

TRADE CREDIT FINANCING: SUBSTITUTION AND MATCHING EFFECT FOR ITALIAN SMEs

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ABSTRACT

The paper focuses on the relevance of financial motivation in the use of trade credit. The analysis considers Italian SMEs over the years 2005-2012.

Using GMM models, the study aims to test whether accounts payable may follow a model of partial adjustment, and aims to find empirical evidence that supports the financial function of trade credit.

Results support the hypothesis of the existence of a model of partial adjustment, since accounts payable of the previous year affect accounts payable of the following year. Results also support the matching hypothesis, since firms that grant extended payment terms to their customers tend to demand delayed accounts payable from their suppliers. The empirical evidence reveals the existence of a substitution function between accounts payable and debts to banks and suggests that SMEs increase their accounts payable terms when short or medium and long bank credit is less available.

Keywords: trade credit, SMEs, accounts payable

1. Introduction

Trade credit is the financing between enterprises, resulting from the granting of agreed deferred payments to the client by the supplier: it is a very important source of financing for enterprises. There are many reasons that lead to the use of trade credit which can be traced to real and financial functions.

Real functions refer to credit offers which support the selling policy and the economic role of trade credit has been widely explored in the literature (Lee and Stowe, 1993; Long *et al.*, 1993; Deloof and Jegers, 1996; Pike *et al.*, 2005).

From a financing point of view trade credit can represent an alternative form of financing in the short term. Firms tend to employ trade credit and tend to substitute trade credit for bank credit when credit from financial institutions is constrained (Petersen and Rajan, 1997; Nilsen, 2002 Casey and O'Toole, 2014, Garcia-Appendini and Montoriol-Garriga, 2013; Engemann *et al.* 2014).

The relationship between the use of trade credit and the extension of trade credit has also been investigated. According to the matching hypothesis (Bastos and Pindado, 2013), when firms increase the supply of trade credit, they tend to demand also more trade credit.

This paper focuses on the relevance of financing motivations, as well as the substitutability of trade credit in comparison to other forms of third party financing. It also focuses on the relationship between trade credit use and trade credit supply which can be mediated by the ability of firms to access other financial sources.

The empirical analysis is carried out on Italian SMEs during the period immediately before and after the outbreak of the financial crisis (2005-2012).

The paper investigates the existence of significant relationships between the incidence of accounts payable of the previous year to the next year, the existence of relationships between trade credit policy and trade debt policy, the existence of relationships between trade payables and debts to banks.

To verify the research hypotheses, the current work uses a panel data analysis. The estimation is carried out using General Method of Moment (GMM) which allows to control for possible endogeneity problems.

The results of the study confirm that conditions of substitutability can be observed: accounts payable of the previous year affect accounts payable of the following year; trade debt policy is influenced by trade credit policy; the increased use of long and short term bank financing causes less reliance on inter-company credit.

This study contributes to reference literature for various reasons. The sample consists of SMEs, and this choice is determined by the reasons that trade credit is particularly important for SMEs, given their greater difficulty in accessing capital markets (Petersen and Rajan, 1997; Berger and Udell, 1998; Fisman and Love, 2003). Italy is an important case to study the determinants and the implications of trade credit, as it is characterised by an elevated practice of trade credit, much higher than other European countries. Trade credits are equal to 60 percent of the total bank debt in 2012 and their value is greater than the amount of short-term bank debts. The survey investigates the possibility that recourse in trade credits can be influenced by firm's size and by their territoriality. For these purposes the Italian economic system represents an important contest at an international level, as it consists of SMEs characterised by different economic development conditions, also depending on their location, northern and central regions compared to southern regions and islands. The paper is organized as follows: the second paragraph gives a brief review of the literature that leads to the research hypotheses; the third paragraph illustrates the methodology; the fourth paragraph describes the sample and the fifth discusses the results. The last paragraph sets forth brief conclusive assessments and the implications of the studied phenomenon.

2. Literature review and research hypotheses

Trade credit is the granting of a loan from a company to another for the purchase of goods and services. Through the granting of trade credit, the seller forgoes an immediate cash flow, for real-type motivations, in the hope to set up, expand or consolidate relations with customers.

Trade credit can be a useful support tool for sales policies and a way to undertake and consolidate relationships with clients, thanks to the product quality guarantee and price discrimination. (Lee and Stowe 1993; Long Malitz and Ravid 1993; Schwartz and Whitcomb 1978, 1979). Trade credit may be also a useful tool for consolidation of business relations (Emery 1987).

Recourse in trade credit also has financial motivations and literature weighs on the relevance of the financial reasons for the use of trade credit, distinguishing the transactional and financial components. The transactional element refers to trade credit as a synchronisation tool between receipts and payments instead of using money, for a better forecast of cash flow, and treasury management planning in case of unexpected payments. Schwartz (1974) and Ferris (1981) claim that the demand and supply of trade credit for transactional reasons explain the short term and very short term components of trade credit, which reduces the transaction costs and the liquidity buffers for precautionary reasons.

Other studies on the transactional costs hypothesise a positive relationship between demand variability and supplier loan (Emery 1987; Long, Malitz and Ravid 1993).

Long, Malitz and Ravid (1993) demonstrated that enterprises which face variable demand make more use of trade credit than enterprises that have stable demand. Transactional reasons refer to the use of trade credit which synchronizes receipts and payments and proves to be convenient both for the seller and the purchaser: the short term duration and the granting of discounts when paying by cash distinguish this operation from trade credit with financial reasons.

The importance of financial reasons in intercompany financing operations is justified by the following factors: the greater availability of trade credit compared to other financing sources; the lower cost of trade credit in comparison to other forms of financing; the higher ductility of trade credit which, on one hand, has no complex contractual formulas and on the other hand may have an extended duration with no extra costs.

Inaccurate information on the financial system, the presence of underdeveloped financial institutions (Fisman, Love 2003) and weak legal recovery rules may determine substitutability or complementarity between trade credit and bank credit. Imperfections in the financial markets may

determine rationing of bank credit (Schwartz 1974), which has a greater influence on the financing of opaque or young enterprises (Huyghebaert 2006) and leads to recourse in trade credit as a fall-back determined by the insufficiency and inadequacy of sources of finance from third parties or banks (Duca 1996; Jaffe and Stiglitz 1990; Petersen and Rajan 1997).

Complementarity conditions and an extended recourse in trade credit are noted when non-financial enterprises know how to monitor the credit capacity of a firm and they are able to transfer funds, borrowing from intermediaries and granting deferred payments to other enterprises, otherwise rationed for reasons of misinformation (Demirguc, Kunt and Maksimovic 2001). In this case, trade credit can also be a signal: information that financial intermediaries receive from relationships with non-financial firms granting deferred payments can mitigate misinformation that causes problems for opaque enterprises and can decrease the conditions of credit rationing.

Opaque firms, that are predominantly small in size, can be subject to credit rationing (Stiglitz and Weiss 1981) and can turn to trade credit as an alternative source of financing. Trade credit, obtained according to the assessment made by the credit provider in respect of the creditworthiness of the firms to be financed, increases the good quality reputation of creditors and allows them to earn easy access to bank credit. Therefore trade credit can be replaceable, but also complementary to bank debts.

The importance of financial motivations may also appear where larger sized firms, that do not have to worry about limited access to the financial market, in terms of funds and costs, act as intermediaries, offering trade credit to smaller firms which face greater difficulties in accessing credit market (Emery, 1984; Mian and Smith, 1992; Schwartz, 1974). The financial motivations imply that the provision of trade receivables could have a positive impact on the profitability of larger sized firms, in this way consolidating their relationship with clients. Even more positive impact is expected for small and medium sized enterprises as the higher percentage of trade payables may represent the availability of intercompany financing even in situations of opacity and credit rationing by banks or other intermediaries.

During a credit crunch, suppliers may be liquidity providers for small and opaque firms and trade credit can be a substitute for bank credit (Biais and Gollier, 1997; Burkart and Ellingsen, 2004; Petersen and Rajan, 1997; Burkart, Ellingsen and Giannetti 2011; Casey and O'Toole, 2014).

Literature believes that many firms use trade credit to finance both their inputs purchases (accounts payable) and their financing to customers (accounts receivable). In this sense trade credit can be considered the link between liability side and asset side of the firm's balance sheet.

Many reasons lead firms to extend and use trade credit simultaneously and those firms that need to grant trade credit to their customers, more likely might demand trade credit by their suppliers (Fabbri and Klapper 2008). Furthermore and in addition, the timing of payments to suppliers should match the receipt of payments received from customers. Finally literature supports the matching hypothesis in which firms that delay collection from their customers may request long-term trade payable from their suppliers (Bastos and Pindado, 2013).

Therefore, as claimed in literature and for the above reasons, it may be useful to investigate the importance of financial determiners of intercompany credit. So the present work aims to investigate: the existence of significant relationships between accounts payable of the previous year to the next year; the existence of interdependent relationships between trade credit policy and trade debt policy; the existence of relationships of substitutability in intercompany credit in relation to other sources of bank financing. The following research hypotheses are formulated:

HP1: A strict interdependence relationship exists between trade credit terms received from suppliers and trade credit terms received in the previous year.

HP2: Trade credit terms offered to customers of small and medium sized enterprises match trade credit terms received from suppliers.

HP3: Conditions of substitutability exist between intercompany credit and financing from banks for small and medium sized enterprises.

3. Methodology and variables

In coherence with literature, in order to verify the research hypotheses a panel data analysis is used.

Table 1: Regression Variables

NAME	DESCRIPTION AND MEASURE
<i>payab</i>	Days payable outstanding is the firm's average payable period: the average number of days of delayed payments
<i>payabi-1</i>	Amount of days payable outstanding of the previous year
<i>receiv</i>	Average number of days of delayed collections of accounts receivable: the ratio of total accounts receivable to sales and other revenues, multiplied by 360
<i>inbanen</i>	Ratio of short-term bank borrowings and shareholders' equity
<i>inbanol</i>	Ratio of medium and long-term bank debt and shareholders' equity
<i>ros</i>	Ratio of operating income and sales revenues
<i>roe</i>	Ratio of net income and shareholders' equity
<i>empl</i>	Natural logarithm of the number of employees
<i>cosden</i>	Ratio of total financial charges and short and medium–long term bank debt
<i>curr</i>	Ratio of current assets and current liabilities
<i>solven</i>	Ratio of equity and total assets
<i>darea</i>	Dummy which has a value of 1 for firms located in the central and northern areas of Italy and 0 for firms located in the southern regions and islands

The analysis is carried out through the General Method of Moment (GMM) which allows to control for possible endogeneity problems. The random disturbances that may affect decisions about the trade credit level may also affect other financial characteristics of the firms and the GMM model allows to control for endogeneity by using instruments.

The paper follows the estimation strategy proposed by Arellano and Bond (1991) and Arellano-Bover/Blundell-Bond dynamic panel estimators (Arellano and Bover 1995; Blundell and Bond 1998). The Arellano-Bond estimation transforms all regressors, usually by differencing. The Arellano-Bover/Blundell-Bond estimator makes an additional assumption that first differences of instrument variables are uncorrelated with the fixed effects: this allows the introduction of more instruments and improves the efficiency of the analysis.

To verify the research hypotheses the following model is used:

$$Y_{ik} = \alpha + \beta_1 payab_{it-1} + \beta_2 receiv_{it} + \beta_3 inbanen_{it} + \beta_4 inbanol_{it} + \beta_5 ros_{it} + \beta_6 roe_{it} + \beta_7 empl_{it} + \beta_8 cosden_{it} + \beta_9 indcorr_{it} + \beta_{10} solven_{it} + \beta_{11} darea_{it} + \beta_{12} ldim_{it} + \beta_{13} logeta_{it} + \beta_{14} darea_{it} + \eta_i + \lambda_t + \delta_s + \varepsilon_{it}$$

The variables used for the analysis are presented in Table 1.

The dependent variable considered, *payab*, is measured in terms of number of days-to-pay accounts payable, in line with the existing literature. Days payable outstanding is the firm's average payable period, so it corresponds to the average number of days of delayed payments.

Static panel data models assume that companies are able to adjust their financing structure without any delay, instead the model used in the present work also considers the possibility of delays in trade payables management policies (García-Teurel and Solano, 2010). So the amount of days payable outstanding may also be determined by the preceding management policies. For the reasons mentioned above, the model considers the amount of days payable outstanding of the previous year (*payabi-1*) an independent variable, in order to test the first research hypothesis. Considering the lagged dependent variable as an explanatory variable, static estimations lose their consistency and dynamic panel regressions are affected by the existence of autocorrelation. Due to the previous

limitations, the parameters of the model will be estimated using instrumental variable estimators. The GMM estimations that use lagged variables as instruments are inconsistent if the errors are autocorrelated. The Hansen test is used to test for the absence of correlation between the instruments and the error term.

Generally enterprises adopt a combination of trade receivables and payables that is coherent both in terms of amount as in terms of duration, so trade credit terms offered to customers should match trade credit terms received from suppliers. Small and medium sized enterprises can be subject to conditions of sale from suppliers that have a larger market share: the offer of trade credit, imposed by the exploitation of market power of suppliers, may determine the adoption of a balancing strategy, financing the supply of trade credit with accounts payable. However, the granting of trade credit exposes the firms to costs and financial risks. The granting of credit on sales requires the firms to use financial resources on which interest could be earned and this approach implies an opportunity cost (Nadiri 1969). The granting of trade credit exposes the firms to financial risks because late payments expose companies to liquidity problems and in some cases to bankruptcy. Then the relative dimension of trade receivable in the balance sheets of small and medium enterprises is very important in terms of the overall management of the company and closely related to the incidence of trade payables. For these reasons, in order to test the second research hypothesis, the model considers the average number of days of delayed collections of accounts receivable - captured by the ratio of total accounts receivable to sales and other revenues, multiplied by 360 - (*receiv*) an independent variable (Bastos and Pindado, 2013).

Trade credit received can be used as an alternative source of financing and a substitute to bank credit or to credit from other lenders. The literature suggests that firms increase their demand for trade credit to overcome any credit rationing, especially when credit from financial institutions is not available (Schwartz, 1974; Petersen and Rajan, 1997; Danielson and Scott, 2004). Businesses rely on loans from suppliers when other forms of credit are fully exhausted (Petersen and Rajan, 1997; Danielson and Scott, 2004; Cuñat, 2007): therefore a substitution effect between intercompany financing and other sources of alternative financing is expected. Useful predictors to test the third research hypothesis are the following financial resources: ratio of short-term bank borrowings and shareholders' equity (*inbanel*); ratio of medium and long-term bank debt and shareholders' equity (*inbanol*).

The management of accounts payable involve a trade off between benefits and costs. As for the benefits, trade receivables allow companies to combine payments for goods purchased with sales revenues; in the absence of trade credit, companies should pay for their purchases at the time of delivery, if the frequency of purchases is not exactly predictable, companies need a precautionary cash stock that is an opportunity cost. Furthermore, trade credit offers more financial flexibility than bank loans, so when companies face liquidity problems it may be less expensive to delay payment to suppliers rather than renegotiate loan conditions and terms with banks (Danielson and Scott, 2004). As for the costs, it should be considered that using the intercompany financing may lead to an implicit interest rate on trade credit, which is often linked to a discount for early payment and the implicit interest rate can also be quite high. For these reasons it can be interesting to observe the relationship between the incidence of trade payables terms and the ratio of total financial charges and the sum of short and medium-long term bank debt (*cosden*).

The ability of obtaining trade credit is also linked to the customer's creditworthiness and dimension. Considering the size of the companies a proxy of creditworthiness, larger firms could receive more intercompany credit. However, larger firms, especially in a sample composed solely of SMEs, may also receive more bank credit than smaller firms as a consequence of their reputation (Berger and Udell, 1998; Niskanen and Niskanen 2006), from this perspective a negative relationship between the size (*empl*) of the firm and trade payable is expected.

Regarding the business location, the analysis also considers the impact of the *darea* variable, a dummy which has a value of 1 for firms located in the central and northern areas of Italy and 0 for firms located in the southern regions and islands.

Finally, the paper also considers the following variables, related to financial firm's characteristics, as control variables: ratio of operating income and sales revenues (*ros*); ratio of net income and shareholders' equity (*roe*); ratio of equity and total assets (*solven*); ratio of current assets and current liabilities (*curr*).

The explanatory variables and the control variables have been assumed to be endogenous since these variables are built from the business financial statements. The variable referring to the firm's size has been assumed to be exogenous. The dummy variables are, in the same way, considered exogenous.

The η_{it} is designed to measure unobservable characteristics of the firms that vary across firms but are assumed constant for each firm. The parameters λ_t are time dummy variables that change over time but are equal in each period considered. δ_s are sector-specific dummies and ε_{it} is a random disturbance.

4. Sample and data

The reference sample is composed of SMEs whose balance sheets were available in the Aida Bureau Van Dijk database in the end of 2013.

The enterprises present the following characteristics:

- Legal status: active firms; independent firms;
- Joint stock companies and limited companies;
- Number of employees less than 250;
- Total assets less than 43 million euro;
- Financial statements availability: for the years 2005 to 2012.

The study was carried out for the years 2005 – 2012 and the sample is made up of enterprises from all over Italy and very different in terms of location and business sectors, according to the classification of economic activities by the Italian National Institute of Statistics (ISTAT), ATECO classification 2007. Firms that conduct financial activities (ATECO codes: 64, 65, 66) were not included in the sample.

Most of the firms are located in the North, therefore the sample reflects the economic and productive Italian systems, which are characterized by a greater number of firms located in the northern regions compared to the firms located in southern and central regions.

Before starting the analysis, observations in the extreme 1% tails of the sample distribution have been trimmed, as well as all implausible values on the key variables (i.e. accounts payable and receivable implying more than one-year commercial credit and debt duration, etc.). Moreover, only the firms with non-missing observations of the key variables for at least four consecutive years have been included.

The descriptive statistics are presented in Table 2.

Table 2: Descriptivestatistics

	payab	payabl	receiv	totasset	inbanen	inbanol	ros	roe	empl	cosden	curr	solven
N	3451	3451	3451	3451	3451	3451	3451	3451	3451	3451	3451	3451
mean	100,892	101,852	112,845	12.836,160	0,193	0,083	3,369	4,790	51,678	5,299	1,447	0,302
sd	41,225	41,104	50,903	7.331,991	0,134	0,088	4,276	12,466	36,888	3,031	0,605	0,165
min	9,510	9,510	1,380	655,253	0,000	0,000	-17,450	-54,020	1,000	0,020	0,320	0,009
max	287,210	287,210	273,140	35.497,560	0,719	0,472	23,160	63,920	219,000	17,720	6,500	0,854

5. Results of the analysis

Table No. 3 reports the results of the analysis.

The coefficient of the variable *payabl* is positive and significant at 5% level, so the first research hypothesis is verified and results confirm that small and medium enterprises are able to adjust their accounts payable terms also in order to reach a target accounts payable term. So the dynamic approach adopted is not rejected, as in previous literature (Garcia-Teruel and Martinez-Solano 2010).

Table 3 : Dynamic panel-data estimation - two step system GMM

Dependent: payab	Coef.	Std. Err.	P-value	
<i>Payabl</i>	0,281	0,143	0,049	**
<i>Receiv</i>	0,183	0,107	0,088	*
<i>Inbanen</i>	-156,270	51,275	0,002	***
<i>Inbanol</i>	-98,853	46,069	0,032	**
<i>Ros</i>	0,854	0,977	0,382	
<i>Roe</i>	-0,605	0,321	0,059	*
<i>Empl</i>	-0,083	0,113	0,461	
<i>Cosden</i>	-1,837	1,616	0,256	
<i>Curr</i>	-8,814	5,424	0,104	
<i>Solven</i>	-106,393	29,917	0,000	***
<i>Darea</i>	-4,466	5,118	0,383	
<i>Const</i>	143,825	35,612	0,000	***
<i>Time dummies</i>	yes			
<i>Sector dummies</i>	yes			
Observations	3451	Instruments	58	
Numb. of groups	550	Obs per groups	4	
Hansen	chi2(38)=31,37	P-value	0,768	

Notes. Level of significance: *** is 1%; ** is 5%; and * is 10%.

The empirical evidence also supports a positive and significant relation between the dependent variable and the variable *receiv*, that is the average number of days of delayed collections of accounts receivable. This result supports the matching hypothesis (Bastos and Pindado 2013), so small and medium enterprises, that delay collection from their customers, seems to adopt a combination of trade receivables and payables that is coherent in terms of duration. Trade receivable terms in the balance sheets of small and medium enterprises are closely related to trade payables terms and this may highlight the adoption of a balancing strategy that finances the supply of trade receivables with trade payables.

The coefficients of the variables *inbanen* and *inbanol* are negative and significant at 1 per cent level and 5 per cent level respectively, highlighting that the higher incidence of bank debt the lower trade payables terms. Both variables have a significant economic impact, therefore a clear substitution effect is observable between intercompany credit and bank credit and this result is in line with previous literature (*inter alia* Schwartz, 1974; Petersen and Rajan, 1994; Bastos and Pindado, 2013). This result confirms the third research hypothesis - that is the substitution hypothesis, which is one of the major aim of this paper - and suggests that small and medium enterprises reduce their accounts payable terms if they have the chance to access to short term bank financing, but also if they have access to long term bank financing (Deloof and Jegers 1999; Garcia-Teruel and Martinez-Solano 2010).

Having regard to the control variables, statistically significant relationships are observable for the *roe* and *solven* variables. The coefficients are negative and significant at 10 per cent level and 1 per cent level respectively and also in this case both variables have a significant economic impact. It appears to establish that small and medium-sized enterprises that have greater profitability and greater solvency - therefore the companies that may be less rationed by the financial system - have lower trade payables terms.

The ability of obtaining trade credit may be also linked to firm's dimension and larger firms, especially in a sample composed solely of SMEs, may also receive more bank credit than smaller firms as a consequence of their reputation, as explained above. Empirical analysis results do not confirm that fact, because it is not observable a significant relationship between the variable size and payables to suppliers.

Finally, even the dummy variable *darea* is not significant, therefore localization of small and medium Italian enterprises is not relevant to inter-company debts terms.

6. Conclusion

Using firm level data from Italian SMEs, during the period 2005-2012 the paper provides empirical evidence on the relevance of financial motivation in the use of trade credit.

The study has tested whether decisions about accounts payable follow an adjustment process and considers the possibility that the amount of days payable outstanding may also be determined by the preceding management policies, that is the amount of days payable outstanding of the previous year (García-Teruel and Martínez-Solano 2010).

The relationship between the use of trade credit and the extension of trade credit has also been investigated, according to the matching hypothesis (Bastos and Pindado, 2013), trying to understand if firms tend to demand more trade credit when they increase the supply of trade credit, in order to adopt a combination of trade receivables and payables that is coherent in terms of duration.

Finally the paper has investigated the existence of a substitution effect between intercompany financing and bank financing, according to which firms increase their demand for trade credit to overcome credit rationing from financial markets (Schwartz, 1974; Petersen and Rajan, 1997; Danielson and Scott, 2004).

Results show that decisions about accounts payable terms may follow an adjustment process. Indeed the amount of days payable outstanding may be determined by the amount of days payable outstanding of the previous year and this reveals that the previous year's management policies are relevant because firms may have a target level to achieve.

According to the relationship between the use of trade credit and the extension of trade credit terms, the empirical evidence suggests that accounts receivable are positively related to accounts payable. The relative dimension of trade receivable in the balance sheets of small and medium enterprises is very important because it exposes the firms to financial risks and liquidity problems due to late payments. Than SMEs try to match trade credit terms offered to customers with trade credit terms received from suppliers in order to limit potential financial and liquidity problems. Indeed when companies face liquidity problems due to late payments by customers, it may be less expensive to delay payment to suppliers rather than renegotiate loan terms with banks.

Finally looking at the results related to the relevance of financial motivations, it is possible to confirm the existence of a substitution effect between intercompany financing and bank financing. SMEs increase their accounts payable terms when credit from bank is less available (Schwartz, 1974) therefore a substitution effect is observable.

The importance of trade credit as short term finance has been established in several studies (Inter alia: Petersen and Rajan, 1997; Berger and Udell, 1998;) and our results are in line with previous literature, because empirical evidence shows that small and medium enterprises reduce their accounts payable terms if they have the chance to access to short term bank financing. It is interesting to observe that the analysis highlights how SMEs reduce their accounts payable terms also if they have access to long term bank financing (DeLoof and Jegers 1996; García-Teruel and Martínez-Solano 2010), so the study provides new empirical evidence on the relevance of accounts payables also as a substitute of long term bank financing.

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