

Trade Credit Contracts

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Abstract

This paper provides new evidence on the unique role of trade credit and contracting terms as a way for both sellers and buyers to manage business risk. The authors use a novel and unique dataset on almost 30,000 supplier contracts for 56 large buyers and more than 24,000 suppliers in Europe and North America. The sample of buyers and suppliers includes firms of varying size, investment grade, and sectors. The paper finds evidence in support of four important, and not mutually exclusive, reasons for trade credit: 1) as a method of financing; 2) as a means of price discrimination; 3) as a bond

assuring buyers of product quality; and 4) as a screening mechanism to gauge buyer default risk. In particular, the analysis finds that the largest and most creditworthy buyers receive contracts with the longest maturities, as measured by net days, from smaller, investment grade suppliers. In comparison, early payment discounts seem to be used as a risk management tool to limit the potential nonpayment risk of trade credit. Early payment discounts are generally offered to smaller, non-investment grade buyers. The results suggest that contract terms are jointly determined by supplier and buyer characteristics.

This paper—a product of the Finance and Private Sector Development Team, Development Research Group—is part of a larger effort in the department to study Capital Structure and Supply Chain Finance. Policy Research Working Papers are also posted on the Web at <http://econ.worldbank.org>. The author may be contacted at lklapper@worldbank.org.

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I. Introduction

Trade credit is an important source of external financing for both small and large firms around the world (Demirguc-Kunt and Maksimovic 2005). For instance, firms often offer working capital financing to their customers, reported as accounts receivables, even if they are small or credit constrained (McMillan and Woodruff 1999, Marotta 2005, and Van Horen 2005).

Trade credit might also be available when other forms of financing are not. For instance, during periods of contractions in bank credit (say, due to monetary tightening or bank distress), buyers might depend more on trade credit for short-term financing as a response to credit market tightening, and this may be especially true for small firms (see, for example, Himmelberg et al. 1995, Choi and Kim, 2005, and Love et al. 2007).

Trade credit is also thought of as a way for a supplier to engage in price discrimination, giving favored or more powerful clients longer terms (see, for example, Wilner 2000, Fisman and Raturi 2004, Van Horen 2005, and Burkart, Ellingsen, and Giannetti, 2008).

Furthermore, trade credit may simply be customary in an industry, with customs driven by economic rationales such as allowing buyers time to check out the quality of the supplied goods (Lee and Stowe, 1993).

Studies have explored the supply and demand of trade credit around the world (for instance, Petersen and Rajan 1997, Johnson, McMillan and Woodruff 2002, Boissay and Gropp 2007, and Fabbri and Klapper 2008). Yet, even the stylized facts on how the contract terms of trade credit vary across buyers and suppliers of different characteristics are poorly understood, in part because firm-level contract-level data have not been easily available. For example, what is the typical duration for which trade credit is offered? Who is offered a longer time to pay? Which firms are offered early payment discounts? By whom?

This paper addresses these questions using a unique database that includes detailed contract information for about 30,000 transactions for 53 large buyers in the United States and Europe. We summarize typical trade credit terms and how they relate to buyer and seller characteristics. We also study the use of early payment discounts. We then draw some

conclusions on the robustness of theories that might have some merit in explaining the patterns in the data.

Empirical work on trade credit thus far has been hampered due to a lack of firm-level data on trade credit contract terms. Most studies have used the Federal Reserve Survey of Small Business Financing (SSBF) database of U.S. firms, which has only limited data on credit terms and firm characteristics (e.g., Petersen and Rajan, 1997, and Burkart et al., 2008).

An exception is Ng et al. (1999) who use survey level data on 950 listed U.S. firms to study the determinants and characteristics of trade credit contracts. They document wide variation across industries in credit terms, and find that variables capturing buyer and seller reputation are significant determinants of a firm's choice to extend credit, consistent with theories that explain credit terms as contractual solutions to information problems concerning product quality and buyer creditworthiness.

Our paper differs from the work by Ng et al. (1999) in several important ways. First, we use unique data on actual trade credit contracts rather than survey based data. Second, we cover a broader set of industries that includes technology firms. Third, our dataset includes trade credit terms not only for US firms but also for international firms. Fourth, we have bilateral contract information, so we can control both for buyer and supplier firm characteristics. Fifth, and importantly, we have multiple contracts for the same firm, rather than a firm-average response, allowing us to include firm fixed effects in our empirical analysis, thereby abstracting from time-invariant firm characteristics that determine the choice of credit terms. Finally, another important distinction is that the Ng et al. data covers only large, publicly traded firms while our dataset includes suppliers of all size. This is an important difference because the credit terms offered by large firms are likely to be very different than those by small firms, especially when credit is extended by small suppliers to large buyers.

In short, the bilateral, multi-contract nature of our dataset is truly unique and is a major improvement on datasets that have previously been used to study the determinants of credit terms used in trade credit. This multi-contract structure of our dataset allows us to abstract from unobserved buyer and supplier firm characteristics, something previous empirical work has not been able to do.

Using this unique dataset, we find that the largest and most creditworthy buyers receive contracts with the longest maturities, as measured by net days, from smaller, investment grade suppliers. In comparison, early payment discounts seem to be used as a risk management tool to limit the potential nonpayment risk of trade credit. In particular, early payment discounts are generally offered to smaller and non-investment grade buyers, where nonpayment risk tends to be greater. Our results suggest that contract terms are jointly determined by supplier and buyer characteristics.

The paper continues as follows. Section II presents summary statistics of our unique data on trade credit contracts. Section III reviews theories of trade credit. Section IV presents the empirical results. Section V concludes.

II. Data and Summary Statistics

We use a novel database of trade credit contracts for close to the universe of suppliers of 56 large buyers.¹ The data are provided by PrimeRevenue, an online network that links large, global companies, their suppliers, and third-party financial institutions, via the Internet. PrimeRevenue provides software and an IT platform for buyers to post their invoices directly; and suppliers to choose whether to be paid at maturity of the contract or to factor the contract and be paid immediately at a discount.

Our data are a snapshot of outstanding receivables as of December 1, 2005. Importantly, this snapshot is before PrimeRevenue started factoring the receivables. Buyers generally post invoices for all ‘important’ suppliers, which is estimated by PrimeRevenue to capture over 90% of total inputs to the buyer. Our database includes information for 29,019 contracts, which includes 56 large buyers and 24,140 suppliers. This includes multiple supplier contracts within and across buyers.

The data include complete information on contract terms: spend (contract amount), net days (days within which the buyer has to pay the amount owed), discount days (days within

¹Because purchasing history is proprietary information, we do not know the identity of buyers in our sample. However, as discussed in this section, PrimeRevenue provided us with buyer characteristics (such as size, sector, and location) and the fact that almost all buyers in our sample are Fortune 500 .

which the buyer has to pay to get the full discount), discount rate (the size of the discount if the amount is paid by the discount date), and currency.

For buyers, we can control for asset size (buckets)², location (North America or Europe), sector, and whether the buyer is investment grade. For suppliers, we know the asset size (bucket) and whether the supplier is investment grade. Information is not provided on the suppliers' location or sector, since most contracts are written to a local distributor and/or paid to a local bank account.

We impute additional variables such as the total buyer spend (as measured by the total dollar amount of contracts entered into) and number of suppliers, and the ratio of spend on a particular supplier to total buyer spend as indicators of the overall importance of the supplier to the buyer's supply chain. Apart from missing information about net days for 832 out of 29,019 contracts, we have complete information on contract terms.

We begin by summarizing the main characteristics of buyers, suppliers, and contracts. Table 1 shows summary statistics of buyer and supplier characteristics. First, the buyers in our sample are very large – we find that 84% of buyers (weighted by number of contracts) have over US\$ 10 billion in sales and less than 1% of buyers have less than US\$ 2 billion in sales.

The buyers are also creditworthy as measured by whether or not they are investment grade – about 84% of buyers in the dataset are investment grade.

Buyers are active in a range of industries, with the majority in retail industries. The sectoral distribution in terms of number of contracts is: 6% in auto manufacturing, 34% in diversified retail, 13% in diversified manufacturing, 6% in retail groceries, 11% in retail hard goods, 8% in retail soft goods, 18% in technology, 2% in food and beverages, and 2% in the utility sector. The data encompasses only one firm in the utility sector and two firms in the food and beverages sector.

Approximately 59% of buyers (weighted by the number of contracts) are from North America (the US or Canada) and 41% of buyers are from Europe.

² Buyer and supplier size buckets are (in US\$): less than \$.1 billion; \$0.1-2 billion; \$2-7 billion; \$7-10 billion; larger than \$7 billion.

In comparison to the buyers, our suppliers are relatively small: Almost half the suppliers (weighted by the number of contracts) have less than US\$ 100 million in sales and only 20% of suppliers have more than US\$ 2 billion in sales. Creditworthiness is also an issue for many suppliers, given that almost two-thirds of suppliers are not investment grade.

Table 2, Panel A shows summary statistics of contract characteristics. We have a wide distribution of contract amounts varying from about US\$ 400 dollars to over US\$ 6.5 billion dollars. Contracts in our sample are generally very long in duration – the average and median is 60 net days. About 75% of contracts in our sample have net days longer than 30 days, which is longer than the ‘typical’ contract of 30 days previously shown in the literature (Ng, Smith and Smith 1999). For example, 20% of contracts have net days of exactly 30 days, 28% have net days of exactly 60 days, and 17% have net days of exactly 75 days.

About 60% of contracts in our sample are denominated in US dollars, followed by almost 40% in euros; this is approximately consistent with the distribution of buyers in Europe and North America (41% and 59%, respectively, as shown in Table 1).

In our sample, 13% of contracts (or 3,717 in total) offer early payment discounts.³ Panel B of Table 2 shows summary statistics for this subsample of contracts. We also examine the discount terms, including discount days and discount rate. Almost two-thirds of discount terms are 30 days or less, while 27% are between 30 and 60 days, and 9% are more than 60 days. For example, 20% of discount days are 10 days, 20% are 30 days, and 16% are 60 days. The majority of contracts have a spread of net days less discount days equal to 20 or 30 days (15% and 27%, respectively). The mean ratio of discount to net days is 63%.

There is a surprising relationship between net days and discount days – over 30% of contracts have a spread of exactly one day. This might suggest that discounts can be used simply to encourage prompt payments, or as an implicit price discount, i.e. an alternative to a cut in list prices.⁴ The mean and median discount is equal to 2%, and 36% of contracts with a discount have a discount rate equal to 1% or less; and only 8% of contracts with a discount have a discount greater than 2%.

³ This is a comparable figure to that obtained using SSBF survey data on U.S. firms, indicating that 20% of firms that use trade credit are offered an early payment discount from their suppliers.

⁴ Anecdotally, large buyers do not pay late fees to their suppliers.

Trade credit appears expensive for most buyers. The mean effective interest rate, defined as the implied interest rate if the buyer does not pay on the discount date, foregoes the discount, and pays on the due date, is $(1/(1 - \text{discount rate}))^{360/(\text{net days} - \text{discount days})} - 1$. It is high at 53%, though it varies from a low of 2% to a high of 100%.

Table 3 shows the distribution of contract terms by buyer and supplier characteristics. Larger buyers tend to make purchases with a wider range of spend, including more frequent relatively small purchases of less than US\$ 1 million in size. Across industries, auto manufacturing and retail hard goods have relatively larger average spend, especially relative to technology, where almost 75% of contracts are less than US\$ 1 million in size. We find no notable differences in spend size across buyer location or investment grade. In addition, large suppliers appear to make large sales (and vice versa), while whether a supplier is investment grade does not seem related to average spend.

We also examine the relationship between contract maturity and buyer and seller characteristics. We find that the number of net days offered is almost twice as long if the buyer is investment grade, although supplier creditworthiness seems to have no effect on the number of net days offered. We find strong sectoral effects: 85% of contracts in retailing of soft goods have a maturity of 30 days or less, relative to other sectors with longer average maturities. Contracts to firms in Europe are on average longer than contracts in North America (although the sectoral distribution is relatively even across regions). Finally, contracts to the largest and most creditworthy buyers receive longer maturities.

Next, we focus on the decision to extend early payment discounts (Table 4). Overall, 13% of buyers (and 13% of contracts) are offered early payment discounts. In general, the buyers receiving a discount are small and non-investment grade, while suppliers offering a discount tend to be larger and are roughly equally likely to be investment or non-investment grade. Suppliers are also most likely to offer discounts to buyers that retail in hard goods. In addition, eight buyers are never offered discounts, while 21 buyers are always offered discounts. In the empirical analysis of this paper we therefore also check how the results look if we drop the firms who never report discounts.

Discounts do not appear strongly related to buyer or supplier characteristics, with the exception that very high discounts are more common in the auto industry and among grocery firms. Discount days, the number of days the buyer has to pay and receive a discount, appears strongly related to buyer size – 78% of firms with less than US\$ 10 billion in total sales have discount days of 30 or less, while only about 64% of firms larger than US\$ 10 billion in size receive a short discount window. The mean of net days is 60 days for contracts without discounts and 44 days for contracts with discounts, suggesting that suppliers trade discounts for net days.

Importantly, our database also allows for both supplier and buyer fixed effects. About 25% of suppliers (or 7,273 suppliers) sell to multiple buyers. Of these, 3,126 suppliers sell to 2 buyers and 4,147 suppliers sell to 3 or more buyers. In addition, 16% of suppliers (or 4,557 suppliers) have more than one contract with the same buyer. Specifically, 2,685 suppliers have exactly 2 contracts with a buyer, and 1,872 suppliers have 3 or more contracts with a buyer. In general, we find variation in net days and the decision to extend an early payment discount across contracts of a single supplier.

III. Theories of Trade Credit

Before we explore the data econometrically, it might be useful to outline various theories of trade credit and formulate some testable hypotheses. Much of the work on trade credit has seen it as a form of financing that can overcome traditional impediments in financing. In particular, the seller may know more about, and have more clout over, the buyer than other arm's length financiers (see, for example, Smith, 1987, Brennan et al., 1988, Petersen and Rajan, 1997, Biais and Gollier, 1997, and Burkart and Ellingsen, 2004). Therefore trade credit may be available when other forms of financing are not. Much of this literature argues that large suppliers have a comparative advantage in obtaining outside finance and pass on this advantage to small, credit constrained firms (e.g., Boissay and Gropp, 2007). Similarly, large suppliers may act also as liquidity providers, insuring against liquidity shocks that could endanger the survival of their customer relationships with smaller firms (see, for example, Cunat, 2006).

Nevertheless, it is clear from previous studies and our own, that trade credit is not only used to finance credit constrained firms.⁵ For instance, large, listed, multinational firms around the world, which are unlikely to face financing constraints in the market, hold large volumes of accounts payable on their balance sheet (e.g., Demirguc-Kunt and Maksimovic, 2005). Globally, it is estimated that trade credit financed 90% of world merchandise trade in 2007, valued at about US\$ 25 trillion dollars.⁶

Why might large, investment grade buyers choose to use trade credit financing? One answer is that their suppliers may have cheaper access to financing, and a comparative advantage in passing it on (see Ng et al., 1999). However, as shown in our data set, most suppliers are much smaller than their buyers, and are unlikely to have access to cheaper financing.

Another possible explanation is that large buyers receive very favorable contract terms, which reduce their overall borrowing costs. Why small suppliers may want to borrow at high cost in order to provide such cheap financing seems less clear – could they not simply offer more of a price discount up front, without incurring the deadweight costs of intermediation?

One explanation may be that a country's laws may not allow a vendor to offer different prices to different clients.⁷ To the extent that price discrimination is prohibited, variations in trade credit terms also offer opportunities for sellers to offer better terms to more important suppliers (e.g., Brennan et al. 1988). This is consistent with the literature that large buyers can use their market power to demand favorable trade credit terms from their suppliers (see, for example, Burkart, Ellingsen, and Giannetti, 2008, and Fabbri and Klapper 2008).

Trade credit might also be used as a risk management mechanism to reduce informational asymmetries between buyers and sellers. Such risk management can either serve to assure product quality or to gauge buyer default risk.

⁵ In fact, Schiff and Lieber (1974) argue that risk management and inventory management decisions are often taken separately from financing decisions and by different units of the firm, and that consequently trade credit cannot be solely explained on financing grounds.

⁶ “World Bank urged to lift trade credit finance,” *Financial Times*, November 11, 2008.

⁷ For example, the Clayton Act in the US prohibits price discrimination across customers for the same good.

In terms of reducing uncertainty concerning product quality prior to payment, buyers might demand a credit period. This may be particularly relevant in cross-border sales between different jurisdictions. In this case, trade credit does not play a financing role but can be seen as a warranty that guarantees product quality (see, for example, Lee and Stowe, 1993, and Long et al., 1993). The credit period offers the buyer time to test the quality of the product before deciding whether or not to make payment and accept the merchandise. Alternatively, buyers that take cash discounts and pay early effectively bear product risk.

Trade credit can also be offered by suppliers as a screening mechanism to gauge buyer default risk (see, for example, Mian and Smith, 1992, and Frank and Maksimovic, 2005). In particular, sellers can reduce payment risks through two-part payment terms, such as early payment discounts (e.g., Ng et al., 1999). Alternatively, suppliers with high borrowing costs might offer an early payment discount to reduce the need to finance their own extension of trade credit to buyers.

In sum then, we see four important, and not mutually exclusive, reasons for trade credit: 1) As a method of financing; 2) As a means of price discrimination or market power; 3) As a bond assuring buyers of product quality; 4) As a screening mechanism to gauge buyer default risk.

These four reasons offer several testable hypotheses, not all of which are mutually exclusive.

Hypothesis 1: Suppliers in industries with substantial turnover and perishable goods extend shorter net days.

This is consistent with both the financing and bonding explanations.

Hypothesis 2: Smaller suppliers extend longer net days.

This is consistent with both a market power explanation (small suppliers are squeezed more by buyers) and a bonding explanation (small suppliers have to offer better bonds).

Hypothesis 3: Larger suppliers extend longer net days.

This is consistent with a financing explanation (large suppliers have lower financing costs).

Hypothesis 4: Investment grade suppliers extend longer net days.

This is consistent with a financing explanation (the cost of finance is less for investment grade suppliers, allowing them to offer longer terms), a buyer market power explanation (suppliers for whom providing credit costs less may be squeezed for more), and a bonding explanation (in order to signal commitment to quality, an investment grade supplier who can raise finance at lower cost will offer longer terms).

Hypothesis 5: Large buyers receive longer net days.

This is consistent with both a market power explanation (suppliers are squeezed more by large buyers) and a screening explanation (large buyers have lower default risk and need not be screened as much).

Hypothesis 6: Investment grade buyers receive longer net days.

This is consistent with a screening explanation (investment-grade buyers have lower default risk and need not be screened as much).

Hypothesis 7: Discounts are more common for small and non-investment grade buyers.

This is consistent with the screening explanation (early payment discounts offer suppliers a screening mechanism to gauge buyer default risk).

Hypothesis 8: Discounts are more common from small suppliers.

This is consistent with the market power hypothesis (large buyers demand discounts from small suppliers) and the screening explanation (it is more difficult for small suppliers to absorb and diversify default risk).

Table 5 summarizes these testable hypotheses for different trade credit terms: net days versus discount offered. Panel A summarizes the role of supplier and buyer characteristics in explaining differences in contract maturity as measured by the net days, and shows whether under each of the four different explanations for trade credit the effect on net days is positive, negative or zero. Panel B summarizes the role of supplier and buyer characteristics in explaining whether or not early payment discounts are offered, and shows whether under each of the four

different explanations for trade credit the effect on the likelihood of discounts is positive, negative, or zero.

With these eight possible explanations and testable hypotheses in mind, let us examine the data more carefully.

IV. Regression Analysis

In this section, we use a multivariate framework to study the determinants of contract terms.

Summary statistics and definitions of all variables are shown in Table 6. Our first dependent variable is the contract maturity, measured as the log number of net days. The strict financing explanation would suggest that large, investment grade suppliers (who have easier access to credit) should offer longer terms to small, non-investment grade buyers. The price discrimination cum bargaining power explanation would suggest that larger buyers should obtain more credit from smaller suppliers. The view that trade credit is posted as a bond assuring product quality would suggest that smaller suppliers (who typically have less of a history and reputation) should offer longer terms, while buyer size should not matter.

We include supplier and buyer characteristics as explanatory variables. We include an indicator if the buyer is big (above \$ 10 billion in sales), as well as an indicator if the buyer has an investment grade rating. Similarly, we include an indicator if the supplier is large (above \$ 2 billion in sales), an indicator if the supplier is medium sized (between \$ 100 million and \$ 2 billion in sales), as well as an indicator if the supplier is investment grade. We also include indicators for the buyer's industry.

Correlation matrices of all variables are shown for the full sample and subsample of contracts that offer a pre-payment discount in Table 7. Although there are significant relationships between our explanatory variables, the correlation levels are generally sufficiently low to eliminate concerns of cross-correlation among variables.

Our first results are shown in Table 8. The first two columns cluster standard errors by buyer, while the next two columns include buyer fixed effects, and the last two columns include supplier fixed effects. The second columns in each of these pairs excludes credit contracts with

discounts to abstract from the possibility that net days on two-part contracts vary systematically from those of simple contracts without discounts. Our industry classifications are very broad. Nevertheless, we find buyers in industries with substantial turnover (groceries, soft goods), and where goods are more likely to be perishable, tend to have shorter net days.⁸ This is consistent with both the financing and bonding explanations.

Perhaps most interestingly, we find that longer net days are offered to significantly larger, investment grade buyers (Table 8 Columns 1-2 and Columns 3-4). The magnitude of these effects is sizeable. For example, from the estimates in Column 2 a buyer who is large gets 9.8 longer days than the mean of 59 days. Similarly, a buyer who is investment grade gets 7.5 longer days than the mean net days. These results empirically support the hypothesis that trade credit terms are used as a means of price discrimination.

We also find that net days are shorter for buyers located in North America (the majority of which are located in the US) relative to buyers located in Europe. One potential explanation for this result is that sales in Europe are often cross-border in which case buyers may demand longer days to protect against damaged goods and avoid having to challenge suppliers in foreign courts.

When we include supplier fixed effects (thus focusing on the subsample of suppliers with multiple contracts within or across buyers), we continue to find that larger and investment grade buyers get longer net days (Table 8, Columns 5 and 6). These regressions exclude observations from suppliers without multiple contracts.

When we include buyer fixed effects (Table 8, Columns 3 and 4), we find that longer net days are significantly more likely to be extended by smaller suppliers. This is consistent with both a market power explanation (small suppliers are squeezed more by buyers) and a bonding explanation (small suppliers, *ceteris paribus*, have to offer better bonds).

Finally, we also find that investment grade suppliers extend longer net days. This is consistent with any of the first three explanations above – clearly, it costs investment grade suppliers less to provide a given amount of financing, so in any financing explanation,

⁸ We do not attach much importance to the industry effect found for the utility sector because it is based on observations from only one firm.

investment grade suppliers will offer longer terms. For any level of buyer market power, one could argue that a supplier for whom providing credit costs less will be squeezed for more. Similarly, in order to signal commitment to quality, an investment grade supplier who can raise finance at lower cost will offer longer terms.

Next, we examine the sample of contracts that include an early payment discount. The view that discounts are used as a screening mechanism to gauge buyer default risk would suggest that smaller and non-investment grade buyers, where default risk tends to be higher, would more likely receive discounts. To the extent that it is easier to absorb and diversify default risk for large firms, this view would also suggest that small suppliers are more likely to extend discounts. On the other hand, if there are fixed costs in screening, one would expect that large suppliers are more likely to offer discounts.

Table 9 shows logit regressions of determinants of early payment discounts for the subsample of contracts that offer early payment discounts. The dependent variable takes value 1 if the contract includes a discount (two-part contract), and 0 otherwise. As before, the first two columns present results for regressions with buyer clustered standard errors, the next two columns present results for regressions with buyer fixed effects, and the final two columns present results for regressions with supplier fixed effects. In the second of each of the regression pairs, we drop observations from buyers that never receive discounts, to abstract from the possibility that such firms are systematically different from firms that receive discounts.

We find that discounts are less common for large and investment grade buyers, consistent with the screening hypothesis according to which early payment discounts offer suppliers a screening mechanism to gauge buyer default risk.

The buyer fixed effects regressions in columns 3 and 4 indicate that early payment discounts are more common from small suppliers. This is consistent with the market power hypothesis according to which large buyers demand discounts from small suppliers, despite the fact that two-part contracts are generally considered to be more expensive to administer. This result is also in line with Burkart, Ellingsen, and Giannetti (2008) who find using U.S. survey data that firms that have more buyer market power receive larger early payment discounts. This finding is also consistent with the screening view that stipulates that smaller suppliers are more

likely to offer discounts as a screening mechanism for nonpayment default because it is more difficult for these firms to absorb and diversify default risk.

The supplier fixed effects regressions in columns 5 and 6 confirm that suppliers are more likely to offer early payment discounts to smaller and non-investment grade buyers, consistent with the screening hypothesis. Furthermore, these regressions display strong industry effects. It should be noted that these regressions are based on a relatively small sample of suppliers because only 85% of the suppliers with multiple contracts display variation in whether or not their contracts include early payment discounts, indicating a strong supplier fixed effect in whether or not firms extend early payment discounts.

Finally, we analyze the determinants of discount terms for the subsample of contracts that offer early payment discounts and for which we have complete information on discount terms (including discount period, discount rate, and net days). The results are not materially affected when we include firms with incomplete information on discount terms.

Discount terms appear to be strongly dependent on industry norms. For instance, buyers of soft goods and groceries tend to receive the longest discount days. The same industries also receive the highest effective rates on two-part contracts. It is also worth emphasizing that a surprisingly large fraction of contracts (over 30%) with early payment discounts have a spread between net days and discount days of exactly one day, suggesting that discounts are often used to encourage prompt payments.

In Table 10, Columns 1 to 3, we regress our buyer and supplier characteristics on the ratio of discount days/net days, for the subsample of contracts that offer early payment discounts. Columns 4 and 5 of Table 10 show results from a multinomial logistic regression model, which includes the full sample of contracts: the dependent variable is equal to zero if the contract does not include an early payment discount; equal to one if net days less discount days is greater than one; and equal to two if net days less discount days is equal to zero or one.

In all specifications, we find a significant relationship with investment grade buyers, contrary to our finding in Table 9 that investment grade buyers are less likely, overall, to receive early payment discounts. In the multinomial logit regression, the coefficients on investment

grade buyers are significant in both columns (denoting net days less discount days is greater than one or net days less discount days is equal to zero or one, respectively), but alter signs between specifications. Investment grade buyers are less likely to receive discounts with net days in excess of discount days, and more likely to receive discounts with discount days close to net days, suggesting that discounts are often used to encourage prompt payments from investment grade buyers.

We also find that buyers in North America are significantly more likely to be offered discount days equal to net days. In addition, supplier characteristics are no longer significant. This may suggest that while suppliers in Europe use early payment discounts as a risk management tool to encourage early payment from riskier buyers, suppliers in North America use discounts as another competitive gesture, or ‘sweetener’, in alternative or in addition to up-front discounts.

In unreported regressions, we generally find similar patterns across discount terms (including discount period, discount rate, and the effective discount rate⁹) in the sense that the coefficients on the various firm determinants have the same sign in most specifications, suggesting that the different discount terms serve similar purposes and that firms do not systematically trade off various terms against each other. This is consistent with the findings by Ng et al. (1999). For example, while grocers tend to receive longer discount days relative to net days, they also pay higher effective rates. Similarly, investment grade buyers tend to both receive longer discount days and pay higher effective rates, conditional upon receiving a discount. However, these regressions are hard to interpret because some of the same firm characteristics that determine whether or not firms receive early prepayment discounts also appear to affect discount terms.

Overall, we find that trade credit contract terms are jointly determined by supplier and buyer characteristics, based on explanations of market power, information asymmetries, and alternative financing costs.

⁹ The effective discount rate is computed as $(1 / (1 - \text{discount rate}))^{360 / (\text{net days} - \text{discount days})} - 1$.

V. Concluding Remarks

This paper provides new evidence on the unique role of trade credit as a competitive gesture and risk management tool used by suppliers and as a potentially inexpensive source of working capital financing for large buyers.

We use a novel dataset on almost 30,000 supplier contracts for 56 large buyers in Europe and North America to document contract terms across buyers and suppliers of varying size and investment quality.

The bilateral, multi-contract nature of our dataset is truly unique and is a major improvement on (generally survey based) datasets that have previously been used to study the determinants of credit terms used in trade credit. This multi-contract structure of our dataset allows us to abstract from unobserved buyer and supplier firm characteristics, something previous empirical work has not been able to do.

We find that the largest and most creditworthy buyers receive contracts with the longest maturities, as measured by net days, from smaller, investment grade suppliers, consistent with existing trade credit theories. In particular, these results are consistent with a market power explanation (smaller suppliers are squeezed more by large buyers), a screening explanation (large and investment grade buyers have lower default risk and need not be screened as much), a bonding explanation (small suppliers have to offer better bonds), and a financing explanation (investment grade suppliers have lower financing costs, allowing them to offer longer terms).

In comparison, early payment discounts seem to be used as a risk management tool to limit the potential nonpayment risk of trade credit. In particular, early payment discounts are generally offered by smaller, non-investment grade suppliers to smaller and non-investment grade buyers. This is consistent with the screening explanation (early payment discounts offer suppliers a screening mechanism to gauge buyer default risk). Our result that discounts are more common from small suppliers is also consistent with a market power explanation, whereby large buyers demand discounts from small suppliers.

Our results suggest that contract terms are jointly determined by supplier and buyer characteristics, based on market power, information asymmetries, and alternative financing costs.

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Table 1: Buyer and Seller Characteristics

This table reports summary statistics of buyer and supplier characteristics. Sample consists of 29,019 trade credit contracts between 56 large buyers and 24,140 suppliers.

<i>Panel A: Buyer Characteristics</i>						
	Number of Buyers	% of buyers	Number Contracts	% of Contracts	Total Spend (\$mln)	% of total spend
Size >\$10B	33	59	24,298	84	612	89
Size \$0.1- 10B	23	41	4,721	16	79	11
Industry auto	9	16	1,615	6	75.8	11
Industry diversified retail	7	13	9,749	34	193	28
Industry diversified mfg	16	29	3,824	13	74.3	11
Industry grocery	4	7	1,630	6	88.5	13
Industry hard goods retail	9	16	3,146	11	164	24
Industry soft goods retail	6	11	2,362	8	42.1	6
Industry technology	3	5	5,306	18	24.2	4
Industry food & beverages	2	4	682	2	26.7	4
Industry utility	1	2	705	2	2.47	0
Location: Europe	13	23	12,029	41	241	35
Location: North America	43	77	16,990	59	450	65
Investment Grade: No	14	25	4,514	16	42.9	7
Investment Grade: Yes	42	75	24,505	84	570	93
<i>Panel B: Supplier Characteristics:</i>						
	Number of Suppliers	% of Suppliers	Number Contracts	% of Contracts	Total Spend (\$mln)	% of total spend
Size >\$2B	2,727	11	5,772	20	531	77
Size \$0.1-2B	7,821	32	9,549	33	142	21
Size <\$0.1B	13,590	56	13,698	47	17.9	3
Investment Grade: No	16,391	68	18,655	65	319	46
Investment Grade: Yes	7,713	32	10,043	35	372	54

Table 2: Contract Characteristics

This table reports summary statistics of trade credit contract characteristics. Sample consists of 29,019 trade credit contracts between 56 large buyers and 24,140 suppliers. Early payment discounts are offered on 3,717 of these contracts.

	N	Mean	Median	Min	Max	Std Dev
<u>Panel A: All Contracts:</u>						
<i>Spend (millions)</i>	29,019	23.8	3.47	.0004	6,520	111.0
Spend ≤ \$1M	29,019	0.28	0	0	1	
Spend >\$1M - ≤ \$4M	29,019	0.25	0	0	1	
Spend >\$4M - ≤ \$15M	29,019	0.22	0	0	1	
Spend >\$15M	29,019	0.25	0	0	1	
<i>Net Days</i>	29,019	59.2	60	1	120	26.1
Net Days 0 – 30	29,019	0.25	0	0	1	
Net Days 31 – 60	29,019	0.37	0	0	1	
Net Days 61 – 90	29,019	0.24	0	0	1	
Net Days >90	29,019	0.11	0	0	1	
Discount offered	3,717	0.13	0	0	1	
<u>Panel B: Subsample of Contracts that offer an early payment discount:</u>						
<i>Discount Days</i>	3,462	30.43	30	1	180	20.09
Discount Days 0 – 30	3,462	0.64	1	0	1	
Discount Days 31 – 60	3,462	0.27	0	0	1	
Discount Days >60	3,462	0.09	0	0	1	
<i>Discount rate (%)</i>	3,707	2	2	.02	11.5	0.09
Discount ≤1%	3,707	36	0	0	1	
Discount >1% - ≤2%	3,707	56	1	0	1	
Discount > 2%	3,707	8	0	0	1	
Ratio of Discount to Net Days	2,634	0.63	0.6	0.02	1	0.28
Effective Interest Rate	2,584	0.53	0.27	0.02	1	0.38

Table 3: Distribution of Buyer and Seller Characteristics by Contract Characteristics

This table reports the distribution (in percentages) of trade credit contract terms by buyer and supplier characteristics. Sample consists of 29,019 trade credit contracts between 56 large buyers and 24,140 suppliers. NA denotes North America.

	Spend (%)				Net Days (%)				Location	
	< \$1M	\$1-4M	>\$4-15M	> \$15M	0-30	31-60	61-90	91+	Europe	NA
<i>Buyer Characteristics:</i>										
Size >\$10B	32	23	20	25	20	38	29	13	46	54
Size \$0.1- 10B	5	35	33	26	52	40	8	0	18	82
Industry auto	0	15	28	57	20	53	20	7	59	41
Industry diversified retail	23	37	22	17	10	13	50	26	84	16
Industry diversified mfg	6	29	36	29	47	34	17	1	0	100
Industry grocery	11	25	18	47	42	54	3	0	84	16
Industry hard goods retail	0	15	29	57	21	52	24	4	3	97
Industry soft goods retail	26	23	22	29	85	14	1	1	0	100
Industry technology	74	9	10	7	8	88	3	0	0	100
Industry food & beverages	28	34	21	17	27	30	12	31	100	0
Industry utility	73	18	6	4	54	9	36	0	100	0
Location: Europe	26	33	20	20	11	19	46	23	100	0
Location: North America	29	19	23	29	37	53	10	1	0	100
Investment Grade: No	18	19	31	33	67	30	2	0	48	52
Investment Grade: Yes	30	26	20	24	19	40	29	12	6	94
<i>Supplier Characteristics:</i>										
Size: >\$2B	5	11	18	65	33	39	21	8	30	70
Size: \$0.1-2B	5	89	48	38	34	32	24	11	39	61
Size: <\$0.1B	53	41	6	0	18	43	27	12	48	52
Investment Grade: No	28	26	23	23	27	40	24	10	43	57
Investment Grade: Yes	27	22	21	30	23	37	27	12	41	59

Table 4: Distribution of Buyer and Seller Characteristics by Discount Characteristics

This table reports the distribution of trade credit contract terms by buyer and supplier characteristics for the subsample of 3,717 contracts that offer an early payment discount.

	<i>Full Sample</i>	<i>Subsample of Contracts that Offer an Early Payment Discount</i>						
		<i>Discount (%)</i>	<i>Discount Rate (%)</i>			<i>Discount Days (%)</i>			Discount to Net days Ratio (%)
0-1%	1-2%		> 2%	0-30	31-60	61+		
<i>Buyer Characteristics:</i>								
Size >\$10B	10	35	58	7	64	33	3	64
Size \$0.1- 10B	26	37	52	11	78	21	2	60
Industry auto	19	21	50	29	100	0	0	35
Industry diversified retail	5	34	66	0	94	5	1	43
Industry diversified mfg	13	67	30	3	95	4	1	44
Industry grocery	25	31	48	22	84	15	0	87
Industry hard goods retail	58	35	60	5	54	42	4	68
Industry soft goods retail	8	5	86	9	25	75	0	95
Industry technology	0	.	.	.	.	.	.	.
Industry food & beverages	0	.	.	.	.	.	.	.
Industry utility	0	.	.	.	.	.	.	.
Location: Europe	4	19	44	37	70	28	2	80
Location: North America	19	38	58	4	67	30	3	61
Investment Grade: No	25	37	60	3	76	21	2	54
Investment Grade: Yes	11	35	54	11	64	33	3	66
<i>Supplier Characteristics:</i>								
Size >\$2B	27	34	58	7	66	31	3	65
Size \$0.1-2B	17	38	54	8	67	30	2	63
Size <\$0.1B	4	32	58	11	80	19	1	57
Investment Grade: No	13	37	55	9	69	29	2	63
Investment Grade: Yes	12	33	59	7	67	30	3	64

Table 5: Testable Hypotheses Based on Trade Credit Theories

This table summarizes the testable hypotheses for trade credit terms (net days and discount offered) that follow from the four, not mutually exclusive explanations for trade credit offered in the text: as a method of financing; as a means of price discrimination or market power; as a bond assuring buyers of product quality; or as a screening mechanism to gauge buyer default risk. Panel A summarizes the role of supplier and buyer characteristics in explaining differences in contract maturity as measured by net days. In this panel, – denotes shorter net days; + denotes longer net days; and 0 denotes no effect on net days. Panel B summarizes the role of supplier and buyer characteristics in explaining whether or not early payment discounts are offered. In this panel, – denotes discounts less common; + denotes discounts more common; and 0 denotes no effect on likelihood of discounts.

Panel A: Net days

	Financing	Market Power	Bonding	Screening
<i>Supplier Characteristics:</i>				
High turnover/perishable goods	–	0	–	0
Small in size	–	+	+	0
Investment grade	+	+	+	0
<i>Buyer Characteristics:</i>				
Large in size	0	+	0	+
Investment grade	0	0	0	+

Panel B: Early payment discount

	Financing	Market Power	Bonding	Screening
<i>Supplier Characteristics:</i>				
Small in size	0	+	0	+
<i>Buyer Characteristics:</i>				
Small in size	0	0	0	+
Non-Investment grade	0	0	0	+

Table 6: Summary Statistics of Regression Variables

This table reports summary statistics of the main regression variables. Sample consists of 29,019 trade credit contracts between 56 large buyers and 24,140 suppliers. Early payment discounts are offered on 3,717 of these contracts.

Variable	Obs	Mean	Std. Dev.	Min	Max
<i>Complete sample:</i>					
Log net days	28,187	3.9468	0.6138	0	5.4806
Discount dummy	29,019	0.1281	0.3342	0	1
<i>Subsample of contracts with early payment discount:</i>					
Discount days	3,462	30.4330	20.0922	1	180
Discount rate	3,707	0.0173	0.0084	0.0002	0.1150
Discount days/Net days	2,634	0.6299	0.2815	0.0167	1
Effective rate	2,584	0.5332	0.3813	0.0169	1
<i>Buyer characteristics:</i>					
Buyer large size	29,019	0.8373	0.3691	0	1
Buyer small size	29,019	0.1627	0.3691	0	1
Buyer investment grade	29,019	0.8444	0.3624	0	1
Buyer North America	29,019	0.5855	0.4926	0	1
Industry auto	29,019	0.0557	0.2293	0	1
Industry diversified retail	29,019	0.3360	0.4723	0	1
Industry diversified mfg	29,019	0.1318	0.3383	0	1
Industry grocery	29,019	0.0562	0.2303	0	1
Industry hard goods retail	29,019	0.1084	0.3109	0	1
Industry soft goods retail	29,019	0.0814	0.2734	0	1
Industry technology	29,019	0.1828	0.3865	0	1
Industry food and beverages	29,019	0.0235	0.1515	0	1
Industry utility	29,019	0.0243	0.1540	0	1
<i>Supplier characteristics:</i>					
Supplier large size	29,019	0.1989	0.3992	0	1
Supplier medium size	29,019	0.3291	0.4699	0	1
Supplier small size	29,019	0.4720	0.4992	0	1
Supplier investment grade	29,019	0.3461	0.4757	0	1

Table 7: Correlation Matrix of Regression Variables

This table reports correlations between the main regression variables. Panel A presents correlations between the dependent variables; Panel B presents correlations between the explanatory and dependent variables; and Panel C presents correlations between explanatory variables. Sample consists of 29,019 trade credit contracts between 56 large buyers and 24,140 suppliers. Early payment discounts are offered on 3,717 of these contracts.

Panel A: Dependent Variables

	Log net days	Discount days/net days
Discount days/net days	-0.19*	
Effective rate	-0.41*	0.32*

Panel B: Explanatory and Dependent Variables

	<i>Full Sample</i>		<i>Subsample w/Discount</i>	
	Log net days	Discount dummy	Discount days/net days	Effective rate
Buyer large size	0.26*	-0.18*	0.09*	-0.10
Buyer small size	-0.26*	0.18*	-0.09*	0.06
Buyer investment grade	0.30*	-0.15*	0.20*	0.13*
Buyer North America	-0.37*	0.22*	-0.18*	-0.32*
Industry auto	0.00	0.04*	-0.17*	-0.00
Industry diversified retail	0.35*	-0.17*	-0.33*	-0.10
Industry diversified mfg	-0.13*	0	-0.32*	-0.00
Industry grocery	-0.17*	0.09*	0.35*	0.33*
Industry hard goods retail	-0.00	0.47*	0.15*	-0.08*
Industry soft goods retail	-0.25*	-0.04*	0.33*	0.11*
Industry technology	-0.02*	-0.18*	.	.
Industry food and beverage	0.05*	-0.06*	.	.
Industry utility	-0.07*	-0.06*	.	.
Supplier large size	-0.11*	0.21*	0.06*	0.10*
Supplier medium size	-0.10*	0.08*	0.00	-0.12*
Supplier small size	0.18*	-0.25*	-0.08*	0.04
Supplier investment grade	0.03*	-0.02*	0.02	0.04

Note: Asterisks indicate significance at 1%

Panel C: Explanatory Variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Buyer large size (1)	1.00															
Buyer small size (2)	-1.00*	1.00														
Buyer investment grade (3)	-0.00	0.00	1.00													
North America (4)	-0.21*	0.21*	-0.31*	1.00												
Ind: auto (5)	-0.15*	0.15*	-0.10*	-0.08*	1.00											
Ind: diversified retail (6)	0.17*	-0.17*	0.17*	-0.62*	-0.17*	1.00										
Ind: diversified mfg(7)	-0.38*	0.38*	-0.06*	0.33*	-0.09*	-0.28*	1.00									
Ind: grocery (8)	-0.70*	0.70*	-0.01	0.17*	0.26*	-0.08*	0.37*	1.00								
Ind: hard goods retail (9)	-0.03*	0.03*	-0.04*	0.27*	-0.08*	-0.25*	-0.14*	-0.11*	1.00							
Ind: soft goods retail (10)	-0.07*	0.07*	-0.32*	0.25*	-0.07*	-0.21*	-0.12*	-0.09*	-0.10*	1.00						
Ind: technology (11)	0.21*	-0.21*	0.15*	0.40*	-0.11*	-0.34*	-0.18*	-0.15*	-0.16*	-0.14*	1.00					
Ind: food&beverages (12)	-0.03*	0.03*	-0.04*	-0.18*	-0.04*	-0.11*	-0.06*	-0.05*	-0.05*	-0.05*	-0.07*	1.00				
Ind: utility (13)	0.07*	-0.07*	0.07*	-0.19*	-0.04*	-0.11*	-0.06*	-0.05*	-0.06*	-0.05*	-0.07*	-0.02*	1.00			
Supplier large size (14)	-0.00	0.00	-0.12*	0.12*	0.07*	-0.10*	0.03*	-0.01	0.23*	-0.03*	-0.15*	0.00	-0.06*	1.00		
Supplier medium size (15)	-0.12*	0.12*	-0.09*	0.04*	0.11*	-0.05*	0.13*	0.02*	0.10*	0.04*	-0.20*	-0.01	-0.07*	-0.35*	1.00	
Supplier small size (16)	0.12*	-0.12*	0.18*	-0.13*	-0.16*	0.12*	-0.14*	-0.01	-0.28*	-0.01	0.31*	0.01	0.11*	-0.47*	-0.66*	1.00
Supplier investment grade (17)	0.08*	-0.08*	0.00	-0.02*	0.02*	0.02*	-0.03*	-0.07*	0.02*	-0.05*	0.03*	-0.02*	0.00	0.22*	-0.11*	-0.08*

Note: * denotes statistical significance at the 1% level.

Table 8: Log net days

Dependent variable is the logarithm of net days on the contract. Standard errors in regressions (1) and (2) are corrected for clustering at the buyer level. Regressions (3) and (4) include buyer fixed effects. Regressions (5) and (6) include supplier fixed effects and are estimated based on the subsample of suppliers that have multiple contracts. Regressions (2), (4) and (6) include only trade credit contracts without discounts. Standard errors are reported between brackets. ***, **, * indicate significance at the 1%, 5%, and 10% level, respectively.

Dependent variable: Log net days	Buyer clustered		Buyer FE		Supplier FE	
	(1)	Without discount (2)	(3)	Without discount (4)	(5)	Without discount (6)
Buyer large size	0.389*** (0.102)	0.391*** (0.110)			0.225*** (0.025)	0.170*** (0.031)
Buyer investment grade	0.242** (0.102)	0.295*** (0.110)			0.217*** (0.024)	0.260*** (0.028)
Buyer North America	-0.485*** (0.167)	-0.554*** (0.184)			-0.446*** (0.043)	-0.502*** (0.054)
Industry diversified retail	-0.072 (0.127)	-0.136 (0.155)			0.042 (0.060)	-0.053 (0.071)
Industry diversified mfg	0.094 (0.165)	0.123 (0.185)			0.183*** (0.052)	0.173*** (0.060)
Industry grocery	-0.764*** (0.136)	-0.760*** (0.163)			-0.529*** (0.069)	-0.521*** (0.084)
Industry hard goods retail	0.140 (0.146)	0.126 (0.162)			0.084 (0.060)	0.031 (0.072)
Industry soft goods retail	-0.263* (0.143)	-0.230 (0.161)			-0.118 (0.086)	-0.091 (0.097)
Industry technology	-0.051 (0.304)	-0.047 (0.321)			-0.231*** (0.062)	-0.277*** (0.069)
Industry food and beverage	-0.148 (0.142)	-0.199 (0.157)			0.090 (0.131)	0.033 (0.141)
Industry utility	-0.806*** (0.122)	-0.872*** (0.156)			-0.551*** (0.119)	-0.652*** (0.128)
Supplier large size	-0.148 (0.126)	-0.143 (0.138)	-0.059*** (0.008)	-0.068*** (0.008)		
Supplier medium size	-0.140 (0.124)	-0.155 (0.134)	-0.041*** (0.006)	-0.047*** (0.006)		
Supplier investment grade	0.008 (0.016)	0.006 (0.017)	0.017*** (0.005)	0.017*** (0.005)		
Number of buyers	56	56	56	56	56	56
Number of suppliers	24,006	22,028	24,006	22,028	2,267	2,051
Number of observations	28,187	25,298	28,187	25,298	6,448	5,321
R-squared	0.337	0.335	0.036	0.030	0.276	0.286

Table 9: Discounts

Dependent variable is a dummy variable that take a value of one if the trade credit contract includes a discount (two-part contract), and zero otherwise. Regression estimates are based on a logit model. Standard errors in regressions (1) through (2) are corrected for clustering at the buyer level. Regressions (3) and (4) include buyer fixed effects. Regressions (5) through (6) include supplier fixed effects and are estimated based on the subsample of suppliers that have multiple contracts. Regressions (2), (4) and (6) exclude buyers with no discounts ever. Several industries do not have firms with discounts and are dropped from estimation. Standard errors are reported between brackets. ***, **, * indicate significance at the 1%, 5%, and 10% level, respectively.

Dependent variable: Discount	Buyer clustered w/o no discount		Buyer FE w/o no discount		Supplier FE w/o no discount	
	(1)	(2)	(3)	(4)	(5)	(6)
Buyer large size	-1.653** (0.686)	-0.854* (0.502)			-1.650*** (0.174)	-1.269*** (0.190)
Buyer investment grade	-0.814 (0.517)	-0.888* (0.535)			-0.668*** (0.139)	-0.651*** (0.157)
Buyer North America	1.666 (1.274)	0.716 (1.141)			3.318*** (0.378)	3.528*** (0.509)
Industry diversified retail	0.922 (1.377)	-0.752 (1.034)			2.452*** (0.415)	0.624 (0.512)
Industry diversified mfg	-0.010 (1.080)	-1.619* (0.955)			-0.157 (0.334)	-1.471*** (0.460)
Industry grocery	3.191* (1.655)	-0.073 (1.118)			5.520*** (0.546)	3.182*** (0.678)
Industry hard goods retail	2.916*** (0.910)	0.556 (1.049)			3.637*** (0.371)	1.417*** (0.466)
Industry soft goods retail	-0.086 (1.136)	-1.184 (1.007)			0.575 (0.750)	-0.592 (0.850)
Supplier large size	1.147*** (0.340)	0.553 (0.415)	-0.225** (0.095)	-0.225** (0.095)		
Supplier medium size	0.697** (0.286)	0.153 (0.329)	-0.322*** (0.083)	-0.322*** (0.083)		
Supplier investment grade	-0.279*** (0.094)	-0.097 (0.107)	-0.065 (0.064)	-0.065 (0.064)		
Number of buyers	56	34	34	34	56	34
Number of suppliers	24,140	7,927	7,927	7,927	399	305
Number of observations	29,019	10,604	10,604	10,604	2,067	1,433

Table 10: Discount Terms

Dependent variable is the ratio of discount days to net days in regressions (1)-(3). Columns (4) and (5) report results of a multinomial logit regression where the dependent variable takes a value of 2 if net days minus discount days is less than or equal to 1, a value of 1 if net days minus discount days is more than 1, and a value of 0 if the contract offers no discount (which we set as the base outcome). Standard errors in regression (1) and the multinomial regression reported in columns (4) and (5) are corrected for clustering at the buyer level. Regression (2) includes buyer fixed effects and regression (3) includes supplier fixed effects and is estimated based on the subsample of suppliers that have multiple contracts. Several industries do not have firms with discounts and are dropped from estimation in regressions (1) to (3). We also exclude contracts with missing discount or net days information from the regressions in (1) to (3). Standard errors are reported between brackets. ***, **, * indicate significance at the 1%, 5%, and 10% level, respectively.

Dependent variable:	Discount days/Net days			Multinomial logit	
	Buyer clustered (1)	Buyer FE (2)	Supplier FE (3)	Net days minus discount days>1 Buyer clustered (4)	Net days minus discount days<=1 Buyer clustered (5)
Buyer large size	0.012 (0.112)		0.002 (0.030)	-1.383* (0.741)	-1.787** (0.814)
Buyer investment grade	0.082* (0.049)		0.148*** (0.033)	-1.139** (0.555)	2.578*** (0.993)
Buyer North America	0.220*** (0.048)		0.380*** (0.078)	1.369 (1.371)	5.768*** (1.508)
Industry diversified retail	0.074 (0.058)		-0.157 (0.101)	0.819 (1.398)	4.318*** (1.609)
Industry diversified mfg	0.049 (0.072)		-0.081 (0.091)	0.128 (1.081)	2.770* (1.532)
Industry grocery	0.611*** (0.057)		0.302*** (0.105)	1.683 (1.778)	12.095*** (1.999)
Industry hard goods retail	0.261*** (0.093)		-0.150 (0.099)	2.786*** (0.943)	6.765*** (1.351)
Industry soft goods retail	0.539*** (0.070)		0.331* (0.174)	-3.911*** (1.130)	5.636*** (1.503)
Supplier large size	-0.016 (0.032)	0.010 (0.013)		0.993*** (0.336)	0.980 (0.603)
Supplier medium size	-0.026 (0.026)	0.010 (0.012)		0.563* (0.309)	0.509 (0.466)
Supplier investment grade	0.006 (0.017)	0.001 (0.009)		-0.262** (0.105)	-0.206 (0.132)
Number of buyers	34	34	28	56	
Number of suppliers	2,080	2,080	531	24,140	
Number of observations	2,584	2,584	1,035	29,019	
R-squared	0.440	0.008	0.254	0.361	

Appendix: Variable Definitions

Variable Name	Variable Definition
Net days	Natural logarithm of net days of the contract in number of days.
Discount days	Natural logarithm of discount days of the contract in number of days.
Discount rate	Discount percentage
Discount days / Net days	Ratio of number of discount days to number of net days
Effective rate	Effective rate computed as $(1/(1 - discount\ rate))^{360/(net\ days - discount\ days)} - 1$
Buyer large size	Dummy variable that takes a value of one when the total sales of the buyer exceeds US\$ 10 billion, and zero otherwise.
Buyer small size	Dummy variable that takes a value of one when the total sales of the buyer is smaller than US\$ 10 billion, and zero otherwise.
Buyer investment grade	Dummy variable that takes a value of one when the buyer is investment grade, and zero otherwise.
Buyer North America	Dummy variable that takes a value of one when the location of the buyer is North America (Canada or US) and zero when the location of the buyer is elsewhere (UK or Continental Europe).
Industry auto	Dummy variable that takes a value of one if the buyer is active in the auto industry, and zero otherwise.
Industry diversified retail	Dummy variable that takes a value of one if the buyer is active in the diversified retail industry, and zero otherwise.
Industry diversified mfg	Dummy variable that takes a value of one if the buyer is active in the diversified manufacturing industry, and zero otherwise.
Industry grocery	Dummy variable that takes a value of one if the buyer is active in the groceries industry, and zero otherwise.
Industry hard goods retail	Dummy variable that takes a value of one if the buyer is active in the hard goods retail industry, and zero otherwise.
Industry soft goods retail	Dummy variable that takes a value of one if the buyer is active in the soft goods retail industry, and zero otherwise.
Supplier large size	Dummy variable that takes a value of one when the total sales of the supplier exceeds US\$ 2 billion, and zero otherwise.
Supplier medium size	Dummy variable that takes a value of one when the total sales of the supplier is between US\$ 100 million and US\$ 2 billion, and zero otherwise.
Supplier small size	Dummy variable that takes a value of one when the total sales of the supplier is less than US\$ 100 million, and zero otherwise.
Supplier investment grade	Dummy variable that takes a value of one when the supplier is investment grade, and zero otherwise.