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A Strategic Approach on Organizing Accounts Receivable Management: Some Empirical Evidence

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Abstract. In this paper, the organizational behavior in managing accounts receivable is studied. It is based on the recent surge of interest in trade credit management from both academics and practitioners emphasizing 1) the rather permanent character of these short-term but continuously renewed investments and 2) their strategic potential due to the existence of financial, tax-based, operating, transaction and pricing motives. The paper focuses on a search for sources of such a strategic value and for the determinants of its risk. More specifically this potential strategic value is said to create a need for flexibility and control in managing accounts receivable. It will therefore induce a need for internalization of its management. The resulting risks, however, favor its externalization. This results in a revision of the existing decision-making processes since, the extension of trade credit becoming a strategic asset, investments in accounts receivable cannot be judged by the financial needs incurred as measured by the traditional DSO-rate anymore. More specifically, a transaction cost theoretic approach is used to explain the decision whether or not to internalize the firm's accounts receivable management and its risk, resulting in a set of hypotheses to be tested on a sample of both large and medium-sized Belgian companies.

1. Introduction

Firms rarely require immediate payment for their merchandise. For example, in the UK corporate sector more than 80% of daily business transactions are on credit terms and accounts receivable constitute one of the main assets on corporate balance sheets (35% of total assets) (Summers and Wilson, 1997). As soon as trade debtors settle their accounts, cash flows into the company. At the same time, however, new sales generate new accounts receivable. The level of debtors thus remains constant when sales figures are stable, while it grows as sales figures increase (Grass, 1972). Although firms extending trade credit heavily invest in accounts receivable, the resulting financial need is not the only reason why trade credit decisions merit more careful attention. This paper develops and discusses two additional considerations.

First, firms selling on credit open themselves to moral hazard. When exchange relations are subject to imperfect information, this uncertainty results in transaction costs. Sellers thus have incentives to develop organizational structures that reduce the transaction costs resulting from this asymmetric information problem. Both homemade planning and sales structuring as well as balanced product and

market portfolios can reduce this uncertainty, while externalization of risk becomes attractive when these homemade institutions fail.

Second, vendors offering trade credit have to adopt a variety of new responsibilities: the decision whether or not to grant credit to a (new) customer, the assumption of credit-, administration- and collection-policies and the bearing of the credit risk involved. From a managerial point of view this means that the seller 1) finances the buyer's inventory, 2) engages in additional accounting and collecting activities, 3) monitors the financial health of both existing and potential customers and 4) gets involved in assessing and bearing new risks. Not all credit management functions, however, have to be performed by the seller. Indeed, when extending trade credit is thought to add no real value to the firm, its management can be contracted to a third party.

A selling firm's decision to extend trade credit thus also requires the seller to decide whether or not to integrate into managing accounts receivable. Moreover, when the seller decides to enter a market transaction, several organizational structures can be employed. In their paper, Mian and Smith (1992) examine the relationship between the functions to be performed in the credit-administration process and the decision whether or not to subcontract these functions to a third party specialist. In this paper, however, the extension of trade credit is looked upon from both a more strategic and a risk-oriented point of view. The strategic approach is based on the extensive financial management literature claiming that the extension of trade credit can become advantageous to the supplier, in which there will be a need for flexibility in managing accounts receivable. The risk-oriented point of view, on the other hand, is based upon those principles that deal with the moral hazard problem. Finally, the implications of these motivational theories are linked to the industrial organization literature on vertical integration. Three types of outsourcing are considered. At first, the factoring contract has been chosen to operationalize the externalization of accounts receivable management, since factoring is the most comprehensive type of outsourcing a firm's accounts receivable management.[1] Next, we clearly isolate the decision to subcontract the administration process from the decision to subcontract the risks incurred, assuming that they are based on different decision processes with different decision variables. Indeed, we assume that both cost advantages and a need for flexibility in managing accounts receivable will cause integration of the firm's credit administration. The assumption of credit risk, however, will not be delegated to a third party when the transaction can be performed in a stable and predictable environmental setting (inducing a low need for monitoring and control).

In section 2 we describe the alternate accounts receivable management policies studied. Section 3 develops the hypotheses used to explain the decision to subcontract or not to subcontract the responsibilities involved. The discussion is based on the motives of sellers to offer trade credit and the moral hazard problem created by delaying payments under conditions of imperfect information. Sections 4 and 5 describe the sampling procedure and the way in which the variables are measured,

while the analysis procedures and results are reported in section 6. At the end of the paper, we summarize our conclusions.

2. The Nature of Outsourcing Contracts

Before analyzing policy choices and their respective determinants, we first give a description of the basic governance structures studied.

2.1. FACTORING AND ITS EQUIVALENT

Factoring basically offers three types of services: 1) finance, 2) risk control and 3) sales ledger administration (Brandenberg, 1987). However, not all factoring contracts provide this full array of services. Based upon the scope of his managerial needs the seller can decide on the extensiveness of the contract. The most important distinction between factoring contracts is that between recourse and non-recourse agreements. A non-recourse agreement implies that the factor makes the credit-extension decision, monitors and collects the accounts receivable and bears the credit risk. Under a recourse agreement the firm selling on credit retains the risk of non-recovery of the debt. Moreover, when the contract provides financing, the factoring contract is called an advance-factoring contract. A full-factoring agreement then is a non-recourse agreement, providing financing for all credit sales (both national sales and export). The equivalents internalizing their accounts receivable management finance their accounts receivable out of general corporate credit and manage internally the credit-risk assessment, credit-granting, credit-collection and credit-risk bearing functions.

2.2. THE ADMINISTRATIVE MANAGEMENT CONTRACT

The companies using an administrative management contract are defined as those companies that use credit information agencies to assess the trade credit risks, to collect accounts receivable when they are due or ARF (Accounts Receivable Financing)-contracts and service contracts offered by a factor. Thus, although the administration of accounts receivable has been outsourced, the firm still bears the trade credit risk.

2.3. THE RISK MANAGEMENT CONTRACT

The risk management contract is defined as a contract that indemnifies firms against losses on uncollected accounts receivable but does not take care of the firm's credit administration process. Examples of such third party specialists are e.g. credit insurance contracts and partial factoring agreements.

3. Determinants of Alternate Policies

Following the transaction cost approach, as developed by Coase (e.g., 1991) and Williamson (e.g., 1975), the transaction (or the exchange of goods and services) is the basic unit of analysis. Each time a transaction is performed, transaction costs arise. These can be defined as the negotiating, monitoring and enforcement costs that have to be spent to allow an exchange between two parties to take place and result from frictions or difficulties entailed by a combination of both human characteristics (bounded rationality and opportunism) and environmental factors (uncertainty, "small numbers", information asymmetry and asset-specificity). Therefore, alternative governance structures, of which markets and firms (hierarchies) are the most important examples, are assessed in terms of their capacities to economize on transaction costs (Jones and Hill, 1988; Williamson, 1975, 1987). This means that strategic assets are to be controlled by the firm itself. Next, internalization of an activity becomes more likely whenever there is a need for flexibility in its management since such a flexibility would make it extremely difficult to prepare full contracts (e.g., Hart, 1991; Klein, 1991).

Uncertainty and/or bounded rationality, however, generate the opposite effect: parameters that are hard to control and/or increase the uncertainty in management are more likely to cause frictions and are therefore apt to externalization (Anderson and Weitz, 1986).

As mentioned before, the factoring contract has been chosen to operationalize the full externalization of accounts receivable management. Next, we assume that the decision to outsource this management is influenced by the need for flexibility in extending trade credit and collecting payments on the one hand and the existence of economies of scale and scope reducing the unit cost of management on the other. Further, such a need for flexibility and control is assumed to be induced by the existence of real motives for extending trade credit. Indeed, when these motives hold, trade credit contributes to the process of maximizing shareholder wealth, a traditional objective in financial management literature, and becomes a strategic asset that is not likely to be extended to a third party. Next, the effects of uncertainty and bounded rationality in managing accounts receivable are studied, assuming that the supplier's risk increases as a result of uncertainty in the customer's payment behavior and uncertainty in the supplier's business environment. The less predictable the customer's payment behavior, the higher the uncertainty in the supplier's financial needs, all other things being equal. Therefore, the assumption of the credit risk becomes less attractive whenever the customer's payment behavior is hard to predict. In addition, two types of environmental uncertainty have been withheld: the possibility to control the customer's payment behavior (based on the absence of information-asymmetry) and the possibility to spread the risks incurred. In the second part of this paper we clearly isolate the decision to subcontract the administration process from the decision to subcontract the risks incurred. Therefore, trade credit administration is described as the process of monitoring

and collecting the outstanding accounts receivable. Moreover, since one cannot bear the consequences of decisions controlled by a third party, it is reasonable to assume that firms deciding to internalize the collection of their accounts receivable will also internalize the credit granting decision. The risk assumption includes the assumption of all responsibilities in case of late and/or bad payments.

3.1. THE DSO-RATE

Since in the traditional literature on accounts receivable management the average number of days' sales outstanding (DSO) is often mentioned to be the primary reason for outsourcing, the DSO rate has been withheld for further analysis. Indeed, the pure financial theories on trade credit stress the fact that high DSO-rates increase the supplier's financial needs, increasing the likelihood of outsourcing. Moreover, it is reasonable to assume that when the firm has no accounts receivable (although it provides its customers with the opportunity to delay their payments), there won't be any need for outsourcing its management. This results in the following hypothesis:

H1: Firms with a higher average number of days' sales outstanding are more likely to outsource their accounts receivable management.

3.2. COST ADVANTAGES

Economies of scale and scope are expected to affect the outsourcing decision. Indeed, the fixed costs associated with credit-risk assessment and monitoring and collection policies can be spread over a larger number of accounts as credit sales increase. Firms with higher credit sales are therefore expected to invest in more specialized personnel, techniques and knowledge, enabling them to realize learning-effects. This results in the following hypothesis:

H2: Firms with the potential of realizing economies of scale are more likely to internalize their accounts receivable management.

3.3. NEED FOR FLEXIBILITY AND CONTROL: THE INCENTIVES FOR TRADE CREDIT EXTENSION

The more recent developments in accounts receivable management literature (e.g. Emery, 1988; Brick and Fung, 1984; Schwartz, 1974) all emphasize its potential strategic value which is usually translated into a set of motives causing trade credit extension. Among these we discern a pricing motive, an operating motive, a financing and a tax-based motive and a transaction motive. In what follows, each of them is briefly discussed and translated into testable hypotheses.

3.3.4. *The Tax-based Motive*

Even in perfectly competitive financial markets with homogeneous interest rates, trade credit can act as a redistributor of wealth since high tax paying suppliers have a lower after-tax financing cost. That way, the tax-based models as introduced by Brick and Fung (1984a, 1984b) see trade credit as a redistributor of tax advantages between buyer and seller. They finally conclude that "...sellers with high effective tax rates will supply more trade credit and are therefore more likely to have a longer investment in accounts receivable". Frank and Maksimovic (1995) follow this reasoning stating that the higher the supplier's tax rate, the higher his comparative tax advantage will be and the more willing he will be to invest in trade credit. His lower after-tax financing cost induces the same incentives as discussed under the financing motive, resulting in the hypothesis that:

H6: Suppliers who are in a higher tax-bracket are less likely to outsource their accounts receivable management.

This tax based motive, however, not only holds when suppliers and buyers are subject to heterogeneous tax rates: Brick and Fung (1984b) show that the impact of taxes varies with the accounting procedure used and the inventory turnover. Indeed, in a NPV-context (Net Present Value) the real value of tax deduction for the buyer depends on when the cost of purchase is recognized as an expense and how this expense is calculated.

3.3.5. *The Transaction Motive*

Finally, Long et al. (1993), Lee and Stowe (1993) and Emery and Nayar (1994) define trade credit as an implicit guarantee for the quality of the goods delivered. Indeed, payment delays offer the buyer larger opportunities in verifying the shipments' quality while discount periods encourage buyers to prompt their payments and therefore to assume the product risk without thoroughly checking the goods delivered. Since this kind of information asymmetry decreases with the reputation of established sellers, the latter have no need for additional quality signaling and will therefore be more rigid in monitoring their accounts receivable. The lack of a need for compliance in collecting accounts receivable turns this collection program into a standard procedure that can easily be outsourced. Moreover, a second reason for externalization exists: since the information provided by the monitoring process adds no real value, the accounts receivable management process becomes a subordinated or a secondary activity. The less established companies, on the contrary, use trade credit as an alternative means of establishing quality reputation, which makes it more likely that they want to control the activities involved. Indeed, they will not only offer more trade credit, they will be more compliant in collecting accounts receivable as well. Although this causes receivables to increase, there

will be a growing reluctance towards outsourcing their control. As in Long, Malitz and Ravid (1993), we translate this assumption in the following hypothesis:

H7: The better-established suppliers have no need for monitoring accounts receivable and are therefore more likely to outsource their management.

Long et al. (1993) introduce 4 different measures of reputation. First, they assume that the more reliable companies will be able to obtain higher amounts of unsecured short-term debt financing and will be less dependent upon trade credit financing offered by their suppliers. Next, they assume that larger companies (measured by the supplier's total assets and sales figures) both have a stronger reputation and a smaller need for quality signaling. We agree with their primary assumption, however, we do not agree with the assumption that larger companies are more likely to externalize their accounts receivable management. Indeed, in a previous study (Asselbergh, 1996) these size measures seemed to have a different impact on the supplier's DSO-rate. We interpreted this as if firms with larger total assets have more opportunities to take care of the responsibilities involved, indicating a potential of realizing economies of scale. As is put in H2, such economies of scale decrease the likelihood of outsourcing.

In order to get a better understanding of this effect the supplier's age is introduced as an additional yardstick. Older companies will indeed have enough experience in managing their client-relationships and will not be prepared to give up this stable environmental setting for some "new" adventure. This results in the following hypothesis:

H7′: Both older companies and companies with larger amounts of total assets will find it more comfortable to internalize their accounts receivable management.

3.3.6. *Conclusion*

The extension of trade credit can be advantageous to the supplier, in which there will be a need for flexibility in managing accounts receivable and a need for controlling the activities involved. Therefore, investments in accounts receivable become strategic assets and, following the transaction cost analytic approach as developed by Coase (1991) and Williamson (e.g., 1975), strategic parameters are to be controlled by the firm itself. Moreover, when the extension of trade credit becomes a strategic asset to the firm, the resulting need for flexibility will make it extremely difficult to prepare full contracts, which once again leads to internalization (e.g., Hart, 1991; Klein, 1991).

3.4. AGENCY PROBLEMS AND MONITORING COSTS

3.4.1. *Predictability of Sales and Cash*

In this section, we emphasize the predictability of the firm's cash flows and the uncertainty arising from seasonality in sales. In their search for the determinants of a firm's accounts receivable management policy, Mian and Smith (1992) and Smith and Schnucker (1994) find no empirical evidence supporting the seasonal sales effect.[2] This might, however, be due to the specification of the independent variable. Indeed, following the operating motive for the extension of trade credit, trade credit can be used to smooth product demand, reducing the supplier's inventory and/or production costs (e.g., Schiff and Lieber, 1974; Emery, 1984, 1987, 1988). Whenever such incentives exist, the extension of trade credit becomes a strategic asset and is therefore more likely to be controlled by the supplier. Therefore, we argue that only the unforeseen or unpredictable deviations in the customers' buying or payment behavior might entail a non-controllable risk, inducing the need for externalization. Since variability in the customers' buying behavior is reflected in variability in the supplier's sales figure, while variability in their respective payment behavior induces variability in the firm's cash-flows, we can say that:

H8: Suppliers facing unpredictable sales fluctuations are more likely to externalize the liquidity risks involved, and

H9: Suppliers facing unpredictable fluctuations in cashing the accounts receivable are more likely to externalize the liquidity risks involved.

3.4.2. *Possibility to Control the Customer's Payment Behavior*

The "small numbers" issue is strongly related to the frequency with which transactions occur. Indeed, the higher the transaction frequency the more opportunities the supplier gets to control the customer's payment behavior and the lower the risk of not being paid in time, since additional deliveries (or any kind of goodwill towards the client) can be refused as long as previous payments have not been received. Therefore, we assume that the customer's repeat order frequency influences the supplier's ability to enforce a specific payment behavior, reducing his moral hazard problem. This results in the hypothesis that:

H10: The higher the customers' repeat order frequency, the less attractive risk outsourcing becomes.

3.4.3. *Informational Asymmetry*

One of the important risk factors in extending trade credit is the risk of incurring bad debt losses. Indeed, buyers recognizing themselves as poor credit risks may be partly attracted to buy to avail themselves of a financing alternative. To reduce this risk both potential and existing account debtors have to be evaluated on their

creditworthiness. Whenever the supplier's sales representatives regularly visit the customers-borrowers, however, this information might occur as a by-product of selling, reducing both the costs and risks in extending trade credit. Therefore, we argue that:

H11: Suppliers whose sales representatives regularly visit their customers are less likely to outsource the risk in their accounts receivable management policy.

3.4.4. *Portfolio Spread*

To reduce the risk in extending trade credit, not only the credit risk of the potential account debtor must be assessed. Indeed, outstanding receivables have to be monitored and collected and their default-risk must be borne. Whenever this default risk is spread more evenly over a larger number of different customers, markets and/or products, the supplier's customer portfolio becomes more diversified. The more diversified the portfolio gets, the lower the importance of the specific risks added by accepting a new customer or credit line (Hay and Louri, 1989; Copeland and Khoury, 1980). We therefore assume that:

H12: Firms extending trade credit to a stronger diversified portfolio of customers are more likely to bear the trade credit risk.

Such risk diversification can, however, not be obtained by simply adding new products to the existing product portfolio. A proper risk spread can only be obtained when the products' contributions to the supplier's sales figures are evenly balanced.

Firms selling to a larger number of countries face an additional type of uncertainty induced by international differences in language, culture, customs, and currency. Therefore, we formulate an additional hypothesis, saying that:

H13: Firms in which the credit sales are made in a larger number of different countries are more likely to outsource their trade credit risks.

Figure 1 describes the expected relationships with the outsourcing decision. All variables, except the one related to the potential to realize economies of scale, are based on a transaction cost theoretic analysis. From this point of view, the extension of trade credit (and thus the investment in accounts receivable) can become a strategic asset. Indeed, the supplier will be able to use his accounts receivable management to 1) enlarge his own market share, 2) to reduce operating costs or 3) to build up a reputation. However, to add value, trade credit management not only has to be characterized by the circumstances as described above, the supplier must also be compliant in cashing receivables. All other things being equal, this compliance increases the average number of days' sales outstanding (DSO).[3] Therefore, all hypotheses must be measured in interaction with the DSO-rate.
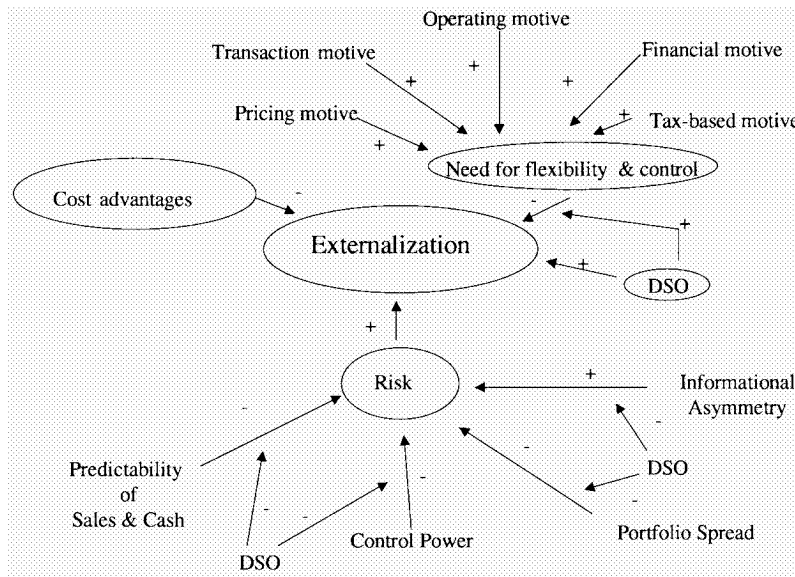
Figure 1.

From a risk-oriented point of view, the reasoning becomes somewhat different: larger investments in receivables indicate a higher degree of uncertainty. It is therefore reasonable to expect that the control parameters as discussed in 3.4. do reduce the risk, unless they are accompanied by high DSO-rates. Therefore, the impact of both the moral hazard issues and their interaction effects with the DSO-rate have to be studied.

High DSO-rates are thus a conditio sine qua non for the validity of the assumptions based on the administrative model, while they act as counterbalances in the case of the risk-oriented approach.

4. Sampling Procedure and Data

The units under study are companies that sell their goods on credit. However, secondary information sources, like the financial reports of European companies, do not reveal any information about the percentage of sales made on credit. Indeed, the total amount of trade debt is the only information publicly available with regard to this issue. This figure, however, cannot be used to identify firms selling on credit. First, its size strongly depends upon seasonal sales patterns, since the data are measured at a specific date. Next, these data can be strongly influenced by the decision to factor. Indeed, when the factor finances the accounts receivable on a non-recourse basis, accounts receivable are transferred into cash as soon as the factor settles his payments. Therefore, we have to rely on other information sources to identify the way in which firms structure their accounts receivable management.

The comparison of financial data on a European scale, however, creates another problem. Indeed, many efforts have been made to harmonize the formats of accounts, the disclosure and evaluation procedures on both a worldwide and European basis (the most famous organizations involved in this matter are the International Accounting Standards Committee (IASC) and the Commission of European Countries (EC)). A uniform accounting legislation for all European countries is, however, still missing (Nobes and Parker, 1994). Therefore, we were forced to restrict our empirical study to a sample of Belgian companies. Since even in Belgium factored companies cannot be identified on the basis of external information, we started with the customers of a factor. Belgium's largest factor (in terms of its number of customers) was prepared to provide us with the information needed and supplied us with the contract types, names, addresses and VAT-numbers of all its customers. All customers that have been contracted by the factor in the 1988–1996 period, and who still continue their factoring agreement, have been withheld for further analysis. This results in a sample of 475 factored companies.

This information not only had to be completed with the respective financial data, for each company using factoring we had to look for an equivalent or comparable company not using factoring (i.e. fully or partially internalizing its accounts receivable management). The sampling frame used for this purpose is the data set provided by the Belgian National Bank (BNB). This data set contains the financial statements of all companies depositing their financial statement at the "Balanscentrale"[4] and covers more than 70% of Belgian economic activity as measured by its GNP, thus providing comparable information on about 150,000 companies each year (Deloof and Jegers, 1996). However, of these 475 customers, only 381 deposit their financial statement with the Balanscentrale. This is not surprising since only large and medium-sized companies are required to deposit their financial statements at this institution, meaning that no reliable information exists about Belgium's smallest companies. Therefore, we limit our study to the sample of both large and medium-sized Belgian companies depositing their financial statements properly.

These data, however, must be treated with caution (Jegers and Buijink, 1987): we checked both their internal consistency and completeness by using a set of logical and arithmetical tests, proposed by the Belgian National Bank. After removal of the respondents with incomplete or inconsistent information, the sample size was reduced to 327 factored companies and as many equivalents.[5]

When adding the "equivalent" companies into the sample, we controlled four variables in order to minimize the impact of biases. Indeed, since Jegers and Buijink found that financial statement quality is only related to firm size, we minimize this bias by matching our observations on firm size (the firm's total assets measured at the year-end preceding the decision to factor). Moreover, as there is evidence which shows that accounts receivable management policies are determined by the industrial activity the firm is involved in (e.g., Smith and Schnucker, 1994), we complete the sample by adding companies which internalize their credit

Table I. Cross-tabulation of the respective partial outsourcing decision

	Administration externalized	Aministration internalized	Total
Risk externalized	38	18	56
Risk internalized	10	55	65
Total	48	73	121

management, paired on their industrial activity code (NACE code specified at the highest digit level possible[6]). At the same time, the observations had to match their financial statement type (since both the quality and extensiveness of information differs when companies are allowed to deposit their financial statements in an abbreviated form[7]). Finally, all matching criteria were measured at the year-end preceding the decision to factor or not to factor.

In the next step, we completed the information file with the data from a mailed questionnaire. Both Flemish and Walloon companies were included, meaning that the mailing was done in both official Belgian languages. The questionnaire was sent to 654 (2∗327) companies, of which 123 responded.[8] After testing the information quality, we found that in 74.8% of the cases, more than 90% of the requested information was obtained. The quality testing was based on some built-in internal consistency tests, the drawing of frequency tables and the calculation of average values and standard deviations for each measurement and variable under study. 65 respondents use factoring, while the other 58, the so-called "equivalents," internalize their receivables management.

Not all factored companies, however, externalize their credit administration and not all "equivalents" internalize this function. Rearranging the data set according to the corresponding functional responsibilities results in a set of 48 companies externalizing their credit administration and 73 companies internalizing it.[9] On the other hand, 56 companies externalize their credit-risk while 65 companies chose internalization. The obtained classifications differ significantly, however (χ^2 = 32.45; p = 0.000), as can be seen in Table I, while the effect of the matching criteria mentioned above pertains.

5. Variables and Their Measurement

5.1. THE DEPENDENT VARIABLE

In our first analysis, the dependent variable is the decision to use or not to use factoring. These values were known beforehand (by using the clients of a factor and pairing them with "equivalent" companies internalizing their credit management) and checked against the answers to 3 questions in the survey.[10] To be classified as

a factored company, the firm should externalize all or all but one of the responsi-bilities mentioned in describing the full-factoring agreement to a factor. In order to be classified as an equivalent company, all or all but one of these responsibilities had to be internalized.

5.2. THE INDEPENDENT VARIABLES

Table II summarizes the independent variables and describes the sign of the expected relationship with the decision to use factoring.

5.2.1. *The DSO-rate*

The number of days' sales outstanding (DSO) is based on the financial statements and relates the short-term accounts receivable to the average daily sales.

5.2.2. *The Economies of Scale Hypothesis*

The economies-of-scale hypothesis (H2) is measured by sales-made-on-credit-variable (CREDSALE), which is based on the surveyed information and estimated as the percentage of sales made on credit times the total sales figure as reported in the income statement.

5.3. VARIABLES MEASURING THE NEED FOR FLEXIBILITY AND CONTROL: THE INCENTIVES FOR TRADE CREDIT EXTENSION

Since it is highly unlikely that companies would openly admit that they use their credit terms as a tool for price discrimination, we preferred to look at the circum-stances acting as necessary conditions for this motive to hold. It is reasonable to assume that the use of trade credit as a pricing variable (H3) can only add value when the price of the goods sold is the supplier's most competitive weapon. This hypothesis is therefore measured by a surveyed variable quantifying the relative importance of different competitive attributes. More specifically, the respondents were asked to rank three different product characteristics in order of their relative importance. The characteristics to be ranked were 1) the price of the goods sold, 2) their quality and image and 3) the service after sales. The result is an interval scaled variable indicating the relative importance of the selling price (PRICE). The operating motive for the extension of trade credit (H4) assumes that trade credit can be used to smooth product demand. This was said to be extremely helpful when sales are seasonal. This seasonal variability (SEVAR) cannot be measured based on accounting data. Therefore, we asked the respondents to indicate the monthly deviations in their sales to the average monthly sales figure. Dividing the sum of these squared deviations by the number of months in which they occur, we obtain an indication of this seasonal variability. The effect of this variable is measured in interaction with the type of the goods sold represented by the percentage of

Table II. Independent variables and their expected effect on the outsourcing decision. The figures in column 1 refer to the respective hypotheses formulated above. For each variable identified in column 2 the full description is given in column 3. Column 4 indicates how these variables are measured, while column 5 refers to the data source used. In column 6 the respective expected effects on the outsourcing decision are described where + signifies an increased probability of outsourcing and − signifies a decreased probability. All but the two first hypotheses are measured in interaction with the DSO-rate; all hypotheses related to the moral hazard problem (H8–H13) are measured as both single and interacted variables

(1) Hypothesis	(2) Variable	(3) Description	(4) Measured by	(5) Source	(6) Expected sign
H1	DSO	Number of days sales' outstanding	(Accounts receivable/sales)∗365	Fin. statements	+
H2	CREDSALE	Economies-of-scale variable	The supplier's total annual credit sales	Survey	−
H3	PRICE∗DSO	Pricing motive	The relative importance of price in the marketing-mix	Survey	−
H4	SEVAR∗GOODS	Operating motive	Average monthly sales deviations∗% of semi-finished products	Survey	−
H5	LIQUID∗DSO	Financing motive	(Cash at bank and in hand + short term investments)/tot. assets	Fin. statements	−
H6	TAX∗DSO	Tax-based motive	Taxes paid during the last 3 years preceding the date of contracting over profits and losses accumulated in the same period	Fin. statements	−
H7	REPUTATION	Reputation of the suppler measured by:			
		SIZEASS∗DSO: The supplier's total assets minus accounts receivable		Fin. statements	−
		SIZESAL∗DSO: The supplier's annual sales figures		Fin. statements	+
		AGE∗DSO: Age of the supplier		Survey	−
		STLIAB∗DSO: The supplier's unsecured short-term financing as a% of total assets		Fin. statementes	+
		DPO∗DSO: The supplier's financing from accounts payable: (accounts payable/purchases)∗365		Fin. statements	+
H8	SALEFREQ (∗DSO)	Frequency of sales budgeting	Interval scaled variable measuring the suppliers frequency of sales budgeting (never, < once in a month, monthly, > once in a month)	Survey	− (+)
H9	CASHFREQ (∗DSO)	Frequency of cash budgeting	Interval scaled variable measuring the suppliers frequency of cash budgeting (never, < once in a month, monthly, > once in a month)	Survey	− (+)
H10	FREQ (∗DSO)	Repeat order frequency	Percentage of customers ordering at least once in 3 months	Survey	− (+)
H11	SALESFOR (∗DSO)	Sales force intensity	Number of FTE employed sales rep's per 1,000 customers	Survey	− (+)
H12	PORTFOLIO	DIVERSP1 (∗DSO): Degree of product diversification (Number of different products sold)		Survey	+ (−)
		DIVERSP2 (∗DSO): Degree of product diversification (Dispersion in the products sold's contributions to the supplier's sales figure, quantified by the entropy measure chaos)		Survey	− (+)
		CREDPERC(∗DSO): Percentage of customers buying on credit		Survey	+ (−)
		CUSTNR (∗DSO): Number of different customers buying on credit		Survey	− (+)
H13	DIVERSGE (∗DSO)	Degree of geographical diversification	Number of countries in which the goods are sold	Survey	+ (−)

semi-finished products sold by the supplier (GOODS). The supplier's liquidity (LIQUID) is measured as in Long et al. (1993) as the total amount of cash in the bank and on hand plus the company's short-term investments. To avoid measuring firm size instead of liquidity, this figure is divided by the supplier's total assets figure. To measure the impact of the tax-based motive, we assume the existence of different tax-rates, as is the case in Belgium. Indeed, in Belgium taxable income[11] is subject to tax at a constant rate of 39% unless taxable income is lower than BEF 13 million. In that case, tax rates can be reduced progressively for small and medium-sized non-financial companies. The supplier's tax rate (TAX) is then calculated as a 3-year average: the total amount of taxes paid during the last three years preceding the date of contracting, over the profits and losses accumu- lated over the same period. Finally, the hypothesis concerning quality signaling is translated into 5 different measures. In their study, Long et al. (1993) assume that established suppliers are generally larger than their less established compet- itors, which is quantified by two measures of firm size: SIZEASS and SIZESAL. SIZEASS is measured as in Smith and Schnucker (1994) as the firm's total assets minus its accounts receivable, while SIZESAL simply measures the supplier's sales figure at the end of the year preceding the date of contracting (both expressed in 1,000 BEF).[12] Although both measures have been withheld here, we expect the firm's asset size to have a negative impact on the outsourcing decision. Next, we introduce the age of the supplier (AGE) as an additional yardstick. In addition, Long et al. (1993) assume that the more established companies are more likely to have a high level of unsecured short-term financing. This level is then measured by the total amount of unsecured short-term liabilities outstanding over total assets (STLIAB). We further extend this reasoning based on the structure of these short- term liabilities. Indeed, we assume that the more established companies are more likely to get additional bank financing. The less creditworthy companies, on the contrary, will be forced to rely on their suppliers. Therefore, we introduce the DPO variable to measure the average number of days' payables outstanding (accounts payable over purchases). Note, however, that these hypotheses all assume that the supplier invests large amounts in trade credit, meaning that the actual interaction effects with the DSO-figure are to be considered.

5.4. Variables measuring agency problems and monitoring costs

SALEFREQ (H8) and CASHFREQ (H9) respectively measure the frequency of sales- and cash-budgeting. The respondent was asked to fill in whether the company budgeted these figures 1) never, 2) less than once a month, 3) on a monthly basis, or 4) more than once a month. A higher budgeting frequency is then supposed to reduce uncertainty unless it results in uncontrolled payment behavior (as measured by a high DSO-rate).

The potential to influence the customers' payment behavior is measured by their repeat order frequency. It is quantified as an interval-scaled variable indicating

Table III. One-sided Spearman rank-correlation for the different measures of sales force. All correlations are highly significant ($p = 0.000$)

	Employed rep's	Employed in FTE	Employed + self-employed rep's*	Employed + self-employed sales representatives (regardless of their reponsibility
Employed rep's	1.000			
Employed rep's (FTE)	0.961	1.000		
Employed + self-employed rep's*	0.782	0.735	1.000	
Employed + self-employed sales representatives (regardless of their responsibility)	0.623	0.554	0.825	1.000

* If made responsible for the customers' payment behavior.

the percentage of customers ordering within a specified time-interval. Since we introduced the frequency-variable to measure the controllability of the customers' payment behavior, its interpretation is related to the DSO-value. The average DSO being 78 days, a repeat order frequency higher than once in three months enables the supplier to refuse additional deliveries as long as previous payments have not been received. Therefore, FREQ measures the percentage of customers ordering at least once in three months.

The intensity of the supplier's sales force (SALESFOR) is measured as the total number of sales representatives employed per 1,000 customers, assuming that a higher number of sales representatives strengthens the relationship with the customer-base. Stronger networks of sales representatives are thus said to decrease the need for risk outsourcing. However, when these networks do not succeed in influencing the customers' payment behavior (measured by the interaction effect with DSO) the preference for outsourcing remains. The number of sales representatives was measured in three different ways, depending upon 1) the type of employment contract (employee versus self-employed), 2) the way in which the sales force is encouraged to control the customers' payment behavior (measured by the existence of appropriate penalties or bonuses) and 3) their exclusive availability for the supplier (expressed by their time spent at the company measured in full-time equivalents (FTE)). As can be seen in Table III, the "absolute number of employed representatives per 1,000 customers" and the same figure expressed in Full-Time Equivalents (FTE) are strongly positively correlated (r = 0.961). The same is true for the two measures including the self-employed representatives as well (r = 0.825): accountability of self-employed representatives doesn't make a big difference. However, when the contract type (employed versus self-employed) becomes the differentiating factor, correlation becomes much smaller. Since controllability is the main issue in this study, the number of FTE-sales representatives with an employment contract per 1,000 customers are withheld for further analysis.

The degree of diversification is measured in three different ways. Both DIVERSP1 and DIVERSP2 measure the degree of product diversification. DIVERSP1 simply measures the number of goods sold while DIVERSP2 measures how different products contribute to the company's sales figure. Indeed, the firm's level of diversification is not simply determined by the number of different products sold. The opposite is true: a higher number of different products sold might induce additional uncertainties that can only be counterbalanced by 1) a proper risk spread in the customers' payment behavior (as measured by the interaction effect with the DSO-rate) and 2) when product portfolios become more properly balanced. This portfolio spread can be quantified by the entropy measure of chaos (H) as introduced by Shannon (1963):

$$H = - \sum_{i=1}^{n} p_i \log_2 p_i$$

with   n   =   number of products sold

        p_i =   percentage of sales of product i

That way, both the number of products sold and the dispersion in their contribution to the company's sales figure determine the degree of diversification. The higher H, the higher the degree of product diversification, due to both a larger number of different products sold and a more proper portfolio spread. The percentage of customers buying on credit variable (CREDPERC) is based on the surveyed information. A high percentage of credit users is supposed to increase the supplier's risk, since when most sales are on credit, these liquidity risks can not be counterbalanced by a high percentage of prompt payers. However, when these credit sales are spread over a larger number of different customers, the risk becomes more properly spread, reducing the probability of outsourcing. Therefore, the total number of different customers using the trade credit offered is measured as well (CUSTNR) (Petersen and Rajan, 1995).

In addition, geographical diversification (DIVERSG) simply measures the number of different countries in which the goods are sold (including the domestic market).

6. Empirical Analysis Results

Since most of the variables under study are measured in interaction with other variables, no univariate data analysis is performed. Moreover, since we are estimating the relationship between a binary dependent variable and a set of continuous independent variables, a logistic regression analysis technique is used. The parameters of the model are estimated by an iterative log-likelihood procedure. The criteria used in evaluating the model are the following:
 1. the number of cases classified correctly expressed as a percentage;

2. the goodness-of-fit statistic of the model;
3. the probability of the model, or the probability of obtaining the observed classi-
   fication, given the parameters of the model, measured by its -2 log likelihood.
   The lower this value, the higher the accuracy of the model.

6.1. AN INTEGRATED MODEL EXPLAINING THE DECISION TO FACTOR

At first, the full or integrated model is used to explain the factoring decision.
However, due to missing values, the number of observations in the sample
decreases each time a new variable is added to the analysis. Given the large number
of variables to be tested in the integrated approach, we were forced to use a step-
wise procedure. We first measure the validity of each hypothesis in explaining the
make-or-buy decision, before we decide on integrating them into the final model.
The respective partial results are given in Table IV.

Next, only the hypotheses that have explanatory power in the partial analysis
procedure have been withheld for further analysis. The financial, tax-based and
operating motive do not seem to have any explanatory power: their logistic regres-
sion coefficients are not significant and all three models result in classifications
that significantly differ from those observed in the sample. The same is true for the
hypotheses referring to the predictability of sales and cash, the existence of infor-
mation asymmetry and the potential to control the customers' payment behavior.
The pricing motive, however, does have predictive power. Indeed, we find that
suppliers who consider their price as their most important competitive weapon, are
more likely to internalize their accounts receivable management ($b = -0.001$; $p <
0.05$). Next, it is worthwhile to mention that we have evidence for our additional,
but aberrant, quantification of the transaction motive: older companies are less
likely to externalize their accounts receivable management to a factor. Thus, we
find empirical evidence for our assumption that older companies do have alterna-
tive incentives to internalize their accounts receivable management and that these
incentives have a stronger impact than the one suggested by the transaction motive.
The economies of scale hypothesis has to be rejected: firms in which a larger
amount of sales is made on credit are more likely to externalize their accounts
receivable management ($b = 0.0706$; $p < 0.05$). Finally, from the risk-oriented
point of view, only one hypothesis gets empirical support. We find that when the
percentage of customers using trade credit is high, the company is more likely to
use factoring ($b = 0.0767$; $p < 0.05$), while the interaction effect of this variable
with the DSO-rate is significantly negative ($b = -0.0010$; $p < 0.05$).

Combining these elements into an "integrated model", as reported in Table
V, confirms our partial findings. The effects of the DSO-rate, the transaction
motive, the age variable and the percentage of credit users are fully consistent
with the partial analysis results reported in Table IV. 75% of the observations are
classified correctly and our model explains 33% of the variation in the observa-
tions (as measured by Cox and Snell determination coefficient R^2). The question

Table IV. Multivariate statistics: Separate logistic regression results for each of the hypotheses used to explain the decision to use or not to use factoring. Column 1 describes the independent variables. Only those hypotheses that have explanatory power have been withheld in the table (columns 2 to 5). The dependent variable is whether or not a firm decides to factor its accounts receivable. All independent variables refer to the supplier and are measured at the yeaer-end preceding the decision to use or not to use factoring

(1) Variable	(2) Pricing motive	(3) Transaction motive	(4) Economics of scale	(5) Portfolio spread
Constant	−0.7230*	−0.8175	−6.7097**	−6.1697*
DSO	0.0170***	0.0169*	0.0958**	0.0914**
Pricing motive				
PRICE∗DSO	−0.001**			
Transaction motive				
STLIAB∗DSO		0.0143		
DPO∗DSO		-5.3×10^{-5}		
SIZESAL∗DSO		3.09×10^{-8}		
SIZEASS∗DSO		-1.0×10^{-7}		
AGE∗DSO		−0.0003**		
Economies of scale				
CREDSALE			0.0706**	
Portfolio spread				
DIVERSP1				0.1702
DIVERSP1∗DSO				−0.0010
DIVERSP2				−1.5218
DIVERSP2∗DSO				0.0113
DIVERSGE				−0.0161
DIVERSGE∗DSO				0.0003
CUSTNR				1.53×10^{-7}
CUSTNR∗DSO				2.12×10^{-8}
CREDPERC				0.0767**
CREDPERC∗DSO				−0.0010**
% correct classification	62.26	70.83	61.00	66.29
χ^2	6.511**	12.603**	15.365***	19.456*
Goodness of fit	109.123	75.401	93.520	81.092
−2 log likelihood	140.286	86.710	123.224	103.373
Number of observations	105	72	100	89

*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

Table V. Multivariate statistics: Logistic regression results for the combined significant hypotheses used to explain the decision to use or not to use factoring. The dependent variable is whether or not a firm decides to factor its accounts receivable. All independent variables refer to the supplier and are measured at the year-end preceding the decision to use or not to use factoring

Variable	Factoring
Constant	−6.7198**
DSO	0.1198**
Pricing motive	
PRICE*DSO	−0.0144**
Transaction motive	
AGE*DSO	−0.0005**
Economies of scale	
CREDSALE	-1.6×10^{-6}
Portfolio spread	
CREDPERC	0.822**
CREDPERC*DSO	−0.0011**
% correct classification	75.27
χ^2	33.585***
Goodness of fit	85.259
−2 log likelihood	95.329
Number of observations	93

*** Indicates statistical significance at the 0.01 level.
** Indicates statistical significance at the 0.05 level.
* Indicates statistical significance at the 0.10 level.

now is whether these findings can be made more conclusive by redefining the outsourcing decision. Indeed, such improvements are quite likely to occur since the decision to use factoring actually is a combined decision. Therefore, we redefine the outsourcing decision as managing the administrative burden or the assumption of risk, and regress both decisions on the respective conceptual models.

6.2. THE DECISION TO OUTSOURCE REDEFINED: COLLECTING AND MONITORING ACCOUNTS RECEIVABLE

In this part of the analysis, the dependent variable is the decision whether or not to internalize the process of monitoring and collecting the accounts receivable. These values are measured by a surveyed dummy variable equaling 1 for a company that outsources its credit administration. The equivalent companies are those that

Table VI. Multivariate statistics: Logistic regression results for the set of strategic hypotheses used to explain the decision to outsource or not to outsource the administration of accounts receivable. Column 1 summarizes the independent variables. In column 2, the dependent variable is whether or not a firm decides to outscore its accounts receivable administration and collection process. Columns 3 and 4 give the results of using this strategic model in explaining the decision whether or not to outsource trade credit risk management and the decision whether or not to use factoring. All independent variables refer to the supplier and are measured at the year-end preceding the decision to outsource or not to outsource

(1) Variable	(2) Administration	(3) Risk	(4) Factor
Constant	-1.3196^*	-0.1698	-0.8168
DSO	-0.0206	-0.0135	-0.0119
Pricing motive			
PRICE*DSO	-0.001^*	-9.9×10^{-5}	-0.0002^*
Transaction motive			
STLIAB*DSO	0.1525^{**}	0.0202	0.0472
DPO*DSO	-3.1×10^{-5}	0.0002	0.0002
SIZESAL*DSO	$1.82 \times 10^{-7**}$	5.05×10^{-8}	1.74×10^{-8}
SIZEASS*DSO	$-8.0 \times 10^{-7**}$	-8.8×10^{-8}	-1.8×10^{-7}
AGE*DSO	-0.0004	-0.0002	-0.0004^{**}
Economies of scale			
CREDSALE	1.4306	1.4707	2.3106
% correct classification	80.00	62.86	70.00
χ^2	33.780^{***}	14.460^*	26.418^{***}
Goodness of fit	59.170	63.831	73.103
-2 log likelihood	54.863	81.580	70.394
Number of observations	70	70	70

*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

internalize their credit administration process. Only the variables measuring the strategic advantage of extending trade credit have been withheld for explanatory purposes and are as described in section 5.3. The number of explanatory variables becomes much smaller than in the case of the integrated model. Therefore, partial analysis procedures are not needed and the full strategic model can be measured at once. Table VI describes the logistic regression results.

The predictive power of the model increases: 80.00% of the cases have been classified correctly and the Cox and Snell determination coefficient amounts to 39%. According to this model, suppliers who have a strategic advantage in extending trade credit due to the existence of a pricing or transaction motive, are

less likely to outsource their trade credit administration. The pure financial explanation of trade credit (the DSO-rate) not only looses its significance, its sign is not consistent with our theoretical assumption. Strategic parameters thus become the real determinants of the outsourcing decision, rather than the financial needs incurred. The effect of the pricing motive is clear and consistent with our assumption: suppliers who consider their price as the most important strategic parameter are less likely to outsource flexibility in managing accounts receivable. The same is true for larger companies (measured by assets), confirming our assumption that the supplier's sales figures and his total assets cannot simply be used as equivalent measures of firm size. Indeed, we agree with the assumption that both older and larger companies have a stronger reputation and would therefore have a smaller need for quality signaling. We didn't agree, however, with the assumption that they would be more likely to outsource their accounts receivable management (see hypothesis H7'). Indeed, only the sales variable supports the size-related measurement of the transaction motive. Next, we assumed that suppliers with a large amount of unsecured short-term financing were thought to be more reliable by their creditors and interpreted this as a side effect of their strong reputation. Such established companies were not expected to have a need for quality signaling and would therefore be more likely to outsource their credit administration which is confirmed by our analysis results ($b_{STLIAB*DSO} = 0.1525$, $p < 0.05$). Both age and DPO have the expected sign but are not significant.

When adopting the model to explain the decision whether or not to externalize the supplier's risk in extending trade credit, it loses a lot of its power: only 62.86% of the cases are classified correctly and none of the variables are significant. The results of the model suggest that the factoring decision is, as we expected, in between the results of the two extreme outsourcing decisions: 70.00% of the observations are classified correctly and two variables remain significant ($b_{PRICING,DSO} = -0.0002$, $p < 0.10$; $b_{AGE*DSO} = -0.0004$; $p < 0.05$). In all three outsourcing decisions the economies of scale hypothesis is once again not consistent with our assumptions. In these regressions, however, the contradictory findings are not significant.

6.3. OUTSOURCING THE ASSUMPTION OF TRADE CREDIT RISK

In the next step, the decision to outsource the firm's trade credit risk is examined. Once again, these values are measured by a dummy variable equaling 1 for a company that outsources its credit risk assumption. The equivalent observations are those companies that internalize their trade credit risk assumption. 83.08% of the observations are classified correctly and the Cox and Snell determination coefficient amounts to 45%. The first column in Table VII describes the variables included in the analysis. The DSO-rate changes sign and becomes consistent with our pure financial theory. However, its effect is not significant. Sales predictability (measured by SALEFREQ as well as its interaction with DSO) is significant and

consistent with our theory. Predictability of cash, informational asymmetry and control parameters are not significant, although their respective signs do confirm our assumptions. The variables related to the resulting portfolio risk have the highest predictive value: companies producing and selling a large number of different products are more likely to outsource their trade credit risk (DIVERSP1), unless this results in a low DSO-rate. Moreover, when this large number of products results in a more properly balanced product portfolio (as measured by DIVERSP2), the need for outsourcing this risk decreases. Next, firms in which a large percentage of customers delays its payments (measured by CREDPERC) are more likely to outsource their trade credit risk, unless this results in a low DSO-figure (measured by its interaction with the number of days sales' outstanding). The opposite is true for the absolute number of customers using the trade credit offered. This may mean that a large number of different credit-takers (CUSTNR) results in a spontaneous risk-spread, since the amounts due are spread over a larger number of customers/sales. When, however, DSO-rates are high, this means that most of these customers are late payers, meaning that the positive spread effect is lost (as measured by the respective interaction-effect). Then again, this effect is consistent with the percentage effect of credit-users: when all customers delay their payments, risk is not necessarily diversified since the trade credit risk is not balanced by a number of prompt payers, unless these credits are spread over large number of customers. Moreover, little experience can be gained when the company's credit-worthiness evaluation and monitoring efforts are spread over a large number of different customers.

When applying the same model to explain the decision whether or not to outsource the firm's trade credit administration, the model looses all its predictive power. The obtained classification does not significantly differ from the random classification (as measured by χ^2) and only one variable has predictive power. Indeed, only the variable measuring the percentage of customers using trade credit and its respective interaction effect with the average number of days sales' outstanding are significant. The results of regressing the model on the factoring decision lie somewhere in between: 75.38% of the observations are classified correctly and the χ^2-value becomes slightly significant (p < 0.10). Once again, the percentage of customers using trade credit generates the same significant effect, confirming the results described in Tables IV and V.

6.4. SUMMARIZING CONCLUSIONS

Based on our previous search for a better understanding of a firm's accounts receivable management, we attempted to improve our knowledge by redefining the subcontracting decision. More specifically, next to the factoring contract, some alternative governance structures are assessed in terms of their capacities to economize on transaction costs. Therefore, we clearly isolated the decision to subcontract the administration process from the decision to subcontract the

Table VII. Multivariate statistics: Logistic regression results for the set of risk-related hypotheses used to explain the decision to outsource or not to outsource the management of trade credit risk. Column 1 describes the independent variable. In column 2, the dependent variable is whether or not a firm decides to outsource its trade credit risk management. Columns 3 and 4 give the results of using this risk model in explaining the decision whether or not to outsource the firm's accounts receivable administration and collection process and the decision whether or not to use factoring. All independent variables refer to the supplier and are measured at the yeare-end preceding the decision to outsource or not to outsource

(1) Variable	Regression coefficients		
	(2) Risk	(3) Administration	(4) Factor
Constant	−1.696	−10.591*	−8.638
DSO	0.019	0.129	0.123
Predictability of sales and cash			
SALEFREQ	−4.376**	−2.204	−2.733*
SALEFREQ∗DOS	0.037**	0.025	0.031*
CASHFREQ	−1642	−1537	−5.809
CASHFREQ∗DOS	22.174	20.747	0.093
Informational			
SALESFOR	−0.089	0.086	0.010
Assymetry SALESFOR∗DOS	0.001	−0.001	0.001
Control			
FREQ	−0.025	−0.027	−0.029
FREQ∗DOS	0.001	0.001	0.001
Portfolio spread			
DIVERSP1	1.589**	0.752	0.145
DIVERSP1∗DSO	−0.012	−0.007	−0.002
DIVERSP2	−4.699**	−2.265	−1.129
DIVERSP2∗DSO	0.021	0.0017	0.006
DIVERSGE	−0.023	0.019	−0.003
DIVERSGE∗DSO	0.0010	0.001	0.001
CREDPERC	0.091***	0.137*	0.155**
CREDPERC∗DSO	−0.010**	−0.002*	−0.002*
CUSTNR	−0.001**	-2.7×10^{-5}	-4.4×10^{-5}
CUSTNR∗DSO	1.44×10^{-6}	3.09×10^{-7}	5.44×10^{-7}
% correct classification	83.08	66.15 7 75.38	
χ^2	38.145***	22.239	28.301*
Goodness of fit	52.306	66.000	61.669
−2 log likelihood	51.286	56.721	56.457
Number of observations	65	65	65

*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

risks incurred in managing accounts receivable and develop alternative conceptual models to describe the underlying decision processes. As we expected, the best and most conclusive results have been obtained when the outsourcing decision becomes more specialized. Indeed, the strategic approach explains the decision to externalize the credit administration process while it has no predictive power in managing trade credit risk. On the other hand, most factors inducing risk and uncertainty can only be used in explaining the decision to assume or not to assume the firm's trade credit risk. Both traditional explanatory variables like the supplier's DSO-rate and the economies of scale hypothesis find no support. The DSO-rate is consistent with the financial theory in explaining the factoring decision but looses its significance as soon as more specific, strategic or risk-oriented explanatory variables are introduced in the model. Moreover, its sign changes in testing the strategic model implying that accounts receivable become a strategic asset rather than a financial burden. Next, the economies of scale hypothesis has to be rejected in studying the factoring decision (firms with higher credit sales are more likely to factor) and the variable looses its significance as soon as other explanatory variables are introduced. Even in studying the decision to outsource a firm's credit administration the variable has no significant effect.

From the strategic point of view, two motives for the extension of trade credit do find empirical evidence. The pricing motive explains both the decision to factor accounts receivable and the decision to outsource the firm's trade credit administration process. On the contrary, it is not significant in explaining the outsourcing of risk. Thus, we find evidence that suppliers who use trade credit as a pricing variable will not outsource their control in managing outstanding receivables. The second motive that finds empirical support is the transaction motive: not all measurements are significant in explaining the decision to outsource a firm's credit administration process, but those that are significant do have the expected sign and thus confirm our theoretical assumptions. That way we can say that the better established companies, characterized by large amounts of unsecured short-term debt financing and high sales do not need to extend trade credit as an alternative quality signal. Older companies and those with larger asset structures, however, feel more comfortable in internalizing this managerial issue.

From the risk-oriented point of view, both the hypotheses with regard to sales budgeting and portfolio spread get empirical support. Indeed, sales budgeting is found to relieve uncertainty, unless these sales create too long credit periods. The same can be said about evenly balanced product and customer portfolios. Larger spreads diversify risk and increase the viability of internal risk assumption, unless this spread doesn't generate the positive effect on the supplier's DSO-rate.

7. Conclusion

Vendors who decide to sell on credit find themselves faced with three additional managerial issues. Among these, the financial burden created by delaying payments

has received far more attention. Our empirical results, however, prove that organizing accounts receivable management is actually driven by two different factors. First, the strategic value of accounts receivable management merits more careful attention. Indeed, both pricing and transaction motives seem to be valuable reasons to extend longer credit terms, although no evidence is found for the operating, finance and tax-based motives. Second, an efficient design of both planning and portfolio structuring might relieve the moral hazard created by extending trade credit. Thus, the efficiency of accounts receivable management cannot be judged by relying solely on the traditional DSO-rate anymore.

Notes

[1] All the credit management functions involved in extending trade credit (financing the accounts receivable, bearing the credit risk, monitoring the buyer's financial health, administration and collection of the accounts receivable) can be performed by the seller or can be contracted entirely or partly to a third party. Such third parties are e.g. credit-reporting firms, captive finance subsidiaries, collection agencies and factors. Typically, a factor performs all the activities involved, whereas in the other cases, the seller still integrates into some of the trade credit functions (Smith and Schnucker, 1994).

[2] Mian and Smith (1992) examine the choice among alternative accounts receivable management policies as a function of variations in costs and revenues. Smith and Schnucker (1994) search for the determinants of vertical integration, as measured by the factoring decision, based on a transaction cost approach.

[3] Although this causes the financial needs to increase, externalization is not likely to occur, as would be expected from a pure financial point of view.

[4] A branch of the Belgian National Bank.

[5] We checked the 87 items from the full financial statements on the 167 logical control relationships including these items and deleted data and observations wherever needed. For the companies depositing their financial statements in an abbreviated form, 39 items are checked on 62 equations (the complete set of tests may be obtained from the author). Unfortunately, unrealistic but formally correct information cannot be discovered this way. We therefore deleted the financial statements showing zero total assets and sales figures (9 observations).

[6] The NACE code refers to the industrial classification taxonomy used in the European Union and can be compared to the well-known SIC classification system.

[7] Although financial statement type is correlated with firm size, the adoption of this additional matching criterium guarantees the use of comparable information.

[8] We lost the information from two respondents, since one of the "equivalent" companies returning the questionnaire, turned out to use factoring (although this was checked during the telephone call). Therefore, we deleted both these factored and "equivalent" observation units.

[9] Two observations are lost since two companies did not succeed in describing the comprehensiveness of their contract.

[10] The exact definitions of the variables and the questionnaire are available from the author upon request.

[11] In Belgium, the generally accepted accounting principles are the basic principles of accounting for taxation. Nevertheless, taxable income is different from accounting profit as a result of various adjustments and deductions required by law (Lefebvre and Flower, 1994).

[12] One US dollar was about 30 Belgian Francs (BEF) in August 1996.

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