

# **Responding to the Financial Distress of Trade Partners: The Determinants and Consequences of Trade Financing**

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## **Abstract**

In this study, I provide unique evidence on the financing role of trade credit by investigating how trade contract terms change after one party breaches the supply contract. Using a hand-collected dataset of long-term supply contracts and contract renegotiations after breach, I show that the financing theory of trade credit dominates changes in trade credit terms. Specifically, when the contract is breached due to the financial distress of one of the trade partners, the non-defaulting party is more likely to *increase* the amount and duration of trade financing extended to the defaulter. Further, the non-defaulting party is more likely to provide credit when the defaulter does not have access to bank finance and when the trade parties exchange specialized assets, consistent with the view that trade creditors have an advantage over bank creditors in providing short-term financing. Finally, I show that while the borrower's investment activity increases after obtaining trade financing, their operating margins decrease. The evidence is consistent with the hold-up problem due to an information advantage, as modeled in Rajan (1992).

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## 1. Introduction

Trade credit is the largest form of short-term, external finance for firms in the United States.<sup>1</sup> An extensive theoretical literature discusses the benefits of trade credit and suggests that it can be used to overcome frictions between trade partners or between firms and external financiers. For example, Smith (1987), Biais and Gollier (1997), and Burkart and Ellinsen (2004) argue that trade credit can be used to finance buyers when the buyer faces frictions in obtaining finance from external capital markets. In contrast, Long et al. (1993) and Lee and Stowe (1993) posit that suppliers extend trade credit as a way to verify product quality, allowing buyers an extended period to verify the quality of the goods before payment. Finally, Klapper et al. (2012) suggest that trade credit is extended to large, profitable buyers because the buyer has market power to demand favorable terms of payment.

Despite the economic importance of trade credit, there is limited empirical research that disentangles these various theories, mainly because of the scarcity of detailed lending data. As a result, the prior literature typically focuses only on one side to the buyer-supplier transaction and investigates the determinants of variation in the aggregate amount of accounts receivable or accounts payable.<sup>2</sup> In this paper, I overcome this challenge by relying on a unique, hand-collected dataset of inter-firm supply agreements and supply contract renegotiations that provide contract-level detail on variation in trade terms. The empirical setting allows me to identify details on the determinants of *changes* in trade credit to help determine the motivation and role of trade credit as a source of finance. I am also able to exploit a difference-in-differences

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<sup>1</sup> Rajan and Zingales (1995) report that accounts payable were twice as large as debt in current liabilities for a sample of non-financial U.S. firms. Barrot (2013) reports that, as of 2012, accounts payable are three times as large as bank loans on the aggregate balance sheet of U.S. non-financial firms.

<sup>2</sup> Klapper et al. (2012) is a notable exception. They investigate trade credit contracts for a sample of 56 large buyers, but only have limited information about the buyers and suppliers including their size-bucket and investment grade status.

research design to help identify how changes in trade financing influence the borrower's subsequent investment and operating performance.

My empirical strategy investigates how the terms of trade change after one partner breaches the original supply contract. After the breach, I identify changes in the trade credit terms in the newly renegotiated contract. Focusing on contractual breaches offers a unique advantage because I can observe how the financing changes in response to various determinants of contractual breach. For example, if the contract was breached due to financial shortfalls, I attribute an increase in credit terms to the financing role of trade credit. In contrast, if the contract was breached due to product quality failures, I attribute an increase in credit terms to the warranty role of trade credit. In addition, the contract-level detail allows me to investigate how variation in buyer and supplier characteristics and product markets influence the provision of additional trade finance.

I begin the analysis by noting the significant variation in the forms of inter-firm financing. The renegotiated contracts provide significant detail about the amount, type, and duration of the new financing. Prior studies focus exclusively on a narrow definition of trade credit, defined as an agreement to allow the customer to purchase goods from the supplier on account, with the ability to pay the supplier at a later date. While many of the renegotiation terms in the sample meet this traditional definition of trade credit, I observe other forms of inter-firm financing with high frequency. For example, many of the renegotiations include *loans* from the non-defaulting trade partner to the defaulting partner. These loans resemble bank financing; they typically offer the borrower a lump sum at initiation in exchange for the promise to pay the principal plus interest back to their partner at a defined later date. In contrast to traditional trade credit in which funds only flow downstream, inter-firm loans are extended to both buyers and

suppliers in my sample. A final form of financing observed in the sample includes advanced payments to the suppliers for goods to be delivered at a later date. This form of financing differs from loans in that supplier's liability is reduced by delivery of goods, and the financing does not carry an explicit interest rate. Due to the heterogeneity in the types of lending contracts in the sample, I refer to inter-firm financing as 'trade financing' to distinguish it from the more narrow definition of 'trade credit.'

My research design regresses changes in trade financing following renegotiation on the causes of breach, controlling for characteristics of both the buyer and the supplier.<sup>3</sup> The theoretical motivation for trade credit suggests that it is used in response to frictions between the trade partners or between firms and external financiers. Therefore, to the extent that I can capture variation in these frictions by investigating the cause of contractual breach, I can better disentangle the various theories of trade credit by measuring changes in trade financing in relation to different types of breaches. In addition, controlling for buyer and supplier characteristics enables me to capture variation in supply and demand for credit and whether the relative bargaining power of the firms contributes to changes in financing terms.

Consistent with the financing theory of trade credit, I find that non-defaulters are more likely to offer additional credit (both in volume and duration) following financing frictions. Specifically, firms that violate accounting-based covenants in their supply agreements or cross-default provisions tied to bank financings are more likely to receive additional financing from their trade partner. However, violating the supply contract because of product quality failures does not increase the amount of trade credit extended; the evidence does not support the product

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<sup>3</sup> I recognize that in analyzing the changes in renegotiated contracts, there is a potential self-selection concern since many of the breaches result in contract terminations. Therefore, I first model the decision to renegotiate the contract and then utilize the results from the renegotiation analysis in a Heckman-selection model to mitigate concerns that self-selection determines changes in trade credit.

warranty role of trade credit.

To investigate the financing role of trade credit further, I examine cross-sectional variation in the trade partners' access to bank lines of credit. Meltzer (1960), Peterson and Rajan (1997), and Nilson (2002) argue that firms with better access to capital will redistribute the credit they receive to less advantaged firms. Therefore, following a renegotiation, I should observe the flow of credit from trade creditors with access to external finance to trade partners with limited access to external finance. The cross-sectional results confirm this hypothesis; the increase in trade finance is highest for the subset of contracts where the lender has access to a line of credit and the borrower does not have access to a line of credit.

In the final set of analyses, I investigate whether the additional trade financing taken by the borrower increases their investment behavior. Burkart and Ellinsen (2004) model the impact of trade credit and show that an increase in credit should increase firm-level investment. In addition, Haley and Higgins (1973) and Guariglia and Mateut (2006) show that buyers should respond to changes in the availability of credit by increasing their investment in inventory.

To test this hypothesis, I construct a 'before period' and an 'after period' to see how the investment and operating behavior of the borrower changes around the change in credit terms. To address the endogeneity concern that the propensity of the trade partner to provide additional financing is correlated with the investment opportunities and future performance of the borrower, I adopt both a propensity-score-matching technique and an instrumental variables analysis. The results of these analyses are consistent with the theoretical prediction; easing financing constraints by extending additional trade financing allows the borrower to increase their investments in capital expenditures, research and development, and inventory. However, I find that the borrowers' profit margins decrease after they receive additional financing; conversely,

the lenders' profit margins increase after they extend additional financing. Using cross-sectional variation in the amount of information transferred after the provision for additional trade financing, I attribute the change in margins to an increase in the bargaining power of the lender after extending the additional financing. The results suggest that there might be a cost associated with borrowing through trade credit.

The primary contribution of the study is to provide novel empirical evidence on how trade finance changes in response to supply contract breaches. The research setting offers several unique advantages over the previous studies. First, the contract-level detail allows me to investigate detailed changes in the terms of credit. These changes, along with details of the breach, allow me to draw inferences about the determinants of trade credit. In addition, the contracts allow me to control for both buyer and supplier characteristics, rather than focusing on one side of the transaction.

I also provide novel empirical evidence on the outcomes of trade credit by using a difference-in-differences design around the change in credit terms. Consistent with predictions, I find that investment increases after the increase in financing, but I find that profit margins decrease after the change in trade financing. I am the first, to my knowledge, to provide evidence that trade credit has a cost because the creditor obtains additional bargaining power after extending credit.

The remainder of the paper proceeds as follows. Section 2 discusses the data and summary statistics. Section 3 investigates the determinants of renegotiation, and section 4 explores the determinants of providing additional trade financing after renegotiation. In sections 5 and 6, I investigate the impact of trade financing on firm performance. Section 7 concludes.

## **2. Data and summary statistics**

### *2.1. Sample selection*

The analysis relies on a novel dataset of long-term supply contracts, contract renegotiations, and contract terminations collected from SEC filings. Regulation S-K of the Securities Act of 1933 mandates that all publicly filing companies disclose material contracts and material contract amendments as exhibits in SEC filings. Included in this requirement is “[any] contract upon which the registrant's business is substantially dependent, as in the case of continuing contracts to sell the major part of the registrant's products or services or to purchase the major part of registrant's requirements of goods, services, or raw materials” (Section 10 (ii)(b) of Regulation S-K). Item 1.02 of form 8-K also requires registrants to disclose terminations of material contracts, including the date of termination, the parties to the agreement, and a brief description of the material circumstances surrounding the termination.

I begin with a sample of long-term supply contracts entered into between January 1996 and July 2012. Contract initiations are collected by searching SEC filings for exhibits with “supply” or “procurement” in the title and “buyer” and “supplier” or “seller” in the first paragraph. For each supply contract, I determine whether the filer is the buyer or the supplier of the good or service and match the filing party to Compustat using the Central Indexing Key provided in the filing. Next, I identify the non-filing counterparty by hand-matching the name and location to the Capital IQ database. If the counterparty is public, I obtain relevant financial variables from Compustat (U.S. firms) or Thomson Reuter’s Datastream (international firms). Finally, I read each contract to determine the following variables: product descriptions, trade credit terms, the details and existence of financial loans, contract duration, initial investment requirements, exclusivity provisions, financial disclosure requirements, plant audits, the

existence and types of covenants, and purchase and supply requirements. This process yields a dataset of 5,847 original supply contracts (supply sample, hereafter).<sup>4</sup>

To identify contractual breaches, I search the public filings of all firms in the supply sample for the terms “violate”, “default”, “noncompliance” or “breach.”<sup>5</sup> I then search the surrounding paragraph to ensure that the breach relates to a supply agreement, and I identify the specific contract in the original supply sample that was breached. I record the identity of the breaching party, the date of the contractual breach, and the reason for the breach, if given. 1,829 contractual breaches are identified, representing 31% of the original supply sample (breach sample, hereafter).<sup>6</sup> Table 1 reports that the most frequent causes of breach are the inability to meet supply and purchase requirements specified in the original contract. It is also worth noting that 13% of the defaults are due to violations of accounting-based covenants in their supply agreements. Costello (2013) finds that financial covenants are included in the supply sample to ensure that the counterparties maintain a minimum performance threshold. Finally, 10% of the breaches involve violating cross-default provisions related to debt contracts; this suggests that there is an important link between product market contracts and capital market contracts.<sup>7</sup>

Finally, I identify the outcomes of breach by searching for renegotiated contracts and contract terminations. For each contract in the breach sample, I search exhibits and 8-K filings for the same buyer-supplier pair in combination with the words “amend,” “renegotiate,” “terminate,” or “termination” in the title of the exhibit or in the body of the filing. This process yields 1,168 renegotiations (renegotiation sample, hereafter) and 661 terminations (termination

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<sup>4</sup> A subset of this dataset was used by Costello (2013).

<sup>5</sup> SEC Regulation S-X, Rule 4-08 (c) requires disclosure of “any breach of...a related indenture or agreement...which has not been subsequently cured...” It is important to note that limitations in the reporting regulation will not allow me to capture immaterial breaches or breaches that were waived before the reporting date.

<sup>6</sup> Throughout the paper, I use the terms ‘breach’ and ‘default’ interchangeably.

<sup>7</sup> The violations either refer to technical defaults, payment defaults, or the inability to obtain adequate bank financing.



sample, hereafter).<sup>8</sup> For each contract in the renegotiation sample, I determine the terms of the renegotiation. In some cases the renegotiated contract explicitly lists the terms that were altered; if the changes are unclear, I directly compare the terms of the renegotiated contract to the terms of the original contract to identify changes.

## *2.2. Summary statistics*

The summary statistics are reported in Table 2; all variables are defined in Appendix A. Panel A reports the descriptive statistics for the full sample of contracts that were breached. The defaulting firms report an average profitability of -0.06 and an average Altman Z score of 1.51 in the year prior to default, indicating that they are distressed. This evidence is consistent with Table 1 and suggests that financial distress might influence the probability of supply contract default. On average, the non-defaulting party is more profitable and more creditworthy, with a profitability ratio of 0.07 and an Altman Z score of 3.46. Out of 1,829 contractual breaches, 64% are renegotiated and 38% of the contracts involve assets with relationship-specific investments. Panel B of Table 2 reports the descriptive statistics for the subsample of breached contracts that are renegotiated. Similar to Panel A, the defaulting firms are financially distressed in the year before the renegotiation. Fifty-eight percent of the renegotiated contracts include additional financing for the defaulting party, and trade credit days are extended for an average of 33 days.

## **3. The determinants of renegotiation**

The focus of the paper is on the determinants of providing trade financing after renegotiation of the contract. However, before changing the trade credit terms, the non-defaulting party decides whether to terminate the relationship in response to the contractual breach or to renegotiate the contract with the breaching party. This suggests that in investigating

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<sup>8</sup> To ensure accuracy and completeness of the breach sample, I reverse engineer the search process by searching the universe of amendments and terminations for filings due to breach of the original contract.

the determinants of changes in trade finance at renegotiation, there might be a self-selection problem related to the renegotiation decision. Therefore, I begin the analysis with the determinants of renegotiation after one party has breached the contract.

### *3.1 Theoretical framework for the decision to renegotiate*

When contracts are incomplete, Aghion and Bolton (1992) suggest that the contract will be designed to allocate bargaining power in a state-contingent manner. Specifically, decision rights will transfer to the non-defaulting party in bad states of the world, when the incentives of the defaulting party to behave opportunistically are high. In practice, supply contract breaches allow the non-defaulting party to exercise the option to terminate the contract, waive the breach, or renegotiate the contract with the option to change contractual terms (Costello, 2013). This suggests that the design of supply contracts in practice closely mirrors the theoretical predictions.

Since the non-defaulting party obtains decision rights after the breach, I first investigate the non-defaulting party's decision to renegotiate or terminate the contract after their supply partner breaches. To motivate this decision, I rely on the theoretical models of renegotiation in the presence of specialized assets by Hart and Moore (1994), Bolton and Scharfstein (1996), and Benmelech and Bergman (2008).<sup>9</sup> They model the financier's renegotiation decision in debt and leasing contracts as a function of the characteristics of the debtor's underlying assets. The lender/lessor's decision to continue the project involves a trade-off between the future rents from continuing the project and the liquidation value of the assets; when liquidation values are low, debtors' bargaining position improves, and the lender will continue the project. Liquidation values reflect the outside option of the collateral and determine the probability of renegotiation

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<sup>9</sup> Klein et al. (1978) and Williamson (1979) suggest that buyers and suppliers can mitigate the hold-up problem at renegotiation by underinvesting in specialized assets or by vertically integrating. However, many of the contracts in my sample still involve specialized assets between independent firms; this suggests that the benefits of outsourcing outweighed the expected hold-up costs when the contract was initiated.

with the defaulter. For example, Benmelech and Bergman (2008) provide empirical evidence that airlines with less redeployable fleets are more likely to renegotiate lease terms with the lessor after they enter bankruptcy.<sup>10</sup>

The theory is closely linked to the supply contract setting because of the nature of the assets exchanged. Many of the relationships involve investments in relationship specific assets which make the assets worth less in an alternative use (Williamson, 1979, 1985). When the contract is breached, the non-defaulting party is faced with the decision to renegotiate with their existing partner or to liquidate the project and switch to an alternative trade partner. However, if the relationship involves specific assets, the number of alternative trade partners is reduced and the defaulter becomes costly to replace. In this case, there are potential gains from renegotiation because the assets are worth more with the current trade partner than they are in another use. Based on these arguments, I predict that contractual breaches are more likely to result in renegotiations when the assets are less redeployable.

### *3.2. Empirical constructs*

The empirical strategy to capture the redeployability of assets relies on three measures. First, I attempt to measure the required capital investments for projects by investigating the terms of the original supply contract. Most filings provide detail on the capital requirements in the asset specifications section of the contract. Investments vary by industry and typically include specialized plant or equipment purchases or upgrades for suppliers and specific marketing or sales plans for buyers.<sup>11</sup> The indicator variable, *Investment*, is equal to one if the original contract discusses projected or required expenditures for specific investments.

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<sup>10</sup> Both Hart and Moore (1994) and Benmelech and Bergman (2008) show that the defaulter's financial condition must be sufficiently poor to make the threat of project liquidation a credible one.

<sup>11</sup> In many cases, the filer deletes the specific dollar amount of the investment due to the proprietary nature of the information. In addition, many contracts merely refer to an investment already made without giving further detail. Thus, *Investment* is an indicator variable rather than a continuous value.

My second and third measures of redeployability are motivated by Shleifer and Vishny's (1992) argument that a broader set of buyers can raise the liquidation value of an asset. If buyers and suppliers have alternative sourcing partners, the cost of switching partners is lower, and the value of liquidating the relationship increases. I measure the number of *existing* redundant partners by searching the supply sample for products involving multi-sourcing relationships. Specifically, I count the number of additional buyer/suppliers the non-defaulting party has contractual relationships with at the time their buyer/supplier defaults. I require the replacement options to be existing contracts to purchase or supply the *same* product/component as the defaulting party purchased or supplied. *Replacement Option* is a count of the number of redundant trade partners. Finally, my third measure captures the number of *potential* replacement options using the Herfindahl Index of market share in the defaulting firm's two-digit SIC industry classification (*Defaulter Industry HHI*). If industry market share is more dispersed, I assume that the non-defaulting party has more potential replacement options than if industry market share is concentrated among a few firms.

### 3.3 Research design and results

To estimate the probability that the parties will renegotiate the contract after breach, I estimate the following Probit model for the panel of all breached contracts:

$$P(\text{Renegotiate}=1) = \alpha + \beta_1 \text{Redeployability} + \beta_2 \text{Relationship} + \sum \beta_i (\text{Defaulter Firm Controls}) + \sum \beta_j (\text{Non-Defaulter Firm Controls}) + \varepsilon, \quad (1)$$

where the dependent variable is equal to one if the contract is renegotiated after the breach, zero otherwise. *Redeployability* captures the liquidation option of the relationship and is equal to *Investment*, *Replacement Option*, or *Defaulter Industry HHI*. Based on the theoretical predictions, I expect *Investment* and *Defaulter Industry HHI* to be positively related to the

probability of renegotiation and *Replacement Option* to be negatively related to renegotiation.

As an instrument for the decision to renegotiate the contract, I include a measure of the persistence of the contracting relationship because previous studies argue that repeated-game interactions can influence the renegotiation process (Baker et al., 2002; Taylor and Plambeck, 2007). When there is a promise of future business, there is less temptation to ‘renege’ on a contract, and parties will be more likely to renegotiate. To capture repeated interactions, I search the supply sample for previous contracts between the same buyer-supplier pair and record an indicator variable, *Relationship*, if the parties had previously interacted.

I control for firm-specific characteristics of the defaulter and the non-defaulter that might influence the renegotiation process. Benmelech and Bergman (2008) show that in order for the threat of liquidation to be credible, the firm (borrower) has to be performing poorly. My sample selection procedure already captures this because the firms defaulted on their supply obligations before the renegotiation decision. Nevertheless, I include additional performance measures for the defaulter in the year before the renegotiation decision, including profitability (ROA) and Altman Z score. I also include controls for size, leverage, and volatility to proxy for the defaulter’s and non-defaulter’s bargaining power (Roberts and Sufi, 2009). Finally, I include the defaulter’s market-to-book as a proxy for potential future rents the non-defaulter might be able to capture if the contract is renegotiated.

The results from estimating equation (1) are reported in Table 3. Columns 1 through 3 report the results by including the redeployability measures separately, and column 4 estimates the Probit regression with all three measures. Consistent with the theoretical predictions, I find that the parties are more likely to renegotiate the contract when the relationship is specialized. Specifically, when the exchange involves an investment, the parties are 6 percent more likely to

renegotiate. Similarly, a one standard deviation increase in the number of replacement options decreases the likelihood of renegotiation by 8 percent. The defaulter's HHI does not have a significant impact on the probability of renegotiation; this could suggest that *potential* replacement options do not reduce the cost of liquidating the current project because start-up costs with new buyers/suppliers are high. Alternatively, the two-digit industry measure does not accurately capture replacement options for the same product that the defaulting party provided.

The instrument loads in the predicted manner; consistent with prior relationships increasing the expected value of future business, I find that parties with repeated interactions are 18 percent more likely to renegotiate. Interestingly, I find that larger defaulters are more likely to get renegotiated contracts, indicating that they might have more bargaining power in the renegotiation process. I also find that trade partners are more likely to renegotiate with defaulters that have higher growth options, consistent with the prediction that the promise of future business influences the renegotiation process.

#### **4. The decision to provide trade financing**

Next, I turn to the determinants of changes in trade financing after renegotiation. I focus on the decision to provide trade financing to the defaulting party for a number of reasons. First, the provision of additional finance is a relatively frequent outcome in my sample of renegotiations. Table 4 reports the renegotiation outcomes after the buyer defaults (panel A) and the renegotiation outcomes after the supplier defaults (panel B). In 45% of the buyer-defaulted renegotiations, the supplier increases the duration (days) of trade credit extended. An additional 11% of the renegotiations involve a loan to the buyer. Turning to supplier defaults, I find that 48% of the renegotiations include a loan to the supplier, and in 12% of the renegotiations buyers promise to pay in advance for goods. The overall frequency of financing suggests that it is an

important outcome in the sample of renegotiations. In addition, trade credit is the largest form of short-term financing for U.S. firms. An extensive theoretical literature investigates the motivation for trade credit, but empirical data on trade credit is limited due to the paucity of data on specific buyer-supplier trade credit terms and limitations in investigating the determinants of *changes* in trade credit terms. Therefore, the focus of the analysis is on how trade financing terms change after renegotiation.

#### *4.1 Theoretical framework for the role of trade credit*

There are many theories to explain the existence of trade credit. Before I discuss my empirical strategy, I will outline the various theories that can explain the changes in trade financing after renegotiation.

##### *4.1.1. Trade credit to finance constrained clients*

The financing theory of trade credit suggests that firms are financed by their trade partners when there are frictions in obtaining financing from banks or financial institutions. Prior studies show that trade credit can substitute for bank credit during periods of tight credit or financial crises (Nilson, 2002; Choi and Kim, 2005; Love et al., 2007). Peterson and Rajan (1997) use the National Survey of Small Business Finance (NSSBF) to show that firms with better access to bank credit have higher levels of accounts receivable. The financing theory of trade credit suggests that small buyers have positive NPV projects but face credit rationing in external capital markets.

The literature suggests many reasons why supply partners might be willing to lend when banks are not. First, trade partners often have an informational advantage over banks. Smith (1987), Biais and Gollier (1997), and Petersen and Rajan (1997) argue that suppliers have an informational advantage over arm's length financiers because of the frequency of interactions

and the types of information exchanged. For example, the supplier may visit the buyer's premises more often than financial institutions or may obtain information about the buyer's creditworthiness through demand forecasts and other operational information. Using survey evidence on trading relationships in Vietnam, McMillan and Woodruff (1999) find that firms lend more to their buyers if they have had a longer duration trading relationship.

A second motivation for the financing theory of trade credit is that the nature of the trade-partner's payoff differs from that of the bank. Wilner (2000) argues that the specificity of the customer-supplier relationship make trade creditors more likely to extend credit than banks. Specifically, because trade creditors are dependent on their trade partners for future business, they are more likely to grant concessions or extend additional financing than banks are. Similarly, Cunat (2007) argues that if the trade relationship involves specific investments, customers have less incentive to default on their suppliers than on their banks, and suppliers have stronger incentives to extend credit to distressed buyers. Put differently, Peterson and Rajan (1997) suggest that because suppliers have an implicit equity stake in the firm, they have a stronger interest than banks in firm's ability to continue doing business.

A final motivation for the financing role of trade credit is that trade creditors may place a higher collateral value on the borrower's assets. Frank and Maksimovic (2005) and Longhofer and Santos (2003) model the decision to extend trade credit and relate it to the supplier's advantage in valuing the underlying assets, particularly when those assets are not homogenous. For example, a supplier can more easily redeploy goods to their network of buyers than a bank. Similarly, a buyer places a higher value on suppliers' specialized investments than banks do, because they can repossess the assets to produce their own products.



#### *4.1.2. Trade credit as a quality guarantee*

A second motivation for the use of trade credit is that suppliers extend credit to buyers to assure product quality. Allowing buyers an extended pay period gives them time to inspect the goods and verify product quality before paying their suppliers. Long et al. (1993) and Lee and Stowe (1993) argue that the time needed to verify the quality of the product will determine the duration of the trade credit. Antras and Foley (2011) investigate trade credit terms for a U.S. based poultry exporter. When exporting to countries with weak legal enforcement, they find that the exporter extends credit to allow the buyer to inspect product quality, consistent with the role of trade credit as a quality guarantee.

#### *4.1.3. Market power*

The final motivation for the role of trade credit is that large buyers have market power over their smaller suppliers. This market power allows them to demand favorable payment terms and better manage their cash cycle. Fabbri and Klapper (2009) find that when firms face strong competition in the product market (relative to their customers), they are more likely to extend trade credit. Klapper et al. (2012) find that large, creditworthy borrowers receive credit from their smaller suppliers, consistent with the market power theory of trade credit.

### *4.2 Research design and results*

Understanding how the terms of trade credit change in response to specific contractual breaches can help to empirically disentangle the various theories of trade credit. For example, if the contract was breached due to financial difficulties, an increase in trade credit is likely attributed to the financing motive. In contrast, if the contract was breached due to product defects, the increase in trade credit is likely due to the warranty motive. To investigate the response of trade credit to specific breach types, I group the contractual breaches into four

categories. The first category, Quantity Failure, includes all defaults related to the failure to meet minimum purchase requirements or supply requirements. Cachon (2004) suggests that a large portion of supply and demand shortages are due to industry or firm-specific financial distress.<sup>12</sup> If purchase and supply shortages are indicative of financial difficulties, I expect trade financing to increase if trade credit is used as a financing mechanism.

The second category of supply contract breaches includes covenant breaches. I include breaches of debt contracts that trigger a cross-default clause in the supply contract as well as direct breaches of financial covenants in the supply contract. The covenants specify a minimum performance threshold; triggering these covenants indicates that the defaulter's financial performance has deteriorated. Therefore an increase in trade credit after a covenant breach is consistent with the financing theory of trade credit.

The third category of supply contract breaches includes failures to meet product specifications. If trade credit is used to help ensure product quality, I would expect trade credit to increase after quality failures. The final category of supply contract breaches includes failure to provide adequate informational reports to the trade partners.<sup>13</sup> It is not clear how trade financing can help to overcome this breach, so I do not have any prediction on the use of trade credit in a renegotiated contract following an informational breach.

To investigate the financing role of trade credit, I analyze both the determinants of *whether* a renegotiated contract will include trade financing and, conditional on receiving financing, I investigate the determinants of the *amount* of financing extended. To account for potential self-selection into the renegotiated sample, I include the *Inverse Mills Ratio* from the

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<sup>12</sup> Anecdotally, I find that many of the breaches related to supply shortages refer to financial shortfalls to purchase raw materials. However, I recognize that alternative factors influence supply and demand shortages, such as inaccurate forecasting and changes in consumer demand.

<sup>13</sup> The informational reports include supply and demand forecasts, internal and external financial reports, and cost projections.

first stage estimation of equation (1) in all trade credit specifications. To estimate the probability that the non-defaulting party will extend trade financing after a breach, I estimate the following Probit model for the panel of all renegotiated contracts:

$$P(\text{Finance}=1) = \alpha + \beta_1 \text{QuantityFailure} + \beta_2 \text{CovenantBreach} + \beta_3 \text{QualityFailure} + \beta_4 \text{InformationFailure} + \beta_5 \text{InverseMills} + \sum \beta_i (\text{DefaulterFirmControls}) + \sum \beta_j (\text{Non-DefaulterFirmControls}) + \varepsilon, \quad (2)$$

where the dependent variable is equal to one if the non-defaulting party extends the number of days of trade credit, offers an advance payment, or offers a loan to the defaulting party. If the renegotiation does not involve any of these financing arrangements, I set *Finance* equal to zero.<sup>14</sup>

To estimate how the causes of breach influence the amount of financing extended, I estimate the following models using OLS for the panel of all defaulters that received financing:

$$\text{Log}(\text{LoanAmount}) = \alpha + \beta_1 \text{QuantityFailure} + \beta_2 \text{CovenantBreach} + \beta_3 \text{QualityFailure} + \beta_4 \text{InformationFailure} + \beta_5 \text{InverseMills} + \sum \beta_i (\text{DefaulterFirmControls}) + \sum \beta_j (\text{Non-DefaulterFirmControls}) + \varepsilon, \quad (3)$$

$$\Delta \text{Trade Credit} = \alpha + \beta_1 \text{QuantityFailure} + \beta_2 \text{CovenantBreach} + \beta_3 \text{QualityFailure} + \beta_4 \text{InformationFailure} + \beta_5 \text{InverseMills} + \sum \beta_i (\text{DefaulterFirmControls}) + \sum \beta_j (\text{Non-DefaulterFirmControls}) + \varepsilon, \quad (4)$$

where the dependent variable in equation (3) is equal to the loan size. Since the distribution of loan size is highly skewed, I take the log of the total dollar value of the loan. The dependent variable in equation (4) is the change in the number of days of trade credit extended. It is calculated as the difference in the number of days specified in the renegotiated contract, relative to the number of days specified in the original contract.

As discussed above, if trade credit is used as a financing mechanism, I expect the coefficients on  $\beta_1$  and  $\beta_2$  to be positive. If trade credit is used to provide warranties for product

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<sup>14</sup> I recognize that there may be additional forms of financing, such as changes in the price of the goods exchanged or guarantees on bank loans. Unfortunately, most pricing terms are redacted from the contract for proprietary reasons. This limitation will cause me to incorrectly characterize some financing renegotiations as non-financing renegotiations.

quality, I expect the coefficient on  $\beta_3$  to be positive. I include several firm-specific controls for both the defaulter and the non-defaulter. If trade credit is extended because of market power, I expect larger, more profitable defaulters to receive more financing from smaller, less profitable non-defaulters. Finally, I include proxies for the defaulter's growth opportunities because Petersen and Rajan (1997) suggest that trade lenders will be more willing to lend to partners with higher future profits.

The results are presented in Table 5, panel A. Column one reports the results on the determinants of whether the non-defaulting party will provide trade financing, and columns two and three report the results on the determinants of the amount of financing extended. The positive coefficients on *Quantity Failure* and *Covenant Breach* suggest that additional trade financing is extended to the defaulter when the breach is caused by a financing shortfall; this is consistent with the financing motive of trade credit. In contrast, I find no evidence supporting the quality/warranty motive of trade credit; the coefficient on *Quality Failure* is insignificant. Further, I find no evidence of the market power theory of trade credit. I find that larger, more profitable firms are more likely to extend credit, and smaller, less profitable defaulters are more likely to receive trade credit. I find little evidence that self-selection influences the decision to provide additional trade financing. The *Inverse Mills Ratio* only marginally loads in column 1; the remaining variables load in the predicted manner.

To further investigate the financing theory of trade credit, I include proxies for the types of assets exchanged and the information environment between the trade partners. As discussed above, the financing theory of trade credit suggests that trade creditors might be willing to invest when banks are not if (1) they have an information advantage in monitoring the borrower/defaulter, (2) the exchange of specialized assets makes them more highly dependent on

the borrower/defaulters, or (3) they place a higher value on the borrower/defaulters' underlying collateral.

In columns four through six, I include *Investment*, *Replacement Option*, and *Defaulter Industry HHI* to capture the non-defaulting partner's dependence on the defaulter. As predicted by Wilner (2000) and Cunnat (2007), more specific investments in the relationship increase their equity-like stake in the firm and will increase the probability of trade credit. *Investment* also captures the differential value that trade partners place on the collateral value of the defaulter, relative to banks. To capture the informational advantage of buyers and suppliers, I create a proxy to capture the frequency of interactions between the buyer and supplier. Specifically, if the original supply contract allowed the parties to inspect the counterparty's production or purchasing plants at specified times, I set *PlantAudit*=1. Biais and Gollier (1997) argue that frequent plant visits give the trade partner an informational advantage over banks; therefore, I expect plant audits to be positively associated with additional trade credit.

Consistent with the theoretical predictions, I find that trade partners are more likely to extend credit when they exchange specialized assets. For example, trade relationships with specific investments increase the probability of providing credit by 24% and increase the duration of trade credit by 29 days. Similarly, when the non-defaulter has a replacement trade partner, they are less likely to provide trade credit. Increasing the replacement options by one standard deviation decreases the probability of providing trade credit by 11%, and decreases the duration of trade credit by 13 days. Finally, I find that a better information environment between the trade partners increases the probability of providing credit; allowing for plant audits increases the probability of providing credit by 29% and increases the payment terms by 3.6 days.

In panel B of Table 5, I investigate the financing motive of trade credit based on cross-

sectional variation in access to bank lines of credit. While panel A of Table 5 shows that non-defaulters respond to the financial distress of their trade partners by providing credit, they should be more likely to do this when they have higher access to bank capital. For example, Meltzer (1960), Petersen and Rajan (1997) and Nilson (2002) argue that firms with better access to capital will redistribute the credit they receive to less advantaged firms via trade credit. As a measure of access to credit, I identify firms that have a bank line of credit outstanding during the renegotiation year. Sufi (2009) argues that lines of credit are a critical component of corporate liquidity management; therefore, measuring access to this form of financing should be a good proxy for the degree of liquidity constraint. To understand whether firms redistribute financing to less advantaged trade partners, I estimate the following regression:

$$\begin{aligned} Finance = & \alpha + \beta_1 LenderAccess + \beta_2 BorrowerConstrained + \beta_3 LenderAccess * \\ & BorrowerConstrained + \sum \beta_j (Non-DefaulterFirmControls) + \varepsilon, \end{aligned} \quad (5)$$

where the dependent variable is either an indicator variable equal to one if the renegotiation involves financing, equal to the log of the loan amount, or equal to the change in the duration of trade credit days. *LenderAccess* is equal to one if the non-defaulter has an outstanding line of credit during the renegotiation year, and *BorrowerConstrained* is equal to one if the defaulter *does not* have access to a line of credit. Under the redistribution argument of the financing role of trade credit, I would expect  $\beta_3$  to be positive because non-defaulters with better access to capital distribute trade credit to their constrained trade partners. In this specification, I include private firms that defaulted because many of these private firms did not have access to bank lines of credit. Therefore, I only control for non-defaulter firm characteristics.

The results are presented in panel B of Table 5. Consistent with the theoretical predictions, renegotiations are most likely to include financing when the non-defaulter has access to credit and the defaulter does not have access to credit. This suggests that trade financing can

serve as a substitute for bank credit when trade partners do not have access to credit markets. Overall, the evidence in Table 5 supports the financing role of trade credit and provides little support for the role of trade credit as a product warranty or as a result of market power.

## **5. The impact of trade financing on firm performance**

For the final step of the analysis, I explore the response of firm-level investment and performance after the provision of additional trade finance. The results from the previous section suggest that trade credit is used as a financing mechanism; when firms have positive NPV projects but have limited access to outside financing, their trade partners ‘fill the gap’ by providing trade finance. Further, Burkart and Ellingsen (2004) model the impact of trade finance and show that increases in trade credit should increase firm-level investment. Therefore, following the renegotiation and the provision of additional trade financing, I predict that the investment activity of the defaulter/borrower will increase, relative to the period before the renegotiation.

To test this hypothesis, I construct a ‘before period’ and an ‘after period.’ For each defaulter that gets a renegotiated contract, I investigate the investment and performance behavior over the three year period after the renegotiation, relative to the investment and performance behavior over the three year period before the renegotiation.<sup>15</sup> The goal of the analysis is to isolate the effect of trade financing on investment and performance. An empirical concern is that the defaulter’s investment opportunities, future performance, and the propensity of the non-defaulter to provide financing are jointly determined. I address this concern with propensity score matching and instrumental variables in an attempt to isolate the effect of trade financing on future investment and performance.

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<sup>15</sup> The results are qualitatively similar if I use two year windows.

## 5.1 Identification strategy

### 5.1.1. Propensity score matching

I analyze the response of defaulting firms to trade financing using a difference-in-differences research design. In an ideal empirical setting, defaulting firms would be randomly assigned to a financed (treatment) group and a non-financed (control) group. However, the evidence provided in the previous section indicates that smaller, less profitable firms with higher growth options get financed. To help overcome this issue, I adopt a propensity-score matching approach. Specifically, I first create propensity scores for each firm in the supply sample based on the conditional probability of receiving financing. This score is derived from a Probit model of the determinants of financing, similar to equation (2), without the causes of breach.<sup>16</sup> I then match each financed firm to a non-financed firm with the closest propensity score, without replacement. Table 6, panel A reports the firm-specific summary statistics of the treatment groups and the control groups, and it appears that the matching procedure works well; tests of the differences in means reveals that there are no significant differences between the treatment and control groups.

I explore how receiving additional trade financing influences the defaulter/borrower's investment and performance using the following regression models, estimated with OLS:

$$Investment = \alpha + \beta_1 Finance + \beta_2 Post + \beta_3 Finance * Post + \beta_4 Investment + \beta_5 ReplacementOption + \beta_6 IndustryHHI + \beta_7 Relationship + \sum \beta_i (DefaulterFirmControls) + \varepsilon, \quad (6)$$

$$ProfitMargin = \alpha + \beta_1 Finance + \beta_2 Post + \beta_3 Finance * Post + \beta_4 Investment + \beta_5 ReplacementOption + \beta_6 IndustryHHI + \beta_7 Relationship + \sum \beta_i (DefaulterFirmControls) + \varepsilon, \quad (7)$$

where *Investment* is equal to *Capex*, *R&D*, and *Inventory*, and *ProfitMargin* is equal to the defaulter's ratio of gross profit to total revenue. I estimate the regressions on separate samples of buyers and suppliers because it is reasonable to assume that buyers and suppliers use short-term

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<sup>16</sup> Firm-specific variables are matched in year t-1, relative to the renegotiation year.



trade financing in different manners. For example, Haley and Higgins (1973) and Guariglia and Mateut (2006) suggest that buyers will respond to changes in the availability of trade credit by increasing their investment in inventory. Suppliers may be more likely to invest in Capex to improve or expand their production facilities.<sup>17</sup>

Although my propensity-score-matching design controls for the observable differences in firm characteristics between the treatment and control groups in year t-1, I include additional contract- and firm-specific control variables in the regression analysis to account for observable changes in the determinants of investment in the ‘after’ period. Specifically, I include *Industry HHI* and *Market Share* to control for changes in industry-level competition. Following Chava and Roberts (2008) and Nini et al. (2009), I include controls for growth opportunities such as market-to-book and sales growth, and I control for the availability of internal funds using cash flow from operations.<sup>18</sup>

The results of the difference-in-differences test using the propensity-score-matched sample are reported in Table 6, panels B and C. Consistent with predictions, I find that suppliers that receive additional trade financing at renegotiation increase their investment in *Capex* and *R&D*. The results are economically significant; relative to the mean value of investment in year t-1, financed suppliers increase their capital expenditures by 13% and increase their research and development expenditures by 3%. I find no change in investment for the propensity-score-matched control group. Interestingly, I find that the supplier’s profit margins decrease after receiving financing; I do not find a decrease in profit margins for the control sample. The decrease in profit margin could reflect a negative trend in operating performance for the financed

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<sup>17</sup> Anecdotally, many of the financing contracts for supplier-defaults state that the loan purpose is for capital expenditures.

<sup>18</sup> I do not control for size in the Capex, R&D, and Inventory regressions because the dependent variable is already scaled by total assets.

firm, particularly since they just breached their supply contract. However, if my identification strategy works well, I expect that any difference in the profit margins of the treatment and control sample is due to characteristics of the loan. Therefore, an alternative explanation for the decrease in profit margin could relate to changes in pricing terms and bargaining power after the renegotiation. I explore this question further in section 6 of the paper.

Panel C of Table 6 reports the results of the changes in investment and profit margins for buyers that receive trade financing. I find that buyers receiving trade financing increase their investment in *Capex* and *Inventory* in the period after the renegotiation, relative to the period before the renegotiation. Again, the results are economically significant; relative to the mean value of investment in year  $t-1$ , financed buyers increase their capital expenditures by 11% and increase their investment in inventory by 13%. I find no changes for the propensity-score-matched control group.

#### *5.1.2 Instrumental variables*

Although the propensity-score-matching technique controls for the *observed* differences between the treatment and control samples, a remaining concern is that an *unobservable* characteristic determines both the propensity to receive trade financing and the subsequent investment and performance characteristics. To mitigate this concern, I estimate a two-stage least squares model with an instrumental variable. This instrument must be related to the propensity to receive financing, but uncorrelated to the firm's subsequent performance. To construct this instrument, I exploit variation in the locations of buyer and supplier pairs. Specifically, I calculate the distance between the buyer and supplier plant locations, using zip codes specified in the supply contract. Peterson and Rajan (1994, 2002) highlight the importance of the proximity of a firm to its lender, suggesting that the communication of soft information is particularly

costly as distance increases. In addition, several studies have documented a home bias in equity investing, suggesting that investors have better access to information about local firms (Kang and Stulz, 1997; Coval and Moskowitz, 1999; Mian, 2006). If distance increases the costs of lending, I expect trade creditors to be more willing to lend to their local trade partners.

I report the first stage regression in column 1 of Table 7 (panels A and B). Consistent with the theoretical prediction, *Distance* is an important determinant of the propensity to provide trade financing, mitigating a weak instrument concern; as distance between the buyer and supplier increases, the likelihood of financing decreases. The instrument should be exogenous to subsequent borrower performance; indeed, I find that *Distance* is not statistically significant when added to the performance regressions. In addition, there is no economic rationale for why distance between plants should impact the borrower's performance after the renegotiation.

I estimate the second stage performance regressions using the instrumented value for *Finance*. This estimation procedure produces results with similar inferences to the propensity-score-matching technique. Specifically, in Table 7, panel A, I report that financed suppliers increase their capital expenditures and research and development after receiving trade financing. Relative to the mean value of investment in year  $t-1$ , financed suppliers increase their capital expenditures by 16% and increase their research and development expenditures by 4.5%. In Panel B, I report that financed buyers increase their capital expenditures and inventory investment; financed buyers increase their capital expenditures by 18% and increase their inventory investment by 19%, relative to their mean investment in period  $t-1$ .

The results in Tables 6 and 7 suggest that the provision of additional trade financing eases defaulter's financing constraints and allows them to increase their investment after renegotiation. However, in all specifications I find that the financed party has a lower profit

margin in the period after they receive financing. In the next section, I explore this result further.

## **6. Determinants of decreasing profit margins after receiving trade financing**

In Tables 6 and 7, I find that borrowers' profit margins decrease in the period after receiving trade financing. If the propensity score matching technique and the instrumental variables technique correct for endogeneity concerns, the decreasing margins are attributed to characteristics of the financing, rather than general trends in borrower performance. Therefore, there must be a cost to the borrower of taking additional trade financing.

One of the costs of relationship financing is the increase in bargaining power that the lender enjoys after developing a relationship with the borrower. Rajan (1992) models the borrower's decision to take bank financing versus arms-length bond financing and shows that a significant cost to bank financing is the informational advantage that the bank gets after extending credit. Specifically, when there is information asymmetry between the borrower and the capital markets, an informed lender can hold-up the borrower after the lending relationship is established; the lender then has bargaining power over the firm and can extract a larger portion of the firm's profits.

Relying on this theory, I predict that the decrease in borrower profit margins in the trade finance setting is due to the informational advantage that the lender receives in extending additional credit.<sup>19</sup> Because the borrower now has fewer lending options, the lender gains bargaining power over the distribution of profits after renegotiation.

The first step in testing this hypothesis is to investigate the lenders' profit margins in the period after the financing is extended. If lenders gain bargaining power due to an informational

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<sup>19</sup> This prediction is anecdotally supported by explicit provisions requesting additional financial information in renegotiated contracts. Thirty-two percent of the trade financings for buyers involve requests for more frequent financial reporting information, and 46% of the trade financings for suppliers involve requests for internal cost reporting information.

advantage, I predict that the lenders' profit margins will increase in the 'after' period, relative to the period before the financing. I rely on the two-stage least squares approach to instrument for the propensity to provide financing and compare the effect of the financing on the borrower's margins to the effect of the financing on the lender's margins.<sup>20</sup> The results are reported in Table 8, panel A. Column 1 investigates the profit margins for suppliers that receive trade financing; column 2 reports the profit margins for the lenders that are linked to the suppliers/borrowers in column 1. Column 3 investigates the profit margins for buyers that receive trade financing; column 4 reports the profit margins for the lenders that are linked to the buyers/borrowers from column 3. Consistent with the prediction, I find that the lenders' profit margins increase in the period after they provide trade financing, while the borrowers' profit margins decrease in the period after they receive trade financing.

### *6.1 Cross-sectional variation in the amount of information transfer*

While the results in panel A of Table 8 show that lenders gain an advantage in the period after they provide financing, it is not clear that the source is an informational advantage. For example, buyers may pay less for the supplier's goods after they extend trade credit to account for the additional financial risk associated with the credit. Similarly, suppliers may charge more for their products after they extend trade credit to account for the credit risk of the loan to the buyer.<sup>21</sup> In addition, many of the trade lending contracts include exclusivity provisions, prohibiting the borrower from trade relationships with other partners for the same good.

In an attempt to disentangle these explanations, I investigate cross-sectional variation in the amount of expected information transfer *within* the subsample of renegotiations that involve financing. I rely on two cross-sectional predictions for differences in information transfer. First, I

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<sup>20</sup> The results are qualitatively similar if I use the propensity-score-matching technique (untabulated).

<sup>21</sup> It is not clear, however, why the lenders would account for the risk in the price of the products rather than the interest rate charged on the loan or the trade credit.

investigate margins after loan financings versus margins after non-loan financings. Since loan financings often involve a higher degree of information requirements, I would expect the change in margins to be greater than for non-loan financings. Therefore, I create a variable, *Loan*, if the financing involves a loan, zero otherwise. The second cross-sectional split I investigate relies on the age of the buyer-supplier relationship. The change in information advantage after a financing is likely to be higher for newer relationships versus more established relationships; it is less likely that the lender will learn something new in financing an older trade partner than a newer trade partner. Therefore, I create a variable, *New*, that is equal to one if the buyer-supplier relationship is in the lowest quartile of duration, zero otherwise.

The results of the cross-sectional tests are reported in panel B of Table 8. Columns 1 and 2 report the results of the cross-sectional split based on loans versus non-loan financings. Consistent with the predictions, borrowers' (lenders') profit margins decrease (increase) more when they receive (provide) loans versus non-loan financings. Columns 3 and 4 report the results of the cross-sectional split based on new versus established financings. Again, I find that borrowers' (lenders') profit margins decrease (increase) more when the financing involves newer relationships, relative to more established relationships. Overall, the results in Table 8 are consistent with there being a cost to receiving trade financing; the cost is likely associated with the informational advantage realized by lenders after they provide the trade financing.

## **7. Conclusion**

I provide unique evidence on the financing role of trade credit by investigating how trade contract terms change after one party breaches the supply contract. I find that the financing theory of trade credit explains changes in trade credit terms. Specifically, when the contract is breached due to the financial distress of one of the trade partners, the non-defaulting party increases the amount and duration of trade financing extended to the defaulter. Further, the non-

defaulting party is more likely to provide credit when the defaulter does not have access to bank finance and when the trade parties exchange specialized assets, consistent with the view that trade creditors have an advantage over bank creditors in providing short term financing. Finally, I show that while the borrower's investment activity increases after obtaining trade financing, their operating margins decrease. Using cross-sectional tests, I find that lenders gain bargaining power after extending trade finance; I attribute this to an information advantage, as modeled in Rajan (1992).

I contribute to the literature on trade credit by documenting how trade finance changes in response to supply contract breaches. The research setting offers several unique advantages including contract-level detail on the changes in credit terms and characteristics of both the buyers and the suppliers. I also provide novel empirical evidence on the outcomes of trade credit by using a difference-in-differences design around the change in credit terms. I am the first, to my knowledge, to provide evidence that trade credit has a cost because the creditor obtains additional bargaining power after extending credit.

## Appendix A: Variable Definitions

Buyer/Supplier Capex:	Capital expenditures scaled by total assets.
Buyer/Supplier Inventory:	Inventory scaled by total assets.
Buyer/Supplier Profit Margin:	The ratio of gross profit to total revenue.
Buyer/Supplier RD:	The ratio of research and development expense to total sales.
Defaulter/Non-Defaulter Altman Z:	$\text{Altman Z} = 1.2(\text{working capital}/\text{total assets}) + 1.4(\text{retained earnings}/\text{total assets}) + 3.3(\text{EBIT}/\text{total assets}) + 0.6(\text{market value of equity}/\text{total liabilities}) + 0.999(\text{sales}/\text{total assets})$ .
Defaulter Industry HHI:	The concentration of market share for the defaulter two-digit SIC industry.
Defaulter/Non-Defaulter Profitability:	The ratio of EBITDA to total assets.
Defaulter/Non-Defaulter Leverage:	Long term debt scaled by total assets.
Defaulter/Non-Defaulter MtB:	The ratio of the market value of total assets to the book value of total assets, where the numerator is defined as the sum of market equity, total debt, and preferred stock liquidation value less deferred taxes and investment tax credits.
Defaulter/Non-Defaulter Size:	The logarithm of total assets.
Defaulter/Non-Defaulter Volatility:	The standard deviation of the filer's (counterparty's) cash flow from operations scaled by total assets over the five year period prior to entering into the contract.
Distance:	The number of miles between the buyer and the supplier, calculated using the plant/office locations specified in the contract.
Finance:	An indicator variable equal to one if the renegotiated contract includes a loan to the defaulting party, an extension of the days of trade credit allowed to the defaulting buyer, or an advanced payment for goods to the defaulting supplier, zero otherwise.
Investment:	An indicator variable equal to one if the contract specifies that the buyer or supplier makes an investment related to the exchange, zero otherwise.
LOC:	An indicator variable equal to one if the defaulter/non-defaulter has an outstanding line of bank credit at the time of the renegotiation, zero otherwise.



Loan:	An indicator variable equal to one if the renegotiated contract includes a loan to the defaulting party, zero otherwise.
Loan Size:	The natural logarithm of the dollar value of the loan extended to the defaulting party.
New:	An indicator variable equal to one if the age of the buyer/supplier relationship is in the bottom quartile at the time of renegotiation, zero otherwise.
Plant Audit:	An indicator variable equal to one if the contract specifies that the parties can inspect or audit their counterparty's production/sales plants, zero otherwise.
Relationship:	An indicator variable equal to one if the buyer/supplier had at least one contractual relationship before the current defaulted contract, zero otherwise.
Replacement Option:	The number of additional buyer/suppliers the non-defaulting party has contractual relationships with at the time their buyer/supplier defaults. I require the replacement options to be existing contracts to purchase or supply the same product/component as the defaulting party purchased or supplied.
Renegotiation:	An indicator variable equal to one if the defaulted contract is renegotiated, zero otherwise.
$\Delta$ Days Payable:	The number of additional days of trade credit extended to a defaulting buyer, as specified in the renegotiated contract.

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**Table 1: Default triggers and descriptive statistics**

This table summarizes the reasons that the contracts were breached before the completed duration for the total sample of breached contracts.

	N	%
Failure to meet minimum supply requirements	589	32%
Failure to meet minimum purchase requirements	342	19%
Violating financial covenants in supply contract	242	13%
Miscellaneous/Undetermined	207	11%
Violating cross-default provisions/failure to obtain financing	190	10%
Failure to meet product specifications	138	8%
Failure to provide informational reports	121	7%
	1829	

**Table 2: Descriptive statistics**

Panel A of this table presents the descriptive statistics for the total sample defaulted contracts and Panel B of this table presents the descriptive statistics for the sample of renegotiated contracts. Financial variables are measured in the year prior to default and the year prior to renegotiation. All variables are defined in Appendix A.

**Panel A: Sample of all defaults**

Variable	N	Mean	Std. Dev.	Q1	Median	Q3
Renegotiation	1,829	0.64	0.43	0	1	1
Investment	1,829	0.38	0.49	0	0	1
Replacement Option	1,829	1.99	1.63	1	2	3
Defaulter Industry HHI	1,291	0.16	0.14	0.07	0.12	0.21
Relationship	1,829	0.28	0.45	0	0	1
Defaulter Size	1,291	4.56	1.60	2.50	3.63	6.54
Defaulter Leverage	1,291	0.19	0.22	0.02	0.13	0.29
Defaulter Profitability	1,291	-0.06	0.47	-0.13	0.09	0.16
Defaulter Volatility	1,291	0.14	0.40	0.03	0.07	0.13
Defaulter Altman Z	1,291	1.51	7.55	1.04	2.92	6.33
Defaulter MtB	1,291	1.32	2.46	0.32	1.04	1.72
Non-Defaulter Size	1,291	6.40	2.48	4.41	6.44	8.12
Non-Defaulter Leverage	1,291	0.19	0.22	0.01	0.12	0.31
Non-Defaulter Profitability	1,291	0.07	0.48	-0.09	0.10	0.16
Non-Defaulter Volatility	1,291	0.16	0.34	0.03	0.06	0.15
Non-Defaulter Altman Z	1,291	3.46	5.73	1.49	3.81	8.70
Non-Defaulter MtB	1,291	1.20	0.67	0.33	1.34	1.79

**Panel B: Sample of Renegotiations**

Variable	N	Mean	Std. Dev.	Q1	Median	Q3
Investment	1,168	0.42	0.49	0	0	1
Replacement Option	1,168	1.85	1.44	1	1	2
Defaulter Industry HHI	899	0.16	0.15	0.06	0.12	0.20
Relationship	1,168	0.33	0.47	0	0	1
Finance	1,168	0.58	0.49	0	1	1
Loan	1,168	0.32	0.39	0	0	1
Loan Size	340	6.38	3.31	4.91	6.12	8.25
$\Delta$ Days Payable	206	32.77	13.47	20	35	75
LOC	1,007	0.61	0.40	0	1	1
Defaulter Size	899	4.91	2.49	3.92	5.07	7.67
Defaulter Leverage	899	0.18	0.20	0.03	0.13	0.27
Defaulter Profitability	899	-0.02	0.16	-0.07	0.03	0.17
Defaulter Volatility	899	0.11	0.35	0.03	0.05	0.13
Defaulter Altman Z	899	1.80	9.57	1.05	2.08	6.90
Defaulter MtB	899	2.05	2.29	0.32	1.54	2.69
Non-Defaulter Size	899	6.84	2.52	4.30	6.80	8.37
Non-Defaulter Leverage	899	0.19	0.22	0.01	0.11	0.30
Non-Defaulter Profitability	899	0.06	0.47	-0.03	0.09	0.16
Non-Defaulter Volatility	899	0.04	0.28	0.03	0.06	0.15
Non-Defaulter Altman Z	899	3.94	6.39	1.43	4.95	8.96
Non-Defaulter MtB	899	1.05	1.16	0.72	0.94	1.80
Buyer Capex	2,190	0.05	0.06	0.02	0.03	0.07
Buyer RD	2,190	0.06	0.23	0.01	0.09	0.18
Buyer Inventory	2,190	0.10	0.11	0.02	0.07	0.14
Buyer Profit Margin	2,190	0.17	1.48	0.05	0.22	0.42
Supplier Capex	3,090	0.07	0.08	0.02	0.05	0.09
Supplier RD	3,090	0.11	0.16	0.02	0.06	0.13
Supplier Inventory	3,090	0.09	0.09	0.02	0.06	0.12
Supplier Profit Margin	3,090	0.22	1.75	0.17	0.32	0.53

**Table 3: The determinants of renegotiations**

This table reports the results from a Probit regression investigating the determinants of renegotiation after contractual default. The dependent variable is equal to one if the contract is renegotiated after a default, zero otherwise. All regressions include year and industry fixed effects and standard errors are heteroskedasticity robust, clustered at the filing firm level. P-values are reported in parentheses, and \*\*\*, \*\*, \* denote significance at the 1, 5, and 10 percent levels, respectively. All variables are defined in Appendix A.

		<i>Renegotiate=1</i>			
	Predicted Sign	(1)	(2)	(3)	(4)
Investment	+	0.140** (0.04)			0.158* (0.07)
Replacement Option	-		-0.264*** (0.00)		-0.268*** (0.00)
Defaulter Industry HHI	+			0.595 (0.46)	0.685 (0.42)
Relationship	+	0.608** (0.02)	0.675** (0.01)	0.599** (0.02)	0.723** (0.01)
Defaulter Size		0.188** (0.02)	0.171** (0.05)	0.185** (0.03)	0.167** (0.05)
Defaulter Leverage		0.072 (0.89)	0.574 (0.29)	0.175 (0.73)	0.615 (0.27)
Defaulter Profitability		-0.669 (0.37)	-0.507 (0.46)	-0.631 (0.38)	-0.652 (0.38)
Defaulter Volatility		-1.559*** (0.01)	-1.392** (0.02)	-1.444** (0.02)	-1.384** (0.03)
Defaulter Altman Z		-0.033* (0.06)	-0.032* (0.08)	-0.036* (0.06)	-0.038** (0.05)
Defaulter MtB	+	1.005*** (0.00)	0.937*** (0.00)	1.011*** (0.00)	0.950*** (0.00)
Non-Defaulter Size		0.090* (0.08)	0.084 (0.11)	0.081 (0.11)	0.079 (0.14)
Non-Defaulter Leverage		-0.833 (0.13)	-0.923* (0.09)	-0.875* (0.10)	-0.777 (0.17)
Non-Defaulter Profitability		1.340*** (0.00)	1.234** (0.01)	1.267*** (0.01)	1.135** (0.03)
Non-Defaulter Volatility		-0.485 (0.25)	-0.616 (0.21)	-0.491 (0.24)	-0.617 (0.20)
Non-Defaulter Altman Z		-0.004 (0.65)	-0.001 (0.96)	-0.004 (0.69)	0.001 (0.90)
Non-Defaulter MtB		0.068 (0.18)	0.059 (0.29)	0.064 (0.20)	0.055 (0.33)
Year and Industry FE		Yes	Yes	Yes	Yes
N		1,291	1,291	1,291	1,291
Pseudo R-Square		0.275	0.280	0.256	0.302

**Table 4: Changes in the renegotiated contract**

This table summarizes the (non-mutually-exclusive) contractual changes in the renegotiated contracts. Panel A summarizes contractual changes in response to buyer defaults and panel B summarizes the contractual changes in response to supplier defaults.

**Panel A: Renegotiation outcomes when buyer defaults**

	N	%
Extend trade credit	223	45%
Add exclusivity provision	101	20%
Must provide financial information	89	18%
Lower purchase requirements	62	13%
Loan	54	11%
Neutral/Undetermined	49	10%
Reduce trade credit	26	5%
Shorten contract duration	17	3%
Total Contracts	496	

**Panel B: Renegotiation outcomes when supplier defaults**

	N	%
Loan	324	48%
Reduce supply requirements	302	45%
Add exclusivity provision	287	43%
Must provide financial information	186	28%
Pay in advance	80	12%
Neutral/Undetermined	42	6%
Shorten contract duration	33	5%
Pay later	8	1%
Total Contracts	672	



**Table 5: The determinants of trade financing**

Column 1 of Panel A reports the results from a Probit regression investigating the determinants of increases in supply chain finance after contractual default. The dependent variable is equal to one if the non-defaulting firm offers a loan, trade credit, or an advanced payment, zero otherwise. Column 2 of panel A reports the results of the OLS regression of the determinants of the loan amount, and column 3 of panel A reports the results of the OLS regression of the determinants of the change in the trade credit days. Columns 4-6 of panel A report the results of the trade credit regressions with additional proxies for the financing role of trade credit. In panel B of this table, I investigate the determinants of supply chain finance based on variation in the defaulting firm's access to bank lines of credit. Lender Access equals one if the non-defaulter has an outstanding bank line of credit in the renegotiation year, and Borrower Constrained equals one if the defaulter does not have an outstanding line of credit in the renegotiation year. All regressions include year and industry fixed effects and standard errors are heteroskedasticity robust, clustered at the filing firm level. P-values are reported in parentheses, and \*\*\*, \*\*, \* denote significance at the 1, 5, and 10 percent levels, respectively. All variables are defined in Appendix A.

**Panel A: The determinants of financing**

		<i>Finance=1</i>	<i>Log(Loan Amount)</i>	<i>Δ Trade Credit</i>	<i>Finance=1</i>	<i>Log(Loan Amount)</i>	<i>Δ Trade Credit</i>
	Predicted Sign	(1)	(2)	(3)	(4)	(5)	(6)
Quantity Failure	+	0.013** (0.04)	0.986* (0.07)	12.595 (0.12)			
Covenant Breach	+	0.519*** (0.00)	1.057** (0.05)	8.591*** (0.00)			
Quality Failure	+	0.002 (0.86)	-0.529 (0.64)	0.197 (0.23)			
Information Failure	?	0.438 (0.22)	3.621 (0.56)	6.195 (0.72)			
Investment	+				0.763*** (0.00)	2.369** (0.03)	28.752*** (0.00)
Replacement Option	-				-0.296*** (0.00)	0.039 (0.92)	-13.128*** (0.00)
Defaulter Industry HHI	+				0.398 (0.60)	-4.470 (0.43)	-5.282 (0.84)
Plant Audit	+				0.839*** (0.00)	0.048 (0.93)	3.633* (0.06)
Inverse Mills		0.002* (0.06)	0.054 (0.46)	1.935 (0.21)	0.003* (0.09)	0.047 (0.35)	2.582 (0.29)
Defaulter Size		-0.077 (0.32)	-0.002* (0.09)	-1.220* (0.08)	-0.087** (0.01)	-0.001 (0.11)	-2.017 (0.36)
Defaulter Profitability		-0.778** (0.05)	-0.001 (0.11)	-2.175* (0.05)	-0.974*** (0.00)	0.000 (0.23)	-1.122** (0.01)
Defaulter Altman Z		0.016 (0.20)	0.492 (0.56)	0.866 (0.39)	0.022 (0.24)	0.583 (0.52)	0.769 (0.38)
Defaulter MtB		0.272** (0.02)	0.001* (0.08)	0.980** (0.05)	0.395** (0.04)	0.003* (0.10)	0.877** (0.03)
Non-Defaulter Size		0.037* (0.06)	0.774** (0.02)	1.945* (0.10)	0.051** (0.02)	0.821*** (0.00)	1.623* (0.07)
Non-Defaulter Profitability		1.327** (0.03)	0.830* (0.07)	1.159 (0.97)	1.435** (0.03)	0.992 (0.11)	2.008 (0.25)
Non-Defaulter Altman Z		0.016 (0.19)	0.218 (0.30)	0.330 (0.30)	0.022 (0.29)	0.299 (0.46)	0.108 (0.39)

Non-Defaulter MtB	-0.238	-0.011	-0.492	-0.075	-0.007	-0.389
	(0.12)	(0.65)	(0.98)	(0.33)	(0.82)	(0.99)
Year and Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
N	899	340	206	899	340	206
Pseudo R-Square	0.3307	0.148	0.137	0.343	0.092	0.159

**Panel B: Cross-sectional variation in access to bank lines of credit**

		<i>Finance=1</i>	<i>Log(Loan Amount)</i>	<i>Δ Trade Credit</i>
	Predicted Sign	(1)	(2)	(3)
Lender Access	+	0.084** (0.03)	1.387* (0.06)	1.482 (0.12)
Borrower Constrained	+	0.216 (0.25)	0.001 (0.54)	8.432 (0.31)
Lender Access* Borrower Constrained	+	0.252*** (0.00)	0.542** (0.02)	3.316** (0.05)
Non-Defaulter Size		0.046* (0.09)	0.560** (0.01)	0.277 (0.54)
Non-Defaulter Profitability		0.764*** (0.00)	3.055*** (0.00)	5.860*** (0.00)
Non-Defaulter Altman Z		0.015*** (0.00)	-0.001 (0.94)	0.069 (0.18)
Non-Defaulter MtB		-0.218 (0.29)	-0.617 (0.91)	-0.006 (0.83)
Year and Industry FE		Yes	Yes	Yes
N		1,007	368	285
Pseudo R-Square		0.1591	0.0927	0.0451

**Table 6: Outcomes of supply chain finance using propensity-score-matching**

This table estimates the investment activities and profit margins for buyers and suppliers after receiving supply chain finance using a difference-in-differences research design. I create propensity scores for each defaulting firm based on the conditional probability of getting supply chain financing. I match each financed firm one-to-one with a non-financed firm with the closest propensity score, without replacement. Panel A reports the descriptive statistics for the treatment and control samples. Panel B reports the results of the difference-in-differences estimation of investment activities and profit margins of financed suppliers, and panel C reports the results of the difference-in-differences estimation of investment activities and profit margins of financed buyers. All regressions include year and industry fixed effects and standard errors are heteroskedasticity robust, clustered at the filing firm level. P-values are reported in parentheses, and \*\*\*, \*\*, \* denote significance at the 1, 5, and 10 percent levels, respectively. All variables are defined in Appendix A.

**Panel A: Descriptive statistics of treatment sample and propensity-score-matched control sample***A.1. Buyer Default Sample*

<i>Buyer Financed=1</i>						
Variable	N	Mean	Std. Dev.	25%	Median	75%
Buyer Size	240	4.141	2.578	2.150	5.177	8.096
Buyer Profitability	240	-0.024	0.527	-0.219	0.093	0.157
Buyer Altman Z	240	3.743	7.294	1.217	3.948	8.807
Buyer MtB	240	1.051	1.005	0.314	1.025	2.748

<i>Buyer Financed=0</i>						
Variable	N	Mean	Std. Dev.	25%	Median	75%
Buyer Size	240	4.415	2.425	2.292	4.591	7.955
Buyer Profitability	240	-0.026	0.487	-0.207	0.094	0.158
Buyer Altman Z	240	3.581	9.429	1.970	3.458	8.065
Buyer MtB	240	1.170	0.736	0.328	1.319	2.744

*A.2. Supplier Default Sample*

<i>Supplier Financed=1</i>						
Variable	N	Mean	Std. Dev.	25%	Median	75%
Supplier Size	338	4.972	2.455	2.216	5.476	8.557
Supplier Profitability	338	0.027	0.411	-0.014	0.110	0.200
Supplier Altman Z	338	3.619	12.268	1.599	3.146	12.044
Supplier MtB	338	1.565	0.407	0.517	1.530	1.690

<i>Supplier Financed=0</i>						
Variable	N	Mean	Std. Dev.	0.25	Median	0.75
Supplier Size	338	4.219	2.498	2.221	5.664	8.088
Supplier Profitability	338	0.040	0.366	-0.010	0.115	0.195
Supplier Altman Z	338	2.875	10.237	1.039	2.677	11.272
Supplier MtB	338	1.593	0.481	0.792	1.519	1.774

**Panel B: Supplier investment and profit margin using propensity-score-matching research design**

	<i>CAPEX</i>	<i>R&amp;D</i>	<i>Inventory</i>	<i>Profit Margin</i>
	(1)	(2)	(3)	(4)
Finance*Post	0.009** (0.02)	0.003*** (0.00)	0.011 (0.18)	-0.118** (0.02)
Finance	0.018 (0.48)	0.001* (0.09)	0.002 (0.55)	-0.033* (0.10)
Post	0.001 (0.71)	-0.010 (0.87)	0.012 (0.31)	-0.042 (0.74)
Investment	0.016* (0.09)	-0.000 (0.94)	-0.006 (0.27)	0.119 (0.19)
Replacement Option	-0.002 (0.31)	0.008 (0.89)	-0.075** (0.01)	-0.050 (0.11)
Industry HHI	0.050 (0.90)	-0.151* (0.10)	-0.075 (0.20)	-0.503*** (0.00)
MtB	0.013*** (0.00)	0.053* (0.06)	0.023** (0.04)	0.910*** (0.00)
Size				0.600 (0.11)
Profitability	0.008 (0.29)	-0.402 (0.23)	0.065*** (0.00)	0.301*** (0.00)
AltmanZ	0.003*** (0.00)	0.000 (0.34)	0.000 (0.32)	0.000 (0.98)
Cflow	0.000 (0.66)	0.001** (0.01)	0.001** (0.04)	0.044*** (0.00)
Sales Growth	0.000 (0.41)	0.000 (0.65)	0.000 (0.14)	-0.005 (0.59)
Market Share	0.243*** (0.00)	0.056** (0.01)	0.228** (0.00)	0.625*** (0.00)
Year and Industry FE	Yes	Yes	Yes	Yes
N	3,090	3,090	3,090	3,090
Adj. R-Square	0.244	0.225	0.196	0.260

**Panel C: Buyer investment and profit margin using difference-in-differences research design**

	<i>CAPEX</i>	<i>R&amp;D</i>	<i>Inventory</i>	<i>Profit Margin</i>
	(1)	(2)	(3)	(4)
Finance*Post	0.007*** (0.00)	-0.023 (0.16)	0.013** (0.02)	-0.164** (0.04)
Finance	0.007 (0.22)	0.006** (0.01)	0.002* (0.07)	0.265 (0.35)
Post	0.007 (0.16)	0.026* (0.08)	0.005 (0.20)	-0.467 (0.38)
Investment	0.002 (0.71)	-0.023 (0.12)	0.016 (0.23)	0.386* (0.06)
Replacement Option	0.000 (0.60)	0.008** (0.04)	-0.003 (0.14)	-0.048 (0.35)
Industry HHI	0.023 (0.42)	-0.122** (0.02)	0.144* (0.08)	-0.168 (0.81)
MtB	0.006 (0.22)	0.088*** (0.00)	0.026 (0.24)	0.809** (0.05)
Size				-0.084 (0.32)
Profitability	0.019 (0.14)	-0.258*** (0.00)	0.169** (0.00)	0.936*** (0.00)
Altman Z	0.001* (0.07)	0.001 (0.63)	-0.001* (0.09)	0.078*** (0.00)
Cash Flow	-0.000 (0.50)	0.001** (0.04)	-0.000 (0.75)	0.001*** (0.00)
Sales Growth	0.001*** (0.00)	0.000 (0.11)	0.001*** (0.00)	0.024*** (0.00)
Market Share	-0.024 (0.29)	-0.049 (0.51)	0.021 (0.78)	0.543 (0.38)
Year and Industry FE	Yes	Yes	Yes	Yes
N	2,190	2,190	2,190	2,190
Adj. R-Square	0.144	0.365	0.296	0.270

**Table 7: Outcomes of supply chain finance using 2sls**

This table estimates the investment activities and profit margins for buyers and suppliers after receiving supply chain finance using two-stage least squares. In the first stage, I estimate the Probit regression of the determinants of financing using the distance between the buyer and supplier plant locations as the instrument. Panel A reports the results of the 2sls estimation for financed suppliers, and panel B reports the results of the 2sls estimation for financed buyers. In both panels, I report the first stage regression in column 1 and the second stage regression results in columns 2-5. All regressions include year and industry fixed effects and standard errors are heteroskedasticity robust, clustered at the filing firm level. P-values are reported in parentheses, and \*\*\*, \*\*, \* denote significance at the 1, 5, and 10 percent levels, respectively. All variables are defined in Appendix A.

**Panel A: Supplier investment and profit margin using 2sls**

	<i>Finance=1</i>	<i>CAPEX</i>	<i>R&amp;D</i>	<i>Inventory</i>	<i>PM</i>
	(1)	(2)	(3)	(4)	(5)
Finance*Post		0.011*	0.005**	0.010	-0.088**
		(0.09)	(0.03)	(0.12)	(0.03)
Finance		0.007	0.002**	0.028	-0.057
		(0.31)	(0.01)	(0.20)	(0.31)
Post		-0.013	0.001	0.008	0.020
		(0.87)	(0.93)	(0.79)	(0.92)
Investment	0.273***	0.014**	0.016	0.016	-0.559
	(0.00)	(0.04)	(0.12)	(0.40)	(0.43)
Replacement Option	-0.201**	-0.002	0.012	-0.007*	0.009
	(0.05)	(0.42)	(0.76)	(0.07)	(0.80)
Industry HHI	-0.130	0.189	-0.189	-0.079	-0.130
	(0.57)	(0.87)	(0.59)	(0.23)	(0.80)
MtB	0.025*	0.033***	0.017**	0.022***	0.402***
	(0.06)	(0.00)	(0.01)	(0.00)	(0.00)
Size	0.031**				0.208***
	(0.04)				(0.00)
Profitability	-0.252	0.016	-0.400	0.065***	0.255***
	(0.13)	(0.31)	(0.78)	(0.00)	(0.00)
Altman Z	-0.002	0.000	-0.000	0.001	-0.013
	(0.37)	(0.30)	(0.33)	(0.42)	(0.13)
Cash Flow	-0.004	0.002***	-0.000	0.001***	0.052***
	(0.16)	(0.00)	(0.79)	(0.00)	(0.00)
Sales Growth	0.003	0.000	-0.000	-0.000	-0.009
	(0.76)	(0.70)	(0.27)	(0.14)	(0.15)
Market Share	0.311	0.243***	0.093***	0.245**	0.706***
	(0.78)	(0.00)	(0.00)	(0.00)	(0.01)
Distance	-0.035***				
	(0.00)				
Year and Industry FE	Yes	Yes	Yes	Yes	Yes
N	2,490	2,490	2,490	2,490	2,490
Adj. R-Square	0.371	0.232	0.219	0.181	0.255
Partial F Test	13.19***				



**Panel B: Buyer investment and profit margin using 2sls**

	<i>Finance=1</i>	<i>CAPEX</i>	<i>R&amp;D</i>	<i>Inventory</i>	<i>PM</i>
	(1)	(2)	(3)	(4)	(5)
Finance*Post		0.009** (0.01)	-0.054 (0.25)	0.019** (0.05)	-0.123* (0.08)
Finance		0.008 (0.17)	0.009* (0.10)	0.010 (0.54)	0.337 (0.16)
Post		0.005 (0.46)	0.041 (0.12)	-0.003 (0.60)	-0.257 (0.19)
Investment	0.038** (0.03)	-0.004 (0.38)	0.004 (0.86)	0.007 (0.64)	0.297* (0.08)
Replacement Option	-0.120*** (0.00)	0.001 (0.49)	0.007** (0.03)	-0.002 (0.16)	-0.046 (0.36)
Industry HHI	0.003 (0.97)	0.034 (0.25)	-0.175*** (0.00)	0.162** (0.05)	-0.009 (0.98)
MtB	0.205** (0.05)	0.005 (0.25)	0.088*** (0.00)	0.025 (0.24)	0.809** (0.05)
Size	0.016 (0.24)				-0.080 (0.35)
Profitability	-0.149*** (0.01)	0.017 (0.18)	-0.253*** (0.00)	0.168*** (0.00)	0.911*** (0.00)
Altman Z	-0.002 (0.79)	0.001* (0.05)	0.001 (0.57)	-0.001* (0.09)	0.078*** (0.00)
Cash Flow	-0.001 (0.51)	0.000*** (0.01)	0.001** (0.04)	0.001*** (0.00)	0.001** (0.03)
Sales Growth	0.001*** (0.00)	0.001*** (0.00)	-0.000 (0.94)	0.001* (0.09)	0.024*** (0.00)
Market Share	0.304 (0.83)	-0.029 (0.20)	-0.040 (0.56)	0.012 (0.88)	0.460 (0.48)
Distance	-0.026*** (0.00)				
Year and Industry FE	Yes	Yes	Yes	Yes	Yes
N	1,695	1,695	1,695	1,695	1,695
Adj. R-Square	0.366	0.136	0.345	0.299	0.272
Partial F Test	13.96***				

**Table 8: Information transfers and profit margins**

This table reports the results of tests of the amount of information transfer between the borrower firm and the lender firm. Panel A compares changes in the borrower's profit margins to changes in the lender's profit margins. Column 1 investigates the profit margins for suppliers that receive trade financing; column 2 reports the profit margins for the lenders that are linked to the suppliers/borrowers in column 1. Column 3 investigates the profit margins for buyers that receive trade financing; column 4 reports the profit margins for the lenders that are linked to the buyers/borrowers from column 3. Panel B of this table reports the results of the cross-sectional tests of differences in the amount of information transfer between the borrower and the lender. Columns 1 and 2 estimate the borrower and lender profit margins for firms that were financed with loans versus firms that were financed with non-loans. Columns 3 and 4 estimate the borrower and lender profit margins for firms that have relatively new relationships with their buyer/supplier versus firms that have more established relationships with their buyer/supplier. All regressions include year and industry fixed effects and standard errors are heteroskedasticity robust, clustered at the filing firm level. P-values are reported in parentheses, and \*\*\*, \*\*, \* denote significance at the 1, 5, and 10 percent levels, respectively. All variables are defined in Appendix A.

**Panel A: Borrower profit margin versus lender profit margin**

	<i>Supplier</i>		<i>Buyer</i>	
	<i>PM</i>	<i>Lender PM</i>	<i>PM</i>	<i>Lender PM</i>
	(1)	(2)	(3)	(4)
Finance*Post	-0.088** (0.03)	0.068** (0.03)	-0.123* (0.08)	0.116* (0.10)
Finance	-0.057 (0.31)	0.032 (0.21)	0.337 (0.16)	0.472 (0.40)
Post	0.020 (0.92)	0.104 (0.26)	-0.257 (0.19)	0.518 (0.43)
Investment	-0.559 (0.43)	-0.235 (0.83)	0.297* (0.08)	-0.293 (0.37)
Replacement Option	0.009 (0.80)	0.009 (0.47)	-0.046 (0.36)	0.055 (0.93)
Industry HHI	-0.130 (0.80)	-0.017 (0.59)	-0.009 (0.98)	-0.455 (0.37)
MtB	0.402*** (0.00)	0.028*** (0.00)	0.809** (0.05)	0.883** (0.05)
Size	0.208*** (0.00)	0.011 (0.41)	-0.080 (0.35)	0.096** (0.06)
Profitability	0.255*** (0.00)	0.231** (0.02)	0.911*** (0.00)	0.436*** (0.00)
Altman Z	-0.013 (0.13)	0.001*** (0.00)	0.078*** (0.00)	0.002 (0.93)
Cash Flow	0.052*** (0.00)	0.013** (0.04)	0.001** (0.03)	0.019** (0.04)
Sales Growth	-0.009 (0.15)	0.000 (0.56)	0.024*** (0.00)	0.019** (0.05)
Market Share	0.706*** (0.01)	0.023*** (0.00)	0.460 (0.48)	0.404 (0.92)
Year and Industry FE	Yes	Yes	Yes	Yes
N	2,490	2,490	1,695	1,695
Adj. R-Square	0.255	0.278	0.272	0.197

**Panel B: Cross-sectional variation in information transfer**

	<i>Profit Margin</i>	<i>Lender Profit Margin</i>	<i>Profit Margin</i>	<i>Lender Profit Margin</i>
	(1)	(2)	(3)	(4)
Loan*Post	-0.111** (0.04)	0.099** (0.05)		
Loan	0.357 (0.55)	-0.312 (0.79)		
New*Post			-0.004** (0.05)	0.007*** (0.01)
New			-0.100** (0.04)	-0.441 (0.44)
Post	-0.003*** (0.00)	0.039** (0.04)	-0.003*** (0.00)	0.042 (0.37)
Investment	-0.019 (0.88)	0.132 (0.20)	0.422** (0.03)	0.029 (0.87)
Replacement Option	-0.059* (0.06)	-0.101 (0.14)	-0.043 (0.46)	-0.076 (0.21)
Industry HHI	0.221*** (0.00)	0.420 (0.58)	0.101 (0.88)	0.044 (0.97)
MtB	-0.237 (0.35)	1.342 (0.13)	-0.242 (0.35)	1.361* (0.06)
Size	0.014 (0.69)	0.075*** (0.00)	0.014 (0.26)	-0.099* (0.10)
Profitability	0.356** (0.03)	0.872*** (0.00)	0.354*** (0.00)	6.240*** (0.00)
Altman Z	0.036** (0.06)	-0.001 (0.96)	-0.037* (0.08)	-0.008 (0.57)
Cash Flow	0.001*** (0.00)	0.021 (0.17)	0.001*** (0.00)	0.044 (0.12)
Sales Growth	0.024*** (0.00)	0.007 (0.67)	0.024*** (0.00)	-0.006 (0.73)
Market Share	0.423 (0.47)	0.545 (0.69)	0.516 (0.39)	0.778 (0.56)
Year and Industry FE	Yes	Yes	Yes	Yes
N	2,735	2,735	2,735	2,735
Adj. R-Square	0.278	0.250	0.249	0.268