

# **An Investigation into the Determinants of Trade Credit Use by French Small and Medium Enterprises**

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## **Abstract**

The aim of this paper is to analyse the role of trade credit in the financing of French small and medium-sized enterprises (SMEs) using specific data collected in a recent survey on small firms. We provide direct evidence that inter-firm credit offered by SMEs is sensitive to the strategic importance of firm size and position. Using existing theories, we also test a supply function and a model of demand for trade credit. On the one hand, results validate supply-side theories relative to a reduction of asymmetric information between the buyer and the seller. On the other hand, econometric exercises show that both a transaction motive, linked to efficient cash management, and a financing motive are significant determinant of trade credit demand. According the financing motive, trade credit is specifically used for the purpose of short-term financing by firms exposed to information asymmetries and bank credit rationing.

## **Résumé**

Dans cette contribution, nous examinons le rôle du crédit interentreprises dans le financement des PME françaises à l'aide d'une base de données construite spécifiquement à partir d'une enquête réalisée auprès de chefs d'entreprise. L'analyse des comportements, en matière de gestion des créances clients, souligne l'importance stratégique de la taille et de la position des entreprises dans le financement des ventes. En référence aux théories existantes, nous testons également une fonction d'offre et un modèle de demande de crédit interentreprises. D'une part, les résultats valident les motifs d'offre liés à une réduction des asymétries d'information entre les contractants. D'autre part, ils confirment l'existence d'une composante transactionnelle, liée à une gestion efficace de la trésorerie, et d'une composante financière de la demande de crédit interentreprises. Selon cette dernière, le crédit fournisseur est utilisé prioritairement à des fins de financement du cycle d'exploitation par les entreprises les plus exposées aux asymétries d'information et au rationnement du crédit bancaire.

*JEL Classification* : G30 ; G32

*Keywords* : Trade credit ; Small and medium-sized enterprises ; Credit rationing ; Asymmetric information ; France

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## **1. Introduction**

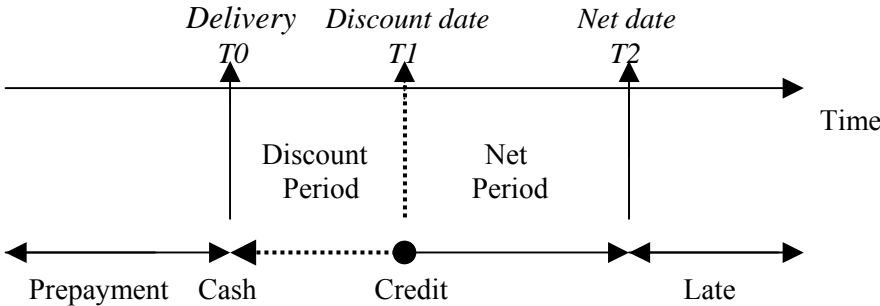
Trade credit is an important source of short-term finance for firms in several countries and especially in Europe. Dietsch [1998] reports that the amount of trade debts is directly comparable to the total of bank short-term financing for the French corporate sector. However, payment terms involved by trade credit constitute a specific source of concern because of financial consequences for the firm's health, particularly for smaller ones. According to estimates, in Europe, late payments are at the origin of one insolvency case on four. The recent reduction of payment terms observed in France has mainly consolidated the benefit position of larger firms, to the detriment of small and medium-sized enterprises for which high exposition to asymmetric information is a major obstacle to find external financing. Acting to limit these adverse effects runs up against a lack of information on the nature and practices of trade credit. In this contribution, we use specific data collected in a recent survey to provide evidence on trade credit practices for a panel of French small businesses observed in 2002. This detailed data set allows a descriptive analysis of quantitative and qualitative aspects of firms' accounts receivable management. To check the validity of different theoretical explanations justifying the use of trade credit, we also test a supply function and a simple partial equilibrium model of trade credit demand. With regards to supply, we examine how the level of accounts receivable depends on characteristics reflecting theoretical motives for offering trade credit. With regard to demand, we estimate a model including a transaction motive, associated to an objective of efficient cash management, and a financing motive based on the predominance of credit rationing and information asymmetries to account for trade credit use.

The remainder of the paper is structured as follows. In section II, we discuss the nature and practices of trade credit in Europe and particularly in France. Section III presents theoretical explanations for trade credit. In section IV, we describe the data. A statistical analysis of data is carried out in section V. Section VI examines the determinants of trade credit offered and received by firms.

## 2. Trade credit practices

The mechanism of trade credit, linked to a temporal gap between delivery and payment of a product (or a service), is an important and relatively specific form of financing. It represents an account receivable (for the seller) and an account payable (for the buyer) of very low maturity and specific nature since it is relative to transactional and not purely financial considerations. Trade credit terms are not legally fixed<sup>1</sup> but fluctuate according to industry practice and bargaining power of contractors. Trade credit is multifaceted and for the buyer its form determines financial costs associated to that financing. Various trade credit arrangements are illustrated below.

**Figure 1**  
**Trade credit configurations**



In the case of payment before delivery, the seller benefits from a credit granted by the purchaser for the duration which separates that advance from delivery. In the case of cash payment on delivery and without any reduction of the selling price, there is no credit. For payment after delivery, the seller extends a credit to the buyer for a period freely fixed by both contractors. In practice, two scenarios are possible. In the case of a transaction without discount, at net terms, full payment is due at net date (T2) and the credit extended corresponds to the period between T0 and T2 (generally 30 days End Of Month, i.e. thirty days from the next month end). In the case of terms including a mechanism of discount with two-part terms<sup>2</sup>, i.e. a reduction of the selling price for a fast or immediate payment, the buyer's attitude to payment determines the cost of credit. In case of payment during the discount period (between T0 and T1), the buyer obtains a price discount and trade credit is free. Conversely, if payment is made after this date, during the net period (between T1 and T2),

<sup>1</sup> Except in the case of statutory payment terms like for perishable goods.

<sup>2</sup> An example of two-part terms is "1/10 net 30", meaning the buyer obtain a 1% discount by paying within 10 days otherwise the full payment is required in 30 days after the delivery.

full price is due and the buyer undergoes a financial cost<sup>3</sup> linked to the opportunity cost of foregoing the discount. Only trade credit with two-part terms is, in case of renunciation, source of high financial cost for the buyer. Late payment defines any payment intervening, with or without discount, after the net date (T2). Predominantly, mechanisms of discount include in France a reduction from 0.5 to 5% of the selling price for an immediate<sup>4</sup> or fast payment, generally within 10 days. Table 1 presents the interest cost of foregoing the discount period for these different values of discount rate according to a net period fixed at 30 days.

TABLE 1

On his part the buyer undergoes management costs of trade credit. He assumes, like a financial intermediary, specific financial functions (credit risk assessment and bearing, collecting and financing of receivables). This exercise involves important risks<sup>5</sup>, particularly in France (Dietsch [1990]), but can be externalized<sup>6</sup>. Because of asymmetric information and size effects, that management cost is higher for smaller firms. Table 2 presents estimates of that cost, as a percentage of turnover, for different European countries.

TABLE 2

Trade credit practices and common payment terms vary appreciably according to financial systems [table 3]. In Europe<sup>7</sup>, one traditionally opposes, according to their payment practices, northern and southern economies of the continent. Thus, Scandinavian countries, the Netherlands, the United Kingdom and Germany are countries where payment terms are traditionally the shortest. Conversely, Belgium, France, Spain, Portugal and Italy report the longest. These differences can be explained by financial but also institutional considerations (Marotta [2000]). Financially speaking, widespread practice of discount with two-part terms, in Germany for example, is a factor of negative influence over the terms of payment as well as the systematic application of pecuniary penalties for late payments. Institutionally speaking, efficiency of legal systems relative to the protection of creditor's claims and the degree of application of specific commercial laws, as the reservation-of-ownership have an impact, even partial, on payment habits.

TABLE 3

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<sup>3</sup> The implicit interest rate is :  $\{(100/(100 - \% \text{ of discount}))^{360/(\text{net period} - \text{discount period})} - 1\}$ .

<sup>4</sup> In this particular case, the reasoning is unchanged but the discount period is nil.

<sup>5</sup> By example, for an unpaid of 1000 euros, a firm is constrained to realise additional sales for 100 000 euros (with a gross margin profit = 1%), 20 000 euros (= 5%), or 10 000 euros (= 10%).

<sup>6</sup> For a detailed approach of management of receivables, see Mian and Smith [1992].

<sup>7</sup> For a recent comparative study of trade credit practice in Europe, see Hol and van der Wijst [2002].

At a macroeconomic level, trade credit generates receivables and liabilities whose weight is preponderant in the majority of developed countries<sup>8</sup>. Thus, in proportion of GDP for year 1993, these amounts represent from 3,5 % in Germany to 50% in France according to trade credit practices [table 4]. For companies, data also underline the strategic role of balance sheets related to trade credit policies<sup>9</sup> [table 5]. In East and Central European countries, which are exposed to a high level of uncertainty<sup>10</sup>, practices of inter-firm credit are not developed (Johnson, McMillan and Woodruff [2002]).

TABLE 4

TABLE 5

Hence, trade credit appears as a key element of the firm's financial environment in Western European countries. But the lengthening of payment terms and the proportion of late payments [table 3] result in increasing the firm's cash requirements. Moreover, the very long payment terms practiced by public administrations constitute a source of particular concern. This situation is accompanied, in France and in Italy, by a recent structural reallocation of trade credit benefits from smaller to larger firms (Dietsch and Kremp [1998], Marotta [2001]). Because of the vulnerability of their financial situation and because they depend on a limited number of customers, smaller firms are in their turn constrained to extend payments of their suppliers. These circumstances result in a degradation of the business climate and in the multiplication of risks of chains bankruptcy. This recent evolution appears as an aggravating fact of the structural component of trade credit according to which payment terms tend to be shortened in times of economic growth and to lengthen in times of recession. To limit late payments and promote harmonization across countries, European authorities, in a 1995 recommendation<sup>11</sup>, have proposed principles and methods to reduce payment terms in Europe. Noting the inefficiency of those first actions since : « The situation indicates that late payment has become the rule rather than the exception, with a large number of firms exceeding the contractually agreed payment terms, thereby creating a large volume of overdue outstanding in Europe<sup>12</sup> », the European Commission voted, in 2000, a directive<sup>13</sup> intended to ensure the maintenance of reasonable payment terms in commercial transactions. The 2001 French law,

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<sup>8</sup> For an analysis concerning developing countries, see Cuevas and al. [1993], Fafchamps [1997] [2000].

<sup>9</sup> For a synthesis of the evolution of payment terms in France since 1992, see Bardes and al. [2002].

<sup>10</sup> Interactions between macroeconomic uncertainty and trade credit are discussed in Baum and al. [2003].

<sup>11</sup> Commission Recommendation of 12 May 1995, O.J.E.C n°L 127 of 10.06.1995, p.19.

<sup>12</sup> O.J.E.C (Official Journal of the European Communities) n°C 216 of 17.7.1997, p.10.

<sup>13</sup> Commission Directive E.C 2000-35 of 29 June 2000, O.J.E.C n°L 200 of 8.8.2000, p.35.

relative to new economic regulations<sup>14</sup>, transposes those dispositions. A first evaluation of the effects of this directive is expected in 2004.

### **3. Theories of trade credit**

A large part of research on the matter, relative to macroeconomic considerations, focused on the effects of trade credit on the efficiency of monetary policies<sup>15</sup>. They test the existence of a trade credit channel or « Meltzer effect » [1960] according to which the flexibility of financing relationships between large and small companies makes it possible to offset the consequences of a restrictive shock of monetary policy. Firms with direct access to capital markets, i.e. larger firms, help out small financially constrained firms (Bernanke and Blinder [1988]) by extending more trade credit when credit rationing is relevant. According to those theories, those elements partially explain the difficulty of evaluation and checking of the broad credit channel<sup>16</sup>. On the microeconomic level, theories justifying the use of trade credit are based on the imperfect character of product markets by underlining the major role of information asymmetries. In this section, we summarize the principal characteristics of these theories depending if they justify supply or demand for trade credit.

#### **3.1. Theories of trade credit supply**

Trade credit supply, materialised by the amount of accounts receivable, is justifying by verification and marketing considerations but also by motives related to the seller compliance, the reduction of asymmetric information and the achievement of economies of scale.

##### ***The verification motive***

Asymmetric information is relative to the firm's financial activities but also to products. According to the verification motive, trade credit is a means offered to clients to make sure that quality and quantity of goods delivered by the supplier are conform before payment (Smith [1987]). It serves as a process of signalling the quality of products or services sold through the inspection period it admits. This argument is particularly valid if the quality of delivered products is longer to assess (high technology or new products) or when the client holds little information on the supplier. Thus, small firms have to finance a great part of their sales by trade credit because of a lack of reputation (Long and al. [1993]). In the event of

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<sup>14</sup> For a critical approach of the transposition of that directive in the French law context, see Drault [2001].

<sup>15</sup> See Meltzer [1960], Brechling and Lipsey [1963], Laffer [1970], Jaffee [1971].

<sup>16</sup> For a recent empirical approach, see Kohler and al. [2000], Nilsen [2002] and Mateut and al. [2003].

opportunistic behaviours relative to a weak quality of products, the use of discounts with two-part terms can be a means of reduction of the inspection period (Lee and Stowe [1993]). Moreover, because of the church tower principle<sup>17</sup>, this check period is supposed to be longer when contractors are geographically distant, in the case of export for example.

### ***The sales-promotion motive***

Trade credit terms offered and the attitude the seller adopts to enforce them are, as part of the price, elements of differentiation of suppliers. They can be used to reinforce the competitive position of firms. For the purpose of sales promotion, developing customer relationships or attenuation of demand variations, an adequate specification of trade credit terms is possible since suppliers are not constrained, unlike a financial intermediary, to realize a profit on the financial part of their commercial transactions. Nadiri [1969] notes that trade credit terms can be adjusted to gain or preserve market shares over competitors or to offload excess inventories<sup>18</sup>. Trade credit is also used to facilitate the establishment of long-term trade relationships with customers, in particular for small and young firms because of asymmetric information and reputation effects (Summers and Wilson [2002a]). Trade credit is then a specific short-term investment whose long-term goal is the certainty of a certain level of sales related to the existence of stable and mature customer relationships<sup>19</sup>. In the event of seasonal or highly variable demand, adjusting trade credit terms can offset uncertainty by increasing sales when demand is low. Trade credit makes it thus possible to stabilize the demand level by smoothing business or seasonal cycles without price variations (Emery [1987]).

### ***The price-discrimination motive***

Trade credit can be used to price discrimination among customers (Schwartz and Whitcomb [1978], Brennan and al. [1988], Petersen and Rajan [1997]). In that case, terms of credit, defined according to industry practices and consequently insensitive to the credit quality of the buyer<sup>20</sup>, reduces the effective price of products or services for riskier customers by partially eliminating the risk premium relative to their status of low-quality borrowers. The supplier's advantage lies in the expression of a higher total demand. Subsequently, the magnitude of the profit margin recorded by the supplier is a principal determinant of the influence of the price-discrimination motive. The higher the supplier's profit margin, the more

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<sup>17</sup> This principle is identified in papers relative to bank credit, for details see Carling and Lundberg [2002].

<sup>18</sup> This process notably permits to transfer storage costs to customers.

<sup>19</sup> In this situation, trade credit gives the opportunity for the supplier to become an implicit stakeholder interested in future activities of its customer base (Smith [1987]).

<sup>20</sup> For a justification of this hypothesis, see Smith [1980] and Petersen and Rajan [1994].

likely the firm is to finance sales. Supported by the inelastic demand of risky borrowers, price-discrimination is carried out to the detriment of high-quality customers. However, the use of trade credit discounts, source of high financial cost in case of renunciation, is a means of limiting opportunist behaviours on behalf of risky customers. It also allows other buyers to benefit from favourable financing conditions within the framework of long-term relationships for example. This motive can be explained by the fact that the supplier's income does not depend on the financial component of sales.

### ***The seller compliance motive***

In a context of limited enforceability of debt contracts, trade credit supply is justified by the comparative advantage of suppliers over banks in lending to their customers (Cunat [2001]). This advantage is mainly due to the nature of the trade relation of dependence that underlies credit and to the extra threat of stopping sales of products and services<sup>21</sup> in case of repeated late payments. The influence of this argument varies appreciably according to the position of the supplier in vertical competition on the one hand and, on the other hand, the bargaining power of its customers (Dietsch [1998]). To the detriment of smaller firms, that bargaining power is often expressed through the respective size of contractors. Probability of loss of the surplus related to the existence and the maintenance of a long-term trade relationship is a factor determining the higher lending capacity of suppliers. In a preventive way, Smith [1987] shows that the use of two-part terms discount is an efficient process of credit risk identification. Thus, information related to the execution of financial commitments by customers is relevant because of reduced information asymmetries allowed by trade credit.

### ***The specific-investments motive***

The sales-promotion motive has highlighted the importance of short-term investment represented by trade credit in a perspective of anticipation for future sales. These profits are relative to the exploitation of long-term trade relationships by the supplier. Consequently, the seller must make this investment profitable by maintaining, with most faithful customers, trade relations for a sufficient length of time (Smith [1987]). This is made possible by a specific use of credit terms. For example, a supplier frequently lengthens payment terms<sup>22</sup> or the discount period<sup>23</sup> for customers facing temporary difficulties in connection with an immaterial and specific investment in relationships. In parallel, Ng and al. [1999] stress that

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<sup>21</sup> For a discussion of this point under the view of contract theory, refer to Fafchamps and al. [1995].

<sup>22</sup> See Summers and Wilson [2002a] [2003].

<sup>23</sup> Ng and al. report that only 31.8% of firms indicate they do not permit customers to take unearned discounts.

an industry specific investment by buyers is also a reason for offering trade credit. That material investment, which is often specific to industry and unrecoverable in case of bankruptcy, reduces asymmetric information by creating an information/reputation capital. However, the value of material investments depends on the vertical position of the firm on its market, supply of trade credit will not be similar to manufacturers, wholesalers or retailers.

### ***The scale economies motive***

According to this motive, firm's size is an aspect of positive influence on the offering of trade credit (Ng and al. [1999]). Due to fixed costs, associated with managing accounts receivable, a large number of customers implies a weaker average management cost and favours the development of trade credit supply by the means of economies of scale. The argument is similar for the management costs generated by the practice of discount with two-part terms. That motive supposes the existence of a positive relation, often checked, between the firm size and the number of its customers.

## **3.2. Theories of trade credit demand**

To explain the amount of firm accounts payable, representative of the quantity of trade credit demanded, it's necessary to take into account credit market imperfections caused by asymmetric information. Indeed, it allows considering a financing motive (or liquidity motive) in connection with the macroeconomic considerations of the trade credit channel, in complement of a transaction motive related to an efficient cash management. The financing motive, linked to the phenomenon of bank credit rationing, is particularly relevant for small firms. The combination of transaction and financing motives allows, on the basis of work by Chant and Walker [1988], the development of a partial equilibrium model of trade credit demand.

### ***The transaction motive***

The transaction motive is based on the simplification of cash management that trade credit allows (Ferris [1981]). The advantage of trade credit lies in a possible separation between delivery of products or services, sometimes uncertain, and payment of these goods. For the buyer, this temporal separation implies savings in transaction costs and a better knowledge of cash needs. Transaction costs are relative to mobilization, detention and transformation into means of payment of the firm's liquid assets at ends of settlement of commercial transactions.

### ***The financing motive***

Information asymmetries on bank credit markets cause credit rationing (Stiglitz and Weiss [1981]). Firms with high risk undergo the strictest consequences of funds restriction imposed by financial intermediaries. In that situation, trade credit demand for financing motive is justified as a means of limiting these adverse effects, most liquid firms (i.e. larger firms) helping out constrained firms (i.e. smaller firms) to finance their exploitation cycle (Schwartz [1974])<sup>24</sup>. This function of « intermediary of substitution » exerted by the supplier is facilitated by the nature of the trade relation which underlies the financing. Compared to a classical financial intermediary, this relation makes it possible for the seller to benefit from savings in collecting information about small firms, evaluating default risk and valuating products in case of bankruptcy (Petersen and Rajan [1997]). Thus, advantages in acquisition of better and less costly information, control of the buyer and valorisation of assets account for higher efficiency of trade credit with respect to bank credit<sup>25</sup>. These advantages explain why the supplier is not forced to limit the amount of loans because of adverse selection and hazard moral problems that do not allow banks to identify small firms' credit risk efficiently. Conversely, by paying late or by dropping the discount period, the borrower automatically reveals his class of risk to the supplier (Elliehausen and Wolken [1993]). Thus, renouncing the discount is interpreted as a preventive sign of degradation of the customer's financial situation but, more generally speaking, observation of payment terms and their evolutions is also revealing. Within this framework, the quantity of credit obtained from suppliers appears as a positive sign of the borrower's repayment capacity. This signal, intended for financial intermediaries, can be used to obtain more important bank financing (Biais and Gollier [1997]).

### ***A simple model of trade credit demand***

According to the theoretical elements mentioned above, the anticipated demand for trade credit of the firm (DTC\*) results from a transaction component (TC) and a financing component (FC), as :

$$DTC^* = TC + FC \quad [1]$$

Following Elliehausen and Wolken [1993]<sup>26</sup>, the transaction component (TC) for trade credit demand can be modelled by variables representative of transaction costs linked to commercial

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<sup>24</sup> See Emery [1984], Smith [1987], Wilner [2000], Cunat [2001] and Jain [2001].

<sup>25</sup> For a comparative approach of trade credit and bank credit, refer to Dietsch [1998].

<sup>26</sup> The model presented by Elliehausen and Wolken [1993] is based on works by Chant and Walker [1988].

relations with suppliers : the volume of purchases (PUR), the uncertainty or temporal variability of deliveries ( $\Delta$ DEL), the return on liquid assets (RLA) and the conversion costs of liquid assets into means of payment (CCLA), as :

$$TC = F (PUR, \Delta DEL, RLA, CCLA) \quad [2]$$

with  $\delta TC/\delta PUR$ ,  $\delta TC/\delta \Delta DEL$ ,  $\delta TC/\delta RLA$  and  $\delta TC/\delta CCLA > 0$

In connection with the exposition to bank credit rationing, the financing component (FC) is specified according to the financial risk (FR) and the business risk (BR) presented by the firm. Prices of trade credit (PTC) and bank credit (PBC) are also considered. The demand for bank credit (DBC) is represented as a decreasing linear function of price. So :

$$FC = F (FR, BR, PTC, PBC) \quad [3]$$

with  $\delta FC/\delta FR$  et  $\delta FC/\delta BR > 0$ ,  $\delta FC/\delta PTC < 0$ ,  $\delta FC/\delta PBC < \text{or} > 0$

and 
$$DBC = F (PBC) \quad [4]$$

with  $\delta DCB/\delta PCB < 0$

Assuming  $DTC^* = TC + FC$  is the anticipated trade credit demand and AP is the amount of accounts payable, the realized demand for trade credit (DTC) is written as :

$$DTC = AP \quad [5]$$

If part of the anticipated demand ( $DTC^*$ ) for trade credit is not satisfied, it's due to an important risk presented by the firm, as :

$$DTC^* - DTC = F (FR, BR) \quad [6]$$

with  $\delta(DTC^* - DTC)/\delta FR$  et  $\delta(DTC^* - DTC)/\delta BR > 0$

combining equations [5] and [6] yields :

$$DTC^* = AP + F (FR, BR) \quad [7]$$

The reduced and estimable form of the model<sup>27</sup> is obtained by introducing equations [4] and [7] into equation [1] :

$$DTC = AP = \alpha + TC + FC + \varepsilon$$

$$DTC = AP = INT + F (PUR, \Delta DEL, RLA, CCLA) + F (FR, BR, PTC, DBC) + \varepsilon \quad [8]$$

The realized demand for trade credit appears as a simple estimable equation including an intercept ( $\alpha$ ), a transaction component (TC) and a financing component (FC).

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<sup>27</sup> For more details about algebraic manipulations, see appendix 1.

## 4. Data description

The data used in this study is from French small and medium-sized enterprises (SMEs) that answered to a postal questionnaire survey carried out in the beginning of 2003 and concerning inter-firm credit during year 2002. A questionnaire, tested beforehand, was sent to a panel of 4000 SMEs stemming from a database called D.I.A.N.E<sup>28</sup>. Firms were selected according to updated information and available financial statements. In accordance with the European definition<sup>29</sup>, selected firms were small and medium businesses [appendix 2]. Moreover, because of specificities in management presented by quoted firms and those belonging to the sectors of administration and financial activities, those firms were excluded from the analysis. The number of exploitable answers, after eliminating questionnaires with missing answers and after checking the coherence, amounts to 513 or 12.8% of the panel. The survey collected detailed data on customer and supplier relationships, credit policy, credit practices, product and market characteristics and bank financing. Thereafter, general and accounting information contained in balance sheets and income statements were extracted from the database and completed the survey.

The demographic characteristics of the survey, presented in table 6, show that most of the respondent firms are public companies (244) or proprietorships (130). The various positions on the chain of production/distribution are, except for merchant dealers (3), significantly represented. The industry classification, established by the French aggregated economic classification for activities (N.E.S)<sup>30</sup>, underlines the prevalence of firms from trade, manufacture of intermediate goods and construction respectively. The distribution by type of market is well balanced. The firm's size, measured by various indicators (employees, type of firms, total assets and turnover), indicates a predominance of smaller firms for which, in theory, the impact of asymmetric information is higher.

TABLE 6

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<sup>28</sup> « DIsc for Economic Analysis » is a database edited by Bureau Van Dijk, Paris.

<sup>29</sup> Commission Recommendation (96/280/EC) of 3 April 1996 concerning the definition of small and medium-sized enterprises, O.J n°L107 of 30.04.1996.

<sup>30</sup> The French economic summary classification (NES), taken up by INSEE is an aggregated double entry classification - economic activities and products - relevant for economic analysis purpose. For more details, see : [http://www.insee.fr/en/nom\\_def\\_met/nomenclatures/nes/pages/nes.htm](http://www.insee.fr/en/nom_def_met/nomenclatures/nes/pages/nes.htm)

## 5. Statistical analysis

This section provides a descriptive data analysis of the survey. These evidences<sup>31</sup>, linked with the management of accounts receivable, concern the determinants of inter-firm credit terms, motives for varying credit terms, average credit period, use of discount with two-part terms and the frequency of late payments.

### *Determinants of credit terms*

According to the total answers obtained [table 7], internal decisions (44%) predominantly determine credit terms offered by firms. They precede requests emanating from customers (35%) and, in last position, influence of industry standards (21%). This classification, as presented in table 8, is related to the firm's position on the production and commercialisation chain. Thus, firms being upstream from this chain (manufacturer, producer, contractor, wholesaler) have a more important power of negotiation. For those firms, that advantage is an element justifying the determination of credit terms mainly according to internal decisions. Conversely, firms located downstream from the production and commercialisation process (retailer and service provider), enjoying a weaker bargaining power and exposed to a higher competition level, classify requests from customer (50.9% and 40.7% respectively) as the principal factor influencing choice of credit terms. The firm's position on the production and commercialisation process is an element which determines credit terms. Negotiation power is also positively related to the firm's size [table 9]. Micro enterprises classify customer's requests as the first determinant of credit terms (42.2%), which is not the case of small and medium-sized enterprises of the panel (32.8% and 30.3%, respectively).

TABLE 7

TABLE 8

TABLE 9

### *Motives for varying credit terms*

The study of motives for varying credit terms offered reveals behaviours strongly depending on the firm's size. The classification of ten motives for variation on a Likert five-point scale<sup>32</sup> underlines the respective importance of financing and competitive motives, contrary to sales promotion motives, in the modification of credit terms offered by the SMEs [table 10].

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<sup>31</sup> In this paper, we only present a part of survey evidences but all evidences are available from author.

<sup>32</sup> 1= not at all important, 2= unimportant, 3= neither important nor unimportant, 4= important, 5= very important.

TABLE 10

« To help a customer in temporary difficulties » appears as the principal reason for varying credit terms. Consequently, the financing or liquidity motive and the role of « intermediary of substitution » exerted by suppliers are checked empirically. However, size classification shows that financial aid is stronger as the firm's size is reduced<sup>33</sup> [tables 11A-11B-11C]. The largest firms, i.e. most liquid firms, are not those that ensure the most significant support in the event of customers' financial difficulties. Conversely, medium firms, compared to small and micro-sized firms, attach more importance to motives which allow to take advantage of using trade credit<sup>34</sup> (« to improve cash flow» and « in response to economic conditions »).

TABLE 11A

TABLE 11B

TABLE 11C

In relation with competitive motives, « to retain a customer » is the major reason for varying credit terms for all size class. However, it seems that, in connection with bargaining power and in a counterintuitive way, micro-sized firms attach little interest to motives « because a customer insists » (4.8% of micro firms consider this motive as very important against 8.4% and 8.7% of small and medium-sized firms) to justify a modification of credit terms. It is the same, to a lesser extent, with the motive of « to remain competitive ». Modification of trade credit terms for competitive reasons appears all the more realizable or desirable that a firm's size and sales are significant.

### ***Duration of credit period***

Answers concerning the duration of inter-firm credit [table 12] stresses that, for a majority of firms (60.7%), payments do not occur before 47 days. The most frequent payment period is “60 days and more” (34.4%) whereas 5.4% of firms are generally paid cash. Comparatively<sup>35</sup>, it is interesting to note that, while the percentage of firms paying cash seems stable in developed countries, approximately 5% (4.8% in United Kingdom for Summers and Wilson [2002a], 4.2% in United States for Ng and al. [1999]), the most frequent payment period in France (60 days and more) is double than that observed in U.K (30 days for Summers and

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<sup>33</sup> 18.3% of micro-enterprises declare that the motive « to help a customer in temporary difficulties » is very important, 15.8% of small enterprises and 13.6% of medium enterprises, tables 11A-11B-11C respectively.

<sup>34</sup> 15.4% and 9.2% of medium enterprises declare that the motives « to improve cash flow » and « in response to economic conditions » are very important versus 11.7% and 7.8% of small enterprises, 6.8% and 5.4% of micro-enterprises, tables 11A-11B-11C. These results validate Dietsch and Kremp [1998].

<sup>35</sup> The comparisons are made only with papers adopting the same reasoning, that is to say giving empirical results from recent self-made surveys : 500 and 655 firms in Summers and Wilson [2002a] and [2003], 950 firms in Ng, Smith and Smith [1999] and 1549 firms in Marotta [2001].

Wilson [2002a] and [2003]) and in U.S (30 days for Ng and al. [1999]), but is only half the average credit period in Italy (124 days for Marotta [2001]).

TABLE 12

The firm's market size is a major determinant of credit periods [table 13]. Most than half of firms (52.1%) working on an international sales market have an average credit period of "60 days and more" against 17.6% for firms with local sales market. Those elements confirm the validity of offering trade credit for a checking motive. In relation with the scale economies motive, the firm's size positively influences the average credit period [table 14].

TABLE 13

TABLE 14

***The use of the two-part terms discount in credit offered***

There is little evidence on the use of the discount mechanism by French small and medium-sized businesses<sup>36</sup>. Nevertheless, that information determines the financial cost of trade credit for buyers. The proportion of firms offering frequently or always is 10%. Terms of discount generally involve a price reduction of 1 to 3% for a fast payment [table 15]. Half of firms (49.3%) never use it, 25% seldom do and 15.6% occasionally do. The practice of offering two-part terms discount is mostly developed in Anglo-Saxon countries (17% and 20% of SMEs in U.K<sup>37</sup>, 37% and 24% of SMEs<sup>38</sup> and 25.3% of large enterprises<sup>39</sup> in U.S) but comparable in Italy (8.2% of firms for Marotta [2001]). Our data confirms that offering discount is strongly dependent on industry practices (Ng and al. [1999]) and is primarily concentrated in sectors of manufacture of consumer goods, intermediate goods and trade. Moreover, firms with international sales, exposed to asymmetric information about buyers, use the process of discount for early payment more intensively [table 17].

TABLE 15

TABLE 16

TABLE 17

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<sup>36</sup> A sample survey by Louis Harris in 2001 indicates that 85% of French SMEs never use trade credit discounts with two-part terms.

<sup>37</sup> Summers and Wilson [2002a] and [2002b], respectively.

<sup>38</sup> Elliehausen and Wolken [1993] and Danielson and Scott [2000], respectively.

<sup>39</sup> Ng, Smith and Smith [1999].

### *The frequency of late payments*

Paying late is a widespread practice for the firm's customers of the survey [table 18]. Only 23.4% of firms declare never (4.1%) or seldom (19.3%) undergo late payments in the management of accounts receivable. For 41.7% of firms, paying late is occasional but frequent in 32.6% of cases and systematic for 2.3% of the sample.

TABLE 18

This report confirms the apprehension of European authorities to see late payments become the rule rather than the exception. This situation is, in the French case, worsened by the bad payment habit of public administrations as underlined by the non-isolated remark of this manager : « If the State and public firms initially respected legal payment terms, that would give the example, public administration is the sector with the longest payment terms in spite of legislations and customer relationships, 120 days on average instead of 30 to 45 days expected ! »<sup>40</sup>. Charging systematic penalties in the event of late payment is envisaged by new regulations but the application to small and medium-sized enterprises seems problematic as the following comments attests: « It is impossible, commercially, to invoice financial interests to customers [...] »<sup>41</sup>; « The attitude consisting in refusing customers who practise late payments can be considered as heroic so much as the principle of late payment is firmly anchored in French mentalities and the majority of suppliers are ready to accept anything in order to sell [...], up to now new measures taken by public authorities have remained dead letter. »<sup>42</sup>

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<sup>40</sup> Comment remark made by the manager of a small enterprise of general electricity created in 1997.

<sup>41</sup> Comment remark made by the manager of a medium enterprise of clothing sales created in 1993.

<sup>42</sup> Comment remark made by the manager of a medium enterprise of printing created in 1987.

## **6. Econometric investigations**

The descriptive analysis stressed the importance of the firm's characteristics in the determination of trade credit terms. To look further into these relations and to test the exposed theories, this section presents the results of econometric analysis of both, the supply of trade credit offered by firms and the model of trade credit demand derived from work by Elliehausen and Wolken [1993].

### **6.1. Determinants of trade credit supply**

In this first empirical approach, we mainly use information contained in the survey to estimate the determinants of accounts receivable, the duration of credit and trade credit terms choices. We test how these dependent variables, representative of trade credit supply, depend on various characteristics relative to the above theories.

#### **6.1.1. The dependent variables**

*Trade credit importance and duration* - The quantitative aspect of trade credit supply is approximated by the firm's accounts receivable to annual turnover ratio (TCI). This variable is estimated by the ordinary least square method. Trade credit duration (TCD), expressed in days of turnover and classified in an ordered scale, is modelled by an ordered probit procedure.

*Trade credit terms* - We model the choice of trade credit terms, as in Ng and al. [1999], using logit estimates to identify the firm's characteristics according to the most commonly payment terms proposed to customers<sup>43</sup>. We construct three dichotomous dependent variables : offering net terms versus cash terms (NT vs CT), two-part terms versus cash terms (TPT vs CT) and two-part terms versus net terms (TPT vs NT).

#### **6.1.2 The independent variables**

The independent variables, drawn from the theoretical discussion, relate to supplier's characteristics offering credit, product characteristics and the nature of demand emanating from customers.

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<sup>43</sup> Following survey answers to the question asking the firm's most commonly used payment terms in financing sales, 437 firms prefer net terms, 48 firms prefer two-part terms and 28 firms prefer cash terms.

### ***Supplier's characteristics***

*Size* – The firm's size is measured by the logarithm of total assets (LTA). We also consider, including dummies variables (LOC, REG, NAT, INT)<sup>44</sup>, the influence of the firm's market size (local, regional, national or international) on trade credit supply.

*Age* – To proxy development, reputation and credit worthiness, the firm's lifespan (AGE) is measured according to a simple logarithmic specification [ $\ln(1 + \text{age of the firm})$ ]. We also use the square of this expression (AGE<sup>2</sup>) in order to take into account the nonlinear influence of age on the quantity of trade credit offered (Petersen and Rajan [1997]).

*Profitability* - The rate of gross margin of exploitation (PROF) is used as an indicator of profit with regard to turnover.

*Credit rationing* - Credit rationing is directly estimated according to the opinion of firm's head. The variable (RAT) identifies firms constrained in obtaining short-term bank financing.

### ***Product characteristics***

*Verification* - To test the verification motive, we use the variable (QUA) to identify firms for which the quality of products or services sold cannot easily be checked in terms of cost and time. Similarly, fast changing products and innovating products are viewed as characteristics justifying a longer inspection period for customers (Ng and al. [1999]). These characteristics are included by dummies variables (FCP) and (INN) respectively.

*Competition* - In relation with strategic considerations of trade credit supply, the variable (COM) identifies firms evolving on strongly competitive market.

### ***Demand characteristics***

*Customer base* - To be informed about the frequency of transactions and the possibility of making economies of scale in the management of accounts receivable, we measure the number of active customers of the firm (NAC). In addition, we approximate firm sales concentration by the variable (SCN) defined as annual turnover to number of active customers ratio. The amount and the form of trade credit also depend on customer type. With dummies

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<sup>44</sup> When we use different dummies variables to represent a same characteristic, we omit, in regressions, the first dummy variable for reference. Hence, results are interpreted in reference to this omitted variable.

variables (RET, WHL, PRO)<sup>44</sup>, we identify the firm's most common type of customer (retailer, wholesaler or producer). Considering the importance of the negotiation power to determine credit terms, we can measure the relative size of the firm's most common customers (lower, equal or higher) by including specific variables (LOW, EQU, HIG)<sup>44</sup>.

*Seasonal variation* – Firms which operate in seasonal markets might be expected to use trade credit as a tool to manage demand variations. We include a dummy variable (SEA) to distinguish firms facing a seasonal demand from others.

Table 19 provides descriptive statistics for these dependent and independent variables.

TABLE 19

### 6.1.3. Econometric results

*Trade credit importance and duration* - Results relating to the determinants of variables (TCI) and (TCD) are presented, respectively, in columns I-II and III-IV of table 20.

TABLE 20

The firm's size and age have a positive and significant influence on the amount and the duration of trade credit. Larger firms have a higher accounts receivable to sales ratio. Thus, the magnitude of the coefficient of size (LTA) indicates that a firm with 480.000 euros in total assets extends an additional 2.4% more of its sales in the form of accounts receivable compared to a firm with 75.000 euros in total assets<sup>45</sup>. The effect is smaller than in Petersen and Rajan [1997]. This result confirms the predictions of the scale economies motive for offering trade credit. Similarly, firm lifespan (AGE) positively influences trade credit supply. However, the significant coefficients of the quadratic form of the age variable (AGE<sup>2</sup>) show that such influence is not linear but only positive during first years of a firm's life. This effect suggests a trade credit use related to the acquisition of an efficient firm size particularly through the sales promotion motive. On our panel, this result is valid for estimates of trade credit importance (Petersen and Rajan [1997]) and duration (Summers and Wilson [2002a]).

The firm's market size (REG-NAT-INT) also has a positive impact on the importance and duration of offered trade credit. In reference to the verification motive, information asymmetries related to geographical distance between contractors justify this fact. The positive and significant coefficients of the profitability variable (PROF) highlight the

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<sup>45</sup> These percentages are calculated in reference to the value of quartiles (1 and 3) of the total assets distribution.

relevance of the price-discrimination motive : firms with higher gross profit margin have more incentive to sell additional units and, consequently, finance a larger part of their sales by inter-firm credit. Conversely, firms which do not obtain total desired bank-financing (RAT) offer a reduced and shorter amount of trade credit compared to firms which are not exposed to bank credit rationing. In reference to the financing or liquidity motive, this suggests trade credit terms are also determined by the seller's financial situation.

As far as product characteristics are concerned, the fact that product quality is difficult to determine by inspection (QUA) because of information asymmetries and necessary inspection period prior to payment seems to have a positive influence on trade credit offered to customers. From the supplier's point of view, a fast changing product limits both, the period of sale at full price and the collateral value in case of complaint (Summers and Wilson [2003]). These elements can account for the negative influence of the variable (FCP) over the amount and the duration of the trade credit offered. The coefficients of variables measuring the degree of product innovation (INN) and market competition (COM) are statistically insignificant.

Following the scale economies motive, firms dealing with a high number of active customers should offer more trade credit than others. These predictions are not checked empirically since the significant variable (NAC) indicates that a high number of customers is negatively correlated with the magnitude of accounts receivable and trade credit duration. Management costs of outstanding debt, supposed higher for smaller firms, can account for that result. For small and medium-sized enterprises of the panel, the achievement of economies of scale is not related to the quantitative aspect of the customer base but contrary to the degree of sales concentration. Working with a reduced number of customers, involving a higher amount of sales per customer, results in a higher engagement in trade credit as underlined by the variable (SCN). Considering the bargaining power of customers representing a significant share of the supplier's annual turnover, this situation can be as undergone as desired<sup>46</sup>. Compared to firms whose customer base is mainly composed of retailers, firms in relation with producers (PRO) offer a significantly more important and longer credit. On the one hand, this result is accounted for by the reduction of information asymmetries related to larger specific

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<sup>46</sup> It appears difficult to separate from an large customer because of a conflict dependent on trade credit terms (undergone situation), but table 10 stresses that 26.9% of firms judge the motive « to attract a new large customer » like important (16.7%) or very important (10.2%) in the decision of varying credit terms (desired situation).

investments realized by this type of customer. On the other hand, Ng and al. [1999] stress that producers face a higher need for financing because of a long production cycle. Indicators of seasonal demand (SEA) and relative size of the firm's customers (EQU-HIG) are not significant.

*Trade credit terms* - Columns V to VII of table 20 present results of estimates concerning binary choice dependent variables : net terms versus cash terms (NT vs CT), two-part terms versus cash terms (TPT vs CT) and two-part terms versus net terms (TPT vs NT).

TABLE 20

Results confirm that firms selling to distant customers extend, in relation with information asymmetric, more two-part terms in the financing of commercial transactions. In reference to the seller compliance motive, this discount process allows a better recovery of payment. Conversely, younger firms (AGE), exposed to a lack of reputation on their market and unable to justify specific knowledge in management of accounts receivable, are more likely to offer net terms credit. Net terms provide a classical inspection period for customers to check quality of products.

In relation with product characteristics and for the above-mentioned reasons (lower collateral value and reduced period of sale), firms with fast changing products demonstrate a clear preference for cash terms. Firms selling innovating products (INN) are more likely to offer net terms versus cash terms. In that case, net terms give the buyer a better opportunity to test the new product before paying and permit the seller to promote sales. Similarly to Summers and Wilson [2002a], we find that offering two-part terms is associated with more competitive markets (COM). This result gives support to the price-discrimination motive because two-part terms are an efficient process of supply differentiation.

As regard to demand characteristics, small firms in relation with producers (PRO), comparatively to others, tend to privilege net terms versus cash or two-part terms. Indeed, financing sales by two-part terms in this case is neither interesting for the seller (producers make larger specific investments reducing asymmetric information) nor for the buyer (because of an important need for financing). Other independent variables (NAC, EQU, HIG and SEA) do not have any significant impact on the choice of trade credit terms.

## **6.2. Determinants of trade credit demand**

The aim of this second empirical approach is to test a demand function for trade credit. Following the model presented above [point 2.2. and appendix 1], use of trade credit for purchases is explained by a transaction motive, linked with a simplification of cash management, and a financing motive. According to the latter, because of information asymmetries, financially constrained firms use trade credit to finance their exploitation cycle.

### **6.2.1. The model specification**

According to equation [8], the reduced and estimable form of the model includes a transaction and a financing component. The transaction component is modelled as a function of transaction costs whereas financial risk and exposition to bank credit rationing determine the financing risk. The explained variable is the trade credit demand realized by firms, following equation [5] it corresponds to the accounts payable to total assets ratio (AP). To look further into the financing motive, we can also estimate, using a logit model, the probability that firms make some of their payments after the due date, using late payments. The dummy dependent variable (LTP) identifies firms for which late payment is a current practice for financing purchases<sup>47</sup>.

#### ***The transaction component***

As in equation [2], it is necessary to quantify the volume of purchases, the uncertainty or temporal variability of deliveries but also the return and conversion costs of liquid assets into means of payment to evaluate savings generated by the use of trade credit in payment of firm purchases. Relatively to transaction costs, the ratio of stocks to total assets (STO) is used to calculate the volume of transactions with suppliers. Stocks turnover (STUR), expressed in days of turnover, and the number of active suppliers (NAS) in relation with the firm indicate variability or uncertainty in transactions with suppliers. We suppose that firms with high stocks turnover and trading with numerous suppliers face increased uncertainty and higher transaction costs. Return on liquid assets and conversion costs are relative to firm's size. Indeed, larger firms are more likely to invest their treasury funds on short-term markets. The volume of annual turnover (TNV) indicates the size of the firm.

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<sup>47</sup> To the question asking the firm's frequency use of late payments on purchases to suppliers, 90 firms (17.5%) declare to frequently (69) or always (21) use it.

### *The financing component*

Demand for trade credit attributable to the financing motive is linked with financial and business risk, price of trade credit and price of bank credit (equation [3]). We use a classical debt ratio defined as the value of total debt to equity (LEV) to approximate financial risk. Furthermore, we form a financial appreciation of firms using a scoring variable (SCOR). This financial score is built from the function<sup>48</sup> defined by Conan and Holder [1979]. If we consider the high mortality rate, about 50%, of French small and medium-sized businesses during their first five year-life<sup>49</sup>, the business risk can be modelled by the firm lifespan (AGE). We also differentiate firms for which the head responsibility is total and unlimited in the event of bankruptcy (Proprietorship and Partnership) from those for which that responsibility is limited to financial contributions (Limited liabilities proprietorship, Limited liabilities company, Public companies). Such distinction, established by the dummy variable (RAM), informs on the degree of risk aversion of managers and completes the modelling of business risk. As in Elliehausen and Wolken [1993], we model the price trade credit using a cash discount dummy variable. This variable (TPT) indicates whether suppliers offer the firm two-part terms discounts for early payments of purchases or not. We know that only trade credit with discount for early payment implies a financial cost for the buyer [table 1]. The price of bank credit is approximated, as specified in equation [4], by the quantity of bank credit demand recorded by the firm. This demand corresponds to the ratio of short-term credit to total assets (STD). In addition, to investigate if unavailability of credit from financial institutions affects the financing demand for trade credit, we identify firms exposed to short-term bank credit rationing by the dummy variable (RAT).

Descriptive statistics relative to transactional and financial variables are presented in table 21.

TABLE 21

### **6.2.2. Econometric results**

Ordinary least squares estimates of the accounts payable variable (AP) are reported in columns I and II, table 22. This table also reports, in columns III and IV, logit estimates of probability that firms frequently or systematically pay commercial debts late (LTP).

TABLE 22

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<sup>48</sup> For details about the function calculation mode : <http://diane.bvdep.com/Diane/help/HelpDiane/diadoc10.htm>

<sup>49</sup> Following the communication of the minister for Small and Medium Enterprises, Trade and Cottage Industry in council of ministers of 3 November 1996 on enterprise creation. For details, see <http://www.senat.fr/rap/r96-374/r96-37410.html>

To a significant extent, the transaction component of the trade credit demand is significant to explain the amount of accounts payable of firms. The positive and significant coefficient for the variable (STO) indicates that a higher volume of transactions results in a higher demand for trade credit. As for temporal variability of transactions, firms in relation with numerous suppliers (NAS) and those with higher stocks turnover (STUR) finance a more important share of their purchases by trade credit use. Relatively to return on liquid assets and brokerage costs, the size variable (TNV) positively affects the demand for trade credit. Consequently, results in connection with the transaction motive fully validate the expression of a demand for trade credit linked with efficient cash management.

The set of financing variables also accounts for a significant part of the demand for trade credit. The scoring variable (SCOR) and the ratio of debt to equity (LEV) reflecting the financial risk are both significant. This result indicates that firms with high financial risk make a greater percentage of their purchases using trade credit. It is confirmed by the credit-rationing variable (RAT). This positive and significant variable demonstrates that unavailability of credit from financial intermediaries positively affects the demand for trade credit, suggesting that additional suppliers financing is used to finance the exploitation cycle of constrained firms. Furthermore, these evidences confirm theories relative to the informational advantage of suppliers over traditional financial institutions in providing financing to small firms exposed to asymmetric information. This advantage consists in using cheaper and more efficient information about clients to monitor accounts receivable (Petersen and Rajan [1997]).

Only one of the two variables proxying business risk, age of firms (AGE), is significant to account for the demand for trade credit. Younger firms, with less business experience and reputation, have greater financing demand for trade credit (Singleton and al. [1999], Elliehausen and Wolken [1993]). The risk aversion of a firm's head (RAM), in connection with the legal form of business, is not a significant variable of the model. Similarly, the variable reflecting the price of trade credit (TPT), in spite of a negative sign, do not account for the demand for trade credit. A possible explanation is that trade credit discount with two-part terms is not widely practiced for firms quoted in the panel. Conversely, the price variable of bank credit, quantified by the short-term debt to assets ratio (STD), has a positive and significant effect on demand. That positive sign implies that small and medium-sized firms do not use short-term bank financing as a substitute but as a complement for trade credit finance.

That result, similar to Elliehausen and Wolken [1993], invalidates empirical predictions from the pecking order theory<sup>50</sup> according to which trade credit financing comes lower down than borrowing from financial intermediaries (Isaksson [2002], Petersen and Rajan [1997]).

The probability that firms practise late payments when purchasing is a means to check the use of trade credit for a financing motive because firms using trade credit only to simplify their cash management or to conform to industry practices would not be exposed to adverse effects of paying suppliers late. According to logit estimates of the dependent variable (LTP), transaction variables are not, as supposed, significant determinants of that probability (STO, STUR, NAS, TNV). In contrast, financing variables are statistically significant determinants. Less experienced (AGE) and strongly indebted firms (STD), like those presenting greater financial risk (SCOR), tend to pay late frequently or systematically. The positive and significant variable (RAT) indicates that when firms are financially troubled, i.e. exposed to bank credit rationing, they try to satisfy their demand for financing by using late payments.

## **7. Conclusion**

By exploiting a survey carried out in 2003 in relation with 513 French small and medium-size enterprises, a first contribution of this paper is to provide new empirical evidence on the use of inter-firm credit in the achievement of commercial transactions. Such evidence related to the determination of trade credit terms (influencing factors, motives for variation and credit periods) and to common uses (practice of discounts, frequency of late payments), allows a better understanding of head behaviours as regards to accounts receivable management. They underline, in particular, that trade credit terms offered to finance sales are sensitive to the strategic influence of supplier's size and position. The most frequent credit period observed, 60 days and more, supports the argument that France is a financial system where payment terms are longest. That situation, dependent on financial (low practice of discounts and penalties for late payments) and institutional considerations (right of creditors, reservation-of-ownership), can also be explained by conventions, rules of thumb and trade traditions. On the European level, heterogeneous practices and situations appear as an important obstacle to the harmonization promoted by supranational authorities.

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<sup>50</sup> The pecking order theory is presented in Myers [1984].

By using qualitative and quantitative information contained in the survey, a second contribution is to present results from econometric tests of both empirical determinants of supply and demand for trade credit. In relation with trade credit supply, the firm's accounts receivable is mainly influenced by motives allowing a reduction of asymmetric information between suppliers and buyers. Larger, most experienced firms and those with higher gross profit margins expend more trade credit for financing sales. These results highlight the validity of motives in connection with demand stimulation and achievement of economies of scale. Firms with a widespread sales market offer a longer and higher trade credit financing justifying the verification motive. As for demand characteristics, a concentrated customer base implies higher sales financing by suppliers. The choice of trade credit terms seems to be predominantly influenced by product and market characteristics. With reference to the simple demand model, estimates show that a transaction component, in touch with an efficient cash management, and a financing component explain small firms' demand for trade credit. A higher volume of purchases and an elevated temporal variability of transactions positively influence the transactional demand. In accordance with the financing motive, firms most exposed to information asymmetries manage accounts payable and late payments on purpose of financing cash needs. It is the case of SMEs presenting poor experience, higher financial risk and exposed to credit rationing from financial institutions. The complementarity of small firms' external financing, trade credit and short-term bank credit, highlights the relevance of the credit-rationing hypothesis and accounts for the informational advantage of suppliers.

**Table 1**  
**Opportunity costs of foregoing the discount period**

<b>Two-part terms (% of discount/discount period, net period)</b>	<b>Implicit interest cost of foregoing (in %)</b>
0.5%/10, net 30	9.5
1%/10, net 30	19.8
2%/10, net 30	43.9
3%/10, net 30	73
4%/10, net 30	108.5
5%/10, net 30	151.7

**Table 2**  
**Management costs of trade credit in Europe**  
(means, in % of turnover)

<b>Country</b>	<b>Management costs</b>
Germany	1.1
Belgium	0.7
Spain	1
France	1.1
Italy	1.2
Netherlands	0.8
Portugal	1.9
United Kingdom	0.8

Source : Baromètre Eurofactor (2002)

**Table 3**  
**Credit period, debt period and late payments in Europe**  
(means, in days of turnover)

<b>Source</b>	<b>Country</b>	<b>Credit period</b>	<b>Debt period</b>	<b>Late payments</b>
Baromètre Eurofactor (2002)	Germany	44	-	16
	Belgium	57	-	10
	Spain	85	-	7
	France	68	-	15
	Italy	87	-	15
	Netherlands	46	-	15
	Portugal	63	-	21
	United Kingdom	44	-	10
Dun & Bradstreet (2001/2002)	Germany	30 à 60	-	8.9/8.7
	Belgium	45 à 90	-	18.4/13.9
	France	60 à 90	-	16/16.5
	Italy	60 à 120	-	16.6/16.1
	Netherlands	25 à 40	-	17.7/16.9
	United Kingdom	30 à 60	-	14.2/18.2
U.F.B Locabail (1999)	Germany	33	22	8
	France	65	53	15
	Italy	90	71	17
	United Kingdom	52	37	19
	G 4	61	46	16

**Table 4**  
**Importance of trade credit**  
(means, in % of GDP)

Country	Trade credit		Trade debt	
	1983	1993	1983	1993
Germany	7.5	5.7	4.6	3.5
Canada	20.4	19.3	22.5	21.1
Spain	40.1	32.1	30.6	20.8
United States	17.5	15.8	14.2	12.8
France	42.4	49.3	40.2	39.4
Japan	64.4	50.8	52.1	39.0
United Kingdom	19.4	14.7	20.3	15.5

Source : Kneeshaw (1995), Table 6

**Table 5**  
**Importance of accounts receivable and accounts payable**  
(means, in % of total assets, total debt and sales)

Source	Country	A.R/T.A <sup>1</sup>	A.P/T.A <sup>1</sup>	A.P/T.D <sup>1</sup>	A.R/Sales <sup>1</sup>	A.P/Sales <sup>1</sup>
Hol, van der Wijst (2002)	Germany	11	-	20	-	-
	Austria	13	-	15.5	-	-
	Belgium	17.5	-	27	-	-
	Denmark	15	-	17.5	-	-
	Spain	26	-	41.5	-	-
	France	24	-	33.5	-	-
	Italy	33	-	37.5	-	-
	Netherlands	6.5	-	12	-	-
	Portugal	22	-	28	-	-
	Sweden	7	-	11	-	-
Bardes (2002)	Germany	8	6	-	-	-
	Spain	25	23	-	-	-
	United States	12	7	-	-	-
	France	26	23	-	-	-
	Italy	33	24	-	-	-
Johnson, Mc Millan, Woodruff (2002)	Japan	16	16	-	-	-
	Poland	-	-	-	2.7	-
	Russia	-	-	-	0	-
	Slovaquia	-	-	-	3.4	-
Petersen, Rajan (1994)	Ukraine	-	-	-	0.7	-
	United States	-	-	-	-	-
	Small firms	-	-	-	4.4	1.8
Large firms	-	-	-	11.6	7.6	

<sup>1</sup> A.R=accounts receivable, A.P=accounts payable, TA=total assets, TD=total debt

**Table 6**  
**Demographic characteristics of survey respondents in 2002**

<b>Form of business</b>	<b>N</b>	<b>%</b>
Proprietorship	130	25.3
Limited liabilities proprietorship	4	0.8
Partnership	6	1.2
Limited liabilities company	129	25.1
Public limited company	244	47.6

<b>Position</b>	<b>N</b>	<b>%</b>
Manufacturer	175	34.1
Producer	11	2.1
Contractor	67	13
Wholesaler	113	22
Merchant dealer	3	0.6
Retailer	53	10.3
Service dealer	91	17.9

<b>Industry classification (N.E.S)</b>	<b>N</b>	<b>%</b>
Agriculture, forestry, fishing (EA)	4	0.8
Manufac. of food prod./beverages/tobacco (EB)	16	3.2
Manufacture of consumers goods (EC)	37	7.3
Manufacture of motor vehicles (ED)	8	1.5
Manufacture of capital goods (EE))	32	6.3
Manufacture of intermediate goods (EF)	91	17.7
Construction (EH)	67	13
Trade (EJ)	185	36
Transports (EK)	28	5.4
Services to businesses (EN)	38	7.4
Personal and domestic services (EP)	6	1.2
Education, health and social work (EQ)	1	0.2

<b>Type of market</b>	<b>N</b>	<b>%</b>
Local	74	14.4
Regional	230	44.8
National	136	26.5
International	73	14.3

<b>Age</b>	<b>N</b>	<b>%</b>
[0-4]	141	27.5
[5-9]	194	27.8
[10-14]	105	30.4
[15-19]	51	10
[20 et +]	22	4.3

<b>Employees</b>	<b>N</b>	<b>%</b>
[0-9]	147	28.6
[10-19]	98	19.1
[20-49]	162	31.6
[50-99]	61	11.9
[100-250]	45	8.8

<b>Type of firms</b>	<b>N</b>	<b>%</b>
Micro-enterprise	147	28.7
Small enterprise	204	39.7
Medium enterprise	162	31.6

<b>Total assets (€000)</b>	<b>N</b>	<b>%</b>
[0-49]	81	15.8
[50-99]	95	18.5
[100-199]	98	19.2
[200-499]	130	25.3
[500-749]	37	7.2
[750-999]	19	3.7
[1000 et +]	53	10.3

<b>Annual turnover (€000)</b>	<b>N</b>	<b>%</b>
[0-49]	43	8.4
[50-99]	53	10.3
[100-199]	93	18.1
[200-499]	141	27.5
[500-999]	88	17.2
[1000-1999]	48	9.3
[2000 et +]	47	9.2

**Table 7**  
**Determinants of credit terms offered**

<b>Type of determinants</b>	<b>N</b>	<b>% firms</b>
Industry standards	109	21.2
Internal decisions	226	44.1
Requests from customers	178	34.7
<b>Total</b>	513	100

**Table 8**  
**Determinants of credit terms offered by position**

<b>Type of determinants</b>	<b>Manufacturer</b>		<b>Producer</b>		<b>Contractor</b>		<b>Wholesaler</b>		<b>Merch. dealer</b>		<b>Retailer</b>		<b>Service dealer</b>	
	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>
Industry standards	42	24	4	36.4	12	17.9	29	25.7	1	33.3	8	15.1	13	14.3
Internal decisions	73	41.7	5	45.4	29	43.3	59	52.2	1	33.3	18	34	41	45
Requests from customers	60	34.3	2	18.2	26	38.8	25	22.1	1	33.3	27	50.9	37	40.7
<b>Total</b>	175	100	11	100	67	100	113	100	3	100	53	100	91	100

**Table 9**  
**Determinants of credit terms offered by type of firms**

<b>Type of determinants</b>	<b>Micro-enterprises</b>		<b>Small enterprises</b>		<b>Medium enterprises</b>	
	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>
Industry standards	25	17	42	20.6	42	25.9
Internal decisions	60	40.8	95	46.6	71	43.8
Requests from customers	62	42.2	67	32.8	49	30.3
<b>Total</b>	147	100	204	100	162	100

**Table 10**  
**Motives for varying credit terms offered**

Motives for varying credit terms offered	[1]		[2]		[3]		[4]		[5]		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
<i>Sales-promotion motives</i>												
To promote existing products/services	237	46.2	135	26.3	82	16	38	7.4	21	4.1	513	100
To promote new products/services	293	57.1	85	16.6	73	14.2	40	7.8	22	4.3	513	100
<i>Competitive motives</i>												
To attract a new large customer	163	31.8	62	12.1	150	29.2	86	16.7	52	10.2	513	100
To attract new customers generally	195	38	132	25.7	102	19.9	51	9.9	33	6.5	513	100
To retain a customer	102	19.9	75	14.6	160	31.2	111	21.6	65	12.7	513	100
Because a customer insists	92	17.9	88	17.1	193	37.6	102	19.9	38	7.5	513	100
To remain competitive	150	29.2	147	28.7	113	22	64	12.5	39	7.6	513	100
<i>Financing motives</i>												
To improve cash flow	186	36.3	120	23.3	83	16.2	65	12.7	59	11.5	513	100
To help a customer in temporary difficulties	79	15.4	59	11.5	156	30.4	138	26.9	81	15.8	513	100
In response to economic conditions	131	25.5	75	14.6	181	35.4	87	16.9	39	7.6	513	100

[1]= not at all important, [2]= unimportant, [3]= neither important nor unimportant, [4]= important, [5]= very important

**Table 11A**  
**Motives for varying credit terms offered by type of firms : the micro-enterprises**

Motives for varying credit terms offered	[1]		[2]		[3]		[4]		[5]		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
<i>Sales-promotion motives</i>												
To promote existing products/services	64	43.5	38	25.9	25	17	14	9.5	6	4.1	147	100
To promote new products/services	84	57.1	27	18.4	17	11.6	14	9.5	5	3.4	147	100
<i>Competitive motives</i>												
To attract a new large customer	49	33.3	14	9.5	42	28.6	28	19.1	14	9.5	147	100
To attract new customers generally	55	37.4	45	30.6	23	15.6	15	10.2	9	6.2	147	100
To retain a customer	30	20.4	24	16.3	41	27.9	35	23.8	17	11.6	147	100
Because a customer insists	37	25.2	23	15.6	51	34.7	29	19.7	7	4.8	147	100
To remain competitive	43	29.3	45	30.6	33	22.4	17	11.6	9	6.1	147	100
<i>Financing motives</i>												
To improve cash flow	66	44.9	35	23.8	23	15.6	13	8.9	10	6.8	147	100
To help a customer in temporary difficulties	22	15	17	11.6	42	28.6	39	26.5	27	18.3	147	100
In response to economic conditions	42	28.6	23	15.6	52	35.4	22	15	8	5.4	147	100

[1]= not at all important, [2]= unimportant, [3]= neither important nor unimportant, [4]= important, [5]= very important

**Table 11B**  
**Motives for varying credit terms offered by type of firms : the small enterprises**

Motives for varying credit terms offered	[1]		[2]		[3]		[4]		[5]		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
<i>Sales-promotion motives</i>												
To promote existing products/services	93	45.6	57	27.9	32	15.7	14	6.9	8	3.9	204	100
To promote new products/services	117	57.3	33	16.2	32	15.7	12	5.9	10	4.9	204	100
<i>Competitive motives</i>												
To attract a new large customer	64	31.4	29	14.2	60	29.4	28	13.7	23	11.3	204	100
To attract new customers generally	80	39.2	54	26.5	42	20.6	15	7.3	13	6.4	204	100
To retain a customer	40	19.6	27	13.2	68	33.3	41	20.2	28	13.7	204	100
Because a customer insists	31	15.2	38	18.6	77	37.7	41	20.1	17	8.4	204	100
To remain competitive	66	32.3	58	28.4	43	21.1	23	11.3	14	6.9	204	100
<i>Financing motives</i>												
To improve cash flow	73	35.8	43	21.1	35	17.2	29	14.2	24	11.7	204	100
To help a customer in temporary difficulties	30	14.7	19	9.3	66	32.3	57	27.9	32	15.8	204	100
In response to economic conditions	45	22.1	27	13.2	72	35.3	44	21.6	16	7.8	204	100

[1]= not at all important, [2]= unimportant, [3]= neither important nor unimportant, [4]= important, [5]= very important

**Table 11C**  
**Motives for varying credit terms offered by type of firms : the medium enterprises**

Motives for varying credit terms offered	[1]		[2]		[3]		[4]		[5]		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
<i>Sales-promotion motives</i>												
To promote existing products/services	80	49.4	40	24.7	25	15.4	10	6.2	7	4.3	162	100
To promote new products/services	92	56.8	25	15.4	24	14.8	14	8.7	7	4.3	162	100
<i>Competitive motives</i>												
To attract a new large customer	50	30.9	19	11.7	48	29.6	30	18.5	15	9.3	162	100
To attract new customers generally	60	37	33	20.4	37	22.8	21	13	11	6.8	162	100
To retain a customer	32	19.7	24	14.8	51	31.5	35	21.6	20	12.4	162	100
Because a customer insists	24	14.8	27	16.7	65	40.1	32	19.7	14	8.7	162	100
To remain competitive	41	25.3	44	27.2	37	22.8	24	14.8	16	9.9	162	100
<i>Financing motives</i>												
To improve cash flow	47	29	42	25.9	25	15.4	23	14.2	25	15.4	162	100
To help a customer in temporary difficulties	27	16.7	23	14.2	48	29.6	42	25.9	22	13.6	162	100
In response to economic conditions	44	27.2	25	15.4	57	35.2	21	13	15	9.2	162	100

[1]= not at all important, [2]= unimportant, [3]= neither important nor unimportant, [4]= important, [5]= very important

**Table 12**  
**Credit periods**

<b>Credit periods (days)</b>	<b>N</b>	<b>% firms</b>
Cash	28	5.4
[1-7]	21	4.2
[8-14]	10	1.9
[15-29]	25	4.8
[30]	47	9.2
[31-46]	71	13.8
[47-60]	135	26.3
[60 et +]	176	34.4
<b>Total</b>	<b>513</b>	<b>100</b>

**Table 13**  
**Credit periods by type of market**

<b>Credit periods (days)</b>	<b>Local</b>		<b>Regional</b>		<b>National</b>		<b>International</b>	
	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>
Cash	12	16.2	16	6.9	0	0	0	0
[1-7]	8	10.8	10	4.3	2	1.5	1	1.4
[8-14]	3	4	2	0.9	4	3	1	1.4
[15-29]	6	8.1	11	4.8	7	5.1	1	1.4
[30]	14	18.9	16	6.9	9	6.6	8	10.9
[31-46]	9	12.2	42	18.3	12	8.9	8	10.9
[47-60]	9	12.2	67	29.1	43	31.6	16	21.9
[60 et +]	13	17.6	66	28.8	59	43.3	38	52.1
<b>Total</b>	<b>74</b>	<b>100</b>	<b>230</b>	<b>100</b>	<b>136</b>	<b>100</b>	<b>73</b>	<b>100</b>

**Tableau 14**  
**Credit periods by type of firms**

Credit periods (days)	Micro-enterprises		Small enterprises		Medium enterprises	
	N	%	N	%	N	%
Cash	15	10.2	10	4.9	3	1.9
[1-7]	10	6.8	8	3.9	3	1.9
[8-14]	3	2.1	4	2	3	1.9
[15-29]	10	6.8	8	3.9	7	4.3
[30]	18	12.2	17	8.3	12	7.4
[31-46]	23	15.6	29	14.2	19	11.7
[47-60]	33	22.5	65	31.9	37	22.8
[60 et +]	35	23.8	63	30.9	78	48.1
<b>Total</b>	147	100	204	100	162	100

**Table 15**  
**Use of discounts with two-part terms in credit offered**

Frequency of use	N	%
Never	253	49.3
Seldom	129	25.1
Occasionally	80	15.6
Frequently	28	5.5
Always	23	4.5
<b>Total</b>	513	100

**Table 16**  
**Use of discounts with two-part terms in credit offered by industry classification**  
(in % of the number of firms)

<b>Frequency of use</b>	<b>EA</b> %	<b>EB</b> %	<b>EC</b> %	<b>ED</b> %	<b>EE</b> %	<b>EF</b> %	<b>EH</b> %	<b>EJ</b> %	<b>EK</b> %	<b>EN</b> %	<b>EP</b> %	<b>EQ</b> %
Never	25	31.2	21.6	62.5	46.9	37.4	59.7	48.6	71.4	78.9	66.7	100
Seldom	50	50	29.7	37.5	21.9	30.8	19.4	23.2	14.3	21.1	33.3	0
Occasionally	25	18.8	24.3	0	31.2	18.7	11.9	15.7	10.7	0	0	0
Frequently	0	0	8.2	0	0	5.5	9	7	3.6	0	0	0
Always	0	0	16.2	0	0	7.6	0	5.5	0	0	0	0
<b>Total</b>	100	100	100	100	100	100	100	100	100	100	100	100

**Table 17**  
**Use of discounts with two-part terms in credit offered by type of market**

<b>Frequency of use</b>	<b>Local</b>		<b>Regional</b>		<b>National</b>		<b>International</b>	
	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>
Never	53	71.6	118	51.3	51	37.5	31	42.5
Seldom	14	18.9	64	27.8	35	25.7	16	21.9
Occasionally	6	8.2	26	11.3	34	25	14	19.2
Frequently	0	0	13	5.7	9	6.6	6	8.2
Always	1	1.3	9	3.9	7	5.2	6	8.2
<b>Total</b>	74	100	230	100	136	100	73	100

**Table 18**  
**Frequency of late payments in credit collection**

<b>Frequency of late payments</b>	<b>N</b>	<b>%</b>
Never	21	4.1
Seldom	99	19.3
Occasionally	214	41.7
Frequently	167	32.6
Always	12	2.3
<b>Total</b>	513	100

**Table 19**  
**Variable definitions and summary statistics of the model of trade credit supply in 2002**  
(mean, median, standard deviation and number of observations)

Type of variables		Name	Definition of variables	Mean	Median	Std. dev.	Obs.
Dependent variables		TCI	Accounts receivable / turnover	0.18	0.19	0.15	513
		TCD	(Accounts receivable * 360) / turnover	64.29	63	44.65	513
		NT vs CT	= 1 if offering net terms, 0 if offering cash terms	0.94	1	0.21	465
		TPT vs CT	= 1 if offering two-part terms, 0 if offering cash terms	0.63	1	0.46	76
		TPT vs NT	= 1 if offering two-part terms, 0 if offering net terms	0.10	0	0.30	485
Independent variables	Supplier's characteristics	LTA	Logarithm of total assets value	12.65	12.17	11.27	513
		LOC	= 1 if the firm sale's market is local, 0 otherwise	0.14	0	0.35	513
		REG	= 1 if the firm sale's market is regional, 0 otherwise	0.45	0	0.44	513
		NAT	= 1 if the firm sale's market is national, 0 otherwise	0.27	0	0.50	513
		INT	= 1 if the firm sale's market is international, 0 otherwise	0.14	0	0.35	513
		AGE	Logarithm of (1 + firm's age)	2.58	2.38	0.74	513
		AGE <sup>2</sup>	Logarithm of (1 + firm's age) <sup>2</sup>	5.17	4.75	1.31	513
		PROF	Gross margin of exploitation / turnover	0.08	0.06	0.17	513
	RAT	= 1 if short-term bank credit is rationed, 0 otherwise	0.10	0	0.29	513	
	Products/services characteristics	QUA	= 1 if the quality of products/services sold is not easily to inspect, 0 otherwise	0.06	0	0.23	513
		FCP	= 1 if products/services sold are fast changing, 0 otherwise	0.22	0	0.41	513
		INN	= 1 if products/services sold are innovating, 0 otherwise	0.29	0	0.45	513
		COM	= 1 if the firm sale's market is strongly competitive, 0 otherwise	0.88	1	0.33	513
	Demand characteristics	NAC	Logarithm of firm's number of active customers	6.41	5.7	7.21	513
		SCN	Turnover / number of active customers	190.73	11.02	1818	513
		RET	= 1 if firm's customer base is mainly composed of retailers, 0 otherwise	0.37	0	0.48	513
		WHL	= 1 if firm's customer base is mainly composed of wholesalers, 0 otherwise	0.22	0	0.42	513
		PRO	= 1 if firm's customer base is mainly composed of producers, 0 otherwise	0.41	0	0.49	513
		LOW	= 1 if firm's customer base is mainly composed of lower-sized firms, 0 otherwise	0.35	0	0.48	513
		EQU	= 1 if firm's customer base is mainly composed of equal-sized firms, 0 otherwise	0.22	0	0.41	513
HIG		= 1 if firm's customer base is mainly composed of higher-sized firms, 0 otherwise	0.43	0	0.49	513	
SEA	= 1 the firm faces a seasonal demand, 0 otherwise	0.48	0	0.49	513		

**Table 20**  
**Estimates of trade credit supply**

Independent variables are relative to supplier's characteristics [1], products/services sold [2] and demand [3]. Models I and II : determinants of the variable (TCI), O.L.S estimates, standard deviations in brackets ; III and IV : determinants of the variable (TCD), ordered probit estimates, khi-square in brackets ; V, VI and VII : determinants of variables {NT(1) vs CT(0)}, {TPT(1) vs CT(0)} and {TPT(1) vs NT(0)}, logit estimates, khi-square in brackets. <sup>1,2</sup> and <sup>3</sup> : significant at 1%, 5% et 10%, respectively.

Variables	I	II	III	IV	V	VI	VII
[1]							
LTA	.012 <sup>1</sup> (.027)	-	.354 <sup>1</sup> (7.57)	-	-	-	-
REG	-	.007 (.015)	-	.132 (0.87)	.879 (1.04)	.942 (.891)	.706 (1.54)
NAT	-	.022 <sup>3</sup> (.012)	-	.273 <sup>3</sup> (2.89)	1.01 (1.16)	.876 (1.22)	.795 <sup>3</sup> (3.26)
INT	-	.050 <sup>1</sup> (.018)	-	.647 <sup>1</sup> (7.28)	.978 <sup>3</sup> (2.83)	1.17 <sup>1</sup> (7.86)	1.75 <sup>1</sup> (7.47)
AGE	.017 <sup>2</sup> (.008)	.014 <sup>2</sup> (.006)	.041 <sup>2</sup> (5.21)	.025 <sup>2</sup> (5.53)	.115 (1.57)	.826 <sup>3</sup> (3.77)	.110 <sup>1</sup> (8.51)
AGE <sup>2</sup>	-.005 <sup>2</sup> (.002)	-.004 <sup>2</sup> (.002)	-.004 <sup>2</sup> (4.37)	-.002 <sup>2</sup> (4.57)	-	-	-
PROF	.051 <sup>2</sup> (.026)	.073 <sup>2</sup> (.035)	.218 <sup>1</sup> (6.80)	.315 <sup>1</sup> (7.46)	.032 <sup>3</sup> (2.85)	-.734 (.573)	-.021 (.292)
RAT	-.010 <sup>1</sup> (.003)	-.012 <sup>2</sup> (.005)	-.697 <sup>2</sup> (4.48)	-.362 <sup>2</sup> (5.32)	-1.37 (2.06)	-.779 (1.92)	.043 (.571)
[2]							
QUA	.033 <sup>2</sup> (.015)	.039 <sup>2</sup> (.016)	.647 <sup>3</sup> (2.86)	.465 <sup>2</sup> (5.32)	.170 (.451)	.762 (.803)	-.110 <sup>3</sup> (3.67)
FCP	-.022 <sup>2</sup> (.010)	-.028 <sup>2</sup> (.012)	-.134 <sup>2</sup> (4.25)	-.194 <sup>3</sup> (2.88)	-.744 <sup>2</sup> (5.85)	-1.43 <sup>2</sup> (5.07)	-.993 (2.21)
INN	.004 (.010)	.006 (.010)	.048 (.59)	.075 (.780)	2.40 <sup>2</sup> (4.74)	1.06 <sup>3</sup> (3.81)	.037 (.532)
COM	.032 (.027)	.027 (.033)	.533 (1.15)	.282 (1.96)	1.16 (1.81)	1.48 <sup>2</sup> (4.94)	.634 <sup>3</sup> (2.97)
[3]							
NAC	-.023 <sup>1</sup> (.003)	-	-.145 <sup>1</sup> (7.79)	-	-.113 (2.35)	-.757 (.658)	-.335 (1.36)
SCN	-	.031 <sup>2</sup> (.014)	-	.036 <sup>2</sup> (4.98)	-	-	-
WHL	.015 (.009)	.014 (.001)	.208 (.894)	.074 (.515)	.119 (.445)	1.33 (.648)	.232 (.486)
PRO	.045 <sup>1</sup> (.012)	.047 <sup>1</sup> (.013)	.653 <sup>1</sup> (9.03)	.394 <sup>1</sup> (8.14)	.922 <sup>1</sup> (6.99)	1.83 <sup>3</sup> (3.33)	-.681 <sup>2</sup> (4.72)
EQU	.018 (.012)	.017 (.013)	.661 <sup>3</sup> (1.88)	.356 (1.92)	1.74 (2.46)	.877 (1.08)	.053 (.494)
HIG	.025 <sup>3</sup> (.022)	.022 (.017)	.761 (1.72)	.380 (1.91)	2.36 <sup>3</sup> (2.83)	1.06 (.971)	.092 (1.83)
SEA	-.010 (.009)	-.008 (.009)	-.219 (1.29)	-.110 (1.13)	.398 (1.01)	.144 (1.59)	.029 (1.67)
N	513	513	513	513	465	76	485
R <sup>2</sup>	0.22	0.21	-	-	-	-	-
F-test	8.21 <sup>1</sup>	7.52 <sup>1</sup>	-	-	-	-	-
-2LL	-	-	561.34	559.48	425.32	174.32	442.31

**Table 21**  
**Variable definitions and summary statistics of the model of trade credit demand in 2002**  
(mean, median, standard deviation and number of observations)

Type of variables		Name	Definition of variables	Mean	Median	Std. dev.	Obs.
Dependent variables		AP	Accounts payable / total assets	0.27	0.26	0.16	513
		LTP	= 1 if late payments to suppliers are frequent or systematic = 0 otherwise	0.17	0	0.39	513
Independent variables	Transaction component	STO	Stocks / total assets	0.20	0.16	0.17	513
		STUR	(Stocks * 360) / turnover	48.66	34.60	50.74	513
		NAS	Logarithm of firm's number of active suppliers	4.99	4.40	5.59	513
		TNV	Logarithm of turnover	12.74	12.65	11.62	513
	Financing component	SCOR	Score variable Conan-Holder	17.46	16.16	10.76	513
		LEV	Total debt / equity	2.21	2.02	1.15	513
		AGE	Logarithm of (1 + firm's age)	2.58	2.38	0.74	513
		RAM	= 1 if firm's form of business is proprietorship or partnership = 0 otherwise	0.26	0	0.44	513
		TPT	= 1 if discounts with two-part terms are offered by suppliers = 0 otherwise	0.13	0	0.33	513
		STD	Short-term bank credit / total assets	0.09	0.07	0.11	513
RAT	= 1 if short-term bank credit is rationed = 0 otherwise	0.10	0	0.29	513		

**Table 22**  
**Estimates of trade credit demand**

Independent variables are relative to the transaction component [1] and the financing component [2] of trade credit demand. Models I and II : determinants of the variable (AP), O.L.S estimates, standard deviations in brackets ; III and IV : determinants of the variable (LTP), logit estimates, khi-square in brackets. <sup>1,2</sup> and <sup>3</sup> : significant at 1%, 5% et 10%, respectively.

<b>Variables</b>	<b>I</b>	<b>II</b>	<b>III</b>	<b>III</b>
[1]				
STO	.058 <sup>1</sup> (.021)	.053 <sup>1</sup> (.020)	-.241 (.823)	-.197 (.849)
STUR	-.001 <sup>1</sup> (.000)	-.002 <sup>1</sup> (.000)	.016 (.595)	.019 (1.04)
NAS	.022 <sup>2</sup> (.008)	.025 <sup>2</sup> (.009)	.382 (1.24)	.419 (.86)
TNV	.043 <sup>1</sup> (.005)	.041 <sup>1</sup> (.005)	.107 (.958)	.141 (.526)
[2]				
SCOR	-.006 <sup>2</sup> (.003)	-.007 <sup>2</sup> (.003)	-.051 <sup>1</sup> (7.34)	-.058 <sup>2</sup> (5.87)
LEV	.024 <sup>1</sup> (.004)	.025 <sup>1</sup> (.004)	.309 <sup>2</sup> (5.21)	.325 <sup>2</sup> (6.12)
AGE	-.003 <sup>2</sup> (.001)	-.002 <sup>3</sup> (.001)	-.015 <sup>2</sup> (4.32)	-.012 <sup>3</sup> (3.63)
RAM	.027 (.023)	.030 (.264)	-	.439 (1.06)
TPT	-.006 (.005)	-.007 (.006)	-.125 <sup>2</sup> (3.21)	-.157 <sup>3</sup> (3.48)
STD	.048 <sup>1</sup> (.010)	.046 <sup>1</sup> (.010)	.649 <sup>3</sup> (3.21)	.511 (2.12)
RAT	-	.058 <sup>1</sup> (.021)	-	.109 <sup>1</sup> (8.35)
Intercept	-.605 <sup>1</sup> (.142)	-.731 <sup>1</sup> (.127)	-1.83 <sup>1</sup> (7.32)	-1.97 <sup>1</sup> (8.08)
N	513	513	513	513
R <sup>2</sup>	0.38	0.44	-	-
F-test	15.78 <sup>1</sup>	16.68 <sup>1</sup>	-	-
-2 LL	-	-	521.36	546.62

**Appendix 1**  
**Algebraic manipulations of the model of trade credit demand**  
**Elliehausen and Wolken [1993]**

Presented equations are the following :

$$[1] \quad DTC^* = TC + FC$$

$$[2] \quad TC = F(PUR, \Delta DEL, RLA, CCLA)$$

$$TC = a_0 + a_1 PUR + a_2 \Delta DEL + a_3 RLA + a_4 CCLA$$

$$[3] \quad FC = F(FR, BR, PTC, PBC)$$

$$FC = b_0 + b_1 FR + b_2 BR + b_3 PTC + b_4 PBC$$

$$[4] \quad DBC = F(PBC)$$

$$DBC = c_0 + c_1 PBC$$

$$PBC = (DBC - c_0) / c_1$$

$$[5] \quad DTC = AP$$

$$[6] \quad DTC^* - DTC = F(FR, BR)$$

$$DTC^* - DTC = d_1 FR + d_2 BR$$

$$[7] \quad DTC^* = AP + F(FR, BR)$$

$$DTC^* = AP + d_1 FR + d_2 BR$$

Introducing equations [2] and [3] in equation [1] yields :

$$[1] \quad DTC^* = [a_0 + a_1 PUR + a_2 \Delta DEL + a_3 RLA + a_4 CCLA]$$

$$+ [b_0 + b_1 FR + b_2 BR + b_3 PTC + b_4 PBC]$$

Combining equations [4] and [7] with equation [1] is :

$$DTC^* = TC + FC = AP + d_1 FR + d_2 BR$$

$$AP = DTC^* - d_1 FR - d_2 BR$$

$$AP = [a_0 + a_1 PUR + a_2 \Delta DEL + a_3 RLA + a_4 CCLA]$$

$$+ \{b_0 + b_1 FR + b_2 BR + b_3 PTC + b_4 [(DBC - c_0) / c_1]\}$$

$$- d_1 FR - d_2 BR$$

Following [5], after simplifications :

$$DTC = AP = [a_0 + b_0 - b_4(c_0 / c_1)]$$

$$+ [a_1 PUR + a_2 \Delta DEL + a_3 RLA + a_4 CCLA]$$

$$+ \{(b_1 - d_1) FR + (b_2 - d_2) BR + b_3 PTC + [(b_4 / c_1) DBC]\} + \varepsilon$$

Then :  $DTC = AP = \alpha + TC + FC + \varepsilon$

**Appendix 2**  
**Main characteristics of the Commission Recommendation of 3 April 1996**  
**concerning the definition of small and medium-sized enterprises**

- Small and medium-sized enterprises, hereinafter referred to as “SMEs”, are defined as enterprises which :
  - have fewer than 250 employees
  - and have either :
    - an annual turnover not exceeding ECU 40 million,
    - or an annual balance-sheet total not exceeding ECU 27 million,
  - conform to the criterion of independence as defined below.
  
- Where it is necessary to distinguish between small and medium-sized enterprises, the “small enterprise” is defined as an enterprise which :
  - has fewer than 50 employees
  - and has either :
    - an annual turnover not exceeding ECU 7 million,
    - or an annual balance-sheet total not exceeding ECU 5 million,
  - conforms to the criterion of independence as defined below.
  
- Independent enterprises are those which are not owned as to 25 % or more of the capital or the voting rights by one enterprise, or jointly by several enterprises, falling outside the definition of an SME or a small enterprise, whichever may apply. This threshold may be exceeded in the following two cases :
  - if the enterprise is held by public investment corporations, venture capital companies or institutional investors, provided no control is exercised either individually or jointly,
  - if the capital is spread in such a way that it is not possible to determine by whom it is held and if the enterprise declares that it can legitimately presume that it is not owned as to 25 % or more by one enterprise, or jointly by several enterprises, falling outside the definitions of an SME or a small enterprise, whichever may apply.
  
- In calculating the thresholds referred above, it is therefore necessary to cumulate the relevant figures for the beneficiary enterprise and for all the enterprises which it directly or indirectly controls through possession of 25 % or more of the capital or of the voting rights.
  
- Where it is necessary to distinguish micro-enterprises from other SMEs, these are defined as enterprises having fewer than 10 employees.

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