Inflation Shock Transmission Along the Supply Chain: The Trade Credit Channel*

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Abstract

We identify a new channel through which inflation can affect the macro economy—the trade credit channel. We show that trade credit suppliers respond to an unexpected increase in inflation by shortening the duration of their trade credit contracts. This effect is weaker for suppliers with higher market power over their customers as these suppliers are better able to absorb rising input costs due to higher ex ante surplus and for suppliers with access to longer-term debt as they receive a wealth transfer from their creditors. Using a matched customer-supplier sample and exploiting within customer heterogeneity, we show that our results are not driven by demand for trade credit. Finally, higher payment speed induces customers to draw down their cash reserves and increase borrowing. We rationalize these findings using a simple model in which inflation tightens the liquidity constraints of supplier firms leading to a reduction in trade credit provision.

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1 Introduction

Understanding how inflation affects real outcomes is a central question in macroeconomics and finance. While much of the existing literature focuses on mechanisms such as monetary policy and labor market dynamics, we propose a novel channel through which inflation shocks are transmitted to the real economy: the trade credit channel. Trade credit is an important source of financing for many firms. In the U.S., it is the second largest liability for firms and accounts for 20 percent of GDP (Murfin and Njoroge, 2015; Garcia-Marin, Justel, and Schmidt-Eisenlohr, 2020). We argue that inflation shocks can affect firm-to-firm credit provision along production networks, which can subsequently have real effects by affecting firms' investment in working capital. This paper is the first to empirically analyze how inflation shocks propagate between firms by affecting credit provision along production networks. We rationalize our findings using a simple model to fix ideas and clarify the mechanism.

Inflation shocks can propagate via the trade credit channel due to two reasons. First, an unexpected shock to inflation reduces the real value of existing trade credit contracts as they are fixed in nominal terms. As such, an unexpected inflation shock represents a wealth transfer from suppliers to customers, all else equal. Also, higher inflation increases the liquidity costs of the supplier firm tightening the working capital constraints. These effects reduce the net benefits of providing trade credit. Second, higher inflation usually coincides with greater uncertainty about future inflation. All else equal, this makes selling on credit more expensive. Both of these reasons would incentivize the trade credit suppliers to insulate their balance sheets from the negative effects of higher inflation. They can do this not only by increasing prices but also by reducing trade credit supplied, i.e., the duration of payments. In both cases, the downstream firms may become financially constrained as

they may be required to draw down their existing cash reserves or increase costly borrowing from external sources to make payments faster or pay a larger cost of goods sold. While the existing literature has studied the pass-through of inflation shocks through prices, the duration dimension has not been studied.

We study this channel empirically using the recent inflation increase in the U.S. where the year-over-year CPI inflation rate increased from less than 2% in the first quarter of 2021 to almost 8% by the first quarter of 2022. We hypothesize that firms that were more exposed to the inflation increase through their existing stock of trade credit are more likely to reduce the duration of trade credit following the inflation shock.

Using supplier-customer level data from FactSet Revere together with balance sheet data from Compustat over the period from 2016Q1 to 2022Q1, we find that, more exposed supplier firms reduced trade credit provision during the high inflation period. Our empirical strategy exploits the granularity of the data to address the concern that this observed decline in trade credit volume after the inflation shock could reflect the reduced demand for trade credit and not trade credit supply. By using a within customer-time fixed effects strategy, we compare the trade credit received by the same customer firm in the same period from suppliers differentially exposed to the inflation shock through the trade credit channel. This within firm-time estimation strategy alleviates concerns that our baseline results are driven by demand effects.

To rationalize the empirical evidence, we develop a simple model in which a firm balances the interest income gained from providing trade credit against the liquidity costs arising from working capital constraints. High inflation escalates the cost of liquidity, thus tightening the working capital constraint and forcing the firm to reduce its supply of trade credit. The model predicts that firms characterized by high productivity or high markups generate sufficient

internal cash flow to hedge against these elevated liquidity costs. Consequently, these firms exhibit lower sensitivity to inflation shocks and are less likely to reduce the amount of trade credit they issue.

To shed further light on the economic mechanism underlying our baseline results, we exploit heterogeneity along several dimensions. First, conditional on being exposed to the inflation shock, the extent to which the suppliers adjust terms would be a function of market structure. Second, the negative wealth effect of the inflation shock could be ameliorated by wealth transfers from suppliers' own long-term creditors.

Market structure can affect the trade credit channel as follows. A supplier that has greater market power may have greater ability to adjust prices and higher bargaining power over their customers. One the one hand, such a supplier may set more stringent terms than the average firm. On the other hand, such a supplier receives ex ante higher surplus from the relationship (Bocola and Bornstein, 2023) and may have higher incentive and ability to shield their customer from financial distress. This idea is consistent with the literature that shows that pass-through is higher in more competitive markets (Weyl and Fabinger, 2013). Given these ideas, we test the hypothesis that a supplier with greater market power cuts trade credit by less.

To test this hypothesis, we construct two measures of market power at the supplier level. The first measure is an indicator for whether a firm's sales share within its industry is in the top quartile in the pre-inflation period. The second measure is an indicator of whether the number of customers connected to a supplier is in the top quartile in the pre-inflation period. Using both these measures, we find that suppliers with market power reduce trade credit duration by less in the inflationary period.

We next test whether wealth transfers to the supplier from their creditors dampen the

trade credit channel of inflation. To do this, we construct a measure of wealth transfer from external creditors. The measure is an indicator for whether a firm's long-term debt over assets is in the top quartile within its industry in the pre-inflation period. We find that, suppliers with high wealth transfers from their creditors reduce trade credit duration by less in the inflation period.

Finally, we examine how the trade credit channel of inflation affects downstream firms. To do this, for each firm, we construct a measure of how exposed its suppliers are to the trade credit channel. The measure is the average trade credit duration of all its suppliers in the pre-inflation period. We find that firms connected to exposed suppliers draw down their cash reserves and increase borrowing. These effects are stronger for customers that have only one supplier as it is more difficult for such firms to substitute across existing supplier relationships.

We contribute to the literature on the effects of inflation. Recent studies have shown that inflation can negatively affect the macro economy by adversely affecting bank balance sheets and inducing banks to curtail credit (Agarwal and Baron, 2023; Corhay and Tong, 2021). In contrast, Brunnermeier, Correia, Luck, Verner, and Zimmermann (2023) show that higher inflation can reduce the real debt burden of firms with higher nominal liabilities and allow them to increase employment.[1] Our paper contributes to the literature by showing that the adjustment in trade credit provision is also an important transmission mechanism and can amplify the negative effects of inflation on the real economy.

Our paper is also related to studies looking at how trade credit responds to macroeconomic shocks. Earlier studies such as Meltzer (1960) and Nilsen (2002) show that trade credit can play an important role in how monetary tightening affects the economy as a reduction

[1] Cirelli (2022) examines the distributional effects of inflation on households depending on their level of bank dependence.

bank credit can be offset by an increase trade credit provision. This finding is also validated in Choi and Kim (2005) who show that trade credit firms help absorb the negative effect of credit contraction after monetary tightening in the U.S. In a similar vein, Garcia-Appendini and Montoriol-Garriga (2013) show that after the global financial crisis, firms with large cash holdings continued to provide trade credit when bank credit dried up.[2] More recently, Adelino, Ferreira, Giannetti, and Pires (2023) shows that trade credit also plays an important role in the transmission of unconventional monetary policy.[3] We contribute to these studies by showing that macroeconomic shocks such as inflation can also be transmitted to the real economy through trade credit.

Our paper also contributes to the literature which studies the determinants of trade credit provision. Existing studies have highlighted the role of transaction and financing motives (Schwartz, 1974), information advantage of suppliers (Petersen and Rajan, 1997), riskiness of borrowers (Klapper, Laeven, and Rajan, 2012), bargaining power of customers (Murfin and Njoroge, 2015), liquidity (Almeida, Carvalho, and Kim, 2023; Amberg, Jacobson, Von Schedvin, and Townsend, 2021), and product differentiation (Giannetti, Burkart, and Ellingsen, 2011; Sanz, 2024) among others. We contribute to this literature by showing that higher unexpected inflation and inflation uncertainty can also significantly affect trade credit provision. Further, we focus on supplier incentives and ability to pass through inflation shocks to their customers, which highlights the importance of market structure in propagating and amplifying shocks along supply chains.[4]

[2]Other studies that have provided evidence on the insulation offered by trade credit to borrowers in financial distress include Wilner (2000); Cunat (2007); Love, Preve, and Sarria-Allende (2007); Coulibaly, Sapriza, and Zlate (2013).

[3]Trade credit has also been shown to play and important role in the international transmission of shocks and in predicting cross-country firm returns. See, for example, Chor and Manova (2012) and Albuquerque, Ramadorai, and Watugala (2015). Hardy, Saffie, and Simonovska (2023) studies how exchange rate risk propagates along the supply chain.

[4]Other studies that explore the relationship between market power and shock pass-through along supply

Finally, by quantifying the effect of inflation shock along the supply chain of trade credit, our paper contributes to the emerging macro-finance literature that structurally estimates the role of trade credit in the transmission of macroeconomic shocks (Reischer et al., 2019; Luo, 2020; Altinoglu, 2021; Bocola and Bornstein, 2023).

The remainder of this paper is structured as follows. We present a simple model illustrating inflation and the trade credit channel in Section 2. We describe our data in Section 3. We present our empirical setting and design in Section 4. We discuss our main results Section 5. We conclude in Section 6.

2 Conceptual framework

2.1 A simple model of inflation and trade credit

Let us set R to be the revenue of a firm and C to be the cost of production, and $R = \mu z C$. At the beginning of each period, the upstream supplier chooses the amount of trade credit they would like to issue, which is a fraction δ of the total revenue. They also need to pay for their production cost using part of the sales that have been collected: $(1-\delta)R$. If it is not enough, the producer needs to take a loan from the bank at a rate of r_b, which is above the risk-free rate and is increasing in the fraction of trade credit. At the end of each period, the producer needs to make the loan payment and, at the same time, collect the interest payment from the downstream buyer. Let us set $\mu^\star = \mu z$, where μ is the markup and z is the productivity. When the supplier charges a higher markup or when they have higher productivity, they have a larger $\mu^\star$.

chains include Alvarez, Cavallo, MacKay, and Mengano (2024); Armstrong and Vickers (2023); Miklos-Thal and Shaffer (2021), among others.

The upstream supplier chooses δ to maximize its profit:

$$\max_{\delta} \ \pi_p = (1 + r\delta)R - C + b/\Pi - (1 + r_b)b \tag{1}$$

s.t.

$$\frac{b}{\Pi} = \max\{\, C - (1 - \delta)\mu^\star C,\ 0 \,\} \tag{2}$$

and

$$r_b = r(1 + \delta). \tag{3}$$

Case (i): When $\mu^\star$ is high enough, i.e., suppliers can charge a high markup, or they are very productive or both, then they do not need to borrow from the bank because $(1 - \delta)R > C$, which is $(1 - \delta)\mu z > 1$. In this case,

$$\delta^\star = 1 - \frac{1}{\mu z} \tag{4}$$

Because trade credit generates an interest payment at the risk-free rate.

Case (ii): When $\mu^\star$ is too low, the supplier must take a loan to cover the production cost: $b > 0$. The first order condition w.r.t. δ:

$$\frac{\partial \pi_p}{\partial \delta} = r\mu^\star C + \left[\frac{1}{\Pi} - (1 + r_b)\right]\Pi C\mu^\star - \Pi[1 - (1 - \delta)\mu^\star]Cr = 0 \tag{5}$$

which yields

$$\delta^\star = \frac{1 + r}{2\Pi r} - \frac{\mu^\star + r}{2r\mu^\star}. \tag{6}$$

The optimal choice for the fraction of trade credit to issue suggests a negative relationship between inflation Π and trade credit δ: the high inflation rate reduces the issuance of trade credit. Also note that $\delta^\star \in [0,1]$; it indicates that $\mu^\star > \frac{r\Pi}{1+r-\Pi}$.

2.2 Dynamic model with heterogeneous firms

In this section, we extend the simple model to a dynamic model with heterogeneous firms. The economy consists of a continuum of upstream intermediate good suppliers indexed by i who produce differentiated goods $x_{i,t}$ and sell them to downstream buyers. The only source of aggregate uncertainty in this economy is the inflation shock. Specifically, we assume that aggregate inflation follows an AR(1) process with persistency ρ_π and volatility σ_π that captures the degree of uncertainty from inflation:

$$\Pi_{t+1} = \rho_\Pi \Pi_t + \sigma_\Pi \epsilon_{\Pi,t+1} \tag{7}$$

Each intermediate good producer produces goods using labor $l_{i,t}$ and productivity $z_{i,t}$, which follows an exogenous log AR(1) process.

$$\log z_{i,t+1} = \rho \log z_{i,t} + \epsilon_{i,t+1} \tag{8}$$

Intermediate good producers adopt production technology: $x_{i,t} = z_{i,t} l_{i,t}$. They face the following constraints. The production and delivery of products along the supply chain is such that sales are only realized after production has taken place, while firms are required to finance their working capital upfront. The within-period timing of events is thus as follows:

At the beginning of each period, both productivity and inflation shocks are realized so that there is no idiosyncratic or aggregate uncertainty in the model. The working capital

constraint further implies that each period features two stages: in the morning, firms hire labor and make the wage payment. They also produce and sell their products to their downstream buyers at a price p_t. At the same time, they issue trade credit to their customers: they allow their customers to postpone part of the payment: $\delta_{i,t}$ fraction of total sales in the afternoon. The outstanding trade credit generates an interest payment at a risk-free rate r_t.

We assume that firms do not have internal funds available, so that firm i needs to finance the wage payment using part of the sales payment $(1-\delta_{i,t})p_t x_{i,t}$ they receive in the morning and, if necessary, a bank loan $b_{i,t}$ with a loan rate $r_{b,it}$. The loan rate $r_{b,it}$ is above the risk-free rate to capture the potential default risk of the borrower. In addition, the loan rate $r_{b,it}$ is increasing in the amount of trade credit because the more trade credit suppliers issue, the more likely that they are lacking liquidity and therefore a higher risk of default. Specifically, the loan rate is modeled as follows:

$$r_{b,it} = r_t \left(1 + \delta_{i,t}^{\mu}\right) \tag{9}$$

where $\mu > 1$ to capture a convex cost in trade credit. The upstream supplier working capital constraint is the following:

$$b_{i,t} = \max\{w_t l_{i,t} - (1-\delta_{i,t})p_t x_{i,t}, 0\} \tag{10}$$

$$w_t l_{i,t} \leq b_{i,t} + (1-\delta_{i,t})p_t x_{i,t} \tag{11}$$

In the afternoon, intermediate good suppliers are paid the rest of their sales on delivery. At the end of the period, they pay their debt obligations to the banks and also pay the liquidity cost $f(\Pi_t)$, which increases with inflation rate. Notice that the bank loan is issued at the beginning of the period but paid at the end, so the loan payment needs to be adjusted

for inflation: $b_{i,t}\Pi_t$.

Hence, intermediate good producers face a cash flow mismatch between the required input payments and the realization of revenues from selling their products.

Intermediate good producers trade off between the benefit of receiving the interest payment from issuing trade credit $r_t\delta_{i,t}p_t x_{i,t}$ and the cost of taking bank loans due to the working capital constraint $b_{i,t} - (1 + r_{b,it})b_{i,t}\Pi_t$. In general, every period intermediate good producers choose labor input, trade credit issuance and loan borrowing to solve the following problem:

$$
\begin{aligned}
V(z_{i,t};\Pi_t) &= \max_{\delta_{i,t},b_{i,t},l_{i,t}} \pi^p_{i,t} + \mathbb{E}_t V(z_{i,t+1};\Pi_{t+1}) && (12)\\
s.t\ \ \pi^p_{i,t} &= (1 + r_t\delta_{i,t})p_t x_{i,t} - w_t l_{i,t} + b_{i,t} - (1 + r_{b,it})b_{i,t}\Pi_t - f(\Pi_t) && (13)\\
x_{i,t} &= z_{i,t}l_{i,t} && (14)\\
b_{i,t} &= \max\{w_t l_{i,t} - (1 - \delta_{i,t})p_t x_{i,t}, 0\} && (15)\\
w_t l_{i,t} &\leq b_{i,t} + (1 - \delta_{i,t})p_t x_{i,t} && (16)\\
r_{b,it} &= r_t\left(1 + \delta^{\mu}_{i,t}\right) && (17)\\
\log z_{i,t+1} &= \rho \log z_{i,t} + \epsilon_{i,t+1} && (18)\\
\Pi_{t+1} &= \rho_{\Pi}\Pi_t + \sigma_{\Pi}\epsilon_{\Pi,t+1} && (19)
\end{aligned}
$$

3 Data

For the firm-level analysis, we use data on non-financial firms headquartered in the US from the Compustat quarterly database over the period 2016Q1 to 2022Q1. We include

firms with at least $1 million in assets. We exclude firm-quarters experiencing asset growth greater than 100% since such high growth rates might reflect mergers or other changes in a firm's fundamentals (Almeida and Campello, 2007). The final sample consists of 104,700 firm-year-quarter observations and 4390 firms.

We obtain information on links between suppliers and customers from the FactSet Revere relationships database. This dataset has information on the major customers of each supplier, i.e., the customers that account for more than 10% of sales. We also observe the start and end date of each relationship at the supplier-customer pair level. This leaves us with 4031 unique suppliers, 3524 unique customers, and 53,044 unique supplier-customer pairs over the period 2016Q1 to 2022Q1.

For the supplier-customer-level analysis, we match suppliers in the FactSet Revere data with firms in the Compustat data. Our matched sample has 1,359 unique suppliers, 2,413 unique customers, and 16,648 unique supplier-customer pairs over the period 2016Q1 to 2022Q1. Consistent with Garcia-Appendini and Montoriol-Garriga (2013), the number of suppliers in the matched dataset is roughly one-fourth of the Compustat sample.

Table A1 summarizes the variable definitions. Table 1 Panels A and B present the summary statistics for the key variables used in the firm-level analysis and customer-supplier-level analysis, respectively. The average trade credit duration in our sample is 90 days with a significant heterogeneity in the cross-section.

4 Empirical design

4.1 The inflation shock

We study the trade credit channel of inflation using the increase in inflation in the U.S. 2021Q2 to 2022Q1. Figure 1 plots the year-over-year percent change in CPI inflation over the period 2006-2024. We can see that the average inflation rate was around 2% between 2016 and 2020. Inflation started accelerating in the second quarter of 2020 and reached its peak value of around 10% in the first quarter of 2022. For our analysis, we consider the period 2016Q1-2021Q1 as the pre-shock period and 2021Q2-2022Q1 as the post-shock period. Importantly, in the post-shock period in our sample, the effective Federal Funds Rate was at the zero lower bound and it wasn't until late 2022 that the Federal Reserve started increasing interest rates in response to higher inflation.

This provides an ideal setting to test how inflation affects trade credit provision as generally nominal interest rates increase with inflation and it becomes hard to disentangle the effect of inflation from that of interest rates. No change in interest rates in the post-shock period in our sample alleviates concerns about our results being driven by changes in interest rates.

Another reason that makes this shock particularly useful for our identification strategy is that this shock was largely unanticipated. At the end of 2020 and in early 2021, the economy was still trying to recover from the negative impact of the COVID pandemic, making inflation a less likely outcome. For example, He, Nagel, and Song (2022) find that asset prices during the March 2020 COVID shock showed no anticipated change in inflation expectations or inflation uncertainty. "Prices of inflation-protected bonds (TIPS) fell along with the prices of nominal Treasuries. Inflation-swaps show no increase in risk-neutral inflation expectations.

Prices of inflation caps and floors likewise do not provide evidence of an increase in inflation uncertainty."[pg. 58]

There are several advantages to this approach of using a major, unanticipated inflation shock. First, because suppliers likely already incorporate modest expected inflation changes into their trade credit decisions, quarterly innovations in the CPI are unlikely to induce large adjustments in trade credit provision. This reduces adjustment costs and is consistent with contract stickiness observed in practice. Second, this shock allows us to empirically analyze the effects of inflation on trade credit separate from interest rate effects.

4.2 Identifying trade credit supply effects

To identify changes to trade credit provision following the inflation shock, we exploit the supplier-customer network data and use a within customer-time empirical strategy adapting Khwaja and Mian (2008).

This identification strategy is illustrated in Figure 2, which depicts an example supplier-customer network with eight nodes: four supplier firms that provide trade credit (A, B, C, and D) and four customer firms (1, 2, 3, and 4). All customers in this analysis are simultaneously supplied by at least two firms allowing for the use of customer-time fixed effects. In this sample network, two suppliers A and B (nodes in orange) are (particularly) exposed to the inflation shock through their existing stock of trade credit, while two suppliers C and D (nodes in blue) are not. Customer 2 and 3 are supplied by at least one firm exposed to the inflation shock and at least one that is not. Using customer-time fixed effects we can isolate the differential impact of the inflation shock on the trade credit supplied by exposed versus unexposed suppliers.

Formally, we estimate the following the panel regression specification:

$$y_{i,t} = \beta_1 INF_t \times TCDuration_i + \gamma Z_{i,t-1} + \mu_i + \theta_t + \eta_{i,j} + \epsilon_{i,j,t} \quad (20)$$

$$y_{i,t} = \beta_1 INF_t \times TCDuration_i + \gamma Z_{i,t-1} + \mu_i + \kappa_{j,t} + \eta_{i,j} + \epsilon_{i,j,t} \quad (21)$$

where i, j, and t refer to the supplier, customer, and quarter, respectively. The sample period is from 2016Q1 to 2022Q1. In the baseline analysis, $y_{i,t}$ is supplier financing (as a proportion of sales) offered by firm i at time t. INF_t is 1 during high inflation period (2021Q2 to 2022Q1) and 0 otherwise. $TCDuration_i$ is the average accounts receivables/sales in the pre-period. μ_i is a supplier firm fixed effect that controls for all time-invariant characteristics at the firm-level that could affect trade credit provision. $\kappa_{j,t}$ is a customer-time fixed effect which control for time-invariant and time-varying customer-firm characteristics. $\eta_{i,j}$ is a supplier-customer fixed effect which controls for relationship-specific effects. The lower-order terms of the interaction that are not shown are absorbed by the fixed effects. Z is a vector of lagged controls, including $LogTotalAssets$, $PP\&E/TotalAssets$, Tobin's Q, $NetWorth/TotalAssets$, $TotalDebt/TotalAssets$, and $Cash/TotalAssets$.

Here, $TCDuration_i$ is our main variable of interest as it measures a firm's ex ante exposure to inflation through the trade credit channel. Our hypothesis is that firms that were more exposed to the inflation increase through their existing stock of trade credit (i.e., with higher $TCDuration$) will reduce trade credit provision more. A negative β_1 would be consistent with our hypothesis.

5 Results

5.1 Baseline analysis

Table 2 shows results from estimating the regression specifications in equation 21 on the supplier-customer data. Column (1) shows the results for the baseline specification without any controls or fixed effects. Column (2) adds firm-level control variables that could affect trade credit provision. Column (3) further includes supplier fixed effects which controls for time-invariant unobservables at the supplier-level that could affect trade credit provision. Column (4) adds time fixed effects to absorb aggregate shocks in each period that can affect trade credit provision. Column (5) adds supplier-customer fixed effects which controls for relationship-specific factors. Finally, column (6) adds customer-time fixed effects which absorb both time-invariant and time-varying customer characteristics that could affect demand for trade credit. This estimation only includes observations from customer firms with more than one supplier in each period.

The coefficient on the interaction variable of interest, $INF_t \times TCDuration_i$, is negative and significant for all specifications, consistent with our hypothesis. Firms that had a higher exposure to inflation through the trade credit channel reduced trade credit provision by more. The coefficient estimates range from around -0.11 to -0.18 across the different specifications in Table 2. This effect is economically significant. Our results indicate that during the high inflationary period, the trade credit supplied as a percentage of sales was up to 18% lower—equivalent to a 13.5 percentage points decline for the average firm that has a $TCDuration$ of 0.75.

A key strength of the analysis using customer-supplier data is that it allows us to isolate the impact of the inflation shock on trade credit *supplied* while controlling for demand effects.

However, a potential concern is that the number of supplier firms in the supplier-customer dataset is about a quarter of the firms in the full Compustat sample. To address this concern, we further validate our baseline analysis using the larger Compustat sample. We estimate the following firm-level quarterly panel regression:

$$\begin{aligned} y_{i,t} &= \beta_1 INF_t \times TCDuration_i \\ &\quad + \gamma Z_{i,t-1} + \mu_i + \theta_t + \epsilon_{i,t} \end{aligned} \tag{22}$$

$$\begin{aligned} y_{i,t} &= \beta_1 INF_t \times TCDuration_i \\ &\quad + \gamma Z_{i,t-1} + \mu_i + \psi_{k,t} + \epsilon_{i,t} \end{aligned} \tag{23}$$

where $\psi_{k,t}$ is an industry-time fixed effect, which controls for both time-invariant and time-varying industry characteristics and absorbs all industry-level aggregate shocks. The other variable definitions are as in regression specification (21). The lower order terms that are not shown are absorbed by the fixed effects. We double-cluster standard errors by firm and time. We also estimate the above specification with an indicator variable $HighTCDuration_i$ in place of the continuous $TCDuration_i$ measure. $HighTCDuration_i$ is one if firm i is in the top quartile average TC duration within-industry by in the pre-period, and zero otherwise.

Table 3 Panel A shows results from estimating this supplier firm-level regression specification with the continuous measure $TCDuration_i$ as the exposure variable of interest. Column (1) does not include any controls. Column (2) adds firm-level control variables. Column (3) adds firm fixed effects. Column (4) adds time fixed effects. Column (5) adds industry-time fixed effects which accounts for both time-invariant and time-varying industry-level heterogeneity in trade credit provision. As in the supplier-customer level analysis, we find that the coefficient on the interaction variable of interest, $INF_t \times TCDuration_i$, is

negative and significant for all specifications estimated on this larger sample of supplier firms, consistent with our baseline hypothesis. The coefficient estimates from this analysis are similar in magnitude to the ones estimated from the customer-supplier data and range from around -0.20 to -0.23 across the different specifications in Table 3.

Table 3 Panel B shows results from estimating this supplier firm-level regression specification with the indicator variable $HighTCDuration_i$ as the exposure variable of interest. The results are again consistent with our hypothesis. The coefficient on the interaction variable of interest, $INF_t \times HighTCDuration_i$, is negative and significant for all specifications and ranges from -0.13 to -0.17.

To better understand the dynamics of the effect and to also present evidence on the parallel trends assumption, we estimate the following model:

$$\begin{aligned} y_{i,t} = \beta_t I_t \times HighTCDuration_i \\ + \gamma Z_{i,t-1} + \mu_i + \psi_{k,t} + \epsilon_{i,t} \end{aligned} \tag{24}$$

This equation is equivalent to estimating equation (23), with the inflationary period indicator, INF_t, replaced with an indicator I_t for each quarter in our sample. Figure 3 plots the β_t coefficients with their 95% confidence intervals from estimating the regression specifications in equation 24, with reference quarter set to 2021Q1. The dashed red vertical line demarcates the start of the high inflation period. The figure shows no significant trends in trade credit supplied in the pre-period. The effects are negative and significant from the start and throughout the high-inflation period in our analysis.

5.2 Supplier heterogeneity

The results from the previous section show that firms' trade credit provision in the inflationary period is affected by their trade credit duration in the pre-period. However, there are other firm-level characteristics that could amplify or mitigate the trade credit channel of inflation. In this section, we analyze the key dimensions of ex ante supplier heterogeneity that we hypothesize can affect this channel.

To do this, we estimate the following panel regression, which captures how the ex ante heterogeneity of a supplier firm impacts the changes to its trade credit provision in response to the inflation shock:

$$\begin{aligned} y_{i,t} = {} & \beta_0 INF_t \times HighTCDuration_i + \beta_1 INF_t \times X_i \\ & + \beta_2 INF_t \times HighTCDuration_i \times X_i \\ & + \gamma Z_{i,t-1} + \mu_i + \eta_{k,t} + \epsilon_{i,t} \end{aligned} \tag{25}$$

where $HighTCDuration_i$ is indicator for firm i being in the top quartile within-industry by average TC duration in the pre-period. X_i captures the firm-level heterogeneity of interest. The triple interaction term is our main variable of interest. The coefficient β_0 captures the mitigating or amplifying effect of firm characteristic X_i on the trade credit channel of inflation. The other variable definitions are as in regression specification (23). The lower order terms that are not shown are absorbed by the fixed effects.

We study two key dimensions of supplier heterogeneity. The first is market structure. Conditional on being exposed to the inflation shock, the extent to which the suppliers adjust terms would be a function of market structure, which can affect the trade credit channel as follows. A supplier that has greater market power may have greater ability to adjust prices

and higher bargaining power over their customers. On the one hand, such a supplier may set more stringent terms than the average firm. On the other hand, such a supplier receives ex ante higher surplus from the relationship (Bocola and Bornstein, 2023) and may have higher incentive and ability to shield their customer from financial distress. This idea is consistent with the literature that shows that pass-through is higher in more competitive markets (Weyl and Fabinger, 2013). Given these ideas, we test the hypothesis that a supplier with greater market power cuts trade credit by less. To test this channel, we construct two measures of market power at the supplier level. The first measure, $HighMktShare_i$, is an indicator for whether a firm's sales share within its industry is in the top quartile in the pre-inflation period. The second measure, $HighNumCust_i$, is an indicator for whether the number of customers connected to a supplier is in the top quartile in the pre-inflation period. Here, if the coefficient on the triple interaction term, β_0, is positive, this would be consistent with the supplier shielding the customer from the inflation shock, suggesting lower pass-through. If β_0 is negative, this would be consistent with the supplier exploiting its market power and passing on the inflation shock to its customer.

The second dimension captures heterogeneity in the wealth transfer from the supplier's own financiers due to the inflation shock. This can arise, for example, if the supplier firm has a high share of long-term debt. The real value of long-term fixed rate debt goes down with higher inflation which is beneficial to the borrower firms. Hence, supplier firms with relatively high levels of long-term debt will receive a larger wealth transfer from their financiers. This will mitigate the negative impact of inflation on trade credit provision by supplier firms. To test this channel, we use the measure, $HighLTDebt_i$, which is an indicator for firm i being in the top quartile within-industry by long-term debt/assets in the pre-period. In Equation (25), a positive β_0 would be consistent with our hypothesis.

Table 4 shows results from estimating regression specification (25) with the heterogeneity of interest captured by $HighMktShare_i$. The coefficient on the baseline interaction variable of interest, $INF_t \times HighTCDuration_i$, remains negative and strongly significant for all specifications, and is around -0.19 in the strictest specification in column 5. Second, the coefficient on the triple interaction, $INF_t \times HighTCDuration_i \times HighMktShare_i$ is positive and significant for all specifications with controls. This suggests that suppliers with a higher market power shield their customers from the inflation shock. In the strictest specification, the coefficient on the triple interaction term is 0.118. This indicates that the reduction in trade credit provision by low-market share supplier firms is more than double that of high-market share supplier firms.

Table 5 shows results from estimating regression specification (25) with the heterogeneity of interest captured by $HighNumCust_i$. Here the sample drops from 83,899 to 23,983 because computing $HighNumCust_i$ requires firms appear in the Revere Factset dataset. The coefficient on the baseline interaction variable of interest, $INF_t \times HighTCDuration_i$, remains negative and significant for all specifications. The coefficient on the triple interaction, $INF_t \times HighTCDuration_i \times HighNumCust_i$ is positive and significant for all specifications. The results suggest that the supplier firms with many active customer relationships do not significantly cut trade credit in response to the inflation shock. This finding is again consistent with the hypothesis that high-market power shields customers during inflation shocks. In a more competitive market structure, a supplier firm may not have enough leeway to absorb the negative shock arising from high inflation and would be forced to pass on the inflation shock to its customers.

Table 6 shows results from estimating regression specification (25) with the heterogeneity of interest captured by $HighLTDebt_i$. We see that the coefficient on the baseline interaction

variable of interest, $INF_t \times HighTCDuration_i$, remains negative and significant for all specifications. The coefficient on the triple interaction, $INF_t \times HighTCDuration_i \times HighLTDebt_i$ is positive and significant for all specifications. This suggests that supplier firms with a higher share of long-term debt are less negatively affected by the inflation shock and cut trade credit by less. In the strictest specification in column (5), the coefficient on the triple interaction term is 0.102. This indicates that the reduction in trade credit provision by low-debt supplier firms is more than double that of high-debt supplier firms.

5.3 Customer effects

We next analyze inflation shock propagation via the trade credit channel from the customer firm's perspective. Here, we exploit variation in the ex ante inflation exposures of a firm's suppliers and examine the impacts of customer firm liquidity and leverage.

To analyze the effects on the customer firms, we estimate the following quarterly panel regression:

$$\begin{aligned} y_{j,t} = \beta_1 INF_t \times AvgSuppTCDuration_j \\ + \gamma Z_{j,t-1} + \mu_j + \eta_{k,t} + \epsilon_{j,t} \end{aligned} \tag{26}$$

where, $AvgSuppTCDuration_j$ is the average $TCDuration$ across all the suppliers of firm j in the pre-period. The other variable definitions are similar to regression specification (23). The lower order terms that are not shown are absorbed by the fixed effects.

The baseline results in Tables 2 and 3 show that the greater a supplier's ex ante exposure to the inflation shock, the larger the cut in trade credit during the inflation period. As such, a customer with a higher $AvgSuppTCDuration_j$ likely experiences a larger reduction in trade

credit that constraints its liquidity position. In the face of a reduction trade credit received, a customer firm could compensate by drawing down their cash position or increasing leverage.

Table 7 shows results from estimating regression specification (26) with log(cash), a proxy for the working capital or available liquidity position of the customer, as the dependent variable. Panel A is on the sample of all customers and Panel B is on the sample of customers with only one supplier. The latter is the sample of customer firms that are dependent on one supplier, with likely lower ability to substitute between suppliers. The coefficient on the interaction variable of interest, $INF_t \times AvgSuppTCDuration_j$, is negative and significant for most specifications. The coefficient ranges from around -0.12 to -0.17 in the specifications with controls, with generally larger magnitude of effects for customers connected to only one supplier. These results are consistent with customer firms drawing down cash to compensate for the reduction in trade credit received following the inflation shock.

Table 8 shows results from estimating regression specification (26) with debt/assets as the dependent variable. Panel A is on the sample of all customers and Panel B is on the sample of customers with only one supplier. The coefficient on the interaction variable of interest, $INF_t \times AvgSuppTCDuration_j$, is positive and significant for most specifications. The coefficient ranges from around 0.01 to 0.03 in the specifications with controls, with generally larger magnitude of effects for customers connected to only one supplier. These results suggest that customer firms compensate for the reduction in trade credit received from supplier firms by increasing external borrowing.

6 Conclusion

Understanding how inflation affects real economic outcomes is a fundamental question in macroeconomics and finance. This paper sheds light on a novel channel through which inflation propagates: the trade credit channel. By focusing on trade credit—a vital source of firm-to-firm financing—we illustrate how inflation shocks influence the financial interdependence embedded within production networks. Our findings reveal that inflation shocks erode the real value of existing trade credit and incentivize suppliers to adjust credit terms, primarily by reducing the duration of credit extended to customers. These adjustments can impose significant financial constraints on downstream firms, particularly those reliant on few suppliers or lacking access to alternative financing.

Our empirical evidence demonstrates that these effects are not uniform but depend on market structure and the financial characteristics of suppliers. Suppliers with greater market power or stronger access to external creditor support are better positioned to absorb the adverse impacts of inflation, thereby mitigating disruptions in trade credit provision. Conversely, suppliers in competitive markets or those with limited creditor support are more likely to pass the financial strain onto their customers.

These findings contribute to the broader literature by highlighting a previously unexplored dimension of inflation's real effects—its capacity to disrupt financial flows along production networks. This complements existing research on price pass-through and monetary policy by showing how the financial constraints imposed by inflation propagate through supply chains.

By exploring the trade credit channel, we provide a new perspective on inflation's impact, underscoring the importance of firm-level dynamics in shaping macroeconomic outcomes. This channel can be even stronger for firms in developing countries where formal credit

provision by banks may be limited due to higher degree of asymmetric information and other financing frictions.

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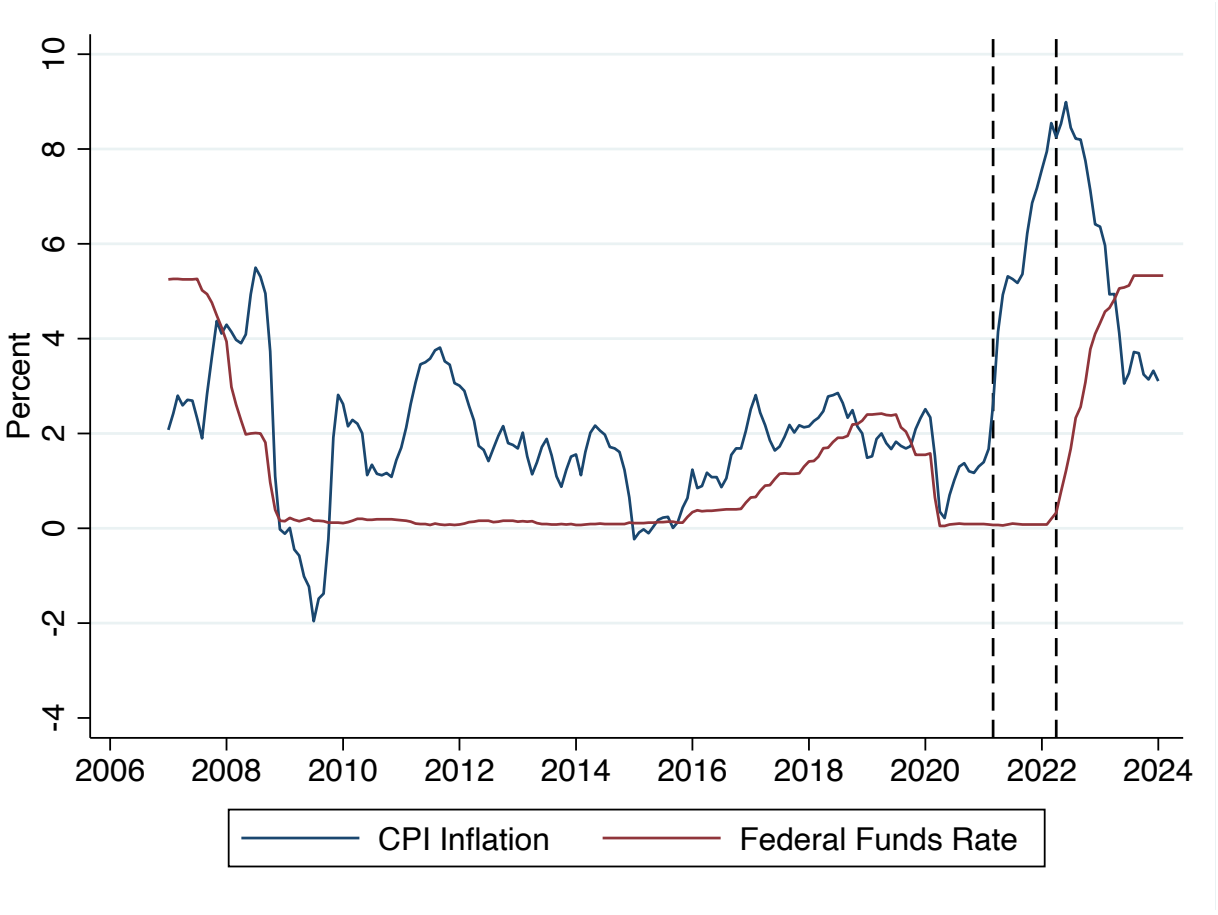


Figure 1: The time series of the Fed Funds rate and the inflation rate

This figure plots the time series of the CPI inflation rate and the Fed Funds rate. The dashed black vertical lines demarcate the the high inflation period used in the empirical analysis.

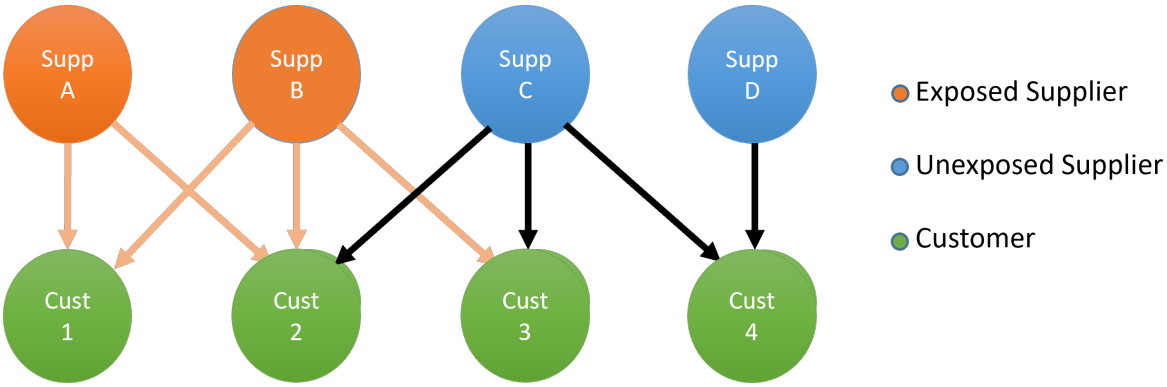


Figure 2: Empirical strategy for analyzing supplier-customer data

This figure illustrates the identification strategy used when analyzing supplier-customer production network data to test whether supplier firms exposed to the inflation shock cut trade credit supplied to customer firms. The figure depicts an example supplier-customer network with eight nodes: four supplier firms that provide trade credit (A, B, C, and D) and four customer firms (1, 2, 3, and 4). All customers in this analysis are simultaneously supplied by at least two firms allowing for the use of customer-time fixed effects. In this sample network, two suppliers A and B (nodes in orange) are (particularly) exposed to the inflation shock, while two suppliers C and D (nodes in blue) are not. Customer 2 and 3 are supplied by at least one firm exposed to the inflation shock and at least one that is not.

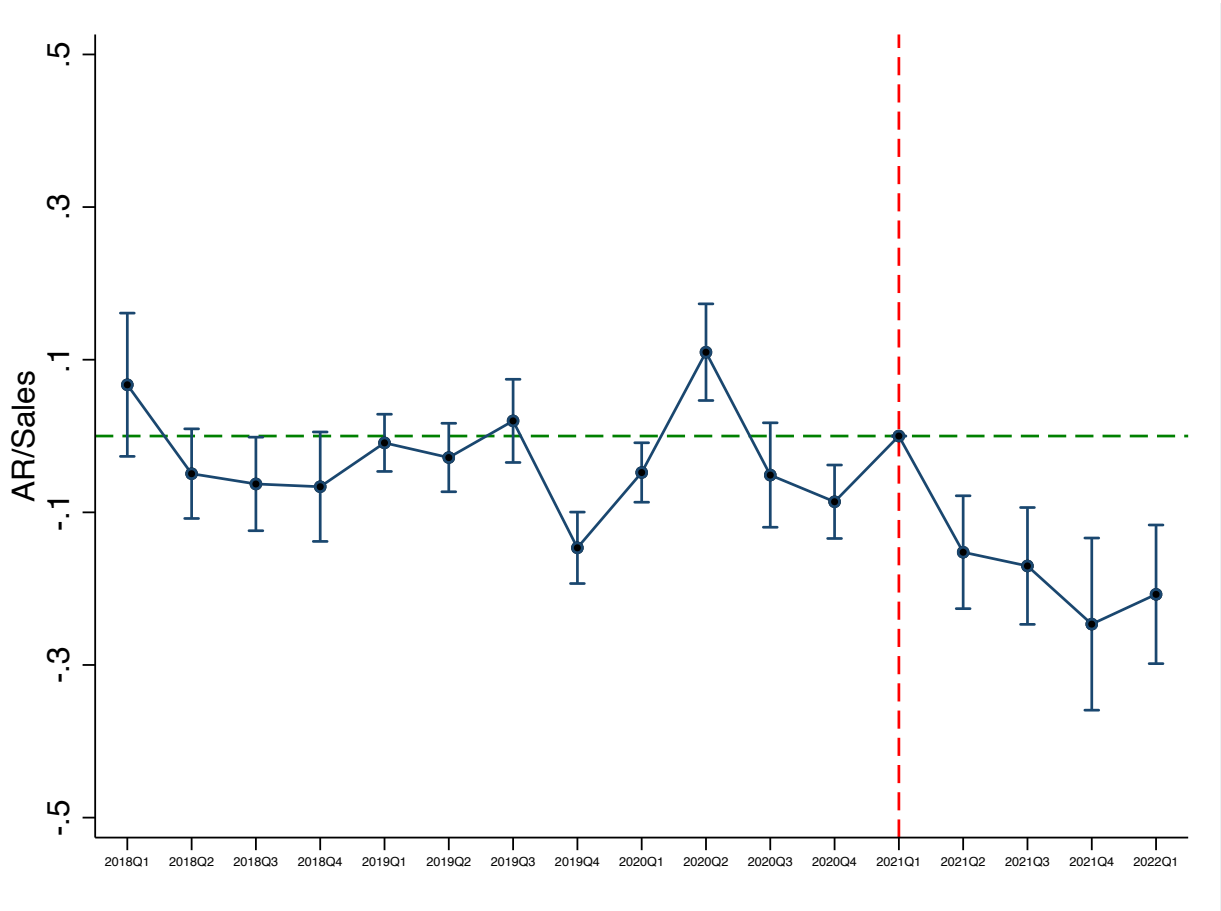


Figure 3: Effects over time

This figure plots the β_1 coefficients with their 95% confidence intervals from estimating the regression specification in equation (24). The reference quarter is 2021Q1. The dashed red vertical line demarcates the start of the high inflation period.

Table 1: Summary statistics

This table shows the summary statistics for the main variables used in the paper. The data are are quarterly from 2016Q1 to 2022Q1.

Panel A: Firm-level data

	Mean	Std. Dev.	25th	50th	75th	Count
AR/Sales	0.751	0.978	0.353	0.573	0.814	92,971
AP/COGS	1.042	2.095	0.304	0.538	0.904	94,676
Assets (Billion USD)	7.12	19.54	0.11	0.81	4.09	104,700
Cash-to-Assets	0.141	0.177	0.024	0.077	0.182	104,295
Debt-to-Assets	0.314	0.359	0.069	0.262	0.427	104,385
Short-term Debt-to-Assets	0.072	0.216	0.002	0.016	0.053	101,682
Long-term Debt-to-Assets	0.236	0.235	0.020	0.197	0.360	103,457
Short-term Debt-to-Total Debt	0.246	0.308	0.026	0.110	0.330	89,959
Long-term Debt-to-Total Debt	0.762	0.304	0.682	0.896	0.977	91,655
Tobin's q	1.746	2.722	0.480	0.943	1.905	87,268
PPE/Assets	0.354	0.303	0.093	0.247	0.613	104,385
Net Worth over Assets	0.367	0.705	0.279	0.451	0.665	104,327

Panel B: Customer-Supplier-level Data

AR/Sales	0.751	0.711	0.439	0.643	0.856	147,116
AP/COGS	0.971	1.674	0.317	0.555	0.914	148,458
Assets (Billion USD)	7.663	20.104	0.310	1.406	5.560	150,864
Cash-to-Assets	0.137	0.139	0.039	0.092	0.186	150,807
Debt-to-Assets	0.309	0.250	0.107	0.288	0.457	150,864
Short-term Debt-to-Assets	0.051	0.112	0.003	0.017	0.055	145,636
Long-term Debt-to-Assets	0.263	0.222	0.061	0.237	0.404	148,335
Short-term Debt-to-Total Debt	0.210	0.268	0.022	0.104	0.269	133,714
Long-term Debt-to-Total Debt	0.798	0.263	0.739	0.902	0.981	136,450
Tobin's q	1.616	2.194	0.469	0.960	1.805	125,090
PPE/Assets	0.286	0.258	0.088	0.181	0.429	150,864
Net Worth over Assets	0.414	0.297	0.264	0.421	0.601	150,861

Table 2: Inflation and trade credit duration: Supplier-customer level analysis

This table presents results of the panel regression model given in equation (21).The dependent variable is AR/Sales. The data are quarterly from 2016Q1 to 2022Q1. The specifications include combinations of supplier firm, customer firm and quarter fixed effects as indicated. The standard errors are double-clustered at the supplier firm and quarter level.Standard errors are shown below the corresponding coefficient estimates. The significance of the coefficient estimate is indicated by * for $p < 0.10$, ** for $p < 0.05$, and *** for $p < 0.01$.

Dep var: AR/Sales	(1)	(2)	(3)	(4)	(5)	(6)
INF	0.1116***	0.0625**	0.0567**			
	(0.041)	(0.024)	(0.026)			
TC Duration	0.9903***	0.9915***				
	(0.014)	(0.016)				
INF × TC Duration	-0.1827***	-0.1217***	-0.1120**	-0.1157**	-0.1472**	-0.1319**
	(0.059)	(0.044)	(0.044)	(0.046)	(0.056)	(0.055)
Log Assets		-0.0017	0.0156	-0.0010	0.0343	0.0176
		(0.003)	(0.054)	(0.061)	(0.043)	(0.037)
PPE/Assets		-0.0220	-0.0531	-0.1525	-0.1054	-0.1056
		(0.020)	(0.128)	(0.132)	(0.137)	(0.126)
Q		0.0004	-0.0062	-0.0041	-0.0010	-0.0006
		(0.002)	(0.005)	(0.005)	(0.005)	(0.005)
Net Worth/Assets		0.0357	0.2349	0.2510	0.0898	0.1068
		(0.034)	(0.189)	(0.192)	(0.115)	(0.098)
Total Debt/Assets		0.0480	0.2934	0.2734	0.1244	0.1272
		(0.038)	(0.196)	(0.186)	(0.123)	(0.098)
Cash/Assets		-0.0239	-0.0925	-0.1187	-0.1540**	-0.1217**
		(0.040)	(0.077)	(0.075)	(0.070)	(0.059)
Supplier FE	No	No	Yes	Yes	Yes	Yes
Time FE	No	No	No	Yes	Yes	Yes
Supplier × Customer FE	No	No	No	No	Yes	Yes
Customer × Time FE	No	No	No	No	No	Yes
Observations	171,600	137,578	137,555	137,555	136,271	114,669
Adj. R-sq	0.668	0.691	0.716	0.719	0.725	0.734

Table 3: Inflation and trade credit duration: Supplier-level analysis

This table presents results of the panel regression model given in equation (23). The dependent variable is AR/Sales. The data are quarterly from 2016Q1 to 2022Q1. The specifications include combinations of firm, industry, and quarter fixed effects as indicated. The standard errors are double-clustered at the supplier firm and quarter level.Standard errors are shown below the corresponding coefficient estimates. The significance of the coefficient estimate is indicated by * for $p < 0.10$, ** for $p < 0.05$, and *** for $p < 0.01$.

Panel A: Continuous measure of ex ante exposure to the trade credit channel

Dep var: AR/Sales	(1)	(2)	(3)	(4)	(5)
INF	0.1366***	0.1424***	0.1237***		
	(0.025)	(0.033)	(0.039)		
TC Duration	1.0000***	1.0039***			
	(0.012)	(0.011)			
INF × TC Duration	-0.1974***	-0.2201***	-0.1997***	-0.2006***	-0.2307***
	(0.040)	(0.052)	(0.056)	(0.056)	(0.063)
Log Assets		0.0003	0.0514*	0.0352	0.0258
		(0.001)	(0.027)	(0.029)	(0.034)
PPE/Assets		-0.0482***	-0.7673***	-0.8444***	-0.9809***
		(0.016)	(0.159)	(0.157)	(0.171)
Q		-0.0013	-0.0181**	-0.0165*	-0.0155*
		(0.003)	(0.009)	(0.009)	(0.008)
Net Worth/Assets		0.0192**	0.1317***	0.1363***	0.1147***
		(0.008)	(0.038)	(0.038)	(0.041)
Total Debt/Assets		0.0195	0.1674**	0.1379**	0.0676
		(0.015)	(0.069)	(0.065)	(0.077)
Cash/Assets		-0.0179	-0.2193**	-0.2625***	-0.2918***
		(0.042)	(0.093)	(0.092)	(0.105)
Firm FE	No	No	Yes	Yes	Yes
Time FE	No	No	No	Yes	No
Industry × Time FE	No	No	No	No	Yes
Observations	110,619	87,496	87,298	87,298	83,899
Adj. R-sq	0.612	0.612	0.609	0.611	0.603

Panel B: Indicator for high ex ante exposure to the trade credit channel

Dep var: AR/Sales	(1)	(2)	(3)	(4)	(5)
INF	0.0190**	0.0226**	0.0116		
	(0.007)	(0.010)	(0.014)		
High TC Duration	0.8818***	0.8146***			
	(0.098)	(0.087)			
INF × High TC Duration	-0.1272***	-0.1702***	-0.1306**	-0.1330**	-0.1659***
	(0.022)	(0.052)	(0.052)	(0.052)	(0.060)
Log Assets		-0.0312***	0.0598**	0.0437	0.0338
		(0.009)	(0.026)	(0.029)	(0.033)
PPE/Assets		-0.1757	-0.7607***	-0.8398***	-0.9877***
		(0.109)	(0.159)	(0.157)	(0.170)
Q		-0.0004	-0.0191**	-0.0177**	-0.0164**
		(0.005)	(0.009)	(0.008)	(0.008)
Net Worth/Assets		0.0122	0.1329***	0.1376***	0.1160***
		(0.057)	(0.039)	(0.039)	(0.043)
Total Debt/Assets		-0.0649	0.1726**	0.1432**	0.0729
		(0.098)	(0.070)	(0.066)	(0.080)
Cash/Assets		0.0843	-0.2275**	-0.2720***	-0.3046***
		(0.160)	(0.092)	(0.090)	(0.102)
Firm FE	No	No	Yes	Yes	Yes
Time FE	No	No	No	Yes	No
Industry × Time FE	No	No	No	No	Yes
Observations	110619	87496	87298	87298	83899
Adj. R-sq	0.157	0.161	0.607	0.609	0.601

Table 4: Supplier heterogeneity: Market share

This table presents results of the panel regression model given in equation (25). The dependent variable is AR/Sales. The data are quarterly from 2016Q1 to 2022Q1. The specifications include combinations of firm, industry, and quarter fixed effects as indicated. The standard errors are double-clustered at the supplier firm and quarter level. Standard errors are shown below the corresponding coefficient estimates. The significance of the coefficient estimate is indicated by * for $p < 0.10$, ** for $p < 0.05$, and *** for $p < 0.01$.

Dep var: AR/Sales	(1)	(2)	(3)	(4)	(5)
INF	0.0254**	0.0269***	0.0138		
	(0.011)	(0.010)	(0.017)		
High TC Duration	0.9871***	0.9202***			
	(0.113)	(0.101)			
HighMktShare	0.0130	0.0961***			
	(0.014)	(0.025)			
High TC Duration × HighMktShare	-0.4123***	-0.4049***			
	(0.091)	(0.085)			
INF × HighMktShare	-0.0196	-0.0142	-0.0067	-0.0198	0.0026
	(0.012)	(0.017)	(0.015)	(0.017)	(0.019)
INF × High TC Duration	-0.1401***	-0.1977***	-0.1735***	-0.1766***	-0.1916***
	(0.026)	(0.056)	(0.062)	(0.062)	(0.068)
INF × High TC Duration × HighMktShare	0.0656	0.1292***	0.1521***	0.1519***	0.1185**
	(0.052)	(0.045)	(0.051)	(0.050)	(0.053)
Controls	No	Yes	Yes	Yes	Yes
Firm FE	No	No	Yes	Yes	Yes
Time FE	No	No	No	Yes	Yes
Industry × Time FE	No	No	No	No	Yes
Observations	110,619	87,496	87,298	87,298	83,899
Adj. R-squared	0.166	0.168	0.607	0.609	0.601

Table 5: Supplier heterogeneity: Number of customers

This table presents results of the panel regression model given in equation (25). The dependent variable is AR/Sales. The data are quarterly from 2016Q1 to 2022Q1. The specifications include combinations of firm, industry, and quarter fixed effects as indicated. The standard errors are double-clustered at the supplier firm and quarter level. Standard errors are shown below the corresponding coefficient estimates. The significance of the coefficient estimate is indicated by * for $p < 0.10$, ** for $p < 0.05$, and *** for $p < 0.01$.

Dep var: AR/Sales	(1)	(2)	(3)	(4)	(5)
INF	0.0078	0.0346***	0.0001		
	(0.007)	(0.009)	(0.015)		
High TC Duration	1.0714***	0.9465***			
	(0.169)	(0.141)			
HighNumCust	0.1200***	0.1033***			
	(0.025)	(0.030)			
High TC Duration × HighNumCust	-0.3279*	-0.2030			
	(0.174)	(0.174)			
INF × HighNumCust	-0.0140	-0.0267**	-0.0311*	-0.0297*	-0.0413
	(0.019)	(0.012)	(0.017)	(0.018)	(0.032)
INF × High TC Duration	-0.3369***	-0.3841***	-0.3327***	-0.3361***	-0.3728***
	(0.072)	(0.118)	(0.084)	(0.082)	(0.102)
INF × High TC Duration × HighNumCust	0.3004***	0.3888**	0.3751***	0.3761***	0.4096***
	(0.089)	(0.148)	(0.123)	(0.122)	(0.140)
Controls	No	Yes	Yes	Yes	Yes
Firm FE	No	No	Yes	Yes	Yes
Time FE	No	No	No	Yes	Yes
Industry × Time FE	No	No	No	No	Yes
Observations	33,340	26,362	26,324	26,324	23,983
Adj. R-squared	0.170	0.178	0.670	0.671	0.659

Table 6: Supplier heterogeneity: Long-term debt

This table presents results of the panel regression model given in equation (25). The dependent variable is AR/Sales. The data are quarterly from 2016Q1 to 2022Q1. The specifications include combinations of firm, industry, and quarter fixed effects as indicated. The standard errors are double-clustered at the supplier firm and quarter level. Standard errors are shown below the corresponding coefficient estimates. The significance of the coefficient estimate is indicated by * for $p < 0.10$, ** for $p < 0.05$, and *** for $p < 0.01$.

Dep var: AR/Sales	(1)	(2)	(3)	(4)	(5)
INF	0.0178***	0.0192*	0.0108		
	(0.007)	(0.012)	(0.013)		
High TC Duration	0.9679***	0.9009***			
	(0.110)	(0.100)			
HighLTDebt	-0.0095	0.0512**			
	(0.013)	(0.024)			
High TC Duration × HighLTDebt	-0.3231***	-0.2927***			
	(0.076)	(0.080)			
INF × HighLTDebt	0.0038	0.0050	0.0021	0.0038	0.0101
	(0.010)	(0.014)	(0.012)	(0.011)	(0.012)
INF × High TC Duration	-0.1557***	-0.1936***	-0.1666***	-0.1684***	-0.1946***
	(0.039)	(0.067)	(0.059)	(0.059)	(0.065)
INF × High TC Duration × HighLTDebt	0.1236**	0.1000*	0.1169**	0.1145**	0.1023**
	(0.053)	(0.060)	(0.047)	(0.048)	(0.051)
Controls	No	Yes	Yes	Yes	Yes
Firm FE	No	No	Yes	Yes	Yes
Time FE	No	No	No	Yes	Yes
Industry × Time FE	No	No	No	No	Yes
Observations	110,577	87,468	87,272	87,272	83,873
Adj. R-squared	0.163	0.165	0.607	0.609	0.601

Table 7: Customer effects: Cash

This table presents results of the panel regression model given in equation (26). The dependent variable is log(cash). The data are quarterly from 2016Q1 to 2022Q1. The specifications include combinations of firm, industry, and quarter fixed effects as indicated. The standard errors are double-clustered at the supplier firm and quarter level. Standard errors are shown below the corresponding coefficient estimates. The significance of the coefficient estimate is indicated by * for $p < 0.10$, ** for $p < 0.05$, and *** for $p < 0.01$.

Dep var: Log Cash	(1)	(2)	(3)	(4)	(5)
Panel A: All customers					
INF	0.5880***	0.2844***	0.3332***		
	(0.046)	(0.066)	(0.078)		
Avg SuppTCDuration	0.1927	0.0562			
	(0.249)	(0.083)			
INF × Avg SuppTCDuration	-0.1093*	-0.1003	-0.1219**	-0.1208**	-0.1188**
	(0.060)	(0.072)	(0.048)	(0.047)	(0.048)
Observations	16,108	14,168	14,153	14,153	12,174
Adj. R-squared	0.009	0.614	0.868	0.873	0.872
Panel B: Customers with one supplier					
INF	0.5881***	0.3217***	0.4571***		
	(0.044)	(0.085)	(0.130)		
Avg SuppTCDuration	0.0157	0.1078			
	(0.238)	(0.067)			
INF × Avg SuppTCDuration	-0.2448***	-0.1080***	-0.1207**	-0.1295***	-0.1717**
	(0.040)	(0.027)	(0.046)	(0.034)	(0.072)
Observations	3,133	3,031	3,026	3,026	2,118
R-squared	0.006	0.606	0.821	0.830	0.857
Controls	No	Yes	Yes	Yes	Yes
Firm FE	No	No	Yes	Yes	Yes
Time FE	No	No	No	Yes	Yes
Industry × Time FE	No	No	No	No	Yes

Table 8: Customer effects: Leverage

This table presents results of the panel regression model given in equation (26). The dependent variables is debt/assets. The data are quarterly from 2016Q1 to 2022Q1. The specifications include combinations of firm, industry, and quarter fixed effects as indicated. The standard errors are double-clustered at the supplier firm and quarter level. Standard errors are shown below the corresponding coefficient estimates. The significance of the coefficient estimate is indicated by * for $p < 0.10$, ** for $p < 0.05$, and *** for $p < 0.01$.

Dep var: Debt/Assets	(1)	(2)	(3)	(4)	(5)
Panel A: All customers					
INF	-0.0009	0.0077	-0.0091		
	(0.003)	(0.008)	(0.008)		
Avg SuppTCDuration	0.0006	0.0122			
	(0.020)	(0.009)			
INF × Avg SuppTCDuration	0.0071	0.0058	0.0151**	0.0151**	0.0119*
	(0.005)	(0.004)	(0.006)	(0.006)	(0.006)
Observations	16,418	14,505	14,494	14,494	12,493
Adj. R-squared	0.000	0.691	0.875	0.878	0.872
Panel B: Customers with one supplier					
INF	-0.0469***	-0.0034	-0.0185***		
	(0.006)	(0.007)	(0.007)		
Avg SuppTCDuration	-0.0037	0.0046			
	(0.023)	(0.010)			
INF × Avg SuppTCDuration	0.0275***	0.0135***	0.0235***	0.0212***	0.0280**
	(0.007)	(0.003)	(0.005)	(0.005)	(0.011)
Observations	3,288	3,189	3,187	3,187	2,256
R-squared	0.002	0.722	0.891	0.892	0.867
Controls	No	Yes	Yes	Yes	Yes
Firm FE	No	No	Yes	Yes	Yes
Time FE	No	No	No	Yes	Yes
Industry × Time FE	No	No	No	No	Yes

Internet Appendix to

"Inflation Shock Transmission Along the Supply Chain: The Trade Credit Channel"

Isha Agarwal, Yuchen Chen, Sumudu Watugala

Table A1: Variable definitions

This table presents definitions of the main variables. The first column gives the variable name. The second column includes a short description. The last column gives the reference to the raw data source. Detailed descriptions and summary statistics of these variables are in Section 3.

Variable Name	Description	Source
INF_t	An indicator variable that is 1 on or after 2021Q1 over the sample period from 2016Q1 to 2022Q1.	
$TCDuration_i$	The average accounts receivables/sales in the pre-period.	Compustat
$HighTCDuration_i$	An indicator variable for firm i being in the top quartile within-industry by average TC duration in the pre-period.	Compustat
$HighMktShare_i$	An indicator variable for whether a firm's sales share within-industry is in the top quartile in the pre-period.	Compustat
$HighNumCust_i$	An indicator for whether the number of customers connected to a supplier is in the top quartile in the pre-inflation period.	Compustat, Factset Revere
$HighLTDebt_i$	An indicator for firm i being in the top quartile within-industry by long-term debt/assets in the pre-period.	Compustat
$AvgSuppTCDuration_j$	The average TCDuration across all the suppliers of customer firm j in the pre-period.	Compustat, Factset Revere
$LogAssets_{i,t}$	Natural log of total assets	Compustat
$PPE/Assets_{i,t}$	Proper, plant, and equipment over total assets	Compustat
$Q_{i,t}$	Tobin's Q - the market value of assets over the book value of assets.	Compustat
$NetWorth/Assets_{i,t}$	Book value of equity over total assets	Compustat
$TotalDebt/Assets_{i,t}$	Total debt over total assets	Compustat
$Cash/Assets_{i,t}$	Cash over assets	Compustat

Table A2: Robustness: Including firm-level controls interacted with inflation

This table presents robustness results for the panel regression model given in equation (23). The dependent variable is AR/Sales. The data are quarterly from 2016Q1 to 2022Q1. In addition to the control variables included in equation (23), we add interactions of all firm-level controls with the inflation shock. The specifications include combinations of firm, industry, and quarter fixed effects as indicated. The standard errors are double-clustered at the supplier firm and quarter level.Standard errors are shown below the corresponding coefficient estimates. The significance of the coefficient estimate is indicated by * for $p < 0.10$, ** for $p < 0.05$, and *** for $p < 0.01$.

Panel A: Continuous measure of ex ante exposure to the trade credit channel

Dep var: AR/Sales	(1)	(2)	(3)	(4)	(5)
INF	0.1366***	0.2257***	0.2448***		
	(0.025)	(0.080)	(0.079)		
TC Duration	1.0000***	1.0042***			
	(0.012)	(0.011)			
INF × TC Duration	-0.1974***	-0.2234***	-0.2041***	-0.2052***	-0.2344***
	(0.040)	(0.053)	(0.055)	(0.055)	(0.062)
Controls	Yes	Yes	Yes	Yes	Yes
Controls × INF	Yes	Yes	Yes	Yes	Yes
Firm FE	No	No	Yes	Yes	Yes
Time FE	No	No	No	Yes	No
Industry × Time FE	No	No	No	No	Yes
Observations	110619	87496	87298	87298	83899
Adj. R-sq	0.612	0.612	0.610	0.611	0.604

Panel B: Indicator for high ex ante exposure to the trade credit channel

Dep var: AR/Sales	(1)	(2)	(3)	(4)	(5)
INF	0.0190**	0.0534	0.0624		
	(0.007)	(0.073)	(0.074)		
High TC Duration	0.8818***	0.8142***			
	(0.098)	(0.087)			
INF × High TC Duration	-0.1272***	-0.1718***	-0.1277**	-0.1297**	-0.1604***
	(0.022)	(0.061)	(0.052)	(0.052)	(0.059)
Controls	Yes	Yes	Yes	Yes	Yes
Controls × INF	Yes	Yes	Yes	Yes	Yes
Firm FE	No	No	Yes	Yes	Yes
Time FE	No	No	No	Yes	No
Industry × Time FE	No	No	No	No	Yes
Observations	110619	87496	87298	87298	83899
Adj. R-squared	0.157	0.162	0.608	0.609	0.601