Analysis of Trade Credit as an Alternate Source of Financing: Evidence from Non-Financial Sector of Pakistan

Ammara Mubashar[1] Sumayya Chughtai[2] Abdul Raheman[3]

Abstract

In order to carry out the business operation , previous researchers have found that Pakistani firms are relying on both sources of short term financing and trade credit is as important as bank credit but the nature of relationship between two is yet to be explored. Be keeping in view this gap in previous researches, the current study aims to explore whether there is a substitution relationship or complementary relationship between these two modes of short term financing. For this purpose, data was collected for 167 manufacturing firms listed at Pakistan Stock Exchange for the period 2005 to 2016. Using dynamic panel estimation, the study verifies the substitution effect of bank borrowings and trade credit financing whereas size and inventory turnover were control variables and found to be positively related. This study also examined the impact of previous period trade credit and found to have a positive relationship which suggests that credit relationships do matter for short term financing. The results of the study are useful to academic researchers and managers in specific areas of trade credit management.

Keywords: Trade Credit, Dynamic Panel Estimation, Working Capital Management

Introduction:

In a financially weak operational system with tightened monetary and debt policies, companies have to pursue different sources of external financing and, one of such sources is trade credit financing (Olusola & Olusola, 2012). Trade credit is a financial transaction in which a firm's goods or services are sold and simultaneously credit is extended for the purchase to the customer. Alternatively, it can be viewed as a loan which is supplied by seller against the product sales (Ferris, 1981; Chou & Lin, 2015). Extension of Trade credit by suppliers is possibly influenced by the availability of short-term bank loans or by their access to short-term bank credit. Casey and O'Toole (2014) observed that trade credit is supplied more by those firms having more access to short term bank loans to financially constrained firms.

From trade credit demand perspective, Petersen and Rajan (1997) consider that, cost of external financing raises as the monetary policy tightened which substitutes bank loans and leads to increase in trade credit demand. Previous studies also indicate that financially constrained firms often use trade credit as a substitute, when bank credit is limited (Choi & Kim 2005; Fisman & Love 2003; Nilsen 2002; Summers & Wilson, 2002; Wilner 2000).

Use of trade credit also supports the financially constrained firms when they apply for bank loans as it signals the information to the bank about creditworthiness of borrowers (Biais & Gollier, 1997). This signaling role of trade credit also helps firms in

[1] PhD Scholar, International Islamic University, Islamabad E-mail: ammara.mubashar8@gmail.com
[2] International Islamic University, Islamabad
[3] University of Gujrat, Gujrat

acquiring reputation, alleviates adverse selection, (Antov & Atanasova, 2007) diminishes moral hazard problems and may also prompts the banks to increase lending limit (Burkart & Ellingsen, 2004). Furthermore, Cuñat (2007) found that use of trade credit also encourages companies to maintain their information standards which may also help them in accessing bank loans as it will improve the opinion about the creditworthiness of such companies and thus facilitates bank credit granting. From this perspective, we may assume the complementary relationship between these two external financing sources. Petersen and Rajan (1997) suggest that the problem of information asymmetry seem to be solved by trade credit on the worth of the borrower. In this aspect, the trade credit supplier has an advantage as compared to the financial institutions, as they can easily monitor and can gather the information of borrower faster and cheaper. Thus, the theory of asymmetric information is a critical piece to understand the existence of trade credit as a substitute or complement to the financial system (Stiglitz & Weiss, 1981). Considering the differences of both sources of financing over each other in countries where financial institutions and capital markets are fully developed, there is no literature about this source of financing using a developing country data. In context of Pakistan, the substitution/complimentary relationship between trade credit demand and bank loan is yet to be unexplored.

Significance of the study:

Recent statistics published by State bank of Pakistan shows that trade debt accounted for 19% of total liabilities in 2016 for a sample of listed companies on Pakistan Stock Exchange. The comparable figure of short term bank credit was 17%. These statistics show that Pakistani firms are relying on both sources of short term financing in order to carry out their business operations and trade credit is at least as important as bank credit.

The discussion on choice between bank credit and trade credit has not been developed for Pakistani firms and thus it justifies the need for analysis in the Pakistani market where bank loans are easily accessible to state owned firms or firms having good relationships with bank (Ahmed *et al.*, 2015). This study has introduced a novel aspect in the econometric exercise by paying special attention to the lagged feature of trade credit by estimating dynamic panel model in order to capture the impact of relationship history. Such a feature was introduced by Benishay (1968) and lately by Haung *et al.*, (2011) who re-activated this legacy. This is of interest not only to academics but also to creditors, firm managers and owner.

The rest of the paper is structured as follows. The relevant literature and hypothesis is provided in Section 2. Details of methodology employed, data description and collection method, variables measurements are discussed in Section 3. Section 4 describes results and analysis. Section 5 concludes the paper.

Literature Review

Trade credit is a major source of short term financing for firms and plays a vital role in establishing financing policies. There are several views explaining the motives behind trade credit usage which can be grouped in two broad categories namely financial aspect and business aspect (Demirguc-Kunt & Maksimovic, 2001). The business aspect

suggests that trade credit allows firms price discrimination, signals good quality of products and minimize transaction costs. On the other hand, financial aspect propose that trade credit has some advantages over bank borrowing. For instance, information advantage about borrower's turnover and repaying capacity, minimal loss in case of default by repossessing the goods sold (Psillaki & Eleftheriou, 2015)

Trade Credit and Bank Loans

Past literature does not provide clear-cut evidence about complementary or substitution effect of bank borrowing and trade credit. Biais and Gollier (1997) theorize that trade credit extension discloses positive signal to the banks which may increase the chances of favorable lending to the firms. Giannetti, Ellingsen, and Burkart (2011) support the argument and found that trade credit usage facilitates those firms having shorter relationships with their banks, to borrow from banks with relaxed terms, low fee and often obtain better deals. This finding suggests that bank borrowing and trade credit are complements instead of substitutes.

Atanasova (2012) also examines the complementary relationship between trade credit and bank borrowing using panel data of UK firms. After controlling the endogeneity and unobserved heterogeneity of firms, it is found that small and young firms use excess trade credit along with higher bank borrowing. The finding of his study validates the acceptance of signaling hypothesis that more opaque firms get more trade credit and conveys positive signals about their creditworthiness and good reputation to external financiers. Matias and Mateus, (2010) investigate from the Portuguese and Spanish SMEs that trade credit do play an information role which built a good reputation for young and small firms. They also state that complementary and substitution is not mutually exclusive for young and small firms. From the sample of public firms of Brazil, Saito and Bandeira (2010) evident a similar conclusion that banks do facilitate loans to those firms having sound reputation signaled by trade credit. Andrieu, Staglianò and Zwan, (2018) confirm the complementary relationship between trade credit and bank borrowing. They suggest that the provision of each mode of finance can be viewed as a signal which lenders analyze while granting finance (Agostino & Trivieri, 2014; Giannetti *et al*., 2011; Psillaki & Eleftheriou, 2015)

On the other hand, Meltzer (1960) proposed the trade credit and bank credit substitution hypothesis. He finds that during the mid-1950s when money tightened in the US, banks were not only the source of external financing for the small firms. He supported the idea that highly liquid firms tend to have more capacity to offer trade credit during tightened monetary conditions to financially constrained firms having no access to bank financings. This finding initiated the concept of trade credit as substitute to bank borrowing. De Blasio (2005) also favor the substitution hypothesis in context of Italian firms and show that, financially constrained firms having difficulties in accessing bank credit usually go for trade credit (Gama & Mateus, 2010; Huang *et al*., 2011).Nilsen (2002) state that most businesses prefer bank credit over trade credit because of the high costs associated with the trade credit. They only use trade credit when bank loans are scarce or monetary policy is tightened and loans are available on higher rate. He also linked the choice of trade credit with monetary policy. Inspired by the mixed evidence

found for substitution and complementary effect between trade credit and bank loans, following hypothesis is derived.

H_1: Trade credit demand is substitute or complement to short term bank loans.

Trade Credit Demand and Efficiency

Another motive of using trade credit is the reduction of transaction costs (Ferris, 1981).Considering the inventory management model presented by Bougheas *et al.* (2009), firms use to delay the payments of goods of raw material purchased and make them clear on monthly or quarterly basis. This motive will benefit those firms having high inventory turnover by bridging the period between payment and purchase. This leads to the hypothesis that firms having high inventory turnover will demand more trade credit (Huyghebaert, 2006). Ahmed, *et al*, (2016) found that firms are more interested to acquire goods on credit and sale them on cash in order to avoid liquidity crisis.

H_2: *Inventory is significantly related to trade credit demand*

Trade Credit Demand and Leverage

Generally, capital markets are always reluctant to finance financially stressed firms. As these firms have tight financial conditions leading to higher bankruptcy risk, these firms often get expensive external finance or often gets their loans rejected. In such circumstances, the only option left with such financial distress firms is trade credit financing. These firms then rely heavily on trade credit as an alternative source of finance even then it is an expensive source of financing (Molina & Preve, 2012). This leads to a positive relationship between trade credit and financial leverage thus our third hypothesis of the study is:

H_3.Leverage is significantly related to trade credit demand.

Trade Credit Demand and Profitability

Firms having sound financial position and having more capacity of cash generation usually choose less borrowing from suppliers (Garcia-Teruel & Martinez-Solano, 2010; Niskanen & Niskanen, 2006). On the other hand, following pecking order theory, it is also possible that firms having sound profitability pursue growth opportunities and invest more in fixed assets thus firms may rely on short term financing. This may lead to a bi-directional relationship between profitability and trade credit demand hence our fourth hypothesis is:

H_4: Profitability is significantly related to trade credit demand.

Trade Credit Demand and Size of the Firm

Size is used as a proxy to measure the creditworthiness of the firms in literature. Large firms which are considered as more creditworthy firms often get more credit from suppliers (Peterson & Rajan, 1997). As these firms are supposed to have less chances of default so suppliers safely extend credit to large firms (Bevan & Danbolt, 2004). On the other hand it is also possible that large firms having sound creditworthiness have smooth access to capital markets so they may get credit easily on relaxed terms. This may lead to two alternative hypotheses.

H_5: Firm Size is significantly related to trade credit demand.

Trade Credit Demand in previous period

Trade credit being the spontaneous mode of financing is frequently demanded and granted by firms (Burkart & Ellingsen, 2004). It suggests that firms' previous relationship history affects the further demand of trade credit. Matching theory suggests that firms frequently demand trade credit and generate accounts payables according to the timings of their receivables and ultimately they match the maturities of their payables and receivables (Diamond, 1991; Bastos, 2010; Yang, 2011; Kwenda & Holden, 2014). Trade credit relationship theory (Bastos, 2010) also supports the arguments that firms do maintain long term credit relationships on the basis of past experiences with suppliers and customers and they may change their credit policy with customers if necessary depending on their history (Blasio, 2005).

H_6: Current Trade Credit Demand is significantly related to previous period demand.

Research Methodology

Data and Sample

To achieve the objective of testing substitution hypothesis in context of Pakistan, sample of listed manufacturing firms has been collected because manufacturing firms have better access to trade credit and bank credit and they are in a strong position to redistribute credit to their financially constrained customers. For sample selection, initially all firms of manufacturing sector listed on Pakistan stock exchange were included but later on financially distressed firms having negative equity values were excluded as they may disturb the analysis. Also, after omitting firms having outliers, finally our panel data comprised of 167 firms on the basis of data availability for the period 2005 to 2016. Data was extracted from annual reports of the companies and published reports of State Bank of Pakistan.

Variables Measurement

Constructs used in this paper, related to bank credit and trade credit are given below in Table 1 along with their respective measurements.

Table 1: *Variables and their measurement*

Variables	Measurements	Adapted From
Trade Credit Demand	Accounts Payable to Total Assets	Ying *et al*. (2014)
Short Term Debt	Short Term Bank Loan to total assets	Ying *et al*. (2014)
Size	Natural Log of Total Assets	Ying *et al*. (2014)
Leverage	Debt-Equity Ratio	(Gupta, 2012)
Inventory	Cost of Goods Sold to Average Total Inventory	Ying *et al*. (2014)
Profitability	Return on Asset	Al-Dohaiman (2013)

Methodology

The substitution or complementary relationship between bank debt and trade credit is analyzed using dynamic panel estimation. As our data is cross sectional-time series therefore, in order to study the relations among all variables, panel data analysis has been employed. For heterogeneous data, panel data analysis is considered as an appropriate estimation. It controls heterogeneity which usually arises due to number factors. The econometric equation used for the study is mentioned below for panel data estimation.

Empirical Model

To capture the effect of previously demanded trade credit keeping in view the credit relationship theory (Bastos, 2010), we applied the dynamic panel model by adding a lagged TCD term for estimating substitution hypothesis using following equation:

$$TCD_{i,t} = \beta_0 + \beta_1 STD_{i,t} + \beta_2 INV_{i,t} + \beta_3 LEV_{i,t} + \beta_4 PROF_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 TCD_{i,t-1} + \varepsilon_{i,t}$$

The model is estimating the substitution effect of trade credit and banks loans where dependent variable *TCD* is Trade Credit Demand, independent variable is Short Term Debt(*STD*), control variables are Inventory (*INV*),Leverage(*LEV)*, Profitability (*PROF*) and *TCD(-1)* lagged trade credit demand.

Results

Previous section has aimed to describe the research methodology in order to test the substitution hypothesis of trade credit and bank loans for non-financial listed firms of Pakistan. In this regard, this section describes Descriptive Analysis, Pearson Correlation Coefficient, Endogeneity Diagnostic and Panel estimation results.

Descriptive Analysis

The mean with standard deviation, minimum and maximum values of six variables used in the model for the period of 2005 to 2016 are given below in the Table 1.

Table 1: *Descriptive Statistics*

Variable	N	Minimum	Maximum	Mean	Std. Deviation
INV	2004	.00	598.38	14.20	39.47
LEV	2004	.00	97.80	1.59	3.98
PROF	2004	-.54	.65	.06	.09
STD	2004	.00	.85	.23	1.41
TCD	2004	.00	.90	.13	.13
SIZE	2004	3.897	11.657	8.047	1.383

Notes: INV represents Inventory, LEV represents leverage ratio, PROF represents profitability, STD is the proxy for short term debt, TCD is the trade credit demand and size is natural log of total assets.

This table shows that on average Pakistani manufacturing firms have 14.20 times of inventory turnover (INV) along with firms having zero turnovers to 598.38 times turnover maximum. This figure shows quick conversion of production into sales. For leverage, mean value is 1.58 which suggests that Pakistani manufacturing firms are maintaining optimal capital structure whereas minimum ratio is zero and maximum is 97.8. As far as profitability is concerned, on average ROA is 0.062 with minimum value of -0.54 which shows net loss and maximum of 0.65.For short term debt variable (STD), data contains sample firms having no short term debt to maximum 85% debt of total assets which shows the attitude of firms towards external financing. Trade credit demand (TCD) is minimum of zero and maximum of 90% of total assets which shows that some of sample firms heavily rely on short term financing and a high proportion of TCD is an indicator of financial distress (Taj *et al.*, 2017) with average of 12.70% of TCD. For Size, log of total assets has been taken and its mean value is 8.047 while the min value is 3.897, max value is 11.657 and a standard deviation is 1.383.

Correlation Matrix

To test the relationship between trade credit and bank borrowing, it is essential to analyze their independent relationships and associations among all variables. For this sake, Pearson Correlation Coefficient is used to fulfill the aim. Correlation matrix is computed by using data of 167 non-financial listed firms with 2004 observations for the period of 12 years. Computations are presented in the Table 2 for seven variables.

Table 2: *Pearson Correlation*

Var.	INV	LEV	PROF	SIZE	STD	TCD
INV	1					
LEV	.108**	1				
PROF	-.013	-.162**	1			
SIZE	.073**	.032	.114**	1		
STD	-.187**	.110**	-.291**	-.020	1	
TCD	.008	.087**	.002	.193**	-.035	1

Notes:*** significance at .01 level, ** significance at .05 level, * significance at .10 level.
INV represents Inventory, LEV represents leverage, PROF represents profitability, STD is the proxy for short term debt, TCD is the trade credit demand and size is natural log of total assets.

Pearson correlation is used to test the association among variables and a correlation of greater than .8 shows strong correlation and indicates the chances of multicollinearity (Gujrati, 2009). As the result shows, none of our variable is strongly related to other and all variables have almost weak correlation. LEV has significant but weak correlation with SIZE, STD and TCD. Our results show that none of our value reaches the range of .8 and above so multicollinearity issue will not bother the further analysis.

Endogeneity Test

Although previous researches point out the two way causality between trade credit demand and short term debt (Ying *et al*., 2014) still it is advised to test the presence of endogeneity issue in our data set before testing any further relationships. To empirically test the endogeneity issue, Huasman test is applied having null hypothesis of exogenous variables. The results of table 3 suggest that null hypothesis is accepted as p – value is greater than .05.

Table 3: *Hausman Test*

Regressors	STD, TCD
Coefficient	-.0119
P-value	.6103

Panel Estimation Results

Below are the regression results of panel data estimation for the previously developed hypotheses related to the trade credit and bank borrowing relationship. By testing both Likelihood Ratios and Hausman tests, values for both tests were 0.000 which suggest the equation estimations by using Fixed Effect Model. Unit root has also been checked for each of the variable, and it is found that all variables are stationary at level.

Table 4: *Panel estimation results for TCD*

Variables	Coefficients		
C	.418***	R-Square	.607
STD	-.060**	Adj R-Square	.566
INV	-.000*	Redundaant Test	.000
LEV	.000	Hausman	.000
PROF	.006	Durbin Watson	2.019
SIZE	-.040***	F-Statistics (Prob)	.000
TCD(-1)	.408***		

Notes:*** 1% significance level, ** 5% significance level, *10% significance level. STD is the proxy for short term debt, INV represents Inventory, LEV represents leverage ratio, PROF represents profitability, size is proxy for creditworthiness and TCD(-1) is the trade credit demand of previous period.

Table 4 shows the results for Panel estimation for trade credit and bank borrowing. The results indicate a significant negative relationship between STD and TCD which implies that trade credit is substitute to bank borrowing in context of Pakistan. This shows that firms prefer bank loans over trade credit and seek trade credit when bank credit is not available. The results of the study suggest that firms may consider trade credit as an expensive source of finance thus they attract more towards bank loans. Moreover, negative relationship also suggests that firms will access trade credit only in case of unavailability of bank loans. These results found to be consistent with Petersen and Rajan, (1997) Santos and Silva, (2014)and Yang, (2011).Considering the information asymmetry, credit rationing may be faced due to moral hazard and adverse selection which can lead to rejection of loan and then trade credit may serve as a last resort of financing (Ying *et al*., 2014). ITO has significant negative relationship with TCD which suggests TCD will decrease when inventory conversion into sales increase. The more quickly inventory is converted into sales the less trade credit will be needed. LEV also has a positive relationship which suggests that financially distress firms usually face difficulty in acquiring bank debt therefore they rely more on alternative financing modes. The results found to be consistent with Kim, (2014) in context of Korean firms but this relationship found to be insignificant in context of Pakistan. Similarly, ROA found to be positively related with trade credit demand which implies that profitable firms channel their funds to other investments and receive more trade credit from suppliers as being more creditworthy but this impact found to be insignificant.SIZE found to be negatively affecting TCD which implies that large firms use less trade credit as they are more creditworthy and have good reputation hence they have more credit capacity of affording other modes of financing (Teruel & Solano,2014). The positive relationship of TCD with TCD (-1) suggests that firms maintain a long term relationship with suppliers and demand trade credit on the basis of their previous credit relationship. This finding is also supported by trade credit relationship theory (Bastos, 2010).

Conclusion

This study investigates the nature of relationship between trade credit demand and short term bank borrowing. In particular the objective was to determine whether there is a substitution or complementary relationship between these two modes of short term financing. Data was collected for 167 non-financial firms on the basis of a certain criteria

for the period of 12 years (2005-2016). Dynamic panel model was applied to analyze the substitution hypothesis along with the impact of previously demanded trade credit. Substitution hypothesis proved in context of Pakistani firms which suggest that firms prefer bank borrowing over trade credit and only opt trade credit when bank loans are rejected or unavailable. These results also suggest that Pakistani firms consider trade credit as an expensive source of finance thus they are more in favor of capital market financing. It is also found that firms that are already burdened with debt finds difficulty in accessing more loans prefer trade credit. Profitable firms also use more trade credit which suggests that Pakistani firms channel their funds in pursuing growth opportunities and also demand trade credit. Large firms found to use less trade credit which suggests that these firms make their timely payments in cash and firms having high inventory turnover also follows the same strategy of making timely payments without demanding trade credit. This study also founds the evidence of strong credit relationship theory that firms demand trade credit more on the basis of their previous relationship (Bastos, 2010).

This study is undertaken with the motivation to shed light on trade credit management in the Pakistani environment. The economy and capital market of the country has grown and transformed, yet little attention is given to trade credit management research despite its importance and the vital role it plays in terms of financing. The results and discussion of the findings contributing significantly to the local trade credit management literature in the Pakistani non-financial sector. The results of the study have significant implications for academics and policymakers. For instance, managers should focus on their trade credit extension policy in order to grab more customers and enhance sales as the substitution relationship shows that firms prefer bank loans over trade credit and trade credit demand behavior varies with the dynamics of firms' characteristics. Moreover, small firms rely more on trade credit and these credit relationships are dependent on the previous record of the customers. Therefore, firms have to carefully establish their credit policies and it should also be noted the trade credit demand policy is always developed in accordance with the firms' trade credit supply policy to avoid any liquidity crunch.

For future analysis, trade credit supply may also be included to confirm this substitution hypothesis. Further, the inclusion of loan characteristics and customer characteristics can make this study more helpful for policymakers but difficulty in accessing this data set constraint us to add these variables in our analysis. Macro-economic variable like inflation or GDP may also be included to enhance the effectiveness of these relationships.

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Appendix

Redundant Fixed Effects Tests
Equation: EQ01
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	2.537	(166,1664)	.000
Cross-section Chi-square	414.381	166	.000

Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	.129	.008	15.494	.000
STD	-.011	.023	-.510	.610

Method: Panel Least Squares
Total panel (balanced) observations: 1837

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	.418	.041	10.118	.000
TCD(-1)	.408	.021	19.028	.000
STD	-.060	.024	-2.501	.013
ITO	.000	.000	-1.651	.099
ROA	.006	.030	.194	.847
LEV	.001	.001	1.037	.300
SIIZE	-.040	.005	-8.390	.000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	.607	Mean dependent var	.126
Adjusted R-squared	.566	S.D. dependent var	.131
S.E. of regression	.086	Akaike info criterion	-1.973
Sum squared resid	12.384	Schwarz criterion	-1.454
Log likelihood	1985.450	Hannan-Quinn criter.	-1.782
F-statistic	14.913	Durbin-Watson stat	2.019
Prob(F-statistic)	.000		