

Business Inflation Exposure and Bank Lending*

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Abstract

We show that banks reduce lending to business borrowers whose profit margins and credit worthiness deteriorate with high inflation. We use U.S. credit registry data on bank lending to business borrowers and information on input and producer price inflation to calculate banks' exposure to more affected firms. In our difference-in-difference approach, business borrowers differ in their degree of *inflation pass-through* (i.e., the extent to which they pass input price inflation onto output prices charged to customers), and banks differ in their ex-ante loan portfolio exposures to low pass-through borrowers (i.e., to firms whose profit margins suffer from high inflation). We find that firms from low inflation pass-through industries (i.e., that only partially pass input price inflation onto output prices) experience reduced access to bank loans and higher credit spreads during high inflation. Furthermore, we find that banks' exposure to low pass-through borrowers exacerbates the effect of high inflation on lending volumes and spreads, as banks with higher exposure to low pass-through firms curtail lending and increase spreads by more, especially to low pass-through firms, consistent with a negative effect of high inflation on the supply of bank lending. Finally, we find that the reduction in loan supply generates real effects, as firms in low inflation pass-through industries borrowing from banks with high exposure to inflation suffer from lower profitability and investment.

Keywords: Inflation, cost pass-through, bank lending, borrower risk.

JEL Codes: E31, G21, L16

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1 Introduction

The elevated price inflation since 2021 has affected banks' and borrowers' balance sheets through various channels with potential economic and financial implications. Recently, the focus has been on the consequences to banks from changes in the value of their securities portfolios and deposit funding resulting from the high interest rates associated with inflationary pressures. However, less attention has been placed on a parallel, pre-existing channel, in which high inflation affects banks indirectly through the deterioration in their borrowers' credit quality and profitability, amid their limited ability to pass-through input price inflation to output prices, which is the focus of this paper. For borrowers that are better able to pass input price inflation to output prices (i.e., "high inflation pass-through" borrowers), the elevated inflation likely helps their profit margins (Bräuning *et al.*, 2023), ability to repay loans, and access to bank credit. The opposite is the case for "low inflation pass-through" borrowers, for whom inflation squeezes profit margins and erodes their debt repayment capacity.

Through its effect on borrowers' credit worthiness, inflation also affects banks differently through their exposures to borrowers from high vs. low pass-through industries. Banks with higher exposures to borrowers in high pass-through industries likely benefit from more resilient credit quality in their loan portfolios. On the contrary, banks more highly exposed to borrowers in low pass-through industries likely experience a deterioration in their credit portfolios given their borrowers' lower profitability, which may lead banks to curtail the supply of credit.

In this paper we examine three questions regarding the impact of high inflation on bank lending. First, what is the impact of business borrowers' exposures to inflation (which depends on their ability to pass through input price inflation on output prices) on their access to bank credit? Second, what is the impact of banks' exposures to low pass-through borrowers on their supply of bank credit? Last, do firms with greater reliance on banks with high exposure to inflation experience different economic outcomes than their peers?

These questions map into three research hypotheses. First, firms in low pass-through industries (i.e., those with lower inflation pass-through) may pose greater risks to banks. Given these firms' lower profits and higher default risk, they have lower access to credit and encounter higher credit costs. Second, banks with greater exposure to low pass-through firms (i.e., to business borrowers with limited ability to pass input price inflation into output prices) cut lending even more to such firms. Third, firms relying on banks with high exposures to inflation through low inflation pass-through borrowers perform worse than comparable firms.

Our findings validate these hypotheses. First, firms in low pass-through industries experience slower growth in loan commitments and higher loan spreads in the high inflation period. The results are largely driven by firms that, on an ex-ante basis, have non-investment grade credit ratings in 2018-2019. The mix of slower loan growth and higher spreads is consistent with a reduction in the supply of bank credit to firms in low pass-through industries.

Second, we test whether banks exposed to low pass-through borrowers curtail their supply of credit to all borrowers or only to those in low pass-through industries. We find that banks with higher ex-ante exposures to borrowers in low pass-through industries reduce lending by more to such firms—and increase credit spreads by more to all firms—during the period of high inflation that started in 2021. The results hold in the presence of borrower-time fixed effects that control for credit demand like in [Khwaja and Mian \(2008\)](#). The results are robust to controlling for the effect of tighter monetary policy on banks' credit supply, reflected by banks' valuation losses on security portfolios and exposure to interest rate risk through fixed rate loans, which are distinct from banks' exposures to high inflation through low pass-through borrowers. We also find that the mechanism driving the lower supply of credit is related to banks' balance sheet constraints that become more binding when high inflation erodes the asset quality of loans portfolios. Banks with higher exposures to low pass-through firms deemed these firms riskier and experienced higher delinquency rates from these borrowers. The interaction between lower asset quality and lower capital ratios pushes banks to reduce credit especially to low pass-through firms.

Third, firms with low inflation pass-through (i.e., negatively impacted by inflation) that receive loans from banks with high exposure to inflation (i.e., to low pass-through borrowers) experience relatively lower returns on assets, lower interest coverage ratios, and lower capital expenditures in the high inflation period. The finding suggests that the reduced supply of loans by banks with higher exposure to inflation generates real effects, as firms that are negatively impacted by inflation suffer lower profitability and investment.

We use data from the Federal Reserve’s credit registry (Y-14Q H.1. schedule) for bank loans to businesses, which we merge with U.S. Bureau of Labor Statistics (BLS) data on Input Price Index (IPI) and Producer Price Index (PPI) inflation available at the 3-digit NAICS level. The combined dataset allows us to *distinguish between borrowers in high vs. low inflation pass-through industries*—i.e., borrowers which benefited or suffered from inflation, respectively—according to whether the difference between the year-over-year PPI inflation and IPI inflation was positive or negative, respectively, on average during the high-inflation period in our sample (2021:Q1-2023:Q2). Following this approach, we define “inflation pass-through” as the difference between PPI inflation than IPI inflation at the industry level. We also *distinguish between banks with high vs. low exposures to borrowers in low pass-through industries*, according to whether the weighted average of the pass-through of each bank’s commercial and industrial (C&I) borrowers was negative or positive, respectively, during the high-inflation period. The weights are based on banks’ ex-ante commitments to borrowers from each industry averaged over 2018-2019. Thus, banks with high exposures to low pass-through borrowers are those with high loan concentrations to borrowers in industries that suffer from inflation, i.e., with limited ability of passing input price increases onto output prices.

We use a simple difference-in-difference approach that allows us to observe differences in bank lending between the low and high inflation periods (2018:Q1-2020:Q4 and 2021:Q1-2023:Q2) and between borrowers in high and low inflation pass-through industries, respectively. First, we regress loan commitments (in log levels and growth) and loan spreads (in

levels) averaged at the bank-borrower pair level on indicator variables for borrowers in low inflation pass-through industries and for quarters covering the high inflation period, as well as interactions between the two. We control for firm and bank characteristics in the presence of firm, bank, and time fixed effects. Second, we regress the same loan outcomes on a measure of banks' exposure to low pass-through borrowers (which is industry-specific depending on each borrower's industry), the indicator variable for firms' low inflation pass-through status, and interactions between the two and an indicator variable for the high inflation period (2021:Q1-2023:Q2); we still control for bank characteristics, while additionally deploying bank fixed effects, bank-borrower fixed effects, and borrower-time fixed effects to control for demand like in [Khwaja and Mian \(2008\)](#). Third, to assess real effects, we collapse the dataset at the firm level, and regress firms' economic outcomes on their low pass-through status, their banks' average exposure to high inflation, the high inflation period indicator variable, banks and firm controls, in the presence of bank and firm fixed effects.

Our results are subject to several important caveats. First, high inflation affects banks and firms through several other channels than the pass-through of cost inflation onto output prices, which we do not address in this paper. For instance, leveraged borrowers often benefit as high inflation reduces the real value of their debt, as shown in [Brunnermeier *et al.* \(2023\)](#). Our channel works in parallel and may offset the beneficial impact of inflation through this debt-inflation channel, especially for firms in low pass-through industries for which high inflation erodes profit margins.

Second, our paper attempts to disentangle the effects of high inflation from those of the related monetary policy tightening on bank lending, while both could weaken firms' and banks' balance sheets simultaneously. For instance, a higher reliance on fixed interest rates at a time of rising interest rates may help borrowers and hurt lenders. Similarly, higher interest rates may reduce the value of banks' security portfolios and prompt bank deposit outflows to higher-yield investment opportunities that lower banks' ability to finance loans. However, borrowing firms' ability to pass through input price inflation to output prices is likely not

correlated with their leverage or reliance on variable rate loans; and banks' exposure to inflation through low pass-through borrowers is likely not correlated with their interest rate risk and the quality of their loan portfolios, which allows us to disentangle the effect of high inflation from that of confounding factors on bank lending to business borrowers.

Third, while the BLS data allows to measure the de-facto pass-through of input price inflation on output process at the 3-digit NAICS industry level, the pass through may vary across firms within each industry depending on firm characteristics such as market power. Robustness analysis that drops the largest firms in each industry reinforce our results.

2 Literature

Our paper is related to several streams of the literature. First, several papers study the impact of high inflation on bank intermediation. [Agarwal and Baron \(2024\)](#) show that the unexpected rise in U.S. inflation in the 1970s prompted banks with higher exposures to inflation to reduce the supply of lending by more than other banks, with the effect occurring through multiple channels (bank net worth, loan misallocation, and deposit outflows). The net worth effect refers to the reduction in bank lending due to banks' lower equity values, as a higher prevalence of long-term fixed rate loans resulted in lower net interest margins; the loan misallocation effect refers to banks' shifting away from long-term loans and toward inflation-protected assets; and the deposit outflows effect occurred as banks subject to regulatory ceilings on deposit rates suffered higher deposit outflows. While also focusing on a net worth-like channel, our paper uses a different bank inflation exposure measure: We focus on banks' exposures to industries whose profitability and credit worthiness were negatively affected by inflation, rather than exposure through state-level reserve requirements for Federal Reserve nonmember banks to hold non-interest bearing reserves. For a more recent period, [Boyd *et al.* \(2001\)](#) show that 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.

Second, our paper is related to the literature studying the impact of inflation on business borrowers' balance sheets. Focusing on the debt-inflation channel through firms, [Brunnermeier *et al.* \(2023\)](#) show that the German inflation of 1919-1923 reduced the real debt burdens for levered borrowers, while decreasing the incidence of their bankruptcy and increasing their equity values and employment. While we also focus on the heterogeneous effect of inflation on business borrowers, we differentiate across firms according to their ability to pass-through inflation rather than according to their leverage. Furthermore, we highlight a potentially negative effect of high inflation on business borrowers' balance sheets, which is separate from and works in the opposite direction of the debt-inflation channel, as limited ability to pass through input price inflation erodes borrowers' profitability and ability to repay loans. In this sense, our paper is more closely related to [Coibion *et al.* \(2020\)](#), who show that firms' higher inflation expectations lead them to raise prices, increase demand for credit, reduce employment and capital. However, we focus on the heterogeneity in firms' ability to raise prices in the face of high inflation, and on the resulting effect on their access to bank credit, rather than their demand for credit.

Third, our paper is also related to recent literature that studies the determinants of firms' ability to pass input price inflation onto output prices. For instance, [Bräuning *et al.* \(2023\)](#) show that the increase in industry concentration in the United States over the past two decades explains a large part of the increase in the pass-through of cost shocks into prices, thus amplifying the inflationary pressure from supply-chain disruptions and a tight labor market. While our papers are complementary, we do not take a stance on why firms in various industries have encountered higher input price inflation since 2021 (i.e., supply chain disruptions, labor market shortages, energy price pressures, etc.) or on why they differ in their ability to pass-through input price inflation to output prices (market concentration, regulation, etc.). Instead, we examine the effects of firms' de-facto pass through of input price inflation on their access to bank credit and their cost of borrowing.

3 Data

We measure input and output price inflation as the year-over-year change in the Inputs to Industry Price Indexes (IPI) and the Producer Price Indexes (PPI) levels, with monthly data provided by the Bureau of Labor Statistics at the 3-digit NAICS level and averaged into quarters.¹ The IPI data are available mostly from December 2018 to present, and allow us to measure the average change in prices for both domestically produced and imported inputs, while it excludes capital investment and labor.

As shown in Figure 1 (panel a), both the PPI inflation (in blue) and the IPI inflation (in red) picked up in 2021, with the IPI initially exceeding the PPI (in red and blue, respectively). The PPI subsequently caught up, as firms in some industries eventually passed-through IPI inflation pressures into PPI inflation, boosting their profit margins. In Figure 1 (panel b), both IPI and PPI inflation have varied substantially across industries. The summary of high and low inflation pass-through industries is in the Appendix Table A1.

[Figure 1 about here]

We define the high vs. low inflation pass-through industries according to whether the difference between PPI inflation and IPI inflation averaged for the high-inflation period (2021:Q1-2023:Q1) is positive or negative, as shown in Figure 2. Industries with positive pass-through on average have had higher PPI inflation than IPI inflation, i.e., they are relatively better able to pass through the input price increases into output prices. On the contrary, industries with negative pass-through were less able to transfer input price increases onto output prices charged to customers.

[Figure 2 about here]

We measure bank lending, loan spreads, and firm characteristics from the Federal Reserve Y-14Q H.1. schedule on C&I loans, which we merge with the BLS data at the 3-digit NAICS

¹See Producer Price Indexes, The U.S. Bureau of Labor Statistics, "[PPI Databases](#)" and "[A new BLS satellite series: inputs to industry price indexes](#)".

industry and quarter level. As shown in Table 1, there is considerable variation in the number of high/low pass-through industries and the volume of loans corresponding to each industry in recent years.

[Table 1 about here]

Figure 3 shows “binscatter” least squares regression of the year-over-year growth rates of existing bank loans to firms on indicator variables for the borrowers’ high and low inflation pass-through industries, as well as bank fixed effects and firm controls during 2019:Q4-2023:Q1. It shows that on average, the growth rates of existing loans did not differ notably across borrowing firms in high and low pass-through industries in the low inflation period (before 2021:Q1). However, the growth of loans to firms in high-pass through industries was higher than for firms in low pass-through industries in the high inflation period (starting in 2021:Q1). The pattern is consistent with our hypothesis that firms that benefited from inflation were better able to retain access to bank credit than firms in low-inflation industries. Importantly, the regression analysis in the following sections will disentangle for the roles of supply and demand in driving these patterns.

[Figure 3 about here]

4 Results

4.1 Firms’ exposure to inflation and access to bank credit

To test our hypotheses, we use a standard difference-in-difference approach. We start by assessing whether firms with low pass-through of input price inflation into output prices experience different lending conditions after the increase in inflation in 2021.

Our first regression specification is as follows:

$$\begin{aligned}
Y_{fbt} = & \beta_1 \text{Low pass through}_f + \beta_2 \text{Low pass through}_f \times \text{Post 2021}_t + \\
& + \beta_3 \text{Firm controls}_{ft} + \beta_4 \text{Firm controls}_{ft} \times \text{Post 2021}_t + \\
& + \beta_3 \text{Bank controls}_{bt} + \beta_4 \text{Bank controls}_{bt} \times \text{Post 2021}_t + \\
& + \delta_f + \gamma_b + \theta_t + \epsilon_{fbt},
\end{aligned} \tag{1}$$

where f denotes a firm, b is a bank, and t is a year-quarter for the sample period from 2018:Q1 to 2023:Q2. The dependent variable measures the year-over-year growth in existing loan commitments (in percentage points), or alternatively, the level of loan spreads (in percentage points) averaged at the bank-firm pair level. Among the explanatory variables, $\text{Low pass through}_f$ equals one for firms in industries in which the inflation pass-through defined as the differential between the producer price index (PPI) inflation and the input price index (IPI) inflation is negative, i.e., $\text{PPI inflation} - \text{IPI inflation} < 0$, and zero otherwise. Post 2021_t is an indicator variable equal to unit for the sample period of high inflation starting in 2021:Q1 and zero otherwise. We control for firm characteristics such as sales growth, the prevalence of secured loans, and cash holdings in total assets; and bank characteristics such as the four-quarter lagged CET1 capital ratio, the share of core deposits in total assets, and return on assets. In addition, we deploy fixed effects for firms, banks, and year-quarter, and cluster the standard errors at the industry-time level.

In Tables 2 and 3, the coefficient of interest is β_2 for the interaction $\text{Low pass through}_f \times \text{Post 2021}_t$. The results show firms with low inflation pass-through experienced lower growth in loan commitments and higher loan spreads in the high inflation period. The results are driven by firms that ex-ante had non-investment grade status in 2018/2019, measured before the COVID-19 pandemic and the period of high inflation starting in 2021. In Table 2, column (2), the results show that non-investment grade firms in low pass-through industries encountered a 0.867 percent lower growth in loan commitments during the high inflation period, which is economically significant relative to the sample mean of 1.22 percent loan

growth during the sample period. Similarly, in Table 3, column (2), non-investment grade firms in low pass-through industries encountered 20 basis points higher loan spreads in the high inflation period, which is economically significant relative to the sample average of 1.65 percent in loan spreads.

[Table 2 around here]

[Table 3 around here]

The mix of slower loan growth and higher loan spreads (i.e., a reduction in quantities coinciding with an increase in prices) is consistent with a reduction in the supply of bank credit to firms in low pass-through industries during the high inflation period. To strengthen the interpretation of these results as a supply effect, the next sub-section will deploy bank-borrower fixed effects while studying the effect of bank-level exposures to inflation through low pass-through borrowers.

Importantly, the results are not driven by pre-existing trends in the riskiness of low pass-through firms. The low pass-through firms—which experienced an erosion in profit margins and reduced access to bank loans due to limited pass through of input price inflation to output prices after 2021:Q1—were less risky before the high inflation episode, as shown by their better credit ratings and larger asset size measured ex-ante (Figure 4, panels a and b).

[Figure 4 around here]

In addition to loan growth and loan spreads, we also examine the impact of firms' exposure to inflation and their loan utilization rates (as a fraction of existing commitments), the prevalence of collateralized loans, and the nature of collateral. In the Appendix Table A.2, the results show that low inflation pass-through firms increased their loan utilization rate during the high inflation period. The results are stronger for small, non-investment grade firms. The increased utilization rate that coincided with the reduction in loan commitments

highlights the contrast between the demand for and the supply of bank credit for low pass-through firms during high inflation.

In Appendix Table A.3, the results also show that low inflation pass-through, non-investment grade firms were more likely to post collateral in the high inflation period, mostly in the form of cash and marketable securities rather than fixed assets and real estate, which is also consistent with reduced supply through tighter lending terms during high inflation.

4.2 Banks' and firms' exposure to inflation and the supply of credit

To test our second hypothesis, whether banks more exposed to inflation through low pass-through borrowers curtail their lending by more in the high inflation period, we need to first define a measure of bank exposure to these types of borrowers. We measure banks' exposure to inflation through their low pass-through borrowers for a firm from industry i as follows:

$$Bank\ Inflation\ Exposure_{bi} = - \sum_{j \neq i} \underbrace{\frac{Commitment_{bj}}{Commitment_b}}_{\text{Pre-inflation period 2018-19}} \underbrace{(PPI\ inflation_j - IPI\ inflation_j)}_{\text{Inflation period 2021-onward}}, \quad (2)$$

where the first term $(\frac{Commitment_{bj}}{Commitment_b})$ is the average share of bank b 's loan commitments to industry j in the bank's total commitments measured over 2018-2019; the second term $(\overline{PPI\ inflation_j - IPI\ inflation_j})$ is the average pass-through in each industry j to which the bank is exposed, measured during the high inflation period (2021:Q1-2023:Q2). The summation excludes the bank's exposure to each borrower's own industry i , an approach which is meant to alleviate any potential concerns about this measure capturing changes in the demand for credit arising from industries where a bank is specialized (Giannetti and Saidi, 2018). Thus, a bank's exposure to inflation depends on the average inflation pass-through of all industries in its loan portfolio (other than the borrower's own industry) weighted by the ex-ante shares of loan commitments to these industries. The negative sign ensures that banks

with larger loan portfolio shares committed to firms in low pass-through industries (i.e., low $\overline{PPI\ inflation_i - IPI\ inflation_i}$) have higher values for *Bank Inflation Exposure* $_{bm}$.

We use the following difference-in-difference regression specification to examine the effect of banks' exposure to inflation on their supply of credit and credit terms to firms, while distinguishing across low and high inflation pass-through firms in the high-inflation period:

$$\begin{aligned}
Y_{fbt} = & \beta_1 \textit{Bank Inflation Exposure}_{bi} \times \textit{Post 2021}_t + \\
& + \beta_2 \textit{Bank Inflation Exposure}_{bi} \times \textit{Low pass through}_f \times \textit{Post 2021}_t + \\
& + \beta_3 \textit{Low pass through}_f \times \textit{Post 2021}_t + \\
& + \beta_4 \textit{Bank Inflation Exposure}_{bi} \times \textit{Low pass through}_f + \\
& + \beta_5 \textit{Bank Inflation Exposure}_{bi} + \beta_6 \textit{Low pass through}_f + \\
& + \beta_7 \textit{Firm controls}_{ft} + \beta_8 \textit{Firm controls}_{ft} \times \textit{Post 2021}_t + \\
& + \delta_{ft} + \gamma_b + \theta_{bf} + \epsilon_{fbt},
\end{aligned} \tag{3}$$

where the dependent variable is, in alternative specifications, the log-level of average loan commitments, the cumulative growth of average loan commitments, or the average loan spread from bank b to borrowing firm f in year-quarter t , with the credit registry data aggregated at the bank-borrower pair level.² Among the explanatory variables, *Low pass through* $_f$ for firm f and *Post 2021* $_t$ for year-quarter t are as defined as in section 4.1. In addition, *Bank Inflation Exposure* $_{bi}$ is the measure of banks' exposure to low inflation pass-through in all industries in their loan portfolios other than borrower f 's industry i , as defined above. Importantly, we include firm-time fixed effects to control for firm-level demand, and therefore omit firm characteristics from the set of explanatory variables, as well as bank and bank-firm fixed effects.

In Table 4, the coefficients of interest are β_1 and β_2 for the double and triple interactions *Bank Inflation Exposure* $_{bi} \times \textit{Post 2021}_t$ and *Bank Inflation Exposure* $_{bi} \times$

²The cumulative growth of average loan commitments is measured relative to the start date of each bank-firm relation in the Y-14Q panel.

$Low\ pass\ through_f \times Post\ 2021_t$, respectively. In Table 4, columns (1), (3), and (5), the results suggest that banks with high exposure to inflation reduced loan commitments and increased loan spreads by more in the high inflation period. In columns (2) and (4), the results with the added triple interaction suggest that banks with high exposure to inflation reduced loan commitments mostly to firms in low pass-through industries, rather than to all firms. However, as seen in column (6), the exposed banks increased loan spreads to all firms, and especially to firms in low pass-through industries in the high inflation period. In all specifications, the bank fixed effects capture firm-level demand, i.e., the same low pass-through firm received lower loan commitments and paid higher spreads to a bank with higher inflation exposure than to a bank with lower inflation exposure.³

[Table 4 around here]

Table 5 shows results for the previous specification (3) estimated separately for credit lines and term loans. The results suggest that banks with higher exposures to inflation cut lending in the form of both credit lines and terms loans (columns 1 and 3), specifically to low pass-through firms (columns 2 and 4). The magnitude of coefficient estimates suggests that banks cut credit to low pass-through firms by more for term loans than for credit lines (columns 2 and 4, comparing the triple interaction coefficients across panels a and b), possibly reflecting the fact that term loans are more likely to remain on banks' balance sheets. In columns 5 and 6, the results suggest that banks with higher exposures to inflation increased loan spreads for credit lines (but not term loans) to all firms, by more to the low than to the high pass-through firms.

[Table 5 around here]

Table 6 tests the robustness of previous results from Tables 4 and 5 to adding controls for the effects of monetary policy tightening on bank credit and terms. Using specification (3),

³While the measure of *Bank Inflation Exposure* $_{bi}$ is constant over time (i.e., it is computed as the average pass-through in 2021-2023 weighted with pre-inflation commitments from 2018-19), it is industry-specific (as it drops the borrower's own industry), which allows to identify the bank fixed effects.

we add measures for banks' *Security Loss Exposure_b* and *Fixed Rate Loan Exposure_b*, both in levels and interacted with *Post 2021_t* and *Low pass through_f*. We compute *Security Loss Exposure_b* as the difference between the fair value and the amortized cost of each banks' security holdings normalized by the amortized cost, measured over 2018-2020. Similarly, *Fixed Rate Loan Exposure_b* measured the banks' average share of fixed rate loans in total loan commitments over 2018-2020. Both measures capture banks' interest rate risk and the possible impact of monetary policy tightening during 2022-2023 on banks. A more negative value for *Security Loss Exposure_b* suggests valuation losses during the earlier monetary tightening episode that peaked in 2018, which would be indicative for the valuation losses in 2022-2023 is the cross-sectional variation in the size of banks' security portfolios was preserved over time. A higher value for *Fixed Rate Loan Exposure_b* reflects interest rate risk for banks, as their net interest income would suffer during monetary tightening due to the slow repricing of fixed rate loan portfolios.

The main results remain robust to the addition of controls for the effects of monetary policy. In Table 6, the results confirm that banks cut loan commitments to low pass-through firms (columns 1-6) and increased loan spreads to all firms (columns 7-9). At the same time, the coefficients on the controls for monetary policy effects are intuitive. For instance, for *Security Loss Exposure_b × Post 2021*, the positive coefficient on commitments and negative coefficient on spreads suggest that banks with potential valuation losses on their security portfolios cut loan commitments and increased spreads by more.

[Table 6 around here]

4.3 Mechanisms

A key question that follows up from these results, is what mechanism leads banks to decrease credit to affected borrowers. The most straightforward explanation is that low-pass through borrowers become riskier as inflation increases, and that this risk becomes more important for banks that are more materially exposed to them. In this section, we explore this mechanism

and the role that capital constraints may play in amplifying the shock to these borrowers for exposed banks.

In Table 7, we present results from a specification similar to equation 3, but where we use various measures for borrowers' riskiness as dependent variables. In particular, we use information on banks internal measures of probabilities of defaults and ratings, and a couple of measures of loan performance (e.g., past due loans relative to total loans and allowances for loan losses relative to total loans).

The results in the table show that banks exposed to inflation experienced a more pronounced deterioration in asset quality, especially for their loans to low pass-through firms, as shown by higher probabilities of default and worse credit ratings for these firms.

[Table 7 around here]

Given the deterioration of credit quality for low pass-through firms shown in Table 7, the results in Table 8 further suggest that banks with lower capital ratios—that were less able to sustain the deterioration in asset quality—cut loan commitments by more to such low pass-through firms.

[Table 8 around here]

4.4 Real effects

To examine the potential for real effects arising from the reduction in loan commitments by banks with high inflation exposure, we collapse the panel dataset by taking averages at the firm level. We use a regression specification with the triple interactions from equation (3) in section 4.2, in which the *Average Bank Inflation Exposure_f* measure becomes firm specific by taking the weighted average of banks' exposures to inflation across all banks with loan commitments to a given firm f , using the size of existing loan commitments as weights. We include firm and bank controls (with the latter computed as a weighted average across all banks for a given firm f). We also include firm and time fixed effects.

In alternative specifications, the dependent variable captures time-varying firm characteristics such as loan utilization, interest coverage ratios, credit ratings (higher values show a worse credit rating), return on assets, cash holdings (normalized by assets), leverage (debt/assets), and capital expenditures (normalized by assets).

The results in Table 9 suggest that the reduction in loan supply suffered by low pass-through firms relying on banks with high inflation exposure resulted in real effects. Thus, firms with low inflation pass-through borrowing from banks with high exposure to inflation had a higher utilized amounts on credit lines, experienced lower interest coverage ratios, and worse credit ratings in the high inflation period. They also suffered from lower profitability as reflected by return on assets and invested less, suggesting that the reduction in credit by banks exposed to inflation had real effects on the low pass-through firms.

[Table 9 around here]

5 Conclusions

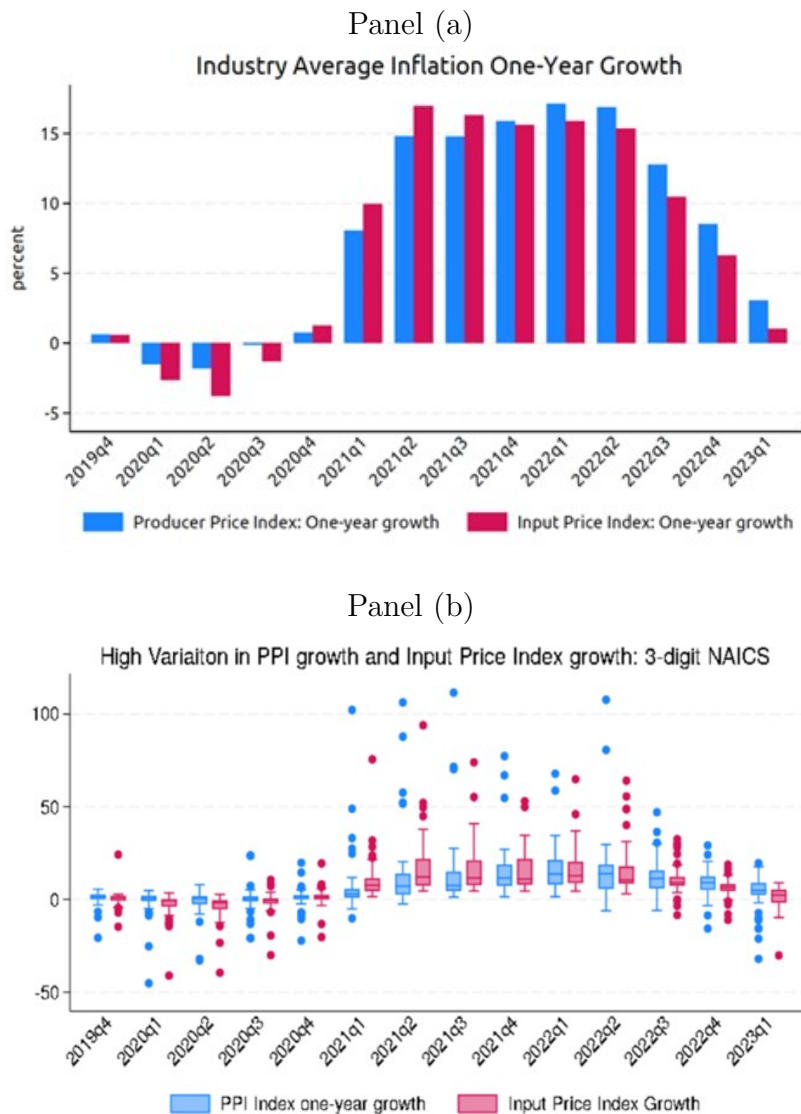
We find that firms and banks' exposures to inflation have affected bank lending during the high inflation period since 2021 through a novel channel. Riskier firms with higher exposure to inflation experience reduced access to bank credit and higher credit spreads in the high inflation period. Furthermore, we find that banks' exposure to inflation further exacerbates the effect of high inflation on lending volumes and spreads to firms in low-inflation pass through industries, as banks with higher exposure to inflation curtailed lending and increased spreads to such firms by more, which is consistent with a supply effect. Finally, we find that the reduction in loan supply results in real effects, as firms with low inflation pass-through borrowing from banks with high exposure to inflation experienced a deterioration in their financial results, lower profitability, and lower investment.

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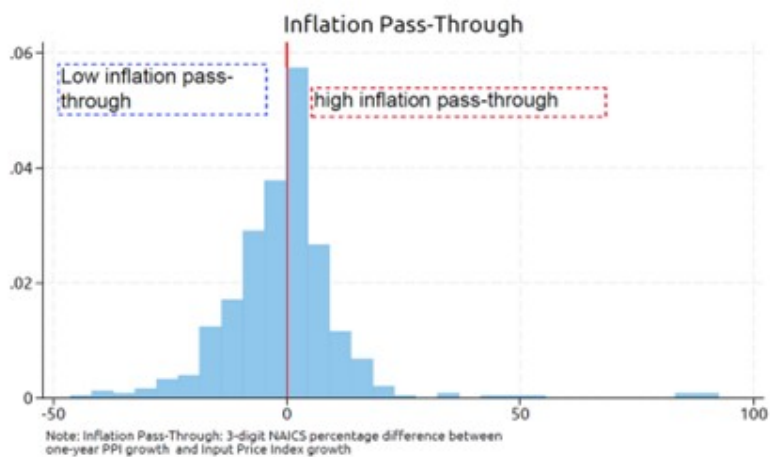
A Figures and Tables

Figure 1: Input Price and Producer Price Inflation across Industries



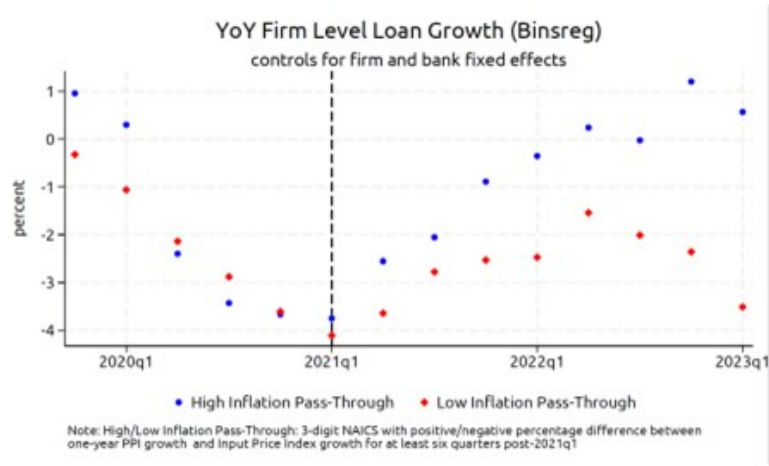
Note: We measure input and output price inflation as the year-over-year change in the Inputs to Industry Price Indexes (IPI) and the Producer Price Indexes (PPI) levels, with monthly data provided by the Bureau of Labor Statistics at the 3-digit NAICS level and averaged into quarters. Both the PPI inflation (in blue) and the IPI inflation (in red) picked up in 2021, with the IPI initially exceeding the PPI (in red and blue, respectively). The PPI subsequently caught up, as firms in some industries eventually passed-through IPI inflation pressures into PPI inflation. In Figure 1 (panel b), both IPI and PPI inflation have varied substantially across industries.

Figure 2: The distribution of inflation pass-through across industries



Note: We define high vs. low inflation pass-through industries according to whether the difference between PPI inflation and IPI inflation averaged for the high-inflation period (2021:Q1-2023:Q1) is positive or negative. Industries with positive pass-through on average have had higher PPI inflation than IPI inflation, i.e., they were better able to pass-through the input price increases into output prices. On the contrary, industries with negative pass-through were less able to transfer input price increases onto output prices charged to customers.

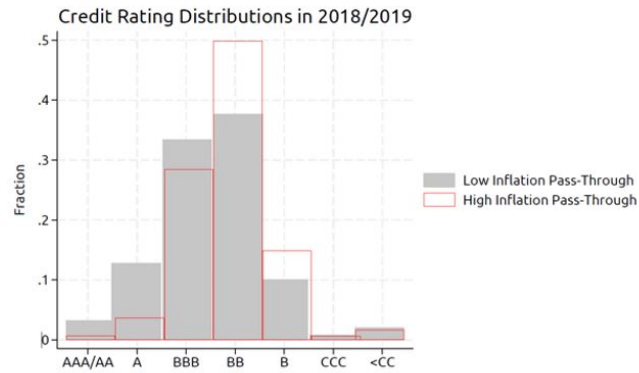
Figure 3: Inflation pass-through and the growth of loan commitments



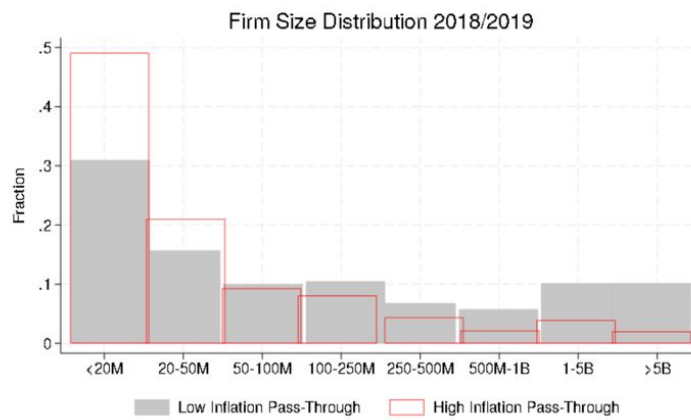
Note: Note: The figure shows “binscatter” least squares regression of year-over-year growth rates in existing bank loan commitments on indicator variables for borrowers’ high and low inflation pass-through industries, as well as bank fixed effects and firm controls during 2019:Q4-2023:Q1. It shows that on average, the growth loan commitments did not differ notably across borrowing firms in high and low pass-through industries in the low inflation period (before 2021:Q1). However, the growth of loan commitments to firms in high-pass through industries was higher than for firms in low pass-through industries in the high inflation period (starting in 2021:Q1).

Figure 4: Firm characteristics and inflation pass-through

Panel (a) Credit ratings



Panel (b) Asset size



Note: The chart shows that low pass-through firms—which experienced an erosion in profit margins and reduced access to bank loans due to limited pass through of input price inflation to output prices after 2021:Q1—were less risky before the high inflation episode, as shown by their better credit ratings and larger asset size measured on average during 2018-2019 from Y-14Q Schedule H.1 data.

Table 1: High/low inflation pass-through industries and lending volumes

Note: This table shows the total volumes of loan commitments from the Federal Reserve Y-14Q schedule H.1 on C&I loans, which we merge with the BLS data on IPI and PPI inflation at the 3-digit NAICS industry and quarter level. As shown in the table, there was considerable variation in the number of high/low pass-through industries and the volume of loans corresponding to each industry in recent years.

	Total volume of loans (in billion)			
	Number	2023Q1	2021Q1	2018Q1
# industries with Inflation Data	40	1362	1262	1078
High pass-through	21	667	605	512
Low pass-through	19	694	657	566
Total Loans (billion)		2192	2071	1730

Note: Source Y14 H1

Table 2: Firms' exposure to inflation and firm-bank growth in loan commitments

Notes: The table shows results from difference-in-difference regressions like in equation (1), while differentiating across borrowers in low and high inflation pass-through industries across low and high inflation periods (2018:Q1-2020:Q4 and 2021:Q1-2023:Q2, respectively). We regress the growth in loan commitments (year over year, in percentage points) averaged at the bank-borrower pair level on an indicator variable for borrowers in low inflation pass-through industries ("Low Pass-through Firm"), both in levels and interacted with an indicator variable for quarters covering the high inflation period ("Post 2021"). We control for firm and bank characteristics, and deploy firm, bank, and time fixed effects. Standard errors are clustered at the industry-time level in all specifications. Significance: *** 1%, **5%, *10%.

	Firm-bank Loan Growth		
	All	Non-investment Grade	Investment Grade
Low Inflation Pass-through	-0.146 (0.409)	-0.146 (0.509)	-0.345 (0.520)
Low Inflation Pass-through*Post 2021	-0.543* (0.328)	-0.867** (0.387)	0.292 (0.362)
Bank Controls	Yes	Yes	Yes
Bank Controls*Post 2021	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes
Firm Controls*Post 2021	Yes	Yes	Yes
Observations	539,236	358,762	180,474
R-squared	0.16	0.17	0.13
Fixed Effects	firm, time, bank		

Note: Credit ratings is defined in 2018-2019

Table 3: Firms' exposure to inflation and firm-bank loan spread changes

Notes: The table shows results from difference-in-difference regressions like in equation (1), while differentiating across borrowers in low and high inflation pass-through industries across low and high inflation periods (2018:Q1-2020:Q4 and 2021:Q1-2023:Q2, respectively). We regress the level of loan spreads (in percentage points) averaged at the bank-borrower pair level on an indicator variable for borrowers in low inflation pass-through industries ("Low Pass-through Firm"), both in levels and interacted with an indicator variable for quarters covering the high inflation period ("Post 2021"). We control for firm and bank characteristics, and deploy firm, bank, and time fixed effects. Standard errors are clustered at the industry-time level in all specifications. Significance: *** 1%, **5%, *10%.

<i>Firm-bank Loan Spread</i>			
	All	Non- investment Grade	Investment Grade
Low Inflation Pass-through	-0.050*** (0.018)	-0.087*** (0.022)	0.015 (0.017)
Infl Period (post 2021)*Low Inflation Pass-through	0.154*** (0.026)	0.205*** (0.028)	0.074*** (0.026)
Bank Controls	Yes	Yes	Yes
	Yes	Yes	Yes
Bank Controls*Post 2021	Yes	Yes	Yes
	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes
	Yes	Yes	Yes
Firm Controls*Post 2021	Yes	Yes	Yes
	Yes	Yes	Yes
Observations	465,926	303,928	161,998
R-squared	0.68	0.64	0.68
Fixed Effects	firm, time, bank		

Table 4: Firms' and banks' exposure to inflation: effect on loan commitments and spreads

Notes: The table shows results from difference-in-difference regressions like in equation (3) that differentiate across banks according to their exposure to inflation ("Bank Inflation Exposure"), across borrowers from low and high inflation pass-through industries ("Low Pass-through Firm"), and across low and high inflation quarters ("Post 2021" = 0 for 2018:Q1-2020:Q4 and = 1 for 2021:Q1-2023:Q2). The dataset is collapsed at the bank-borrower pair level. The cumulative growth of loan commitments is computed relative to the first quarter of each bank-firm relation. Standard errors are clustered at the industry-time level in all specifications. Significance: *** 1%, **5%, *10%.

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)
	log(Commitments)		Cumulative Growth of Commitments		Loan spreads	
Bank Inflation Exposure × Post 2021	-0.019*** (0.004)	0.001 (0.005)	-0.034*** (0.008)	-0.003 (0.013)	0.054*** (0.007)	0.031*** (0.009)
Bank Inflation Exposure × Post 2021 × Low Pass-through Firm		-0.036*** (0.007)		-0.060*** (0.017)		0.033*** (0.013)
Uninsured Deposits Ratio	-0.145*** (0.047)	-0.132*** (0.050)	-0.209** (0.101)	-0.184* (0.108)	-0.151** (0.076)	-0.167** (0.079)
Uninsured Deposits Ratio × Post 2021	0.007 (0.030)	-0.011 (0.033)	-0.009 (0.059)	-0.028 (0.064)	0.118** (0.055)	0.130** (0.059)
CET1 Ratio	0.004* (0.002)	0.003 (0.003)	0.004 (0.005)	0.000 (0.006)	-0.023*** (0.004)	-0.024*** (0.005)
CET1 Ratio × Post 2021	-0.011*** (0.002)	-0.010*** (0.002)	-0.026*** (0.004)	-0.025*** (0.005)	0.053*** (0.004)	0.052*** (0.005)
ROA	0.001 (0.003)	0.002 (0.003)	0.003 (0.006)	0.004 (0.006)	-0.003 (0.005)	-0.001 (0.006)
ROA × Post 2021	0.013** (0.005)	0.012** (0.005)	0.028*** (0.010)	0.032*** (0.010)	-0.010 (0.009)	-0.010 (0.010)
Log(Assets)	0.143*** (0.019)	0.143*** (0.020)	0.278*** (0.038)	0.272*** (0.040)	0.203*** (0.020)	0.189*** (0.021)
Log(Assets) × Post 2021	0.005* (0.003)	0.004 (0.003)	0.004 (0.006)	0.006 (0.006)	-0.034*** (0.006)	-0.029*** (0.006)
Observations	342,629	318,584	339,847	315,959	256,602	238,556
R-squared	0.95	0.96	0.81	0.81	0.92	0.91
Lower-level interactions and controls	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

Table 5: Firms' and banks' exposure to inflation: effect on loan commitments and spreads, credit lines vs. term loans

Note: The table shows results from difference-in-difference regressions like in equation (3) that differentiate across banks according to their exposure to inflation ("Bank Inflation Exposure"), across borrowers from low and high inflation pass-through industries ("Low Pass-through Firm"), and across low and high inflation quarters ("Post 2021" = 0 for 2018:Q1-2020:Q4 and = 1 for 2021:Q1-2023:Q2) like in Table 4. The dataset is collapsed at the bank-borrower pair level, separately for credit lines and term loans. Standard errors are clustered at the industry-time level in all specifications. We control for the same bank characteristics as in Table 4, in levels and interacted with "Post 2021". Standard errors are clustered at the industry-time level in all specifications. Significance: *** 1%, **5%, *10%. Significance: *** 1%, **5%, *10%.

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)
	log(Commitments)		Cumulative Growth of Commitments		Loan spreads	
Panel A: Credit Lines						
Bank Inflation Exposure × Post 2021	-0.015*** (0.004)	-0.009 (0.006)	-0.020** (0.008)	-0.010 (0.014)	0.063*** (0.008)	0.033*** (0.011)
Bank Inflation Exposure × Post 2021 × Low Pass-through Firm		-0.014* (0.008)		-0.024 (0.019)		0.049*** (0.015)
Observations	264,511	243,216	262,510	241,308	205,257	188,708
R-squared	0.96	0.96	0.82	0.82	0.91	0.91
Panel B: Term Loans						
Bank Inflation Exposure × Post 2021	-0.013 (0.012)	0.030** (0.014)	-0.050** (0.023)	0.005 (0.027)	-0.005 (0.013)	-0.009 (0.022)
Bank Inflation Exposure × Post 2021 × Low Pass-through Firm		-0.067*** (0.022)		-0.089** (0.042)		0.007 (0.026)
Observations	38,697	37,279	38,697	37,279	23,794	22,726
R-squared	0.96	0.96	0.90	0.90	0.96	0.96
Lower-level interactions and controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls, in levels and interacted w/ 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

Table 6: Firms' and banks' exposure to inflation: effect on loan commitments and spreads, the role of monetary policy

Note: The table shows results from difference-in-difference regressions like in equation (3) that differentiate across banks according to their exposure to inflation ("Bank Inflation Exposure"), across borrowers from low and high inflation pass-through industries ("Low Pass-through Firm"), and across low and high inflation quarters ("Post 2021" = 0 for 2018:Q1-2020:Q4 and = 1 for 2021:Q1-2023:Q2) like in Table 4. The dataset is collapsed at the bank-borrower pair level. We control for the same bank characteristics as in Table 4, in levels and interacted with "Post 2021". To control for the effects of monetary policy tightening, we add banks' "Security Loss Exposure", defined as (fair value-amortized cost)/amortized cost for security holdings, and "Fixed Rate Loan Exposure", defined as the share of fixed rate loans in total loans, both observed during 2018-2020. Standard errors are clustered at the industry-time level in all specifications. Significance: *** 1%, **5%, *10%.

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 (0.005)	0.002 (0.005)	0.000 (0.005)	-0.005 (0.014)	-0.002 (0.013)	-0.005 (0.014)	0.031*** (0.009)	0.046*** (0.009)	0.049*** (0.010)
Bank Inflation Exposure × Post 2021 × Low Pass-through Firm	-0.042*** (0.007)	-0.036*** (0.007)	-0.041*** (0.007)	-0.071*** (0.018)	-0.058*** (0.017)	-0.069*** (0.018)	0.031** (0.013)	0.040*** (0.013)	0.038*** (0.013)
Security Loss Exposure × Post 2021	-0.007 (0.005)		0.092*** (0.019)	-0.016 (0.010)		0.258*** (0.047)	-0.003 (0.006)		-0.037* (0.021)
Security Loss Exposure × Post 2021 × Low Pass-through Firm	0.064*** (0.018)		-0.006 (0.005)	0.178*** (0.044)		-0.013 (0.010)	-0.042** (0.020)		0.015** (0.006)
Fixed Rate Loan Exposure × Post 2021		-0.000 (0.001)	-0.001 (0.001)		-0.001 (0.002)	-0.003 (0.002)		-0.008*** (0.002)	-0.009*** (0.002)
Fixed Rate Loan Exposure × Post 2021 × Low Pass-through Firm		0.002** (0.001)	0.001* (0.001)		0.003* (0.002)	0.003* (0.002)		0.027*** (0.002)	0.028*** (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

Table 7: Firms' and banks' exposure to inflation: loan performance

Note: The table shows results from difference-in-difference regressions like in equation (3) that differentiate across banks according to their exposure to inflation ("Bank Inflation Exposure"), across borrowers from low and high inflation pass-through industries ("Low Pass-through Firm"), and across low and high inflation quarters ("Post 2021" = 0 for 2018:Q1-2020:Q4 and = 1 for 2021:Q1-2023:Q2) like in Table 4. The dataset is collapsed at the bank-borrower pair level. We control for the same bank characteristics as in Table 4, in levels and interacted with "Post 2021". Standard errors are clustered at the industry-time level in all specifications. Significance: *** 1%, **5%, *10%.

Dependent variable:	(1)	(2)	(3)	(4)			(6)		(7)
	PD	Rating		Past Due/Loans			Allowances/Loans		
				All firms	Small firms	Large firms	Small firms	Large firms	
Bank Inflation Exposure × Post 2021 × Low Pass-through Firm	0.002** (0.001)	0.018* (0.010)	0.046 (0.110)	-3.275*** (1.035)	0.074 (0.120)	0.104 (0.607)	0.263** (0.109)		
Bank Inflation Exposure × Post 2021	-0.001 (0.001)	0.027*** (0.008)	-0.165** (0.082)	3.476*** (0.805)	-0.198** (0.099)	-0.681* (0.396)	-0.240** (0.097)		
Observations	276,847	317,509	241,691	13,693	232,145	8,548	108,527		
R-squared	0.82	0.92	0.67	0.49	0.39	0.65	0.58		
R-squared across	0.731	0.879	0.517	0.410	0.341	0.587	0.517		
R-squared within	0.000574	0.00594	0.000929	0.0129	0.00119	0.0491	0.00671		
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						
FE firm				Yes	Yes	Yes	Yes	Yes	Yes
FE time				Yes	Yes	Yes	Yes	Yes	Yes
Firm controls, in levels and interacted w/ Post 2021				Yes	Yes	Yes	Yes	Yes	Yes

Table 8: Firms' and banks' exposure to inflation: effect on loan commitments and spreads, the role of bank capital

Note: The table shows results from difference-in-difference regressions like in equation (3) that differentiate across banks according to their exposure to inflation ("Bank Inflation Exposure"), across borrowers from low and high inflation pass-through industries ("Low Pass-through Firm"), and across low and high inflation quarters ("Post 2021" = 0 for 2018:Q1-2020:Q4 and = 1 for 2021:Q1-2023:Q2) like in Table 4. In addition, we further differentiate across banks with high and low capital ratios. The dataset is collapsed at the bank-borrower pair level. We control for the same bank characteristics as in Table 4, in levels and interacted with "Post 2021". Standard errors are clustered at the industry-time level in all specifications. Significance: *** 1%, **5%, *10%.

Dependent variable:	(1) log(Commitments)	(2) Cumulative Growth of Commitments	(3) Loan spreads
Bank Inflation Exposure \times Post 2021	0.085** (0.038)	-0.077 (0.092)	-0.650*** (0.080)
Bank Inflation Exposure \times Post 2021 \times Low Pass-through Firm	-0.237*** (0.065)	-0.297** (0.139)	-0.261** (0.102)
Bank Inflation Exposure \times Post 2021 \times Low Pass-through Firm \times Low Capital	-0.015*** (0.005)	-0.019* (0.010)	-0.022*** (0.008)
Observations	318,584	315,967	238,556
R-squared	0.96	0.81	0.91
Lower-level interactions and controls	Yes	Yes	Yes
Bank controls, in levels and interacted w/ Post 2021	Yes	Yes	Yes
FE bank	Yes	Yes	Yes
FE bank \times firm	Yes	Yes	Yes
FE firm \times time	Yes	Yes	Yes

Table 9: Firms' and banks' exposure to inflation: real effects on borrowing firms

The table shows results from difference-in-difference regressions like in equation (3) that differentiate across banks according to their exposure to inflation ("Bank Inflation Exposure"), across borrowers from low and high inflation pass-through industries ("Low Pass-through Firm"), and across low and high inflation quarters ("Post 2021" = 0 for 2018:Q1-2020:Q4 and = 1 for 2021:Q1-2023:Q2). The dataset is collapsed at the borrower level, rather than at the bank-borrower pair level like in Table 4, and the sample is restricted to be consistent with the main regression results with firm-time fixed effects in Table 4. Standard errors are clustered at the industry-time level in all specifications. Significance: *** 1%, **5%, *10%.

Dependent variable:	(1) log(Utilization)	(2) ICR	(3) Rating	(4) ROA	(5) Cash	(6) Leverage	(7) Capex
Avrg. Bank Inflation Exposure × Post 2021 × Low Pass-through Firm	0.004*** (0.001)	-0.077* (0.041)	0.011* (0.006)	-0.008** (0.003)	-0.000 (0.000)	0.001 (0.001)	-0.065* (0.036)
Low Pass-through Firm × Post 2021	0.035*** (0.006)	-1.416*** (0.165)	0.109*** (0.019)	-0.085*** (0.010)	-0.008*** (0.002)	0.019*** (0.002)	0.020 (0.122)
Avrg. Bank Inflation Exposure × Post 2021	-0.005*** (0.001)	0.019 (0.042)	-0.005 (0.006)	0.006* (0.003)	0.000 (0.000)	0.000 (0.001)	-0.023 (0.027)
Avrg. Bank Inflation Exposure × Low Pass-through Firm	-0.006*** (0.001)	0.046* (0.027)	-0.009** (0.005)	0.005** (0.002)	0.000 (0.000)	-0.002*** (0.001)	0.003 (0.030)
Avrg. Bank Inflation Exposure	0.005*** (0.001)	0.019 (0.028)	0.006 (0.005)	-0.002 (0.002)	-0.000 (0.000)	-0.001 (0.001)	-0.037 (0.030)
Low Pass-through Firm (dummy)	-0.031*** (0.006)	0.633*** (0.132)	-0.043*** (0.017)	0.040*** (0.008)	0.003* (0.002)	-0.012*** (0.003)	-0.113 (0.140)
Observations	75,941	67,362	82,691	82,708	82,708	78,840	33,931
R-squared	0.71	0.68	0.76	0.66	0.75	0.78	0.66
Firm controls, in levels and interacted w/ Post 2021	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Avrg. bank controls, in levels and interacted w/ Post 2021	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FE firm	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FE time	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Internet Appendix for “Business Inflation Exposure and Bank Lending”

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February 15, 2024

A-I Appendix Tables and Figures

Table A1: High and low inflation pass-through industries

Notes: The table shows the list of industries with low and high inflation pass-through computed from the BLS data on IPI and PPI inflation at the 3-digit NAICS industry level. Low pass-through industries are those with $Low\ pass\ through_f = 1$, defined as industries with $PPI\ inflation - IPI\ inflation < 0$ on average during 2021-2023, i.e., the difference between the producer price index (PPI) inflation and the input price index (IPI) inflation was negative. The high pass-through industries are those with $Low\ pass\ through_f = 0$, or a positive difference between the PPI and IPI inflation.

NAICS3	Low Pass-through	NAICS3	High Pass-through
213	support activities for mining	211	oil and gas extraction
221	utilities	212	mining (except oil and gas)
311	food manufacturing	313	textile mills
312	beverage and tobacco product	316	leather and allied product manufacturing
314	textile product mills	321	wood product manufacturing
315	apparel manufacturing	322	paper manufacturing
325	chemical manufacturing	323	printing and related support activities,
327	nonmetallic mineral product	324	petroleum and coal products
333	machinery manufacturing	326	plastics and rubber products
334	computer and electronic product manufacturing	331	primary metal manufacturing
336	transportation equipment manufacturing	332	fabricated metal product manufacturing
339	miscellaneous manufacturing	335	electrical equipment, appliance, and component
481	air transportation	337	furniture and related product manufacturing
482	rail transportation	423	merchant wholesalers, durable goods
484	truck transportation	424	merchant wholesalers, nondurable goods
491	postal service	441	motor vehicle and parts dealers
492	couriers and messengers	444	building material and garden equipment and supplies dealers
517	telecommunications	445	food and beverage stores
622	hospitals	483	water transportation
		493	warehousing and storage
		721	accommodation, including hotels and motels

Table A2: Firms' exposure to inflation vs. firm-bank growth in loan utilization

Notes: The table shows results from difference-in-difference regressions like in equation (1), while differentiating across borrowers in low and high inflation pass-through industries, across low and high inflation periods (2018:Q1-2020:Q4 and 2021:Q1-2023:Q2, respectively). The dependent variable is the prevalence of secured loans and the prevalence of loans secured with cash collateral (in percentage points), while the dataset is aggregated at the bank-borrower pair level. We control for firm and bank characteristics, and deploy firm, bank, and time fixed effects. Standard errors are clustered at the industry-time level in all specifications. Significance: *** 1%, **5%, *10%.

	Utilization Rate (%)						
	All	Non IG	IG	Non IG: Small Firm	Non IG: Large Firm	IG: Small Firm	IG: Large Firm
Low Inflation Pass-through	-0.029*** (0.007)	-0.032*** (0.007)	-0.023*** (0.007)	-0.044*** (0.012)	-0.027*** (0.007)	-0.030 (0.019)	-0.020*** (0.006)
Low Inflation Pass-through*Post 2021	0.065*** (0.011)	0.073*** (0.012)	0.052*** (0.011)	0.073*** (0.011)	0.066*** (0.012)	0.105*** (0.021)	0.038*** (0.009)
Bank Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank Controls*Post 2021	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Controls*Post 2021	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	516,637	331,855	184,782	136,804	194,308	37,781	146,663
R-squared	0.73	0.71	0.71	0.738	0.675	0.733	0.701
Fixed Effects	firm, time, bank						

Table A3: Firms' exposure to inflation vs. firm-bank prevalence and nature of collateral

VARIABLES	Secured (1/0)		Cash Collateral	
	Non IG	IG	Non IG	IG
Low Inflation Pass-Through	0.024*** (0.003)	0.022*** (0.005)	-0.014** (0.006)	0.011 (0.008)
Low Inflation Pass-Through*Post 2021	0.003*** (0.001)	-0.007*** (0.002)	0.008** (0.004)	0.005 (0.004)
Bank Controls	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes
Bank Controls*Post 2021	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes
Firm Controls*Post 2021	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes
Observations	618,507	354,136	571,985	208,170
R-squared	0.619	0.802	0.633	0.722
FE	Firm, Time			