

Evidence on the Determinants of Credit Terms Used in Interfirm Trade

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ABSTRACT

Trade credit is created whenever a supplier offers terms that allow the buyer to delay payment. In this paper we document the rich variation in interfirm credit terms and credit policies across industries. We examine empirically the firm's basic credit policy choices: whether to extend credit or to require cash payment; and, if credit is extended, whether to adopt simple net terms or terms with discounts for prompt payment. We also examine determinants of variations in two-part terms. Results are supportive primarily of theories that explain credit terms as contractual solutions to information problems concerning product quality and buyer creditworthiness.

TRADE CREDIT HAS IMPORTANT ECONOMIC SIGNIFICANCE from both micro- and macroeconomic perspectives. During the 1990s vendor financing has accounted for an average \$1.5 trillion of the book value of all assets of U.S. corporations and has represented approximately 2.5 times the combined value of all new public debt and primary equity issues during a given year. As a component of the money supply, trade credit, in the form of accounts payable, exceeds the primary money supply (M1) by a factor of 1.5 on average.¹ Clearly, efforts to control economic growth through monetary policy can be confounded by aggregate decisions of businesses to increase or decrease reliance on trade-credit financing.

Several recent empirical studies examine determinants of firm reliance on trade credit.² These studies model supply and demand for trade credit using financial-statement data (accounts receivable and payable).³ However, many aspects of trade-credit practice are unexplored. Most notably, little is known about the types of credit terms (e.g., net 30, 2/10 net 30) and credit policies that are observed across firms and industries. The only comprehensive doc-

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¹ *Statistical Abstract of the United States*, 1997, Tables 801, 811, 841.

² See, for example, studies by Petersen and Rajan (1997) and Long, Malitz, and Ravid (1993). Also see Mian and Smith (1992), who examine aspects of several theories of trade credit but limit their empirical tests to explaining accounts-receivable management policy.

³ Petersen and Rajan (1994, 1997) use 1987 data from the National Survey of Small Business Finance; Long et al. (1993) study COMPUSTAT firms, which typically are much larger.

umentation of which we are aware is almost three decades old.⁴ Furthermore, little is known about the determinants of firm choices among the basic types of payment arrangements: cash on or before delivery, simple net terms, and two-part terms (where the buyer is offered a discount for prompt payment).

In this paper we use original survey data to document the most common payment and credit terms offered by firms in a broad cross section of industries. In Section I we analyze both the motives of sellers to offer, and buyers to accept, trade credit. In Section II, in the context of alternative theories of trade credit, we examine corporate practice with respect to implementation of trade-credit policy, including enforcement of stated terms and reactions to buyer defaults. Section III contains our analysis of determinants of the choice among the basic types of payment arrangements. In Section IV we look more specifically at the choices of payment provisions for two-part contracts.

I. Determinants of Credit Policy

Unless transactions between firms occur instantaneously, payment arrangements are, in effect, credit terms. If payment is made after delivery, the seller is extending credit to the buyer. The converse is true if payment is made before delivery. Figure 1 labels this basic choice as prepayment versus postpayment.

As the figure illustrates, credit policy is multifaceted. There are two basic forms of trade credit. The simpler form, net terms, specifies that full payment is due within a certain period after delivery. For example, "net 30" means full payment is due 30 days after the invoice date; after that date, the buyer is in default. Invoicing normally occurs either around the date of delivery or at the end of a billing cycle. The more complex form of trade credit, two-part terms, has three basic elements: (1) the discount percentage; (2) the discount period; and (3) the effective interest rate. In our sample, the most common two-part terms are "2/10 net 30." This combination of a 2 percent discount for payment within 10 days and a net period ending on day 30 defines an implicit interest rate of 43.9 percent. This rate is the opportunity cost to the buyer should the buyer decide to forgo the discount in exchange for 20 additional days of financing.⁵ As with net terms, the buyer is in default if payment is not made by the end of the net period.

The figure describes basic credit-policy alternatives and the functions that must be performed by the seller or buyer if a particular policy is selected. For example, if prepayment is selected, the buyer assumes greater product quality risk since the buyer cannot inspect the product before payment. This

⁴ Dun and Bradstreet (1970) report on most commonly adopted trade-credit terms classified by industry, but do not report firm-level data.

⁵ The implicit interest rate is computed as:

$$\text{implicit rate} = \left\{ \left(\frac{100}{100 - \text{discount \%}} \right)^{360/(\# \text{ days net} - \# \text{ days discount})} - 1 \right\}.$$

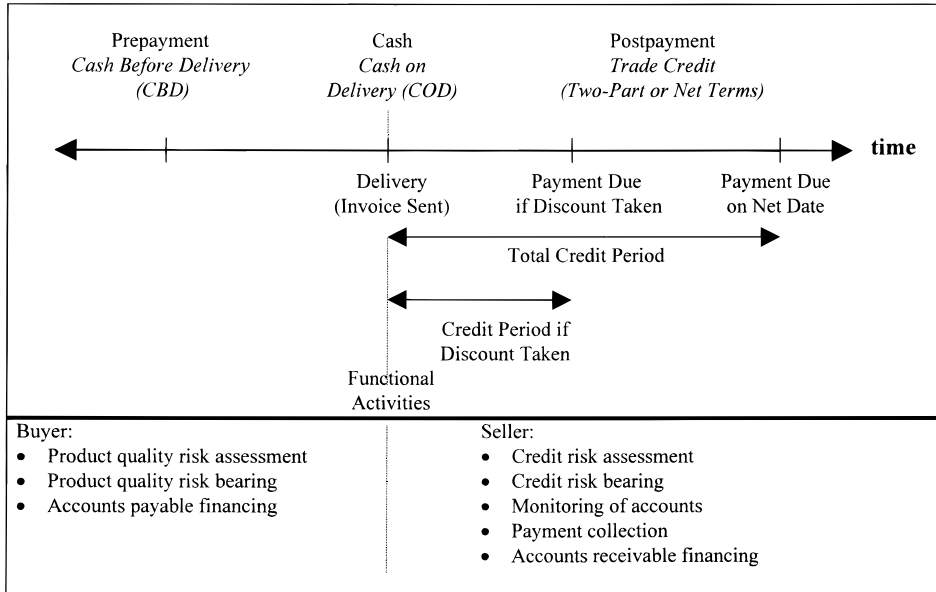


Figure 1. Time profile of payments and functional activities implied by payment policy. The figure shows the range of interfirm credit arrangements, from cash before delivery of merchandise or services, where the buyer assumes product quality risk and must arrange for financing, to payment after delivery, where the seller assumes credit risk and receivables financing responsibilities. With payment after delivery, terms can be two-part or net. Two-part terms provide a discount if payment is made promptly.

arrangement requires the buyer to seek any needed financing from a third party such as a bank. Conversely, if trade credit is extended, the seller assumes responsibility for assessing credit risk, financing, and collecting receivables.⁶

Credit policy is an organizational design choice to internalize activities as opposed to relying on the market. As such, the theory of the firm literature suggests determinants that are expected to influence the choice. This literature concerns the effects of transaction-specific investments and transactions costs (defined to include information and monitoring costs) on the choice of organizational structure.⁷ Generally, offers of trade credit are expected when informational asymmetries between supplier and buyer are present, when monitoring and other transactions costs are high, and when the supplier has a high level of specialized investment at stake. We also consider

⁶ These functions can be spun off to third parties or internalized. See Mian and Smith (1992) for a comprehensive analysis of the alternatives by which to manage receivables, including use of factors, accounts-receivable-secured debt, captive finance subsidiaries, and general corporate credit. Also see Smith and Schnucker (1993) who analyze the choice to factor receivables and the nature of factoring contracts.

⁷ See Williamson (1985), Klein, Crawford, and Alchian (1978), and Coase (1937).

the empirical importance of economies of scale and price discrimination as determinants of trade-credit policy, along with traditional explanations such as seller liquidity.

A. Asymmetric Information between Buyers and Sellers

In exchange relationships with imperfect information, uncertainty imposes transactions costs on the traders. A vendor who offers credit opens himself to moral hazard because buyers who recognize they are poor credit risks may be attracted partly to avail themselves of a financing alternative. Buyers who pay cash are exposed to the opposite moral-hazard problem, for vendors of low quality products (relative to price) are harder to hold accountable if the buyer makes payment before quality can be assessed.⁸ Both buyers and sellers have incentives to devise institutions that reduce transactions costs due to asymmetric information. Seller-provided guarantees and reputation can reduce concerns about product quality. Buyer reputation and credit ratings can reduce concerns about nonpayment. Reputation-based approaches, however, are not complete solutions, particularly when trading partners are new, small, or distant from each other. Since payment terms can be selected to mitigate these concerns, we expect systematic relations between terms and variables that capture information costs and the potential for opportunism.

Asymmetric information can influence the choice of trade credit terms in two ways. First, sellers who lack sufficient reputation can offer delayed payment as an effective guarantee. Second, specific terms can enable buyers to reveal credit quality through their payment practices.

A.1. Offering Delayed Payment to Guarantee Product Quality

Smith (1987) suggests that delayed payment can facilitate exchange by allowing the buyer to verify product quality before paying.⁹ Long et al. (1993) find support for the product-quality-guarantee theory. They find that smaller firms and firms producing products whose quality requires longer to assess are more likely than others to extend more trade credit relative to sales. This reasoning suggests that in the models below, variables indicating difficulty in assessing product quality increase the likelihood that trade-credit financing is offered.

⁸ Under the Uniform Commercial Code (UCC) the buyer has the right to inspect goods as a prerequisite to payment except if there is an agreement otherwise or when the contract provides for delivery COD. See § 2-513(1) and (4), 2-310(b), 2-321(3), 2-512(2) and § 2-513 (3) (a). Interfirm trades generally are unsecured transactions, although the seller has remedies for breach of contract by the buyer and there is an implied warranty of merchantability (UCC § 2-703 and 2-709(1)(a)).

⁹ Faith and Tollison (1981) suggest that postpayment institutions, such as trade credit, are conceivably more prevalent in the economy than vertical integration, product guarantees, insurance, and other contractual arrangements aimed at mitigating potential information problems of service or product quality.

A.2. Trade Credit as a Means of Obtaining Information on the Buyer's Creditworthiness

Faced with imperfect information about buyer default risk, sellers either demand prepayment or cash or find ways to evaluate creditworthiness. Trade-credit terms can be designed to elicit information on creditworthiness because buyers' responses to the terms help identify those who may be having financial difficulties. Smith (1987) models two-part trade credit as such a screening contract. A buyer who forgoes the discount may pay a very high effective interest rate, as determined by the terms of the two-part offer. Failure to take the discount in such cases signals that monitoring of the buyer's financial position is merited. Depending on the seller's response to default, simple net terms can generate a similar signal, although the penalty for paying after the net date is not explicit.

Several reasons are offered in the literature as to why vendors can have a comparative advantage over financial institutions in monitoring debtors.¹⁰ First, vendors have a cost advantage over banks because they gain information about the financial health of buyers as a by-product of the selling function. Second, conducting business with a network of similar buyers can produce information about specific buyers so the vendor is better able than a financial institution to distinguish between a buyer who is in financial trouble and a general decline in the market for the seller's products. Third, if the goods are more valuable as collateral to the supplier than to a financial institution, then the supplier may have a cost advantage in collection.

B. Specific Investment and Credit Policy

B.1. Specific Investment in the Buyer-Seller Relationship

Transactions costs theories of the firm suggest that asset specificity is an important determinant of when an activity (extension of credit in this case) is integrated by the firm as opposed to being performed by a third party. Smith (1987) models the presence of specialized, nonsalvageable investments as a determinant of seller decisions to offer two-part trade credit. By offering the screening contract, a seller can identify prospective defaults more quickly than if financial institutions were the sole providers of short-term financing. Such a contract makes economic sense if the seller has a stake in the future of the buyer's business, as would be the case if the seller had made a specific investment in the buyer. For example, point-of-sale efforts that require the salesperson to spend considerable time with an account may create a specific nonsalvageable investment in the relationship. The seller can earn a return on the investment only if the buyer stays in business. The

¹⁰ Discussion of comparative cost advantages of vendor monitoring of buyers appears in Mian and Smith (1992), Smith and Schnucker (1993), and Petersen and Rajan (1997).

seller can protect investments by using credit terms to learn of financial difficulties quickly and to distinguish between buyers who need temporary assistance and those likely to fail.

In this view, trade credit is provided because the value of default-risk information to the seller can exceed its value to prospective third-part financiers. This occurs if the seller can take action to protect the quasi-rents that derive from the investment. Relative to financial intermediaries, a seller has an additional interest in the debtor because the seller considers both the potential profits from the loan and the potential profits from selling its goods.

B.2. Reputation as Specific Investment

In addition to relationship-specific investments, firms make investments that are industry-specific. Firm reputation (for product quality of the seller or credit quality of the buyer) is facilitated by making nonsalvageable investments in an industry because the investment itself creates a performance bond that would be forsaken if the firm were to leave the industry. The supplier's concern with the buyer's credit is reduced if the buyer has made a significant sunk investment in the industry. Accordingly, buyer reputation is an expected determinant of credit terms and practice.

Wide variation exists in the characteristics of buyers. Some suppliers sell to original equipment manufacturers (OEMs), others to retailers, and still others to wholesalers or other distributors such as jobbers, dealers, etc. Buyers vary in the extent of their industry-specific nonsalvageable investment. To capture the effect of these differences on trade-credit practice we classify buyers into groups. We then make predictions about when to expect trade credit as opposed to cash terms based on the industry-specific investments of the buyers. For example, other things constant, OEMs are likely to have made investments in industry-specific manufacturing capacity, so that sellers have little need to demand cash payment or to employ trade-credit terms that operate as a screening contract.

Buyer characteristics also may affect specific credit terms because some products, like those sold to OEMs and wholesalers, are likely to be consumed or resold quickly and thus have less collateral value than final goods sold to retailers. Hence, suppliers of OEMs and wholesalers are likely to offer shorter inspection periods before requiring payment than are suppliers of retailers.

C. Scale Economies in Extending Credit

A firm's size affects its decision to integrate into credit provision. Fixed costs associated with investigating credit quality, along with fixed costs of managing outstanding credit, are spread over more customers as the firm's customer base expands. Furthermore, the larger the seller's customer base, the greater the likelihood that experience with some customers will yield information on the default risk of others. Thus, vendors serving more buyers are better able to discern whether a particular buyer's financial problems are buyer-specific or industry-wide. These considerations lead to a predic-

tion that larger firms are more likely to offer trade credit. Also, because two-part offers are more complex than net terms and may result in more monitoring costs, larger firms are more likely than others to offer two-part credit terms.

D. Other Theories of Trade Credit

D.1. Trade Credit and Imperfect Information about Demand

Suppliers who face uncertain or highly variable demand can respond by changing either selling price or production level. There may, however, be an advantage to dealing with demand fluctuations by adjusting credit terms instead of prices. Emery (1987) presents such a model. Consistent with this view, Long et al. (1993) find that firms with variable demand extend more trade credit than firms with stable demand.

D.2. Liquidity and Credit Policy

A common explanation for trade credit is that it enables firms that can obtain funds at low cost to extend credit to firms that are credit constrained. For example, Schwartz (1974) develops a model that predicts that larger, more financially secure producers extend credit to smaller, less financially secure customers. This reasoning suggests that liquid firms are more likely than others to extend credit offers to buyers, either in the form of net or two-part credit.

D.3. Trade Credit as a Means to Price Discriminate

The final theory we examine is that trade credit can be used to price discriminate among customers. Petersen and Rajan (1997) offer a price-discrimination theory for trade credit.¹¹ They assume that the seller offers credit terms that are invariant to the credit quality of the buyer. Since trade credit exposes the seller to default risk, offering credit reduces the effective price to low-quality borrowers. Provided that risky borrowers are the more price-elastic segment of the market, offering credit results in a gain for the seller. Petersen and Rajan find support for this theory in that the higher the supplier's profit margin, the more likely the firm is to offer credit. Their explanation is that a supplier's profit margin from a sale enables the supplier to accept a lower profit or greater loss on the credit than could a financial institution. The argument is similar to the explanation of why firms that have made specific investments in buyers are more likely to extend credit. A supplier in a repeated relationship with a buyer has an implicit equity stake (nonsalvageable investment) in the buyer. Because of the potential for repeat business, the supplier's stake in the relationship may far exceed the implicit equity stake of a financial institution.

¹¹ Also see Schwartz and Whitcomb (1979) and Brennan, Maksimovic, and Zechner (1988).

Table I
Respondents by Industry

Number and percentage of survey responses, grouped by two-digit SIC code, from the total sample of 950 responses.

Industry	Two-Digit SIC Code	Number of Firms	Percentage of Responses
Agriculture	01–09	6	0.6%
Mining	10–14	39	4.1%
Construction	15–18	8	0.8%
Manufacturing			
Food and Tobacco Products	20–21	46	4.8%
Fabrics, Carpet, and Apparel	22–23	30	3.2%
Wood and Paper Products	24–27	64	6.7%
Chemicals and Allied Products	28	65	6.8%
Petroleum, Rubber and Plastics	29–30	27	2.8%
Leather, Stone, and Glass	31–32	22	2.3%
Metals	33–34	45	4.7%
Machinery and Equipment	35	147	15.5%
Electrical Equipment	36	130	13.7%
Transportation Equipment	37	24	2.5%
Instruments	38	120	12.6%
Other Manufacturing	39	27	2.8%
Transportation and Public Utilities	40–49	69	7.3%
Wholesale Trade	50–51	73	7.7%
Other		8	0.8%

II. Data and Evidence on Industry Practice

A. Data

We examine the empirical implications discussed above using data compiled from a survey of the credit managers of 2,538 firms drawn from the COMPUSTAT files and cross-indexed for mailing addresses with Dun and Bradstreet's *Million Dollar Directory* or Standard and Poor's *Register of Corporations, Directors, and Executives*. The survey data are augmented with financial data from COMPUSTAT. To enhance reliability, we limit the sample to firms from the Compustat Full Coverage Tape, which tend to be smaller, younger, more narrowly focused companies. We also limit the sample to firms producing a single product line, as defined by the number of four-digit SIC (Standard Industrial Classification) codes reported by the firm. As a check, each respondent is requested to confirm the SIC code of the firm's products and to respond on the basis of that SIC code.

To increase the response rate, the initial mailing of the survey is followed with a second mailing to nonrespondents from the initial round. The resulting sample includes 950 useable responses, a 37.4 percent response rate. Table I reports a breakdown of the number of respondents by SIC code.

The survey instrument is composed of four brief sections: an initial section of descriptive information about the firm's geographic market, customer base, and customer ordering practices; a section on the extent of offering of various credit arrangements such as net terms and two-part terms, together with descriptive information on selling practices; a qualitative section on product characteristics such as the difficulty of assessing quality by inspection; and a section on company practice with respect to selection and enforcement of two-part terms (completed only by firms that offered such terms).

Evidence collected from surveys rather than by direct observation introduces or exacerbates problems of interpretation. Among these, respondents may have difficulty answering particular questions or may respond inaccurately. They also may interpret questions differently from what was intended. For these reasons, we stress the qualitative aspects of the results. Generally, we avoid comparisons of magnitudes or significance levels of reported relations. We do discuss results in term of conventional significance levels, recognizing that survey-response errors tend to bias coefficients and significance levels toward zero.

B. Evidence on Industry Practice

We begin by examining variations across industries in trade-credit terms offered. This examination is necessarily limited and qualitative. SIC code groupings do not always provide a convenient basis for comparing practices across industries. Variations in practice sometimes are apparent at the two- or three-digit SIC code level, but more commonly at the four-digit level. Accordingly, it sometimes is difficult to generalize about standard practice within groupings.

Table II contains a summary of our findings for SIC groupings where the data provide clear evidence of practice, considering both the number of observations and the homogeneity of terms offered. By far the most common simple net terms are "net 30," though longer and shorter periods do occur. Firms in a number of SIC codes tend not to offer two-part terms. For those that do, we find considerable variation across groupings and little variation within groupings.¹² The most common two-part terms are "2/10 net 30," but some groupings offer larger or smaller discounts. Lengths of discount and net periods also vary. Most industry groupings offer net terms even if two-part terms also are offered. Those that do not offer net terms do offer two-part terms. These general remarks also apply to findings for industry groupings not reported in Table II.¹³

Focusing more specifically on firms that offer two-part terms, the literature offers a variety of theories and conjectures about corporate practice. The survey provides an opportunity to generate some relevant evidence.

¹² This finding is consistent with the observation in the literature that there is not much intraindustry variation in quoted terms, suggesting that competition on quoted terms is not common. See, for example, Dun and Bradstreet (1970) and Elliehausen and Walken (1992).

¹³ A complete listing of findings by industry is available from the authors on request.

Table II
Most Common Two-Part and Net Trade Credit Terms
by Industry Grouping

Most commonly quoted trade-credit terms are given for various industry groupings, as reported by survey respondents. These terms, though they are those most commonly reported by survey respondents, may not be representative of other firms in the same SIC grouping. Two-part terms (e.g., 2/10 net 30) offer two payment options to the buyer: either take a prompt payment discount and pay within a specified number of days (2% discount if paid in 10 days) or make full payment by the specified net date (net 30). Net terms (e.g., net 30) quote the number of days within which payment is due (30), but do not offer a discount for prompt payment.

Industry Group	Two-Part Terms	Net Terms
Mining (SIC 10–13)	Generally not offered	Net 30
Manufacturing – Perishable Food Products (SIC 201, 202, 205)	Generally not offered	Net 7 and Net 30 are most common. Net period is related to rate of perishability
Non-Perishable Food Products (SIC 203, 204, 206–209)	2/10 net 30 is most common, occasional shorter net periods such as 2/10 net 11	Net 30
Fabrics (SIC 221, 222, 223, 225, 228)	Generally not offered	Net 30 or net 60
Apparel except women's outerwear (SIC 230, 231, 232, 234, 236)	Generally not offered; when offered 8/10 EOM is most common	Net 30 is most common, occasional longer or shorter periods
Apparel – Women's Outerwear (SIC 233)	8/10 EOM	Generally not offered
Lumber and Wood Products (SIC 242, 243, 249)	2/10 net 30 and 2/10 net 11 are most common, longer terms are more common for finished goods	Generally not offered
Furniture and Fixtures (SIC 251, 252, 259)	Generally not offered	Net 30
Inorganic Chemicals (SIC 280–282)	Generally not offered	Net 30
Pharmaceuticals (SIC 2833, 2834)	2/10 net 30	Net 30
Diagnostic Products (SIC 2835, 2836)	Generally not offered	Net 30
Chemical Products (SIC 285–289)	Generally not offered	Net 30
Petroleum Refining (SIC 29)	2/10 net 11 for refining and 1/10 net 30 for lubricants	Generally not offered
Rubber and Plastic Products (SIC 30)	5/15 net 15 and 1/10 net 30	Net 30
Stone, Clay, and Glass Products (SIC 32)	1/10 net 30	Net 30

Table 2—Continued

Industry Group	Two-Part Terms	Net Terms
Manufacturing (continued)		
Blast Furnaces and Steel (SIC 3310–3312)	0.5/10 net 30 and 0.75/10 net 30	Generally not offered
Iron and Steel Foundries (SIC 3315–332)	Generally not offered	Net 30
Fabricated Metal (SIC 34)	2/10 net 30	Net 30
Industrial Machinery (SIC 350–356, 359)	2/15 net 30, occasional smaller discounts and shorter discount periods	Net 30
Industrial Equipment (SIC 357)	Generally not offered	Net 30
Electrical Industrial Apparatus (SIC 360–364)	2/10 net 30	Net 30
Communications Equipment		
Electronic Components (SIC 366–369)	Generally not offered, otherwise 1/10 net 30	Net 30
Transportation Equipment and Parts (SIC 37)	Generally not offered, except for parts with 1/10 net 30	Net 30
Instruments (SIC 38)	Generally not offered, otherwise 2/10 net 30	Net 30
Transportation – Railroad and Truck (SIC 40–42)	1/14 net 28	Net 15 and some longer net periods
Communications (SIC 48)	Generally not offered	Net 30
Services – Electric, Gas and Sanitation (SIC 49)	Generally not offered	Net 30

Respondents are requested to indicate the extent of coherence of their practices with statements describing the use of two-part trade credit terms. Responses are recorded on a five-point anchored scale ranging between “Always” (5) and “Never” (1). In Table III we report responses to these statements.

The first statement in Table III concerns the extent to which customers rely on trade credit as a routine means of financing. Responses are skewed slightly in the direction of customers making occasional use. However, 30 percent of respondents report that their customers either always or frequently pay in the net period, thus relying on trade credit for routine financing.

The next two statements address the credit provider’s willingness to accept discounted payment that is unearned (the buyer takes the discount for prompt payment, but does not pay within the discount period). A substantial minority of respondents (31.8 percent) indicate they do not permit customers to take unearned discounts. Most (72.4 percent) indicate some degree of willingness to accept discounted payments during the net period, and that their willingness is higher when the buyer has a long-standing relationship with

Table III
Practices of Firms Offering Two-Part Trade-Credit Terms

Survey responses to questions regarding firm trade-credit practices for the 233 firms that report two-part credit is their most commonly offered form of credit.

Statement	Percentage of Responses					Mean Response
	Always (5)	Frequently (4)	Half of the Time (3)	Occasionally (2)	Never (1)	
Our customers pay in the net period and do not take the discount.	1.72	27.9	22.8	38.6	9.0	2.75
We allow customers to take the cash discount even if they do not pay in the discount period.	1.7	7.7	4.3	54.5	31.8	1.93
We do nothing if a long-standing customer pays within the net period and takes an unearned discount.	7.7	16.7	3.4	44.6	27.5	2.33
Use of trade credit suggests to us that the customer cannot obtain financing elsewhere.	1.3	5.6	3.4	40.3	49.4	1.69
We vary credit terms rather than product prices in response to fluctuations in market demand.	0.9	3.4	3.4	28.8	63.5	1.49
We manage inventories by changing credit terms rather than product prices.	0.0	2.6	0.4	17.6	79.4	1.26
We relax credit terms when banks significantly lower interest rates.	0.0	0.0	1.3	10.7	88.0	1.13

them. The evidence suggests that many providers of trade credit use the terms to discriminate among customers in some fashion. Discounts to long-standing customers could reflect a perception that such customers are less costly to serve or that concern with losing their business is higher than for other customers.

The fourth statement is an effort to gauge the extent to which trade-credit terms are used to identify customers who are having financial difficulty. About half of the respondents indicate that use of trade credit does not imply

that the customer is unable to obtain alternative financing. Most of the other respondents (50.6 percent) report that using the trade-credit financing does indicate, at least occasionally, that the customer is facing financial difficulty. However, few respondents report that using trade credit always indicates trouble.

The final three statements concern the willingness of providers to vary terms in response to economic changes. We find little willingness to vary terms either in lieu of product price changes or in response to a change in prevailing interest rates. Results indicate that trade-credit terms are stable over time.

C. Survey Results and Trade-Credit Theories

Although the evidence presented above suggests credit terms are not used to manage fluctuations in demand (Emery (1987)), it does suggest that firms accommodate individual buyers by extending the credit period or allowing unearned discounts to be taken if the long-term relationship with the buyer warrants it, or if the sale is better protected by extending additional credit. These responses are consistent with using trade credit to price discriminate, especially if firm-specific investment in relationships with buyers is preserved (Smith (1987)). The findings also indicate that though sellers make occasional strategic use of trade credit to price discriminate among buyers, terms tend to be uniform across an industry and stable over time (Petersen and Rajan (1997)).

III. Choice of Basic Trade-Credit Policy

What explains the willingness of some firms to offer net payment, others to offer two-part terms, and still others to insist on cash payment? As discussed in Section I, a firm's decision is driven by several considerations. We model the vendor's choice of trade-credit terms as a function of variables intended to reflect three general categories: scale, transactions costs including information and monitoring costs, and liquidity considerations. We consider the decision to involve three binary choices: net terms versus cash, two-part terms versus cash, and two-part versus net terms.¹⁴ Table IV contains the logit results for the three binary choices. Information about firms selecting the third alternative is excluded from the analysis of each binary choice. The more complex polychotomous approach does not, however, result in materially different findings. The independent variables are described below.

¹⁴ The dichotomous dependent variables are defined as the survey response to the question asking for the firm's most commonly used payment terms. We classify as "cash" those terms that require cash on delivery (COD) as well as cash before delivery (CBD). COD terms are far more common; CBD is more likely when the product has a highly customized user so that its market value if not sold to that user is low. Our data show "occasional use" of CBD terms is more likely in manufacturing and construction than in agriculture and mining.

Table IV
Choice of Trade Credit Policy

The table contains results of logit models for three binary choices facing firms: the choice to extend net terms versus cash terms; the choice to extend two-part terms versus cash terms, and the choice to extend two-part versus net terms. After deleting observations with missing values for some variables, the sample sizes are: 649 for net terms, 39 for cash terms, and 233 for two-part terms. Information about firms selecting the third alternative is excluded from the analysis of each binary choice.

Independent Variables	Net = 1; Cash = 0		Two-part = 1; Cash = 0		Two-part = 1; Net = 0	
	Coefficient	T-ratio	Coefficient	T-ratio	Coefficient	T-ratio
Intercept	1.888	1.67**	-1.073	-0.78	-2.274	-3.45***
Number of customers	0.435	3.05***	0.642	3.53***	0.150	1.47*
Age of seller	0.092	0.46	0.619	2.50***	0.350	3.54***
Infrequency of transactions	-0.283	-0.65	0.067	0.12	-0.311	-1.32*
International customers	0.227	0.59	0.567	1.34*	0.007	0.04
OEMs	2.374	4.79***	2.115	3.46***	-0.572	-1.71**
Wholesalers	1.013	1.80**	2.153	3.24***	0.758	2.05***
Mix of customers	-1.913	-3.38***	-2.217	-3.25***	0.287	0.83
Relationship	-0.150	-0.93	-0.125	-0.66	0.037	0.49
Fast-changing	-0.182	-1.31*	-0.369	-2.32***	-0.208	-3.14***
Produce for inventory	-0.020	-0.15	0.113	0.72	0.110	1.73**
Product quality	0.021	0.18	-0.221	-1.53*	-0.165	-2.87***
Liquidity	-0.707	-1.15	-1.495	-1.42*	-0.016	-0.39

Two-tail significance level: *** = .05, ** = .10, * = .20.

Number of customers is a categorical variable reported by the survey respondent and ranging from 0–25 customers to more than 100 customers. Since scale economies increase with the number of customers, the likelihood of offering credit (either two-part or net terms) is expected to increase with the firm's customer base. Results in Table IV are consistent with this expectation. Firms that serve more customers are more likely to offer credit rather than require cash payment. Further, firms that serve more customers are more likely to adopt two-part terms rather than simple net terms.

Age of seller is the log of firm age in years as reported by COMPUSTAT. Age is related to economies of scale and scope because the longer a firm expects to remain in business, the easier it is to justify a fixed investment in an activity such as offering trade credit. Alternatively, younger firms may be compelled by lack of reputation to offer net terms in lieu of cash to provide time for customers to inspect the product. As a result, the use of two-part terms instead of net would be positively related to seller age. The pattern of results for this variable is consistent with the view that both factors affect the choice. The strong results for two-part versus cash and two-part versus net suggest a scale effect, as two-part terms are more costly to administer. Firms do not demonstrate a clear preference, based on age, for cash versus two-part terms. However, if credit is offered, younger firms are more likely to offer net credit, indicating a concern with offering an opportunity to inspect the product before paying.

Infrequency of transactions between the seller and a typical buyer is a categorical variable. Responses are grouped as infrequent (semiannual or annual) or frequent (daily, weekly, or monthly). Buyers and sellers who transact infrequently are less likely to be well known to each other and business relationships are more likely to be sporadic or seasonal. Seasonal producers, in particular, are expected to be less able to provide financing than those with more continuous transactions. For example, a supplier of seasonal merchandise to a department store is likely to have more difficulty arranging financing than is the department store, and so would prefer cash payment.¹⁵ However, lack of regular transactions also leads to an increased need for buyers to inspect products before payment. Results are weak statistically, but consistent with the view that sellers who transact with customers infrequently are induced to offer inspection periods.

International customers, as compared to others, are likely to experience delivery delays, and be unfamiliar with the seller. From a buyer's perspective, these factors increase the likelihood of demanding trade credit. But from a seller's perspective, dealing with an international customer intensifies information problems concerning credit quality and therefore increases the likelihood of demanding cash payment. Therefore, information-based theories of trade credit yield no clear prediction of whether credit or cash will be preferred. As shown in Table IV, the only statistically significant result for this variable suggests that selling to international buyers marginally increases the likelihood of the seller adopting two-part terms.

Sampled firms are asked to identify their most common type of customer and the responses were classified into four groups: *OEMs*, *Wholesalers*, *Retailers*, and *Mix of customers*. *OEMs* (original equipment manufacturers) are buyers who "consume" the product in the process of manufacturing another product or service. *Wholesalers* are buyers who purchase from the manufacturer and resell to the ultimate retailer or others in the distribution network such as jobbers or dealers (we include mass merchandisers, who effectively have integrated into the wholesaling function, in this classification). *Retailers* are buyers who sell to final consumers, excluding mass merchandisers. The classification *Mix of customers* is used when the sampled firm identifies buyers from two or more of the previous groups. In the models we include binary variables for three of the four groups. The omitted group is *Retailers*. Hence, estimated coefficients test whether each customer type produces effects that are different from those firms selling primarily to retailers.

This set of variables, which reflects the nature of product distribution, is included to capture the differences in level of industry-specific investment and reputation of buyers. Wholesalers and OEMs are expected to have made larger specific investments in their respective industries than firms classi-

¹⁵ Seasonality of sales may also be a motive for firms to factor their receivables. However, neither Mian and Smith (1992) nor Smith and Schnucker (1993) find a significant relationship between measures of seasonality of sales and factoring. In our sample, firms that offer trade credit, whether or not they choose to factor, are treated as offering trade credit.

fied as Retailers. Although retailers make specific investments, their investments normally are smaller in proportion to the size of a typical transaction so that less investment is at stake in a given transaction. Investments in the case of OEMs are likely to be in industry-specific manufacturing assets such as machinery, dies, production facilities, etc. As intermediaries, wholesalers make investments in both the suppliers and buyers in their industry. Such investments are likely to be human-capital investments, as the wholesaler acquires specific information about the nature of individual organizations and invests in relationships with personnel of both the seller and buyer organizations. Since a mix of customers reflects a variety of buyer types, specific investments are likely to be more variable and uncertain compared to those of retailers. The empirical predictions suggested are that, relative to sales to retailers, trade credit is more likely to be tied to sales to OEMs and wholesalers and less likely to be tied to sales to a mix of customers. We have no expectations as to whether two-part or net terms would be more likely for any group of customers.

Results indicate that sales to OEMs and wholesalers are characterized by concern for product-quality issues. The results for both dummy variables are highly significant and indicate that these transactions tend not to require cash payment. Although credit sales are preferred for both sets of buyers, sales to OEMs are significantly more likely to be made on net terms than two-part terms and the opposite holds for sales to wholesalers.¹⁶ In our data, firms selling to OEMs tend to be significantly younger and smaller than those selling to wholesalers, suggesting that the dichotomy of practice is another manifestation of scale economies for which we are unable to control fully in the model.

For sales to a mix of customers, cash payment is significantly more likely than delayed payment, and when financing is used no systematic preference for net versus two-part terms is indicated by the data. Taken together, these results provide strong evidence that the payment policy chosen by the seller is dependent on the distribution channel and, more specifically (as interpreted here), on the typical buyer's reputation for creditworthiness.

Relationship is intended to reflect the importance of relationship-specific investments. Transactions-cost theories suggest sellers with relational investments are more likely to integrate into financing. Relational investment is measured as a scaled response to the statement, "Personal relationships between salespeople and their accounts have a lot of influence on sales of our product line." Results, however, are not statistically significant, suggesting that such investments are not important determinants of trade-credit policy, a result that does not mesh with some of our other findings on the importance of nonsalvageable investment. Perhaps the measure, with its

¹⁶ These results are for the variables indicating buyer type, but as Table I shows, the sample of firms includes 73 that are classified as wholesalers (SIC code 5000-5199). Of the firms that offer two-part terms as their most common payment method, 12 percent are wholesalers; of those that offer net terms, only 6 percent are wholesalers. Hence, transactions involving wholesalers, both as suppliers and as buyers, are more likely to involve two-part credit.

emphasis on personal relationships, is not a good index of the magnitude of relational investment across such widely diverse industries. As noted, *Age of seller* also is a proxy for reputation and is significantly related to the likelihood of offering two-part credit relative to cash or net terms.

Fast changing measures survey responses indicating degree of agreement with the statement: "Our primary product line can be described as fast-changing." Information-based theories of trade credit provide two reasons for expecting the variable to impact the choice of payment policy. First, the product may be prone to unpredictable swings in demand (e.g., stylish clothes) or in cost of production (e.g., agriculturally based products). Hence, the supplier may be uncertain about the buyer's ability to pay and that uncertainty would be exacerbated by the potential for collateral value of the products to fluctuate. This would lead the seller to require cash. Second, the buyer faces uncertainty about product value and would want delayed payment to help mitigate the uncertainty. Results show that suppliers of fast-changing products are more likely to require cash. If financing is offered, net terms are more likely than two-part terms.

Selling firms differ in the extent to which they *Produce for inventory* as opposed to producing to order. Products made for inventory are less specific to the buyer, therefore the seller has less concern with being held up by an opportunistic buyer who reneges on the order. Under these conditions, financing terms are more likely than cash terms, especially if there is a demand on the part of buyers for an inspection period. Results show that when firms produce for inventory, two-part terms are more likely than net terms.

Product quality is measured by agreement with the statement: "The quality of our product line is difficult to determine by inspection only." According to the product-quality-guarantee theory, the more difficult it is to determine quality, the more likely buyers are to demand postpayment terms. Our results, though marginally significant, are not fully consistent with expectations. Cash is preferred to two-part terms. A possible explanation is that the difficulty of ascertaining product quality makes it easier for the buyer to renege on the purchase by claiming that quality is unsatisfactory. This would suggest a propensity for sellers to demand cash. Consistent with the use of terms to guarantee quality is the finding that net terms are the preferred choice when selecting between the two basic credit contracts.

Liquidity is included to evaluate the perception that liquid firms have a financial advantage in offering trade credit. Measuring liquidity in the context of any model of trade credit is problematic. Traditional measures are based on accounts receivable, cash, and short-term liabilities, all of which depend on the trade-credit decision, making the traditional liquidity measures endogenous. To minimize this problem, we adopt the Lehn and Poulsen (1989) measure of free cash flow and standardize it by sales.¹⁷ Our results do not indicate that this measure of liquidity has a positive effect on the

¹⁷ Undistributed cash flow is measured using COMPUSTAT data as: (operating income before depreciation, less interest expense, less net income taxes, less dividends), standardized by net sales.

Table V
Choice of Payment Terms for Firms Offering
Two-Part Trade Credit

Using the sample of firms offering two-part credit, the table presents regression results of models for three dependent variables: effective interest rate, discount percentage, and discount period. Sample size is 233 firms that offer two-part terms as their most common form of trade credit.

Independent Variables	Effective Interest Rate		Discount Percentage		Discount Period	
	Coefficient	<i>T</i> -ratio	Coefficient	<i>T</i> -ratio	Coefficient	<i>T</i> -ratio
Intercept	3.218	1.55*	1.586	2.07***	10.109	3.32***
Number of customers	-0.583	-1.37*	-0.167	-0.15	-0.130	-0.29
Age of seller	0.461	1.17	-0.145	-1.33*	0.306	0.61
Infrequency of transactions	-1.076	-1.19	0.062	0.16	-1.645	-1.06
International customers	0.692	1.27	0.138	0.56	2.536	2.76***
OEMs	-6.130	-2.53***	-2.132	-2.77***	-7.882	-2.68***
Wholesalers	-5.747	-2.30***	-1.696	-2.24***	-7.747	-2.69***
Mix of customers	5.592	2.26***	1.624	2.12***	4.789	1.58*
Relationship	-0.137	-0.57	0.046	0.46	0.039	0.08
Fast-changing product	0.156	0.75	0.214	2.44***	0.289	0.70
Produce for inventory	0.659	3.44***	0.073	0.77	0.367	1.05
Product quality	-0.027	-0.11	-0.050	-0.64	-0.366	-1.11
Liquidity	0.003	0.89	-0.000	-0.36	-0.052	-0.64***

Two-tail significance level: *** = .05, ** = .10, * = .20.

decision to offer credit. Instead, the variable is a marginally significant determinant of the choice to require cash in preference to two-part credit terms.

IV. Choice of Specific Credit Terms

To obtain a more complete understanding of the determinants of credit policy, we examine the relationships between the independent variables from Table IV and the specific terms in two-part credit offers. Consistent with the analysis above, when two-part terms are used to elicit information about buyer default risk, the terms should include high discount percentages and effective interest rates. Conversely, when two-part terms are used as a convenient way to bundle traditional financing with an inspection period, terms will include lower discount percentages and effective interest rates. The length of the discount period is expected to be related to how quickly the product turns over and its perishability. Hence, we can assess the strength of the findings in Table IV by examining how specific two-part terms vary with the same variables describing buyer, seller, and product attributes.

Table V shows results using the subsample of firms offering two-part credit.¹⁸ As above, variables describing buyer attributes are significant determinants of credit terms. As expected, discount rates and implicit interest rates are

¹⁸ In the first regression, the dependent variable is the log of the interest rate.

significantly lower when firms sell to OEMs and wholesalers than when they sell to retailers. Discount (inspection) periods are shorter, consistent with the rapid turnover and consumption rates typical of wholesalers and OEMs. Results suggest that two-part terms are less likely to be used as a screening contract for this group of buyers and function more like traditional financing. The credit offered, even for a short period, helps to finance sales of merchandise that is expected to be turned over quickly or converted into final manufactured goods.

Compared to selling to retailers, selling to a mix of customers is associated with higher interest rates, higher discount percentages, and longer discount periods. The evidence suggests that, in these transactions, trade credit functions as a screening contract to identify prospective defaults quickly. This makes sense because buyers are more heterogeneous and information about them is more costly to obtain. These results are consistent with the Table IV choice models showing that suppliers prefer to sell on cash terms when dealing with heterogeneous buyers.

Table V shows that longer discount periods are offered to international customers. Such customers are farther away from the seller and likely benefit more from longer time periods to inspect products and arrange payment. The table also indicates that the nature of the product (whether it has a fast-changing value) has a positive impact on the discount percentage. This result adds clarity to the Table IV finding that if product value is fast-changing, cash payments are more likely to be preferred by the supplier. As Table V shows, however, when two-part terms are adopted and product value is fast-changing, the offered terms will induce the buyer to pay quickly (close to cash terms), and will have a positive impact on the discount percentage and interest rate. The Table V result conforms with the common observation that products such as “stylish” clothing are associated with very high discount percentages. For example, Table II shows that women’s outerwear typically sells with an 8 percent discount for prompt payment compared with 0.5 to 1.0 percent discounts for such items as stone, glass, and clay products.

The positive impact of the *Produce for inventory* variable on the implicit interest rate is consistent with the Table IV result indicating that this variable is an important determinant of the choice to select two-part credit terms over net terms as a convenient way to identify problem buyers.

Finally, higher cash flows are associated with significantly shorter discount periods. This result complements the above finding that firms with high undistributed cash flow tend not to offer two-part credit terms, preferring cash instead. Seller liquidity does not appear to contribute positively to the choice to extend credit.

V. Discussion and Conclusion

In this paper we provide original data and empirical analysis of current industry trade-credit practice. The data show wide variation across industries in credit terms, but little variation within industries; furthermore, the

data indicate that credit terms are stable over time. Results yield stylized facts that indicate the motivations for adopting trade credit: Firms generally do not respond to fluctuations in market demand by adjusting trade-credit terms (instead of product prices); similarly, firms rarely use trade-credit terms to manage inventories; and rarely alter credit terms in response to fluctuations in prevailing interest rates.

The paper sheds light on several theories of trade credit. We find limited support for the price-discrimination theory because a majority of sampled firms report that they occasionally allow customers to take “unearned” discounts and that they would “do nothing” if a long-standing customer were to take an unearned discount. These responses suggest that the vendor’s relationship with the customer plays an important role in inducing the seller to strategically lower the effective price for some transactions. Results are not consistent with theories of trade credit that suggest liquidity of the seller is a primary determinant in the decision to extend credit, nor are they consistent with the theory that suppliers who face variable demand prefer to alter credit terms in lieu of price to deal with fluctuations. Instead, the results are consistent with theories that stress the importance of payment terms as market responses to information problems that characterize interfirm trade.

Variables measuring buyer and seller reputation are significant determinants of a firm’s choice to extend credit. When the seller’s reputation for quality products is more likely to be known (the firm is older and larger), two-part credit offers tend to dominate net terms, indicating that terms are designed to deal with credit quality issues rather than product quality issues. When reputation of the buyers is likely to be high, credit terms are more likely than cash terms. Other variables that proxy for buyer and seller uncertainty and opportunities for adverse selection and opportunism generally are important determinants of the choice to extend credit and of the form of the credit contract.

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