank controls ## Post 2021	Yes	Yes	Yes	Yes	Yes	Yes
FE bank	Yes	Yes	Yes	Yes	Yes	Yes
FE bank × firm	Yes	Yes	Yes	Yes	Yes	Yes
FE firm × time	Yes	Yes	Yes	Yes	Yes	Yes

- One st dev increase in bank inflation exposure (1.15%) translates into 2.5% decrease in committed amounts post-2021 for low pass-through firms.