

# PREDICTORS OF NET TRADE CREDIT EXPOSURE: EVIDENCE FROM THE ITALIAN MARKET

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## ABSTRACT

*In light of multiple motivations for the use of trade credit, firms tend to supply and receive trade credit at the same time, so the choice to engage in one of these activities could influence the other. Many studies proposed in the literature define models of trade credit and provide empirical evidence, looking mainly at only one aspect of trade policy at a time. The few studies comparing gross and net exposure models are based on a limited set of variables or on a limited time horizon. In the context of one of the more relevant world markets (Italy), this paper compares models for gross and net exposure, demonstrating a significant difference in the statistical fitness of the two models and in the characteristics of the explanatory variables. The results demonstrate the existence of a strict relationship between trade credit and debt choices and suggest some unique features of net models compared to gross ones.*

**JEL:** G31, G32, C31

**KEYWORDS:** trade credit, Italy

## INTRODUCTION

Trade credit represents a way for large and financially strong firms to extend credit to small and financially weak ones (Schwartz, 1974). According to traditional theories (Omiccioli, 2005), the use of trade credit is determined by features of the economic sector and characteristics of the firm (Petersen and Rajan, 1997), but market power, on both the demand and supply sides, could influence a firm's trade credit/debt decisions (Mian and Smith, 1992; Wilson and Summers, 2002).

Empirical evidence confirms the intense use of trade credit by small firms (Berger and Udell, 1998) but shows that large firms also receive it and small firms also extend it (Rajan and Zingales, 1995; Nielsen, 2002). Moreover, in light of the multiple motivations for the use of trade credit, firms tend to supply and receive trade credit at the same time, so the choices to offer/accept trade credit are influenced by each other (Kiyotaki and Moore, 1997) as the decision to extend trade credit is financed by trade debt (Fabbri and Klapper, 2008). Although more recent studies have underlined the need to consider both trade debt and credit choices, there is no evidence about the impact on the explanatory variables that could be attributed to the choice of gross relative to net amount/duration. The comparison of gross and net models could be useful to demonstrate, as hypothesised in some theoretical works, that some types of variables affect net exposure more significantly than gross exposure.

This paper reviews the literature on the motivations of supply and demand for trade credit, stressing the roles of different explanatory variables in gross and net exposure. The empirical analysis, performed in the context of one of the more developed world markets (Italy), demonstrates that models constructed based on net exposure fit statistically better than gross ones, and the main differences among the explanatory variables of the net and gross models primarily involve the types of firm-specific variables considered in the models. The main policy implication concerns the approach that must be adopted in evaluating the trade credit/debt dynamics: normally, firms adopt a trade credit/debt structure that is coherent for the amount and for the duration, so it is important to pay attention to all events (i.e., the

dilution risk) that could affect this close relationship. On the basis of the results obtained, financial instruments constructed based on trade receivables (i.e., factoring, asset based lending) must not only consider the characteristics of the credit assigned, but also evaluate the overall credit/debt trade exposure of the seller.

The remainder of the article is organized as follows. In the next section a literature review is provided. This section is followed by a presentation of the data, methodology and empirical results. The paper closes with a summary, brief conclusions and implications for the evaluation of the phenomenon.

## LITERATURE REVIEW

According to traditional theories (Omiccioli, 2005), the supply and demand for trade credit are determined by the features of the economic sector and the characteristics of the firm (Giannetti et al., forthcoming). Trade credit allows firms to separate the delivery of the good/service in time from the payment of the price, so the buyer benefits from an extended period of time to verify the quality of the supply (Long et al., 1993): the inspection need depends on the relevant economic sector, according to the innovation, complexity, customisation and perishability of the supplied good. Both the terms (Ng et al., 1999) and volumes (Giannetti et al., forthcoming) of trade credit available vary according to the type of product/service supplied: given the economic sector and product type (Lee and Stowe, 1993), buyers consider discounts for cash payments as low quality signals regarding the supply, while the extension of trade credit is considered to be a more effective solution than minimum quality guarantees (Faith and Tollison, 1981). As it concerns the contract enforcement, the type of product also affects the buyer's opportunistic behaviour: services and tailor-made products are exposed to a lower risk of diversion (Burkart and Ellingsen, 2004), even though their lower level of liquidity can affect the recovery value in case of the debtor's default (Mian and Smith, 1992).

Besides the relevant economic sector, the use of trade credit is also influenced by characteristics of the firm. According to the theory of real motivations, suppliers extend trade credit to support sales (Nadiri, 1969), while financial motivations stress the position of trade debt in the firm's financial structure (Lewellen et al., 1980). To support sales, suppliers can use trade credit as a mean of price discrimination between cash and delayed payments by means of a two-part terms approach (Ng et al., 1999): the buyer can pay the price at the end of the delay period or benefit from a discount for payment shortly after the purchase. If trade credit is evaluated as an investment, then the delayed payment and the price cannot be considered as independent (Schwartz, 1974).

Moreover, the combined supply of finance and goods allows trade creditors to modify the offer conditions without modifying the price (Schwartz and Withcomb, 1979). Lastly, price discrimination can affect the fiscal effects of trade credit: other conditions being equal, suppliers with a high tax rate prefer to extend trade credit to buyers facing a low tax rate, particularly if the Value Added Tax is refunded to suppliers in the case of the debtor's default (Florentsen et al., 2003). Nevertheless, the use of trade credit to support sales is not limited to price discrimination: the counterparties can agree to delay the payment for a few days to minimise the financial flow variability due to the dynamics of receipts and payments and the pertinent transaction costs (Ferris, 1981).

Besides price discrimination, suppliers can also extend trade credit to stabilise the demand, both at the micro and macro levels. On the micro level, trade credit allows firms to protect their non-salvageable investments in their relationships with buyers (Smith, 1987), to transfer the inventory warehousing costs to buyers by promoting a push strategy (Emery, 1987), and to benefit from the customer's inertia and performing payment behaviour due to the high costs of supplier switching (Cunãt, 2007), particularly for non-standardised goods/services (Giannetti et al., forthcoming) that favour the building of long-lasting trade relationships (Summers and Wilson, 2003), even if the debtor is experiencing difficulties in the

reimbursement of the debt (Wilner, 2000). At the macro level, trade credit supports sales during economic downturns (Meltzer, 1960), particularly by extending delayed payment plans to new customers (Nielsen, 2002); moreover, the extension of trade credit is particularly relevant as a smoothing tool when the demand is characterised by a seasonal trend (Paul and Wilson, 2006).

Trade debt allows buyers to delay payment for the inputs until after the revenues are realised (Lewellen et al., 1980); thus, they can use it as either a substitute or a complement for other financial sources. Theories on the substitution effect indicate that in the presence of market imperfections, the suppliers' cost of financial sources is lower than the buyers' cost, or in other words, suppliers have higher liquidity. Therefore, buyers can use trade debt as a substitute (Meltzer, 1960) and residual (Jaffee and Stiglitz, 1990) source compared to bank credit and, at times of monetary shortage, the size of the firm may be irrelevant (Nielsen, 2002).

Theories supporting the complementary use of trade and financial debt stem from the competitive advantage based on the combined supply of finance and goods that allows firms to improve the operative efficiency of the counterparties taking part in the transaction (Mian and Smith, 1992), compared to alternative financial sources. First of all, suppliers benefit from a competitive advantage in the acquisition of information on a firm's creditworthiness (Berger and Udell, 1998), which is particularly relevant for evaluating young and opaque firms. Second, suppliers benefit from continuous exchanges during the trade relationship that allow them to track the buyer's creditworthiness based on updated information (McMillan and Woodruff, 1999). Third, if the debtor defaults, suppliers can easily recover the assets due to their knowledge of the supplied goods (Myers and Rajan, 1998), and they can extract value from the collateral assets in a way that is not always easy for other creditors (Longhofer and Santos, 2003); this advantage of trade credit suppliers over financial intermediaries is particularly relevant in common law countries (Frank and Maksimovic, 2004).

As trade credit is mainly intended for traders or intermediaries in the distribution channel, its dynamics can be more affected by the bargaining power of the counterparties involved in the inter-firm transaction than by the characteristics of the firm and the economic sector as predicted by traditional theories (Van Horen, 2005). On the supplier side, trade credit is extended when the exploitation of market power ensures effective price discrimination (Mian and Smith, 1992). On the demand side, market power can be exploited by large buyers toward suppliers that extend trade credit even if it causes a financial disadvantage (Wilson and Summers, 2002). Empirical evidence shows that large buyers exploit their market power, particularly in trade relationships with small suppliers (Summer and Wilson, 2003) and in developing countries (Van Horen, 2007), where the use of trade credit is strongly connected with reputation (Fisman and Love, 2003) and is considered an indicator of market competitiveness (Hydman and Serio, forthcoming). However, the empirical evidence for transactions involving larger firms does not support this hypothesis (Banarajee et al., 2004).

Firms tend to supply and accept trade credit at the same time, and the choices to offer and accept trade credit may be influenced by each other (Kiyotaki and Moore, 1997). Empirical evidence from developed countries shows that firms suffering from excessive customer market power balance the supply of trade credit with trade debt by adopting a matching strategy of the net trade credit position at the levels both of volumes and of terms (Fabbri and Klapper, 2008). In addition, small firms in developed countries do not adjust their trade credit supply, while large firms are found to adapt trade credit and debt to smooth their financial cycle (Marotta, 2005), particularly during times of monetary tightness (Brechling and Lipsey, 1963), when trade credit defaults of small and constrained firms rise as they run up against large firms acting as final providers of liquidity (Boissay and Gropp, 2007).

## DATA AND METHODOLOGY

### Sample

The sample consists of all accounting information available for Italian firms on the AIDA-Bureau Van Dijk database for the time period of 1999-2008. The choice of accounting data for the Italian market constrains the choice of frequency because half-year reports are unavailable for most of the firms (Table 1).

Table 1: Sample characteristics

Geographical Area	N° Firms	Year	Firms
North	8878	1999	7695
Center	1853	2000	8136
South and Islands	857	2001	8594
Not Classified	264	2002	9068
Overall	11561	2003	9448
		2004	10198
		2005	10617
		2006	11115
		2007	11716
		2008	11731
Sector	N° Firms	N° Years available	Firms
Agriculture	1995	Only 1 year	0
Construction	238	2 years	658
Consultant	1703	3 years	495
Energy	199	4 years	452
Entertainment	203	5 years	739
Finance and Insurance	377	6 years	433
Media	577	7 years	495
Instruction	59	8 years	502
Manufacturing	2446	9 years	565
Mining	0	10 years	7485
Tourism	103		
Transportation	2935		
Utilities	241		
Wholesale	512		
Not Classified	237		

Source: AIDA-Bureau Van Dijk data, processed by the authors

The database encompasses 11,824 firms and, based on the standard Italian ATECO 2007 (For further details on the ATECO 2007 classification, see the site of the Italian Institute of Statistics (ISTAT) at the following address: [www.istat.it](http://www.istat.it)) classification, it is also well diversified in terms of geographical area. Firms in northern Italy and firms in the manufacturing and mining sectors predominate in the sample. The sample is coherent with the Italian market, in which more firms are located in the north because of the high efficiency of service and infrastructure available there, and is predominantly specialised in the manufacturing or transport sectors.

Some firms do not have data for all the years considered, so the sample size varies over time on the basis of data availability, but for each year there are not fewer than 7600 firms (year 1999), and the number of firms considered is growing over time. More than 63.30% of the firms included in the sample remain in the sample for the entire time period considered, and none of them have data available for only one year. The core sample is thus not variable over time, and the results are not significantly affected by the survivorship bias.

On the basis of the literature available, the analysis of trade credit policy considers both the amount and duration of trade credit offered and obtained by each firm and look at some features of the firm, sector and market that could affect firm choices. The explanatory variables, classified by type, are summarised in Table 2.

Summary statistics of data available for the overall time period (1999-2008) are summarized in the following table. The entire sample is used to construct some benchmark variables (like Sector trade credit

/debt amount / duration and Ratio sales / sector) used in the analysis while, because of the lack of some firm-specific data, more than 60% of the firms previously identified could not be considered for the analysis of trade credit/debt firms' choices.

Table 2 : Explanatory Variables for Trade Credit Identified in the Literature

Name	Description	Type of Variable	Main References
Firm age	N° years from the firm's year of birth and the evaluation date	Firm	Petersen and Rajan (1997), Pike and Cheng (1998), Ng et al. (1999), Paul and Wilson (2006), Wilson and Summers (2002), Fabbri and Klapper (2008), Van Horen (2005)
Geographical Area	Dummy variable for North, Center and South and Islands	Firm	Marotta (2005); Petersen and Rajan (1997)
Listed	Dummy variable with value 1 for listed companies	Firm	Petersen and Rajan (1997)
Total Assets	Total assets at time t	Firm	Long et al. (1993), Petersen and Rajan (1997), Wilson and Summers (2002), Peek et al. (1998), Van Horen (2005)
Employees	No. of Employees	Firm	Giannetti et al. (forthcoming); Fabbri and Klapper (2008)
BT debt	Short term debt <sub>t</sub>	Firm	Long et al. (1993)
MLT debt	Bank debt <sub>t</sub> / Total Asset <sub>t</sub>	Firm	Russo and Leva (2005)
Fixed assets	Fixed Assets/Assets	Firm	Giannetti et al. (forthcoming)
Revenues growth	Mean revenue growth rate <sub>t,t-1</sub>	Firm	Wilson and Summers (2002)
Trade credit growth	Yearly growth rate of trade credit <sub>t</sub>	Firm	Petersen and Rajan (1997)
Inventory coverage	N° days for which inventory available at time t ensure production cycle	Firm	Russo and Leva (2005)
Debt interest rate	Mean interest rate for bank lending <sub>t</sub>	Firm	Marotta (2005); Russo and Leva (2005)
Profit margin	Operating margin <sub>t</sub> / Sales <sub>t</sub>	Firm	Wilson and Summers (2002), Petersen and Rajan (1997)
Output inventory	Output inventory <sub>t</sub> / Inventory <sub>t</sub>	Firm	Petersen and Rajan (1997)
Cash Flow / Sales	Cash flow <sub>t-1</sub> / Sales <sub>t</sub>	Firm	Ng et al. (1999), Wilson and Summers (2002)
Cash sales	(Sales <sub>t</sub> - Trade credit <sub>t</sub> ) / Total Assets <sub>t</sub>	Firm	Long et al. (1993)
Current asset ratio	Current Assets <sub>t</sub> / Total Assets <sub>t</sub>	Firm	Petersen and Rajan (1997)
Solvency	Rating <sub>t</sub>	Firm	Long et al. (1993)
Sector trade credit amount	Mean amount of sector trade credits	Sector	Petersen and Rajan (1997), Long et al. (1993), Giannetti et al. (forthcoming), Marotta (2005)
Sector trade debt amount	Mean amount of sector trade debts	Sector	Petersen and Rajan (1997), Long et al. (1993), Giannetti et al. (forthcoming), Marotta (2005)
Sector trade credit amount	Mean duration of sector trade credits	Sector	Petersen and Rajan (1997), Long et al. (1993), Giannetti et al. (forthcoming), Marotta (2005)
Sector trade debt amount	Mean duration of sector trade debts	Sector	Petersen and Rajan (1997), Long et al. (1993), Giannetti et al. (forthcoming), Marotta (2005)
Inventory turnover	N° day for inventory turnover <sub>t</sub>	Sector	Russo and Leva (2005)
Brand equity	Fixed assets at time t / Sales <sub>t</sub>	Market	Van Horen (2007), Bhattacharya (2008)
Brand equity net	(Fixed assets at time t - Goodwill) / Sales <sub>t</sub>	Market	Van Horen (2007), Bhattacharya (2008)
Ratio sales/sector	Revenues <sub>t</sub> / Sector Total Revenue <sub>t</sub>	Market	Fabbri and Klapper (2008), Van Horen (2007)

Source: Authors' elaboration

Table 3: Summary Statistics of Variables

Name of the Variable	N° Observations	Mean	Dev.st	Max	Min
Trade debt amount	80,863.00	17,397,022.53	29,441,267.17	1,000,352,833.00	0.00
Trade credit amount	80,467.00	21,292,260.31	31,994,500.49	978,061,049.00	0.00
Trade debt duration	86,732.00	103.56	87.79	1,997.99	0.01
Trade credit duration	73,079.00	147.63	96.52	554.52	0.02
Firm age	111,833.00	25.33	23.43	108.00	0.00
Geographical Area	118,250.00	-	-	-	-
Listed	115,610.00	-	-	-	-
Total Assets	99,052.00	72,859,273.54	147,552,637.58	1,993,714,059.00	2.00
Employees	99,608.00	6,397.19	1,974,252.10	651,588,038.00	0.00
BT debt	96,914.00	38,044,966.85	78,938,375.90	1,935,834,679.00	0.00
MLT debt	64,189.00	15,420,034.25	53,309,835.15	1,460,317,212.00	0.00
Fixed assets	72,347.00	4,021,737.81	20,416,476.04	1,014,121,997.00	0.00
Revenues growth	74,085.00	0.05	0.26	1.00	-1.00
Trade credit growth	81,087.00	0.05	0.31	1.00	-1.00
Inventory coverage	75,576.00	105.97	95.18	499.92	0.01
Debt interest rate	95,895.00	0.03	0.24	1.00	0
Profit margin	98,325.00	72,560,399.88	120,067,462.95	2,161,859,658.00	-456,825,139.00
Inventory / Revenues	65,595.00	0.12	0.37	10.00	0.00
Output inventory	65,724.00	7,274,246.48	17,446,279.36	1,526,260,995.00	0.00
Output inventory/Inventory	65,724.00	0.63	0.35	1.00	0.00
Cash Flow / Sales	98,263.00	1.87	430.07	10.00	-10.00
Cash sales	98,577.00	1.32	2.61	298.60	-2.24
Current asset ratio	72,347.00	0.04	0.07	1.00	0.00
Solvency*	67,512.00	25.18	19.06	100.00	-47.64
Sector trade credit amount	115,880.00	20,697,019.53	6,896,593.61	52,238,387.57	5,060,496.86
Sector trade debt amount	115,880.00	16,961,915.69	5,491,377.99	37,216,673.82	3,627,188.14
Sector trade credit duration	115,880.00	103.99	18.45	161.94	52.02
Sector trade debt duration	115,880.00	157.45	46.84	379.55	92.79
Inventory turnover	79,195.00	57.72	59.49	499.86	0.01
Brand equity	82,378.00	-0.11	97.89	6,945.00	0.00
Brand equity net	82,378.00	0.05	3.88	1,072.58	0.00
Ratio sales/sector	98,325.00	0.00	0.00	0.01	0.00

\* Solvency is a rating assigned by AIDA Bureau VanDijk that could vary from -100 to 100. For further details about computation methodology see AIDA-Bureau Van Dijk website

Source: AIDA-Bureau Van Dijk data, processed by the authors

## Methodology

The analysis of determinants of trade credit policy considers the demand, the supply and the net exposure. For each feature, the approach considers both the duration and the amount of the trade credit/debt. The formulas can be summarised as follows:

$$\text{Trade Credit Amount}_t = \alpha_t + \sum_{i=1}^n \beta_{it} X_{it} + \sum_{j=1}^n \gamma_{jt} Y_{jt} + \sum_{k=1}^o \delta_{kt} Z_{kt} + \varepsilon_{it} \quad (1)$$

$$\text{Trade Debt Amount}_t = \alpha_t + \sum_{i=1}^n \beta_{it} X_{it} + \sum_{j=1}^n \gamma_{jt} Y_{jt} + \sum_{k=1}^o \delta_{kt} Z_{kt} + \varepsilon_{it} \quad (2)$$

$$\text{Trade Credit Duration}_t = \alpha_t + \sum_{i=1}^n \beta_{it} X_{it} + \sum_{j=1}^n \gamma_{jt} Y_{jt} + \sum_{k=1}^o \delta_{kt} Z_{kt} + \varepsilon_{it} \quad (3)$$

$$\text{Trade Debt Duration}_t = \alpha_t + \sum_{i=1}^n \beta_{it} X_{it} + \sum_{j=1}^n \gamma_{jt} Y_{jt} + \sum_{k=1}^o \delta_{kt} Z_{kt} + \varepsilon_{it} \quad (4)$$

where the variable representing the time/amount of trade credit/debt is regressed on some features of the firm ( $X_{it}$ ), the sector ( $Y_{jt}$ ) and the market ( $Z_{kt}$ ) that have been identified in the literature as possible explanatory variables or indices.

The huge number of regressors identified in the literature makes it necessary to define selection criteria for reducing the number of estimators. The approach selected is the stepwise forward approach, with the cut-off for including a variable fixed at 0.01%. In the analysis no assumption are done on the order of the

variables to be included and all possible models combination are tested in order to define the model that fit the best.

The fitness of a model based on amount and term conditions is not strictly comparable for the higher variance that characterises the first type of models compared to the others. To test the impact of the choice of net measures with respect to gross ones, we compare the fitness statistics for each model.

Following Fabbri and Klapper (2008), the analysis of net exposure is performed with the same model proposed for the gross estimates, including as explanatory variables for the amount or duration of trade credit (debt) the amount or duration of the trade debt (credit), as in the following formulas:

$$Trade\ Credit\ Amount_t = \alpha_t + \tau_t Trade\ Debt\ Amount_t + \sum_{i=1}^n \beta_{it} X_{it} + \sum_{j=1}^n \gamma_{jt} Y_{jt} + \sum_{k=1}^o \delta_{kt} Z_{kt} + \varepsilon_{it} \quad (1a)$$

$$Trade\ Debt\ Amount_t = \alpha_t + \tau_t Trade\ Credit\ Amount_t + \sum_{i=1}^n \beta_{it} X_{it} + \sum_{j=1}^n \gamma_{jt} Y_{jt} + \sum_{k=1}^o \delta_{kt} Z_{kt} + \varepsilon_{it} \quad (2a)$$

$$Trade\ Credit\ Duration_t = \alpha_t + \tau_t Trade\ Debt\ Duration_t + \sum_{i=1}^n \beta_{it} X_{it} + \sum_{j=1}^n \gamma_{jt} Y_{jt} + \sum_{k=1}^o \delta_{kt} Z_{kt} + \varepsilon_{it} \quad (3a)$$

$$Trade\ Debt\ Duration_t = \alpha_t + \tau_t Trade\ Credit\ Duration_t + \sum_{i=1}^n \beta_{it} X_{it} + \sum_{j=1}^n \gamma_{jt} Y_{jt} + \sum_{k=1}^o \delta_{kt} Z_{kt} + \varepsilon_{it} \quad (4a)$$

If the new variables included improve the fitness of the model and are statistically representative, the trade credit and debt decisions may be considered to be strictly interrelated. The next step of the analysis is to study the main differences between gross and net models to evaluate whether the second approach displays any distinctive features compared to the standard gross approach.

## RESULTS

### Models of Trade Credit/Debt Amount

On the basis of the previously explained methodology, we present an analysis of the dynamics of trade credit amounts, considering the characteristics of the firm, the sector and the market in which the credit is offered or received. The results of the models based on gross and net exposure are presented separately for trade credit (Table 4) and trade debt (Table 5).

The comparison between gross and net models shows that the choice to consider the net exposure significantly increases the fitness of the model (normally doubled) and thus demonstrates that choices about credit and debt are closely related (Fabbri and Klapper, 2008). The variables that are relevant and persistent in explaining the amount of trade credit/debt do not change when passing from the gross to the net position, although the intensity of the relationship changes. As concerns the variables, regarding the firm's characteristics, the geographical area appears poor relevant, with the exception of the South and the Island for which available data show that they traditionally use intensively trade debt (Cannari et al., 2005).

Table 4: Cross Sectional Regression of Trade Credit Amount

	1999		2000		2001		2002		2003	
	Gross	Net	Gross	Net	Gross	Net	Gross	Net	Gross	Net
Trade debt amount	-	0.54***	-	0.16***	-	0.47***	-	0.18***	-	0.25***
Firm age	0.13***	0.05***	0.16***	0.06***	0.11***	-	0.08***	-	0.10***	0.02
Nord	-	-	-	-	-	-	-	-	4.18***	2.31**
Center	-	-	-	-	-	-	-	-	-	-
South and Islands	-	-	-	-	-	-	-	-	-	-
Listed	15.20***	-	9.98***	-	16***	-	18.80***	5.91***	16.90***	6.58***
Total Assets	-	0.10***	-	0.23***	-	0.15***	-	0.16***	-	0.15***
Employees	-	-	-	-	-	-	-	-	-	-
Short term	36.80***	-	46.50***	-	63.90***	-	45.90***	-	28.20***	5.42*
MLT debt	0.36***	-0.12***	0.57***	-0.22***	0.86***	-0.02	0.62***	-0.02	0.38***	0.00
Fixed Asset	-	-	-	-	-	-	-	-	-	-
Δ Sales	-	-	-	-	-	-	-	-	-	-
Δ Trade credit	-	-	-	-	-	-	0.09***	0.02***	-	-
Inventory	-	-	-	-	-	-	-	-	-	-
Debt interest rate	-	0.41**	-	-	-	-	0.54**	-	-2.64***	0.40**
Profit Margin	-	-	-	-	-	-	-	-	-	-
Inventory /	-	-	-	102.00***	-	-	-	-	-	-
Output inventory	-	-	-	-	-	-	-	-	-	-
Output	-	-	-	-	-	-	-	-	-	-
Cash flows / Sales	-	-	-	-70.10***	-	-	-	-	-	-
(Revenues – trade	-	-	-	-	-	-	-	-	-	-
Net	7.60**	16.10***	8.27**	12.00***	-	8.31***	17.00***	28.00***	8.37***	21.9***
Solvency	-	-	0.11**	-	-	-	-	-	-	-
Sector trade credit	0.89***	0.57***	-	-	0.64***	-	0.57***	0.33***	0.63***	0.28***
Inventory turnover	-	-	-	-	-	-	-	-	-	-
Brand equity	-	-	-	-	-	-	-79.40***	-44.10***	-10.2***	-11.10***
Brand equity net	-	-	40.00***	35.60***	-	-	80.20***	26.00***	-	-
Ratio sales /	3.63***	1.12**	1.04**	-	2.82***	-1.52***	-	-	4.45***	-0.54**
Constant	-30.90***	-8.47***	-24.80***	10.30***	-52.10***	1.53	-36.20***	-5.10*	-9.06*	-7.28**
Adj R-squared	0.23	0.66	0.40	0.78	0.42	0.78	0.41	0.72	0.31	0.70
Number of obs	2264	2263	2091	2090	2263	2256	2432	2421	2653	2640

  

	2004		2005		2006		2007		2008	
	Gross	Net	Gross	Net	Gross	Net	Gross	Net	Gross	Net
Trade debt amount	-	0.66***	-	0.77***	-	0.72***	-	0.69***	-	0.69***
Firm age	0.09***	-	0.06**	-	0.09***	-	0.07***	-	-	-
Nord	-	-	-	-	-	-	-	-	-	-
Center	-	-	-	-	-	-	-	-	-	-
South and Islands	-	-	-	-	-	-	-	-	-	-
Listed	12.00***	8.48***	10.50***	-	-	-	-	-	-	-
Total Assets	-	-	-	-	-	-	-	-	-	-
Employees	-	-	-	-	-	-	0.99***	-	0.70**	-
Short term	35.50***	-	43.10***	-	46.40***	-	38.40***	-	39.80***	10.80***
MLT debt	0.34***	0.09***	0.42***	0.08***	0.50***	0.14***	0.32***	0.05***	0.27***	0.08***
Fixed Asset	-	-	-	-	-	-	-	-	-	-
Δ Sales	-	-	-	-	-	-	-	-	-	-
Δ Trade credit	-	-	-	-	-	-	-	-	-	-
Inventory	-	-	-	0.02**	-	0.04***	-	0.03***	-	-
Debt interest rate	-	-	-	-	-	0.71***	-	0.65***	-	0.66***
Profit Margin	-	-	-	-	-	-	-	-	-	-
Inventory /	-	-	-	-	-	-	-	-	-	-
Output inventory	-	-	-	-	-	-15.20**	-25.00***	-20.90***	-	-18.30***
Output	-	-	-	-	-	-	-	-	-	-
Cash flows / Sales	-	-	-	-	-14.10**	-	-	-	-	-
(Revenues – trade	-	-	-	-	-	-	-	-	-	-
Net	17.10***	25.20***	22.30***	30.50***	26.80***	32.50***	32.90***	34.90***	8.67***	12.90***
Solvency	-	0.13***	-	0.15***	-	0.20***	0.13***	0.21***	-	0.14***
Sector trade credit	0.50***	0.39***	0.43**	-	0.55***	-	0.37***	0.32***	0.31**	0.36***
Inventory turnover	-	-	-	-	-	-	-	-	-	-
Brand equity	-19.40***	-	-35.80***	-	-	-	-	-	-	-
Brand equity net	19.60**	-	31.00***	-	-13.20**	-	-	-	-11.40**	-
Ratio sales /	2.43***	-	3.59***	-	5.12***	-	-	-	4.85***	-
Constant	-18.00***	-3.93	-21.90***	2.17	-39.50***	-4.22*	-31.40***	-13.40***	-12.70**	-9.63**
Adj R-squared	0.25	0.50	0.27	0.54	0.30	0.55	0.26	0.49	0.23	0.46
Number of obs	2763	2745	3183	3178	3299	3296	3540	3531	3482	3479

This table shows the cross section estimates for each year of the following equations:

$$Trade\ Credit\ Amount_{it} = \alpha_i + \sum_{i=1}^n \beta_{it} X_{it} + \sum_{j=1}^n \gamma_{jt} Y_{jt} + \sum_{k=1}^o \delta_{kt} Z_{kt} + \varepsilon_{it} \quad \text{and}$$

$Trade\ Credit\ Amount_{it} = \alpha_i + \tau_i Trade\ Debt\ Amount_{it} + \sum_{i=1}^n \beta_{it} X_{it} + \sum_{j=1}^n \gamma_{jt} Y_{jt} + \sum_{k=1}^o \delta_{kt} Z_{kt} + \varepsilon_{it}$  where  $X_i$  are firm specific features,  $Y_i$  are

sector mean characteristics and  $Z_i$  are market power proxies. \*\*\*, \*\* and \* indicate significance at 1, 5, 10 percent levels respectively.

Source: AIDA-Bureau Van Dijk data, processed by the authors



Table 5: Cross Sectional Regression of Trade Debt Amount

	1999		2000		2001		2002		2003	
	Gross	Net	Gross	Net	Gross	Net	Gross	Net	Gross	Net
Trade credit amount	-	0.32***	-	0.14***	-	0.29***	-	0.68***	-	0.46***
Firm age	0.08**	-	0.08***	-	0.09***	-	0.07**	-	0.12***	-
Nord	-	-	-	-	-	-	-	-	-	-
Center	-	-	-	-	-	-	-	-	-	-
South and Islands	-	-	-	3.93**	-	-	-	-	-	-
Listed	11.10***	-	11.50***	-	10.20***	-	10.60***	-	-	-
Total Assets	-	0.13***	-	0.18***	-	0.14***	-	-	-	0.19***
Employees	-	-	-	-	-	-	-	-	-	-
Short term debt/Debt	38.00***	0.67	40.20***	-	51.80***	-	51.10***	16.9***	-	-48.80***
MLT debt	0.36***	-0.15***	0.44***	-0.22***	0.61***	-0.22***	0.47***	-	-	-0.76***
Fixed Asset	-	-	-	-	-	-	-	-	-	-
Δ Sales	-	-	-	-	-	-	-	-	-	-
Δ Trade credit	-	-	-	-	-	-	0.06***	-	-	-
Inventory coverage	-	-	-	-	-	-	-	0.05**	-	-
Debt interest rate	-	-	-	-0.42**	-	-0.31**	-	-0.636***	-7.56***	-4.85***
Profit Margin	-	-	-	-	-	-	-	-	-	-
Inventory / Revenues	-	-	-94.50***	-38.60***	-	-	-	-	-	-
Output inventory	-	-	-	-	-	-	-	-	135.00***	63.20***
Output	-	-	-	-	-	-	-	-	-28.00***	-14.40***
Cash flows / Sales	-	-12.20**	32.60*	-	-	-	-	-	-	-
(Revenues – trade	-	0.97**	-	-	-	-	-	-	-	-
Net inventory/Assets	-	-	-	-	-	-1.773053	-11.20***	-23.00***	-23.90***	-18.10***
Solvency	-	-	-	-	-	-	-	-	-	-
Sector trade debt	-	-	0.64***	0.31**	0.63***	-	-	-	-	0.40**
Inventory turnover	-	-	-	-	-	-	0.05***	0.13***	-	-
Brand equity	-	-	66.60***	-	-	-	-58.70***	-	-	-
Brand equity net	-	-	-36.90**	-34.70***	-	-	84.50***	-	-	-
Ratio sales / Sector	2.96***	-	1.34***	-	4.25***	1.17***	4.51***	2.28***	7.07***	0.87**
Constant	-20.10***	9.76***	-30.10***	5.48***	-43.60***	10.10***	-25.70***	-1.299648	70.70***	65.60***
Adj R-squared	0.22	0.73	0.33	0.70	0.39	0.79	0.29	0.56	0.47	0.76
Number of obs	2268	2263	2092	2090	2273	2256	2432	2421	2648	2640

  

	2004		2005		2006		2007		2008	
	Gross	Net	Gross	Net	Gross	Net	Gross	Net	Gross	Net
Trade credit amount	-	0.14***	-	0.51***	-	0.23***	-	0.45***	-	0.43***
Firm age	0.08***	-	-	-	0.06***	-	0.06**	-	-	-
Nord	-	-	-	-	-	-	-	-	-	-
Center	-	-	-	-	-	-	-	-	-	-
South and Islands	-	-	-	-	-	4.01***	-	3.54**	-	3.31**
Listed	-	-	-	-	-	-	-	-	-	-
Total Assets	-	0.17***	-	-	-	0.14***	-	-	-	-
Employees	-	-	-	-	-	-	0.90***	0.54***	0.79***	0.60***
Short term debt/Debt	44.00***	5.75*	54.00***	30.90***	57.40***	11.10***	56.70***	41.00***	44.90***	26.30***
MLT debt	0.33***	-0.15***	0.44***	0.20***	0.49***	-0.09***	0.38***	0.24***	0.28***	0.17***
Fixed Asset	-	-	-	-	-	-	-	-	-	-
Δ Sales	-	-	-	-	-	-	-	-	-	0.01***
Δ Trade credit	-	-	-	-	-	-	-	-	-	-
Inventory coverage	-	-	-	-	-	-	-	-	-	-
Debt interest rate	-	-	-	-	-0.59**	-0.969***	-0.56**	-0.671***	-	-0.785***
Profit Margin	-	-	-	-	-	-	-	-	-	-
Inventory / Revenues	-	-	-	-	-29.20***	-22.00***	-	-	-	-
Output inventory	-	-	-	6.06	-	0.90	-	8.76*	-	5.76
Output	-	-	-	-	-	-	-	-	-	-
Cash flows / Sales	-	-	-	-	-	-	-	-	-	-
(Revenues – trade	-	1.68***	-	2.45	-	0.98**	-	-	-	0.95**
Net inventory/Assets	-	-	-	-19.8***	-	-	-	-18.50***	-	-
Solvency	-	-	-	-	-	-	-	-	-	-
Sector trade debt	-	-	-	0.34**	-	-	-	-	-	-
Inventory turnover	-	-	-	0.10***	0.07***	0.09***	-	0.09***	-	0.08***
Brand equity	-	-23.50***	-39.30***	-	-	-	-	-	-	-
Brand equity net	-	16.00***	38.70***	-	-	-	-	-	-	-
Ratio sales / Sector	3.95***	1.69***	4.84***	3.01***	8.20***	4.06***	7.58***	5.03***	5.74***	3.82***
Constant	-10.70**	8.51***	-17.40***	-16.80***	-29.80***	3.70	-24.60***	-13.30***	-8.12**	-6.30**
Adj R-squared	0.29	0.64	0.33	0.58	0.37	0.67	0.38	0.57	0.30	0.51
Number of obs	2756	2745	3189	3178	3308	3296	3536	3531	3484	3479

This table shows the cross section estimates for each year of the following equations:

$$Trade\ Debt\ Amount_i = \alpha_i + \sum_{j=1}^n \beta_{ij} X_{ij} + \sum_{j=1}^n \gamma_{ij} Y_{ij} + \sum_{k=1}^n \delta_{ik} Z_{ik} + \varepsilon_{it} \quad \text{and} \quad Trade\ Debt\ Amount = \alpha_t + \tau_t Trade\ Debt\ Amount + \sum_{i=1}^n \beta_{it} X_{it} + \sum_{j=1}^n \gamma_{jt} Y_{jt} + \sum_{k=1}^n \delta_{kt} Z_{kt} + \varepsilon_{it}$$

where  $X_i$  are firm specific features,  $Y_i$  are sector mean characteristics and  $Z_i$  are market power proxies. \*\*\*, \*\* and \* indicate significance at 1,5,10 percent levels respectively. Source: AIDA-Bureau Van Dijk data, processed by the authors

Contrary to previous studies (see Long et al. (1993) for all of them), variables standing for the firm's creditworthiness and reputation are not significant, like "Age", "Listed" or "Fixed Assets", are rare significant for trade debt, both for the gross and the net position, while for trade credit the significance is higher even though the persistence appears limited. As it concerns bank credit access variables, Medium/long-term debt is found to have a positive effect on the gross amount of trade credit but a negative effect on the net trade credit position: this evidence suggests that trade credit is financed through trade debt and that its growth requires an adjustment of liabilities; as trade debt net position is negatively affected by medium/long debt, results do not confirm the financial motivations of trade debt (Russo and Leva, 2005). While the average cost of funds is predominantly not significant, the incidence of short term bank debt affects positively the offer of gross trade credit and, more persistently, trade debt both for the gross and net position: evidences exclude the substitution relationship between trade debt and bank credit as predicted in previous literature (Meltzer, 1960).

The timeframe required to obtain the goods does not affect both trade credit and debt, while the goods inventories turnover affects negatively trade credit and positively trade debt (Russo and Leva, 2005), both for the gross and net position: the evidence suggests that firms do not adapt passively trade credit to address marketing motivations. Consistently, cash holdings are negatively affected by trade credit both at gross and net positions, and, although less persistently, they are positively associated with trade debt only when the net position is taken into consideration. Economic sector variables are found to be significant with good persistence for the trade credit amount (Giannetti et al., forthcoming), although when passing to the net position, the intensity of the relationship decreases; on the trade debt side, sector variables show poor persistence.

Market power variables are significant only when the relative dimension of the firm is considered relative to the sector dimension (Summers and Wilson, 2003): as concerns the gross trade credit, the variable is positively and persistently related, while its influence is lower when considering the net position. Turning to the trade debt side, the variable is positive and persistent, even though the influence is weaker when passing to the net position.

#### Model of Trade Credit/Debt Duration

The analyses of trade credit and debt duration are presented separately (see, respectively, Tables 6 and 7). For both aspects, the analysis presented considers both the gross and net approaches, stressing the main differences in the fitness of the model and in the roles of different explanatory variables.

The results show, as hypothesised by Kiyotaki and Moore (1997), the existence of a positive and persistent relationship between trade credit days and trade debt days: in general, the relationship is stronger for the duration analysis than for the amount analysis. The characteristics of the explained variables make it necessary to use more explanatory variables than were used for predicting the amount of credit/debt, and the fitness of the model is significantly lower.

As concerns the firm characteristics, variables regarding the firm's dimension, reputation and creditworthiness are not significant to explain both trade credit and debt duration both for the gross and net position: the evidence suggests that credit/debit terms are poorly obtained as negotiation between the counterparties as confirmed by the absence of relevance of market power variables.

Table 6: Cross Sectional Regression of Trade Credit Duration

	1999		2000		2001		2002		2003	
	Gross	Net	Gross	Net	Gross	Net	Gross	Net	Gross	Net
Trade debt duration	-	0.12***	-	0.07***	-	0.16***	-	0.09***	-	0.09***
Firm age	-	-	-	-	-	-	-	-	-	-
Nord	-	-	-	-	-	-	-	-	-	-
Center	-	-	-	-	-	-	-	-	-	-
South and Islands	-	-	-	-	-	-	-	-	-	-
Listed	-	-	-	-	-	-	-	-	-	-
Total Assets	-	-	-	-	-	-	-	-	-	-
Employees	-	0.00**	0.00**	0.00**	0.00**	0.00**	0.00***	0.00**	0.00***	0.00***
Short term debt/Debt	0.29***	0.17**	0.24**	0.23***	-	-	-	-	-	-
MLT debt	-	-	-	-	-	-	-	-	0.00***	0.00***
Fixed Asset	-	-	-	-	-	-	-	-	-	-
Δ Sales	-	-	-	-	0.03***	0.00***	-	-	-	-
Δ Trade credit	-	-	-	-	-	-	-	-	-	-
Inventory coverage (days)	0.00**	-	0.00***	-	0.00***	-	-	-	0.00***	-
Debt interest rate	-	-	-	-	-	-	-	-	-	-0.79**
Profit Margin	-	-	-	-	-	-	-	-	-	-
Inventory / Revenues	-	-	-	-	-	-	-	-	-	-
Output inventory	-	-	-	-	-	-	-	-	-	-
Output inventory/Inventory	0.15***	0.16***	0.22***	0.19***	-0.0714	-	0.13***	0.18***	0.09**	-
Cash flows / Sales	-	-	-	-	-	-0.42**	-	-	-	-
(Revenues – trade credit) /	-	-	-	-	-	-	-	-	-	-
Net inventory/Assets	0.68***	0.64***	0.57***	0.54***	0.27***	0.28***	0.85***	0.85***	0.59***	0.61***
Solvency	-	-	-	-	-	-	-	-	-	-
Sector trade debt	-	0.00**	-	-	0.00**	0.00***	-	-	-	-
Inventory turnover (days)	-	-	-	-	-	-	-	-	-	-
Brand equità	-	-	-	-	-	-	-	-	-	-
Brand equity net	-	-	-	-	-	-	0.17**	-	-	-
Ratio sales / Sector	-	-	-	-	-	-	-	-	-	-
Constant	76.46***	58.81***	102.21**	95.76***	96.79***	58.16***	95.97***	77.71***	123.17***	100.97***
Adj R-squared	0.38	0.45	0.39	0.46	0.24	0.30	0.42	0.47	0.45	0.46
Number of obs	2266	2189	2091	2030	2269	2190	2435	2343	2654	2541
	2004		2005		2006		2007		2008	
	Gross	Net	Gross	Net	Gross	Net	Gross	Net	Gross	Net
Trade debt duration	-	0.10***	-	0.09***	-	0.13***	-	0.20***	-	0.13***
Firm age	-	-	-	-	-	-	-	-	-	-
Nord	-	-	-	-	-	-	-	-	-	-
Center	-	-	-	-	-	-	-	-	-	-
South and Islands	-	-	-0.07**	-0.07**	-0.07**	-0.07**	-	-	-	-
Listed	-	-	-	-	-	-	-	-	-	-
Total Assets	-	-	-	-	-	-	-	-	-	-
Employees	0.00***	0.00***	0.00***	0.00**	0.00***	0.00**	0.00***	0.00***	0.00***	0.00***
Short term debt/Debt	-	-	-	-	0.14**	-	-	-0.16***	0.32***	-
MLT debt	0.00**	0.00**	0.00***	-	-	-	-	-	-	-
Fixed Asset	-	-	-	-	-	-	-	-	-	-
Δ Sales	-	-	-	-	-	-	-	-	-0.00**	-
Δ Trade credit	-	-	-	-	-	-	-	-	-	-
Inventory coverage (days)	0.00***	-	0.00***	-	0.00**	-	0.00***	-0.00***	0.00***	-
Debt interest rate	-1.00**	-	-	-	-	-	-1.26***	-	-	-
Profit Margin	-	-	-	-	-	-	0.44**	0.60***	-	-
Inventory / Revenues	-	-	-	-	-0.52***	-	-	-	-	-
Output inventory	-1.65***	-1.32***	-1.05***	-1.34***	-0.67***	-1.05***	-1.25***	-1.55***	-1.06***	-1.11***
Output inventory/Inventory	0.28***	0.24***	0.15***	0.23***	-	0.13***	0.13***	0.23***	0.10**	0.13***
Cash flows / Sales	-	-	-	-	-	-	-	-	-	-
(Revenues – trade credit) /	-0.45***	-0.41***	-0.46***	-0.43***	-0.33***	-0.30***	-0.28***	-0.23***	-0.27***	-0.23***
Net inventory/Assets	0.79***	0.78***	0.86***	0.88***	0.93***	0.87***	1.01***	1.01***	0.30***	0.78***
Solvency	-0.00***	-	-0.00***	-	-	-	-	0.01***	-0.00***	-
Sector trade debt	0.00***	-	-	-	0.00***	0.00**	0.00***	0.00***	0.00***	0.00***
Inventory turnover (days)	-	-	-0.00***	-	-0.00***	-	-0.00**	0.01***	-0.00***	-
Brand equità	-	-0.48***	-	-0.17**	-	-	0.39***	-	-	-
Brand equity net	0.21**	0.77***	-	-	-	1.40***	-	-	-	-
Ratio sales / Sector	-	-	-	-	-	-	-	-	-0.00***	-
Constant	81.67***	78.38***	103.91***	76.31***	55.22***	46.39***	-3.96	-43.83**	59.14***	35.95***
Adj R-squared	0.41	0.49	0.47	0.49	0.44	0.46	0.35	0.42	0.32	0.39
Number of obs	2766	2650	3188	3046	3324	3193	3571	3422	3506	3361

This table shows the cross section estimates for each year of the following equations:

$$Trade\ Credit\ Duration_{it} = \alpha_i + \sum_{j=1}^n \beta_{ij} X_{ij} + \sum_{j=1}^n \gamma_{ij} Y_{ij} + \sum_{k=1}^n \delta_{ik} Z_{ik} + \varepsilon_{it} \quad \text{and} \quad Trade\ Credit\ Duration_{it} = \alpha_i + \tau_i Trade\ Debt\ Duration_{it} + \sum_{j=1}^n \beta_{ij} X_{ij} + \sum_{j=1}^n \gamma_{ij} Y_{ij} + \sum_{k=1}^n \delta_{ik} Z_{ik} + \varepsilon_{it}$$

where  $X_i$  are firm specific features,  $Y_i$  are sector mean characteristics and  $Z_i$  are market power proxies. \*\*\*, \*\* and \* indicate significance at 1,5,10 percent levels respectively. Source: AIDA-Bureau Van Dijk data, processed by the authors

Table 7: Cross Sectional Regression of Trade Debt Duration

	1999		2000		2001		2002		2003	
	Gross	Net	Gross	Net	Gross	Net	Gross	Net	Gross	Net
Trade credit duration	-	0.28***	-	0.15***	-	0.26***	-	0.21***	-	0.19***
Firm age	-	-	-	-	-	-	-	-	-	-
Nord	-	-	-	-	-	-	-	-	-	-
Center	0.12**	-	-	-	-	-	-	-	-	-
South and Islands	-	-	-	-	-	-	-	-	-	-
Listed	-	-	-	-	-	-	-	-	-	-
Total Assets	-	-	-	-	-	-	-	-	-	-
Employees	-	-	-	-	-	-	-	-	-	-
Short term debt/Debt	0.67***	0.58***	0.62***	0.62***	0.50***	0.47***	0.63***	0.69***	0.92***	0.91***
MLT debt	-	-	-	-	-	-	-	-	0.00***	0.00***
Fixed Asset	-	-	-	-	-	-	-	-	-	-
Δ Sales	-	-	-	-	-	-	-	-	-	-
Δ Trade credit	-	-	-	-	-	-	-	-	-	-
Inventory coverage (days)	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***
Debt interest rate	-	-	-	-	-3.30***	-3.06***	-	-	-	-2.37***
Profit Margin	-	-	-	-	-	-	-	-	-	-
Inventory / Revenues	-	-	-	-	-1.34**	-1.33**	-	-	-	-
Output inventory	0.96**	1.34***	2.34***	2.53***	1.90***	1.98***	1.01***	1.07***	1.24***	1.38***
Output inventory/Inventory	-	-	-	-	-0.62***	-0.59***	-	-	-	-0.46***
Cash flows / Sales	3.04***	3.06***	-	-	2.20***	2.20***	-	2.31***	0.96***	1.00***
(Revenues – trade credit) /	-	-	-	-	-0.14***	-0.09***	-	-	-	-0.26***
Net inventory/Assets	-0.151**	-	-	-	-0.16***	-0.22***	-	-	-	-0.26***
Solvency	-	-	-	-	-0.01***	-0.01***	-	-	-	-0.01***
Sector trade debt	-	-	-	-	-	-	-	-	-	-
Inventory turnover (days)	-	-	-	-	-0.01***	-0.02***	-	-	-	-0.01***
Brand equità	1.95***	1.73***	0.76***	0.73***	1.57***	1.50***	1.68***	1.53***	0.78***	0.73***
Brand equity net	-	-	-	-	-	-	-	-	-	-0.67***
Ratio sales / Sector	-	-	-	-	-	-	-	-	-	-
Constant	159.84***	145.30***	194.13***	181.69***	169.14*	142.43*	188.06***	147.14***	155.54***	132.97*
Adj R-squared	0.48	0.49	0.52	0.53	0.47	0.49	0.47	0.49	0.50	0.51
Number of obs	2192	2189	2032	2030	2201	2190	2349	2343	2548	2541
	2004		2005		2006		2007		2008	
	Gross	Net	Gross	Net	Gross	Net	Gross	Net	Gross	Net
Trade credit duration	-	0.25***	-	0.19***	-	0.29***	-	0.39***	-	0.31***
Firm age	-	-	-	-	-	-	-	-	-	-
Nord	-	-	-	-	-	-	-	-	-	-
Center	-	-	-	-	-	-	-	-	-	-
South and Islands	-	-	-	-	-	-	-	-	-	-
Listed	-	-	-	-	-	-	-	-	0.56**	-
Total Assets	-	-	-	-	-	-	-	-	-	-
Employees	-	-	-	-	-	-	-	-	-	-
Short term debt/Debt	0.79***	0.75***	0.71***	0.70***	0.72***	0.70***	0.86***	0.85***	0.90***	0.74***
MLT debt	-	-	-	-	-	-	-	-	0.00***	-
Fixed Asset	-	-	-	-	-	-	-	-	-	-
Δ Sales	-	-	-	-	-	-	-	-	-	-
Δ Trade credit	-	-	-	-	-	-	-	-	-	-
Inventory coverage (days)	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***
Debt interest rate	-3.60***	-3.42***	-3.50***	-3.43***	-5.23***	-4.88***	-4.35***	-4.15***	-3.92***	-3.95***
Profit Margin	0.03**	-	-	-	-	-	-	-	-	-
Inventory / Revenues	-1.07**	-	-1.06**	-1.07**	-1.47***	-	-2.86***	-2.23**	-2.20***	-2.00***
Output inventory	1.04***	1.40***	1.67***	1.90***	1.09***	1.30***	0.72***	1.26***	1.02***	1.34***
Output inventory/Inventory	-0.33***	-0.42***	-0.44***	-0.47***	-0.41***	-0.43***	-0.35***	-0.41***	-0.39***	-0.43***
Cash flows / Sales	1.41***	0.52**	1.57***	1.56***	1.92***	1.70***	3.59***	2.85***	2.71***	2.48***
(Revenues – trade credit) /	-0.35***	-0.25***	-0.349***	-0.26***	-0.25***	-0.15***	-0.20***	-0.10***	-0.19***	-0.12***
Net inventory/Assets	-0.21***	-0.42***	-0.378***	-0.54***	-0.25***	-0.50***	-0.30***	-0.67***	-0.27***	-0.51***
Solvency	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***
Sector trade debt	0.00***	0.00***	-	-	0.00***	0.00***	0.00***	0.00***	0.00***	-
Inventory turnover (days)	-0.01***	-0.01***	-0.02***	-0.02***	-0.01***	-0.01***	-	-0.01***	-0.01***	-0.01***
Brand equità	0.28***	0.65***	-	-	1.19***	1.05***	0.72***	0.70***	-	0.10
Brand equity net	-	-1.10***	-	-	-1.34***	-2.54***	-0.67***	-0.64***	-	-
Ratio sales / Sector	-	-	-	-	0.00	0.00	-	-	-	0.00***
Constant	143.60***	130.96***	189.31***	172.75***	139.53*	116.44*	100.01***	82.09***	59.14***	126.16*
Adj R-squared	0.51	0.52	0.50	0.51	0.48	0.50	0.45	0.50	0.46	0.49
Number of obs	2658	2650	3053	3046	3199	3193	3423	3422	3363	3361

This table shows the cross section estimates for each year of the following equations:

$$Trade\ Debt\ Duration_{it} = \alpha_i + \sum_{j=1}^n \beta_{ij} X_{ijt} + \sum_{j=1}^n \gamma_{ij} Y_{ijt} + \sum_{k=1}^n \delta_{ik} Z_{kit} + \varepsilon_{it} \quad \text{and} \quad Trade\ Debt\ Duration_{it} = \alpha_i + \tau_i Trade\ Debt\ Duration_{it} + \sum_{j=1}^n \beta_{ij} X_{ijt} + \sum_{j=1}^n \gamma_{ij} Y_{ijt} + \sum_{k=1}^n \delta_{ik} Z_{kit} + \varepsilon_{it} \quad \text{where}$$

$X_i$  are firm specific features,  $Y_i$  are sector mean characteristics and  $Z_i$  are market power proxies. \*\*\*, \*\* and \* indicate significance at 1,5,10 percent levels respectively. Source: AIDA-Bureau Van Dijk data, processed by the authors

Trade credit duration is negatively affected by the goods inventories at both the gross and net levels. Cash holdings negatively affect trade credit days, although the intensity falls when passing to the net position. Inventories affect only the duration of trade debt: consistently, the inventory coverage days affect it directly for both the gross and net positions, while there is an inverse relationship between the inventory turnover days and the trade debt duration. This could be justified on the basis of a lack of confidence on the part of suppliers in firms with longer production cycles (Russo and Leva, 2005).

The impact of the cost financial debt is negative and significant on trade credit duration only for a few years, and moreover, the gross and the net positions do not matter; on the trade debt duration side, the variable is persistently significant, underlining the fact that the higher the cost of bank debt, the fewer the firm's trade debt days, both for the gross and net positions. As concerns the availability of financial debt, evidence shows that this availability is significant for trade credit duration only for a few years, both for the gross and the net positions, and that trade debt duration is affected directly and persistently by the available external financial sources. The results obtained for the cost and amount of debt are consistent with the hypothesis that a higher interest rate applied by financial intermediaries signals an increase in the firm's risk level, which is also considered by suppliers in determining the duration of the credit offered (Marotta, 2005).

As expected, unsecured inventories positively affect trade credit duration with a similar intensity between gross and net values; opposite results are shown for the trade debt duration, both for the gross and net positions (Long et al., 1993). Final goods inventories affect only the trade debt duration directly and persistently, both for the gross and net positions; meanwhile, the fraction of final goods in the total inventories shows an inverse relationship with trade debt duration. The results are coherent with the thesis that suppliers are more interested in the inventory of inputs for final products/services because for these types of items, the marketability/usefulness of inventories is directly related to the firm's production/selling process (Petersen and Rajan, 1997). Unsecured inventories positively affect the duration of trade credit, with a similar level of intensity between gross and net values; opposite results are shown for the trade debt duration, both for the gross and net positions. The liquidity of the firm is persistently significant according to an inverse relationship with both trade credit and debt duration for both the net and the gross positions.

The solvency variable does not capture the implications of trade credit and debt, so it shows a negative relationship, particularly more persistently for the trade debt duration. Surprisingly, the sector is more relevant for the trade credit duration, both for the gross and the net positions, than for the trade debt duration: the unexpected evidence for the sector (Petersen and Rajan, 1997) can be attributed to the characteristics of the variables used, which do not consider only the trade credit/debt terms, but also the possible payment delays.

## **CONCLUSIONS**

Trade credit literature points out some links between debt and credit choices but there is a lack of empirical analysis in order to test the relevance of the trade credit/debt explanatory variables on both gross and net models. The analysis proposed considers of the main world market (Italy) and collect a wide database with all variables considered in literature in order to study the trade credit and debt choices. The methodology adopted for the analysis is standard linear regression model constructed in order to explain the amount and duration for both trade credit and debt. The final model for each feature studied is defined using a stepwise forward procedure that allow to identify the model that fit the best on the data. Results shows that trade credit and debt choices are closely related, and the strategy adopted by each firm cannot be explained by looking only at one side of its trade policy. Considering the amount of credit, the choice of gross or net exposure does not affect the type of explanatory variables used, but this choice significantly affects the fitness of the model: models of net trade credit/debt exposure demonstrate double

the statistical significance of their gross counterparts. Looking at the duration of the trade credit, the difference in the significance of models based on gross and net exposures is smaller, but the effects of this choice could significantly modify the types of explanatory variables that are the most relevant for each model.

The main policy implication concerns the approach that must be adopted in evaluating the trade credit/debt dynamics: normally, firms adopt a trade credit/debt structure that is coherent for the amount and for the duration, so it is important to pay attention to all events (i.e., the dilution risk) that could impair this close relationship. On the basis of the results obtained in this study, financial instruments constructed on trade receivables (i.e., factoring, asset-based lending) must not only consider the characteristics of the credit assigned, but also evaluate the overall credit/debt trade exposure of the seller. Further developments should define some controlling variables to test whether the results obtained here are more or less relevant for some types of firms (i.e., small and medium firms) (Berger and Udell, 2006) or for sectors characterised by a higher or lower level of dependence on customers or suppliers (Burkart and Ellingsten, 2004). A new analysis employing a smaller sample could be employed to consider some variables related to the relevance of each customer, which would allow us to evaluate whether the firm adopts different trade credit/debt policies on the basis of customer/supplier characteristics (Banjeree et al., 2004).

## ENDNOTES

The article is a joint effort by the two authors and the single sections could be ascribed as follows: introduction, literature review and conclusions by Lucia Gibilaro and empirical analysis by Gianluca Mattarocci.

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