

# Crafty Credit?

## The Strategic Use of Trade Credit

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### Abstract

This paper explores the contribution that trade credit can and does make as a competitive device that can add value to companies when used strategically. By reference to the literature, we argue that trade credit is not merely a short-term collection issue, and that, used proactively, it can be a source of competitive advantage. We then develop an empirical model to test the relationship between trade credit and sales/profitability to determine whether, and the extent to which, trade credit constitutes a strategic tool. We find, *inter alia*, evidence that, when used strategically to enhance competitive advantage, firms have a discernible optimal level of trade credit. Despite data limitations, we conclude that our model demonstrates a viable methodology that could be applied usefully to an extended data set.

### I. Introduction

Trade credit – any delay in firm-to-firm transactions between the provision of goods or services and payment for them – constitutes a complex and heterogeneous set of business lending practices (Paul and Boden, 2008). Globally, the scale of trade credit is significant – in most developed countries it exceeds short-term bank credit (Blasio, 2003) and can be an important way of financing firms' working capital (Peel and Wilson, 1996; Paul and Boden, 2008). In the UK, more than 80% of firms sell goods on credit (Paul and Wilson 2006; Wilson and Summers, 2002). This extensive use of trade credit is however counter-intuitive as the practice brings with it very serious risks of late-payment or default, with all that ensues from that for businesses' cash cycles. This begs the question as to why any firm would grant trade credit, with such questions prompting both reactive and proactive categorical explanations.

The extension of trade credit may sometimes simply be the reactive result of power asymmetries between suppliers and their customers. That is, trade credit can be a *de facto* consequence of powerful customers effectively taking credit because they can (Pike and Cheng, 2001, Paul and Boden, 2010). Moreover, in some business sectors trade credit appears to be an historical and intractable practice (Paul and Boden, 2008). And, of course, trade credit may simply be the unintended result of poor internal financial management practices (Wilson, 2003). Embracing some or all of these reactive explanations suggests the need for management accounting practices designed simply to mitigate the potential adverse effects of trade credit, either by not granting it or by managing/monitoring it better. In such circumstances the management

of trade credit is essential but prosaic, for instance confined to back-end chasing activities, and may often be accorded little status or regard within organisations (Wilson, 2003).

In contrast, a substantial and largely normative literature now suggests that trade credit can offer significant competitive advantage to suppliers, enhancing sales and profitability, if it is managed proactively and these benefits are often promoted as the reason for its widespread availability (Wells, 2004). Such arguments may well be teleological, but this should not deflect consideration as to whether there is sound theory and empirical evidence supporting the argument that the proactive management of trade credit holds the potential (or indeed realised) capacity to give firms a competitive advantage and the extent to which it is, in reality, managed proactively towards these ends.

Trade credit management is often something of a Cinderella subject that sits in no clear place in the accounting panoply (Paul and Boden, 2008). We hesitate to re-open the can of worms that is “strategic management accounting” (Lord, 1996), but find it useful to conceptualise the proactive management of trade credit as a form of management accounting that might support strategic decision-making. Lord (1996) draws comparisons between military and business strategy in defining strategic management accounting. These suggest that management accounting can play a strategic role in securing competitive advantage by collecting and synthesising internal information and that on competitors and “making it available to the strategic process” (Lord, 1996: 347). Lord categorises the existing literature on strategic management accounting under three main headings: the collection of competitor information, the exploitation of cost reduction opportunities, and the matching of accounting emphasis with strategic position. She also suggests that strategic management accounting is, in reality, nothing new and merely reflects the re-branding of information collecting activities that were going on within firms anyway.

Whatever normative arguments have been or could be made for the strategic management of trade credit, there remains the question of the extent to which this is the *modus operandi* of UK firms. Scapens and Bromwich (2001) argue that management accounting research has revealed a significant difference between normatively defined techniques and organisational practice. Similarly, Tillmann and Goddard argue that much normative work is “disconnected from what actually happens in organisations” (2008: 81).

With these caveats very much in mind, we explore in this paper the extent to which trade credit might be and actually is managed to achieve competitive advantage, increasing profitability, as opposed to being prudently handled as a necessary evil. Accordingly, this paper has three further sections. In section 2, we draw upon the literature to demonstrate that trade credit can indeed be used strategically to increase firms’ sales and profitability. We do so across three principal themes: that trade credit can assist in developing information flows which provide assurances as to the characteristics of a supplier’s products; that effective trade credit management can help to build sustainable and mutually beneficial customer relations, and; that trade credit can be a useful means of intelligently managing cash flows and business finance. Having established the theoretical case for the strategic advantage that trade credit can afford, we then set out how we approached the empirical testing of the relationship between the use of trade credit and sales/profitability. In section 3 we present empirical findings on the use of trade credit in a sample of UK firms and consider what they reveal about the relationship between sales/profitability and trade credit, and therefore to what extent trade credit is used strategically to gain competitive advantage. This is followed, in Section 4, by a discussion and conclusions.

## II. The Strategic Possibilities of Trade Credit.

Trade credit occurs when a supplier allows a customer to delay payment for goods or services. The exact terms on which this is done varies considerably between suppliers and indeed within them. Trade credit embodies considerable costs and risks for suppliers as they are effectively financing the purchase for a period, and may be paid late or not at all.

Trade credit decision-making can be transaction-based, relationship-based or both (Berger and Udell, 2006) and utilise both formal accounting data (such as the credit-scoring of customers) and informal

information. Transaction-based credit granting decisions are driven by formal policies and/or procedures and rely upon financial data. Relationship-based decision making processes are grounded in practices of negotiation and bargaining and are more overtly subjective. In reality, most suppliers operate a mix of these technologies: for instance, a firm may have a formal credit policy and procedure but individual customers may be allowed to depart from that by agreement (Paul and Wilson, 2006). Such mixes suggest that the effective strategic management of trade credit to achieve competitive advantage requires technical understanding and skills, organisational competences, and business acumen in the utilisation of “soft” information. Of course, issues of power will be evident in both transaction and relationship-based decisions and indeed in hybrids: power to either enforce processes and policies or to negotiate relationships. Power asymmetries may therefore impede suppliers’ capacity to optimise their management of trade credit.

The available literature suggests that a number of advantages can accrue, at least normatively, from the more proactive supply-led provision and management of trade credit. These can be categorised into three main areas: the communication of product information to customers, building of customer relations and financial management. We now consider each in turn.

### ***1.Products***

Information asymmetries may mean that purchasers are unsure or unconfident about the quality or reliability of suppliers’ goods and services and this may deter them from buying. Trade credit can be used by suppliers to signal their confidence in the quality of their products because buyers receive goods or services without the necessity of immediate payment (Peel *et al.*, 2000). Supplier-customer information asymmetries may therefore be ameliorated by placing customers in the position where they can easily return goods or negotiate the price once quality is evaluated (Pike and Cheng, 1996). Trade credit can therefore be seen as constituting a very strong form of warranty as the customer might simply opt not to pay at all (Lee and Stowe, 1993). The terms of trade credit are invariably heterogeneous and may, for instance, include a discount for early payment or apply interest for credit taken. As such, “the difference between the credit and cash price can be interpreted as the price of a warranty attached to the product” (Lee and Stowe, 1993: 286). This cost may be borne by either the customer or the supplier, depending on how the trade credit terms are constructed (for instance, the supplier bears the cost where they offer a discount for early payment). Where suppliers have little to prove in terms of quality it is rational for warranty costs to be borne by the customer.

It follows that the strategic management of trade credit would entail firms being self-aware of their reputation and product quality, especially *vis-à-vis* that of competitors (Bromwich, 1990). This information should then be utilised to determine trade credit policies and practice that enhance the strategic position of the firm via increased sales and also to exploit cost reduction opportunities by ensuring that the price of product quality warranties are rationally allocated.

### ***2.Customers***

Trade credit can be used to manage customer relations in three principal ways. First, suppliers may want to make informed choices about whether it is worthwhile investing in customer relationships by, for instance, developing new products or services for them. If suppliers hold insufficient or asymmetrical information about the financial status of existing or potential new customers they may be unable to make rational choices. Trade credit can assist indirectly here by signalling the state of customers’ financial health and this information can be used to ameliorate information asymmetries and in identifying problems earlier than otherwise possible. For instance, if buyers are offered a discount for early payment and do not take it this may signal constraints on their working capital availability, allowing suppliers to identify those with possible cash flow problems (Smith, 1987).

Second, trade credit terms can constitute a direct investment in customer goodwill and loyalty, enhancing market position through higher sales. Many argue that customers are more profitable to buyers the longer the trading relationship continues (Jacob 1994). For instance, extending trade credit can assist the buyer in recovering from financial difficulty to the mutual benefit of the long-term supplier. Such investments are not cost-free as trade credit adversely affects suppliers' cash flow and they also risk late payment or default. Of course "the seller can earn a return on the investment only if the buyer stays in business" (Ng *et al.*, 1999:1113) and "when such investments are non-salvageable, their value is lost if the buyer fails or terminates the relationship" (Smith, 1987:865). Effective trade credit management protects such relationship investments through screening, which should distinguish between customers whose financial problems are temporary and those who are unlikely to survive.

Third, trade credit can also be used to favour certain customers, building market share. When suppliers cannot or do not wish to openly discriminate between customers by offering some lower prices than others, trade credit can be used to achieve a similar result, signalling a preferential status to the customer. For instance, suppliers can allow customers to pay after the agreed date without a penalty (Schwartz and Whitcomb, 1978) or vary their two-part-terms<sup>1</sup> to offer higher discounts to selected customers, or allow them to take an unearned discount. Suppliers can also vary their terms to attract specific customers in order to achieve a certain level of market share (Summers and Wilson, 1999). Price discrimination through trade credit can also be a useful tool for circumventing price controls (Emery, 1984) – but this can cut both ways and some buyers may subvert official process by demanding credit. The bargaining power of some companies may have a disproportionate effect on the credit terms offered. Petersen and Rajan argue that "since credit terms are usually invariant to the credit quality of the buyer, trade credit reduces the effective price to low-quality borrowers. If this is the most price elastic segment of the market, then trade credit is an effective means of price discrimination" (1997: 644).

Trade credit can therefore be an extremely useful means of collecting information about potential or current customers' financial position and this can be utilised not just in decisions about trade credit terms but also be fed into wider strategic decision-making. It can also be used to discriminate between customers, signalling "valued-customer" status to buyers, helping to build good customer relationships and sustainable customer-bases. This matches the accounting emphasis with the strategic position of the firm.

### **3.Finance**

Trade credit can be used to strategically manage financial flows with customers, either reducing suppliers' costs or providing an advantage to customers, building goodwill. Transaction cost theory suggests that trade credit can lower costs by providing both goods and finance from a single source (Mian and Smith, 1992), allowing the supplier to accept a lower profit or a greater loss on the credit than a financial institution could. In a similar vein, by facilitating the separation of the exchange of goods and of money, trade credit allows companies to efficiently separate the payment cycle and the delivery schedule (Petersen and Rajan, 1997). This allows suppliers to accumulate invoices, billing in bulk at regular intervals, enabling them to anticipate their cash requirements with greater certainty so that they can hold smaller precautionary cash balances and plan movement from liquid assets to cash in a cost-effective manner (Schwartz 1974). Sellers often adjust their debtors' balances in response to deviations in demand by relaxing/tightening credit terms; suppliers who experience marked seasonal fluctuations in demand can use trade credit to stabilise and improve their cash flows as well as to reduce monitoring costs (Emery 1984; 1987).

Trade credit operates as a form of finance for customers because of the delay in payment; the cost to suppliers is the opportunity cost of alternative investment. Atanasova and Wilson report that large suppliers

“may provide an important mechanism for channelling finance down to those firms rationed by financial intermediaries” (2003: 504). Trade credit can also act as a facilitator in that those firms that are able to borrow from financial institutions do so and pass on the benefit to those that are unable to access funds in the same way. If more liquid sellers extend credit to less liquid buyers this can build good business partnerships and generate sales. Such finance may also lock some customers into particular supply chains (Paul, 2010).

In sum, trade credit is potentially strategically useful in the management of finance for two reasons. First, it can reduce costs and the consequent savings can be either retained or passed on to customers to deliver a competitive advantage. Second, trade credit can help build strong alliances with customers by providing them with congenial financing arrangements.

We have presented three possible ways in which trade credit might be usefully deployed by suppliers as a means of achieving a competitive advantage. First, trade credit can be used to signal confidence in product quality. Second, trade credit can provide valuable information on the financial health and stability of customers and also be used to develop/manage customer relationships, generating market advantage. And third, it can help to cut financing costs and also supply customers with vital lines of credit finance, facilitating stronger supply chains.

Direct testing for the strategic use of trade credit is problematic. Firstly, it is very hard to measure intangible constructs such as “building strong alliances”. Secondly, even if the measurement of such variables were possible, we would still be measuring the differential use of trade credit across firms, not their strategic use of it. In other words, we would only be able to tell whether more or less of certain characteristics lead to more or less trade credit. It does not really tell us whether or not trade credit is used strategically.

A reasonable way of determining whether trade credit is used strategically is to check whether it is related to *both* sales and profit as these two variables are, arguably, the best measure of a company’s success. A possible alternative measure is stock performance, but this can only be observed for publicly traded companies, thereby excluding from analysis a significant number of corporate actors.

Assuming that firms are rational agents, the strategic uses of trade credit discussed above are directly aimed at increasing sales and profits relative to competitors. Cost reduction, customer loyalty, and quality signalling are obvious means of obtaining such competitive advantage, thereby increasing market share and profitability. Financing the purchases of customers can also play a major role in achieving increased market share.

From the above, we anticipate the strategic use of trade credit to be associated with enhanced profit and sales performance. Increased sales are expected with the increased use of trade credit. However, increased use of trade credit will not necessarily lead to additional profit if it is used injudiciously. Unfortunately, we cannot measure judiciousness directly. However, increasing trade credit should increase profitability until it reaches the optimum point, at which the effect reverses – like people, firms can use too much of a good thing. Thus, we define the judicious (and therefore strategic) deployment of trade credit as using the optimal amount to enhance profitability. Hence we advance the following two main hypotheses:

**Hypothesis 1:** *Sales are a strictly increasing function of trade credit.*

**Hypothesis 2:** *Profit and trade credit are related by a hump-shaped function, increasing up to a certain level of trade credit and then decreasing thereafter.*

The above two hypotheses are conditional on other control variables, which we discuss shortly.

A standard approach to testing these two hypotheses is to use a regression in which trade credit is used as a right hand side (explanatory) variable while sales and profit are used as the dependent variables. However, there are three major considerations in modelling the strategic use of trade credit. First, strategy entails some measure of performance relative to similar firms. Unfortunately, we have not been able to collect such information. Instead, we use percentage change in sales and profit. Second, strategic success is better measured in the longer rather than the shorter term. Accordingly, we use four years cumulative

percentage change in sales and profits as measures of strategic performance. The third consideration is the problem of endogeneity. The causality between trade credit on one hand and sales and profit is not one sided. For example, greater use of trade credit may be expected to increase profit, but greater profit can also affect trade credit because more profitable firms have greater ability to offer trade credit and take on more risk.

Thus, to complete the picture we add one further hypothesis:

**Hypothesis 3:** *Trade credit is a strictly increasing function of profit and sales.*

Each of the three hypotheses can be represented by an equation, yielding a system of three simultaneous equations.

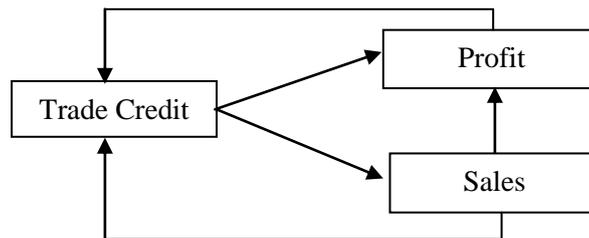
$$C = \beta_0 + \beta_1 P + control ,$$

$$P = \alpha_0 + \alpha_1 C + \alpha_2 C^2 + \alpha_3 S + control ,$$

$$S = \gamma_0 + \gamma_1 C + control ,$$

where C, P and S are trade credit, profit, and sales respectively. The quadratic term in the second equation captures the hump-shaped function. The causality and interaction between the three endogenous variables (C, P, and S) is represented graphically in

**Figure 1. A graphical representation of the trade credit model.**



Our research is complicated by the endogenous relation that exists between the three main variables. For example, we are trying to determine the causal effect of C on P. The inference usually involves a regression involving P as a dependent variable, and C and other control variables (say a vector Z) as explanatory variables. The question is therefore: holding Z constant, does C have an economically and statistically significant causal effect on P? If we were to proceed this way, the coefficient will be biased and may lead to spurious results (for example we may have a negative coefficient even when the true relationship is positive). The reason for this bias is that P and C are simultaneously determined. P can cause C, but C can also cause P. More importantly, both P and C can be caused by an unobservable factor (say managerial skills).

One solution to the problem of simultaneity is to estimate a system of equations. However, given the limited data points in our sample, we do not have enough degrees of freedom to estimate the full system using three stage least squares or full information maximum likelihood methods. A more appropriate approach is the Generalised Method of Moments (GMM). The GMM is able to estimate models with endogenous regressors and has the added advantage of being robust to heteroscedasticity.

We turn now to an examination of empirical data in which we explore the extent and modalities of strategic trade credit management in a sample of UK firms.

### III. Empirical Evidence

Our data is from a mixture of primary and secondary sources. The primary data is based on a survey questionnaire sent to a large number of UK firms across a broad range of sizes and sectors in manufacturing,

services, and construction. This survey is used to obtain control variables (firm characteristics) and most of the instrumental variables. Our main (dependent) variables, however, are obtained from the Fame Database.

Because we use a small fraction of the questionnaire data, we only give a brief description of the survey. The target firms were randomly selected from a credit reference agency. The questionnaire gathered data on many areas of trade credit management and business performance. The questionnaire was piloted and comments were reflected in a revised design.<sup>ii</sup> Our response rate of 17% is very similar to those found previously.<sup>iii</sup> The resulting database was tested for non-response bias by looking for significant differences in the responses of early and late replies using t-tests on a range of characteristic variables. The results revealed no significant differences in the responses of the sub-samples.<sup>iv</sup>

The survey data was collected in 2005. The secondary data covers the period 2004 to 2007. These years were selected because they span the period of the survey data. Mixing primary and secondary data has resulted in a substantial loss of valid observations, leaving 48 and 79 observations, depending on the case. The compensating factor for the loss of observations is that we obtained the rich data set that was needed to test the viability of the methodological approach developed.

### *1. Definition of variables*

Our empirical tests involve three main endogenous variables: profit, sales and trade credit. In modelling relative performance, the percentage change over time is usually more appropriate than levels. We therefore have the following variables:

P: is the four year percentage cumulative change in profit.

S: is the four year percentage cumulative change in sales.

C: is the four year percentage cumulative change in debtors.

In principle, growth in trade credit reflects the intensity with which a firm uses it to acquire greater market share and enhance profits. However, because firms do not necessarily have the same initial conditions (for instance age and size), proportional changes in trade credit do not always coincide with its actual level. For example a young growing firm has very low levels of credit and would naturally tend to have rapid growth in trade credit. On the other hand, an established firm may have very little growth in trade credit, but still have high levels of it.

Thus, growth in trade credit needs to be complemented by its level. By using both level and growth we are able to capture a more complete picture of strategic use of trade credit. For the level of trade credit we use ARTA which is the amount of accounts receivable relative to the firm's total assets.

Table 1, Panel A, provides summary statistics for these dependent variables. The average firm in our sample has an ARTA ratio of 34.9% and a standard deviation of 21.2%. This indicates some variation across firms, with 95% having roughly between 4% and 72% ARTA ratios. The presence of outliers is noticeable, with the most generous firm having a surprisingly high ratio of 99.6%.

Outliers are even more noticeable in the other variables. Trade credit has a mean of around 70% cumulative growth over four years, but the maximum is more than 2000% whilst the 95<sup>th</sup> percentile is only 320%. The situation is less pronounced with sales growth, but worse with profit growth – the mean, at more than 412%, is extremely large while the median is negative. The distribution is extremely skewed with 95% of the firms showing less than 776% growth while the 99<sup>th</sup> percentile is more than 11000%.<sup>v</sup>

Panel B of Table 1 shows similar information on four control variables. Growth in employment and assets has potential explanatory power for both sales and profit growth. However, these variables also suffer from outliers, especially the three asset growth variables.

There are usually three ways of dealing with such extreme outliers. One solution is to use robust estimators. However, to our knowledge, no satisfactory methodology exists that deals with both robustness and endogeneity. Another solution would be to winsorise the data by excluding a small proportion in the tail of the distribution. Our sample is relatively small, and winsorising would remove valuable information. This option, though straightforward, is therefore discarded for practical reasons. A third solution would be to perform a first pass regression and then exclude extreme residuals. Again, this would remove much needed data points from our sample. Rather, our solution to this problem is to shift the data to the right and take logarithms.

$$NewValue = \log(136 + OldValue)$$

The number 136 coincides with the lowest growth in all variables plus one (to avoid  $\log(0)$ ). Shifting all variables by the same amount preserves the relative comparability across these variables. This transformation has the advantage of allowing the use of the GMM methodology, using every available data point and curbing the influence of extreme observations. The logarithm transformation also has a satisfactory “diminishing return” interpretation.

Panel C of Table 1 shows the main statistical features of the endogenous and control variables. The medians are now very close to the means, while the maxima do not appear too extreme. For example, in the most extreme case of profit growth the 95<sup>th</sup> percentile is 6.79 while the 99<sup>th</sup> percentile is 9.31, and the maximum follows closely at 9.51. The other variables have a similar pattern with a lot less accentuated extremes. The regression results were based on this transformation.

**Table 1: Summary Statistics of Dependent and Control Variables**

	Observations	Mean	Median	Std Error	Minimum	Maximum
<b>Panel A: Dependent Variables</b>						
ARTA	208	0.349	0.328	0.212	0	0.996
Trade Credit Growth (C)	150	69.753	9.00	261.382	-100	2368
Sales Growth (S)	90	30.022	15.50	75.106	-118	334
Profit Growth (P)	70	412.714	-6.50	2013.275	-135	13427
<b>Panel B: Control Variables</b>						
Employment Growth (EMP)	96	19.510	8.00	53.706	-81	267
Growth in Fixed Assets (FA)	98	71.765	9.50	261.981	-98	1727
<b>Panel C: Transformed Variables</b>						
Trade Credit Growth (C)	150	5.070	4.977	0.596	3.584	7.826
Sales Growth (S)	90	5.017	5.021	0.458	2.890	6.153

Profit Growth (P)	70	4.982	4.864	1.256	0.000	9.515
Employment Growth (EMP)	96	4.998	4.970	0.308	4.007	5.999
Growth in Fixed Assets (FA)	98	5.049	4.980	0.643	3.638	7.530

One of the most important elements of GMM estimation is the determination of appropriate instruments. An instrument is a variable that is uncorrelated with the regression error term but is, at the same time, correlated with one of the right hand side (both exogenous and endogenous) variables. While the above control variables can indeed be used as instruments, they may not be sufficient as the number of endogenous variables may be greater than the number of instruments. Fortunately, in our survey we collected additional information on the firms' characteristics. To ensure that the instruments are appropriate we correlated a large number of these characteristics with our three endogenous variables. Table 2 reports summary statistics of the characteristics that were significantly correlated with one or more of the endogenous variables. Because they are significantly correlated with the endogenous variables, it is less likely that these instruments are redundant.

**Table 2: Summary Statistics of Instruments.**

	Series	Observation	Mean	Standard Error	Minimum	Maximum
<b>Correlated with Profits</b>						
Log Years selling products	PRIMYEARS	244	2.970	1.096	0.405	5.707
Competitiveness of market	MARCOMP	255	0.510	0.501	0	1
Credit score	CRESCOR	205	58.517	14.850	9	96
<b>Correlated with Sales</b>						
Credit terms affected by customers	CUSAFTERM	255	0.059	0.236	0	1
Competitiveness of market	MARCOMP	255	0.510	0.501	0	1
Granting credit is customer relation decision	CREDCUSREL	255	0.082	0.275	0	1
Cash management importance	CASHMANIMP	255	0.586	0.501	0	1
<b>Correlated with Trade Credit (ARTA, C)</b>						
Log Years selling products	PRIMYEARS	244	2.970	1.096	0.405	5.707
Ascertain quality by simple inspection	QUALASSESS	255	0.141	0.349	0	1
Product diversification	PRODIVERS	255	0.165	0.372	0	1
Credit score	CRESCOR	205	58.517	14.850	9	96

The variables (defined in Appendix 1) whose minima and maxima are zero and one respectively are dummy variables and CRESCOR (credit score) is a score between 0 and 100. The variable “years selling product” (PRIMYEARS) is log-transformed for two reasons. First, outliers were found in this data, with some extremely old firms (the maximum age was 399 years). Second, we do not expect the relationship between trade credit and firm age to be linear because of diminishing marginal effect.<sup>vi</sup> Thus, a logarithmic function seems more appropriate as it offers a diminishing marginal effect. The summary statistics for this variable are given for log-values rather than level values.

**2.Results and discussion**

The regression results for profit and sales are shown in Table 3. The profit regression was carried out with 10 instruments in total. Thus, we have 10 moments and 5 coefficients, or 5 over-identifying restrictions. Hansen’s J statistic is distributed as a  $\chi^2(5)$ . In this case Hansen’s J statistic is very low and statistically insignificant (p-value = 0.49). This suggests that the model is appropriate. However, the number of observations is rather low due to missing observations.

**Table 3: Profit and Sales Models**

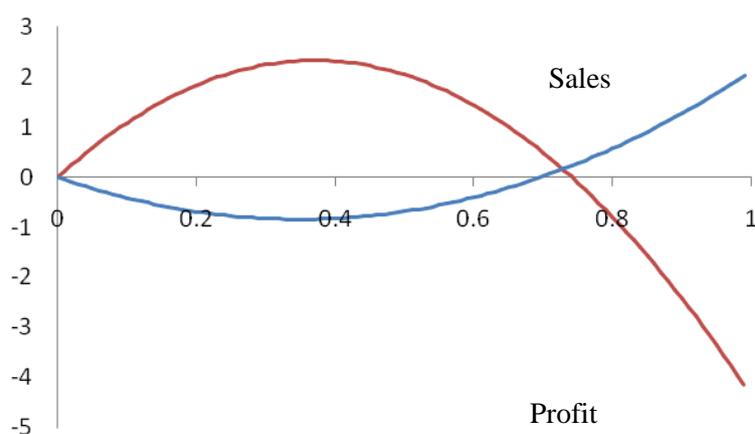
<i>Explanatory variables</i>	<i>Dependent Variables</i>			
	<b>Sales Growth</b>		<b>Profit Growth</b>	
	<i>Coef.</i>	<i>p-val.</i>	<i>Coef.</i>	<i>p-val.</i>
Constant	2.369	0.001	-9.510	0.152
Sales Growth (S)			2.882	0.007
Fixed Assets Growth (FA)			-0.468	0.106
Employment Growth (EMP)	0.311	0.205		
Trade Credit Growth (C)	0.332	0.061		
ARTA	-4.851	0.020	15.226	0.054
ARTA-square	6.964	0.029	-18.790	0.092
	J(5)=2.041 Sig.(J)=0.84 N=79		J(5)= 4.372 Sig.(J)=0.49 N=48	

The sales growth results do not seem to fully support our first hypothesis. The fixed asset growth variable was highly insignificant and adversely affected the significance of the other variables, hence its removal from the regression. Employment growth appears to be positively related to sales growth, but is statistically insignificant and, judging by the size of its coefficient, is economically unimportant. However, the three trade credit variables are highly significant. First, trade credit growth is positively related to sales

growth, suggesting that firms that increased their trade credit during the four year period also significantly increased their sales during the same period (but not necessarily the profit, as trade credit growth is not significant in the profit equation).

The coefficients for ARTA and ARTA squared suggest a U shaped function similar to the lower curve in Figure 2. This curve is a plot of the function  $y = -4.85x + 6.96x^2$ . The point of reversal is at roughly 36% ARTA. Given that the mean ARTA is about 35%, this result suggests that firms that have below average levels of trade credit have some sort of disutility of trade credit, in the sense that increasing the firm's level of trade credit may reduce sales growth. It should be noted however that the slope in this region is very flat and may therefore not be economically important. On the other hand, above average firms (in terms of level of trade credit) do enjoy a positive relationship between level of trade credit and sales growth.

**Figure 2. Suggested relationship between sales and profit growth and ARTA.**



Regardless of the economic importance of the negative slope of the first half of the curve, this U shape relationship is puzzling since we would expect sales growth to be strictly increasing in ARTA. We are not able to fully explain this, but suggest two possibilities. First, this could be due to the effect of trade credit growth (C) whose coefficient is positive. However, using our sample firms, we calculated the aggregate effect of both ARTA and C. The impact of C was found to be insufficient to change the U shape pattern. A second explanation is that low ARTA firms may be using trade credit inefficiently and hence the increased ARTA is not the result of increased sales but decreased recovery rates. Overall, the first hypothesis is not fully supported by our data.

The second regression in Table 3 involves profit growth as a dependent variable. First we note that employment growth and trade credit growth are highly insignificant and their inclusion in the model worsens the fit. In addition, these two variables are significantly positively correlated with the growth in fixed assets. Given that the inclusion of irrelevant variables may worsen the efficiency of the estimates, we decided to drop these two variables from the regression. Thus, only the level of trade credit seems to matter for profit growth.

Overall, the regression supports our second hypothesis. In particular, the coefficient of ARTA is positive while the coefficient of the square of ARTA is negative. Both are significant at the 10% level. This suggests a hump shaped relationship between profit growth and the level of trade credit. Figure 2 plots the curve  $y = 15.22x - 18.79x^2$ , which is shown as a dashed line. The impact of the level of trade credit on

profit growth (holding other factors constant) is increasing until roughly 42% ARTA. After that increasing the level of trade credit adversely affects profit growth. The model thus suggests that an optimal trade credit level may exist that would maximise profit growth, other things being constant. Too high levels of trade credit seem likely to adversely affect the growth of a firm’s profits.

Sales growth is highly significant and positively related to profit growth. This is not surprising since sales are the main drivers of the profitability of a firm. Fixed assets appear to be negatively correlated with profit growth. However, its coefficient is statistically insignificant at the 10% level and is economically unimportant (the coefficient is more than 5 times smaller than that of sales growth). Hence, the growth of assets does not seem to matter for profit growth.

We now turn to our third hypothesis. The regression results for the level of trade credit (ARTA) and the growth of trade credit are shown in Table 4. As before, the two Hansen’s J statistics are insignificant and suggest a good fit. We also note the low sample size due to missing values. Otherwise, the results are mostly in line with our third hypothesis.

**Table 4: Trade Credit Models**

<i>Explanatory variables</i>	<i>Dependent Variables</i>			
	<b>TC</b>		<b>ARTA</b>	
	<b>Growth</b>			
	<i>Coef.</i>	<i>p-val.</i>	<i>Coef.</i>	<i>p-val.</i>
Constant	-0.887	0.462	1.213	0.024
Sales Growth (S)	0.878	0.003	-0.186	0.102
Fixed Assets Growth (FA)	0.166	0.026	-0.030	0.562
Profit Growth (P)	0.168	0.040	0.093	0.040
PRODDIVERS	-0.294	0.005	-0.002	0.960
PRIMYEARS	-0.031	0.457	-0.085	0.000
QUALASSESS	-0.046	0.764	0.092	0.151
	J(8)=3.131		J(8)=5.027	
	Sig.(J)=0.79		Sig.(J)=0.54	
	N=48		N=48	

As expected, sales growth is positively associated with trade credit growth. However, sales growth is negatively related to the level of trade credit (ARTA). To some extent, this reflects the earlier result of the U shaped relationship between ARTA and sales growth. Nevertheless, it remains inexplicable. On the other hand, profit growth is more robust and is more in line with expectation. It has a positive and highly significant impact on both the level and growth of trade credit. Overall, our third hypothesis is not completely supported by the data since sales growth is increasing in trade credit growth but not the level of trade credit.

To complete the empirical picture, we briefly note that growing firms (fixed assets growth) seem to have a better ability to grow their trade credit. However, growing firms do not necessarily have higher levels of trade credit. Product diversity does not seem to matter, although the negative sign is in line with previous findings (Summers and Wilson, 2000). The negative relationship between PRIMYEARS and ARTA shows that long-established firms have relatively lower levels of trade credit. This is in line with expectations since established suppliers are under less pressure to offer credit, given their market share, reputation and the quality of their products. However, established firms are not necessarily growing their trade credit differently from other younger firms. Finally, QUALASSESS has a positive coefficient but is not significant at the 10% level. Thus, contrary to previous findings (Paul and Wilson, 2006), the ability to assess the quality of goods does not seem to have any impact on the level or growth of trade credit.

#### IV. Summary and discussion

This paper has set out the case for the strategic potential of trade credit to enhance sales and profitability of firms. Theoretically, such an enhancement is realized primarily through three channels: products, customers and financing. Having established the theoretical prospects for trade credit, we then tested the relationship between trade credit use and sales/profit in a sample of UK firms. A dynamic relationship between these variables would suggest that trade credit does have strategic potential.

We tested three hypotheses; the first two are direct tests of strategic use of trade credit, while the third is an auxiliary hypothesis needed to test the feedback effect from sales and profits to trade credit implied by the endogenous nature of these three variables.

The first hypothesis implies that increasing the use of trade credit increases the market share of a firm as proxied by the growth in sales. Our data on UK firms partially support this hypothesis, suggesting that the hypothesised strict positive relationship between trade credit and sales growth is only confirmed for firms with an above average trade credit level.

The second hypothesis is fully supported by our empirical results. The predicted hump-shaped pattern was found to be statistically significant and economically meaningful. According to this pattern, trade credit is only beneficial up to a point. Roughly speaking, increasing trade credit increases profit as long as accounts receivable does not exceed 42% of the total assets. Beyond this point, the effect becomes counter-productive, leading to an actual worsening of the profitability of the firm. One important feature of this outcome is the existence of an optimal level of trade credit for profit growth maximisation. To our knowledge, this has not been observed in prior literature. Indeed, the existence of an optimal level of trade credit is consistent with the idea of judicious use of trade credit.

The third hypothesis, which predicts a positive relationship between trade credit and profit/sales is generally confirmed. Although not directly relevant to our study (we are interested in the effect of trade credit on profit and sales), this result supports the idea of the duality between trade credit and profit/sales. Thus, not only can (a judicious use of) trade credit help the performance of a firm, the performance of that same firm is also likely to help it extend more trade credit.

We now consider the theory and our findings in the light of Lord's (1996) three categorisations of strategic management accounting. First, there is the issue of using management accounting to secure competitive advantage by collecting and synthesising internal information and that on competitors and making good use of it. In principal, trade credit information can be usefully collected and collated to provide information on customers' financial health and behaviour. This can be utilised in a wide range of decision making contexts. In particular, such information can help firms decide which customer relationships they should invest in and in early identification of customers' financial stress (which may affect a wide range of

decisions). Our results suggest that firms can do this up to a point. It seems likely that extending trade credit to an unlimited number of customers may not be profitable because, beyond a certain number of credit-customers, it may become too difficult or costly to maintain the same quality of internal and external information. This view is consistent with our result that profitability worsens with levels of trade credit that are beyond the optimum level.

Lord's second categorisation – the strategic possibilities for achieving cost reductions (1996) is directly linked to our second hypothesis. In principal, trade credit can be managed highly effectively to reduce costs by, for instance, tailoring credit policies to meet the strategic needs of the organisation at least cost. We have found that, at least in terms of trade credit level, firms should have an optimal level which achieves minimal cost. In our case, this would coincide with higher profit growth, although we do recognise that other factors may influence profitability.

Third, Lord (1996) talks about how good strategic management accounting would match the accounting function to firms' strategic objectives. Strategic trade credit management offers the prospect of the integration of the trade credit function into strategic decision making across the firm. For instance, it can be used in work with customers to build market share and advantageous customer bases. Our first hypothesis seems to be partially in line with this view, given that sales growth is generally increasing with trade credit growth. In terms of trade credit level, firms that extend low levels of trade credit (ARTA) do not seem to enjoy a build up in market share or customer base. However, firms that grant above average levels of trade credit do seem to benefit from greater sales growth and, presumably, greater market share.

This is, of necessity, a limited study that offers twin insights. First, it develops an empirical model which exhibits the potential for the further and more nuanced analysis of trade credit as a strategic tool, an hitherto largely neglected topic. Second, it offers some insights into both strategic possibilities and practices. However, there is ample evidence (Paul, 2010; Peel *et al.*, 2000; Summers and Wilson, 1999) to suggest that trade credit is by no means ubiquitously well-managed, even at the prosaic level of back-end chasing activities, never mind strategically. This will make achieving the strategic advantages of trade credit problematic and somewhat elusive. Together, these insights point to the need for further work, employing our empirical model but with extended data sets.

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<sup>i</sup> Two-part terms are where the buyer is offered a discount for early payment.

<sup>ii</sup> The full questionnaire is available upon request from the authors.

<sup>iii</sup> The response rates in the surveys by Wilson *et al.* (1995) and Haworth and Westhead (2003) were 16% and 17% respectively.

<sup>iv</sup> A comparison between the characteristics of respondents and the mailing sample were made using accounting data. T-tests on size, sector, profitability and a range of financial ratios were conducted and we were satisfied that response bias was not an issue.

<sup>v</sup> The lowest profit growth value is -135%. Figures less than -100% are possible because we calculate growth on a cumulative basis.

<sup>vi</sup> For example, a young firm grows fast in the first few years, but its growth slows down in later years as it approaches its full potential.

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### Appendix 1: A brief definition of the instruments

The following is a brief description of the instrumental and control variables used in the empirical models. These variables were obtained from the survey.

- **QUALASSESS:** is a dummy variable, which measures how easy it is to evaluate the quality of goods. If the goods quality is difficult to inspect, sellers are expected to grant credit to allow customers to assess the goods before paying.
- **PRODIVERS:** is a dummy variable, which measures firms' product diversification. Those selling a wide range of products may have difficulty establishing credit terms for each product, which makes the management of credit decisions difficult and costly. Given the choice, firms in this situation tend to offer less credit.
- **PRIMYEARS:** measures the length of time firms have been selling their goods. Those that are well established give less credit as customers are familiar with their goods and do not need long inspection periods.
- **CUSAFTERM:** a dummy variable reflecting the extent to which suppliers accede to customers' credit demands. A positive correlation between CUSAFTERM and trade credit is expected.
- **MARCOMP:** a dummy variable indicating whether the firm operates in a competitive market. A firm that sells in a competitive market may use trade credit terms to encourage sales. We expect MARCOMP to be positively correlated with trade credit.
- **CREDCUSREL:** a dummy variable indicating whether a given firm perceives credit extension as a customer relationship decision. Such firms see trade credit as a means of attracting and retaining customers and are therefore more likely to extend it. We expect this variable to be positively correlated with credit decisions.
- **CRESCOR:** suppliers' credit scores are used as proxies for financial risk. Firms with low credit score (i.e. high risk) may find it harder to access finance and thus tend to extend less credit to their customers. CRESCOR is expected to be negatively correlated with credit decisions.
- **CASHMANIMP:** a dummy variable reflecting the importance of cash management to firms. Firms that consider cash management an important financial objective are more likely to have healthier liquidity and thus are expected to grant more credit. This variable is expected to be positively correlated with trade credit decisions.<sup>vi</sup>