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INVESTIGATION OF TRADE CREDIT DEMAND PATTERNS IN EFFECT WITH FIRM-BANK RELATIONSHIP: A PANEL DATA APPROACH

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Abstract

This research paper investigates the behavior of non-financial firms towards trade credit demand in a developing economy while focusing on firm-bank relationship. We have analyzed data from 2005 to 2011 for 220 listed non-financial firms, including manufacturing and services industries. This study reveals that joint board of directors of a firm and a commercial bank leads to easy availability of bank loan and thus decrease firm's demand for trade credit. Moreover, some control variables like fixed assets, inventory and size has been found significant for trade credit demand.

1. INTRODUCTION

Trade credit is a contract where firms buy goods on credit form their suppliers. These suppliers have good access to the financial institutions and markets and thus they arrange finance based on their reputation and size. This makes these suppliers a financial intermediary in this whole setup. In light of redistribution effect Meltzer (1960) have found that suppliers extend financing in shape of trade credit to deprived firms. Basically, trade credit is a two tier contract where a non-financial firm performs two functions simultaneously. In tier 1 non-financial firm obtain goods from its supplier on account and mention them as trade credit payables (AP) in its balance sheet. In tier 2 when it have enough resources to grant goods on account to its customers then it will record these transactions as trade credit receivables (AR) in its balance sheet.

Account receivables and payables are the major components of the current assets and current liabilities respectively. Rajan and Zingales (1995) have found that trade credit was a significant part of balance sheet for all American firms in early 1990s. They have mention that account receivable was 18 percent of total assets at that time. After analyzing the balance sheets of the firms from United Kingdom Kohler *et al*. (2000) have mentioned that there is 70 percent of short term debt in the form of account payables. Guariglia and Mateut (2006) have found that there is

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more than 50 percent short term debt in overall credit of firms in United Kingdom. Trade credit has been found more than a quarter of total corporate assets in France, Germany and Italy and it is also important in emerging economies, like China, where firms get limited support from the banking system (Ge & Qiu, 2007).

Trade credit is an expensive form of financing, (Petersen & Rajan, 1994; Ng *et al*., 1999; Wilner, 2000; Marotta, 2001; Molina & Preve, 2012) yet the balance sheets of non-financial firms carry a major account of trade credit. This is because sellers and buyers have their own intensions towards use of trade credit. Trade credit serves as a monitoring tool for the product quality and shortens the informational asymmetries for buyers (Smith, 1987; Long *et al*., 1993; Pike *et al*., 2005). Also it helps to solve liquidity issues of buyers. On the other hand trade credit suppliers extend goods on account in order to discriminate the price among customers (Emery, 1987; Petersen & Rajan, 1997 and Brennan *et al*., 1988). Further, transaction cost theory put forward by Ferris (1981) suggests that trade credit could also be used as a means to reduce transaction costs. Inventory management model developed by Bougheas *et al*. (2009) states that after the producer produce goods she either sell finished goods or holds them in inventory at cost. In order to reduce that cost he may opt to extend them on account and thus play a role in the credit chain as middle man. To maintain long term relationships suppliers give some discounts and as mentioned earlier try to settle the liquidity problems of a deprived customer (Wilner, 2000; Cunat, 2007).

Deloof and Overfelt (2011) have tested the effect of bank relationship on trade credit supply. This study is an innovative extension in literature as it is the first to inquire about what behavioral change firms would depict regarding trade credit demand when they have good relationships with banks. Remainder of the study is organized as follows. Section II discusses the relationship between trade credit demand and firm-bank relationship. Section III describes the sample, preliminary data analysis and variables of the study. Section IV discusses the results obtained and finally, conclusion of the study has been presented in section V.

2. RELATIONSHIP BETWEEN TRADE CREDIT AND BANK RELATIONSHIP

The availability of bank loan gives confidence to non-financial firms to grant more trade credit. However, availability of less costly loan dispirits these firms to receive less trade credit. Good relationships with banks and being a state owned firm, a non-financial firm can get bank loan easily (Deloof & Overfelt, 2011; Ge & Qiu, 2007). This study uses the two measures to estimate firm-bank relationship that have been used by Deloof and Overfelt (2011). These two measures are the equity stake of a commercial bank in a firm and the presence of a bank director on the board of directors of the firm. Moreover, we have introduced a third measure by computing an interaction term of the above mentioned two measures. The need for this third measure was to capture the effect of the interaction term on the probability of bank loan availability. Once bank loan is available, the motives for the demand of expensive trade credit, such as liquidity control, reduction in informational asymmetries etc (Petersen & Rajan, 1994; Wilner, 2000; Molina & Preve, 2012), no longer remains influential. This causes actual demand for trade credit to decline. Therefore our hypothesis is;

H_a: there is an inverse relationship between TCD and bank relationships.

3. PRELIMINARY DATA ANALYSIS AND VARIABLES

Like many other countries (United Kingdom, Netherlands and Germany) it is not obligatory for Pakistani non-listed firms to report their financial statements properly. Due to this data constraint this study has used data from all the non-financial firms which are listed at Karachi Stock Exchange (country's largest stock market) only. Data have been extracted from Financial Statement Analysis (FSA) and Balance Sheet Analysis (BSA) published by The State Bank of

Pakistan (SBP) form 2005 to 2011. Before 2011 there were 411 non-financial firms listed at KSE. Those firms which have not provided the complete information regarding trade credit supply, demand and other control variables were excluded. Firms having missing and extreme values of assets and liabilities were also excluded. Lastly, after excluding those firms which have not reported financial information for three or more consecutive years, the final analysis included 220 non-financial firms. Due to the common practice and special nature of trade credit contracts, we have excluded financial sector from our sample. Table 1 shows the industrial distribution and their contributions in overall sample selected.

Table 1: Frequency distribution

No.	Sectors	Frequency	Percentage	Bank Relationship 1	Bank Relationship 2	Bank Relationship 3
1	Textile	66	30	09	19	07
2	Food	27	12	01	05	01
3	Chemicals, chemical products and Pharmaceuticals	32	15	08	11	06
4	Other manufacturing	20	09	-	02	-
5	Other non-metallic mineral products	17	08	04	06	04
6	Motor vehicles, trailers and auto parts	18	08	01	03	01
7	Fuel and Energy	09	04	05	05	05
8	Information, Communication & transport Services	08	03	04	01	01
9	Coke and refined petroleum products	06	03	02	03	02
10	Paper, paperboard and products	05	02	-	-	-
11	Electrical machinery and apparatus	06	03	-	-	-
12	Other services activities	06	03	-	-	-
	Total	220	100	34	55	27

Notes: The frequency and the percentages show the major contribution of firms in corresponding industrial group. Bank relationship 1 means that the firm has a banker in its BOD. Bank relationship 2 shows that a commercial bank has an equity stake in the firm. Bank relationship 3 is the interaction of bank relationship 1 and 2. State owned firms are the firms for which a maximum of shares is held by either central or provincial government

According to Table 1, 30 percent of the firms belong to the major textile sector of Pakistan. On the basis of number of firms, chemical and food industrial groups stood at the second and third position respectively. Paper, paperboard and products sector is the smallest industrial group in the above mentioned distribution.

Table 2: Use of trade credit in different economic groups

	TCD					TCS				
	Mean	Min	Max	Var.	SD	Mean	Min	Max	Var.	SD
IG1	0.04	0.00	0.52	0.01	0.09	0.11	0.00	0.76	0.01	0.11
IG2	0.04	0.00	0.40	0.01	0.08	0.03	0.00	0.11	0.00	0.03

IG3	0.06	0.00	0.34	0.01	0.08	0.10	0.00	0.51	0.01	0.11
IG4	0.10	0.00	0.62	0.02	0.15	0.07	0.00	0.59	0.01	0.10
IG5	0.10	0.00	0.64	0.01	0.12	0.04	0.00	0.22	0.00	0.05
IG6	0.09	0.00	0.80	0.03	0.16	0.10	0.00	0.64	0.01	0.12
IG7	0.08	0.00	0.51	0.02	0.13	0.26	0.00	0.85	0.04	0.20
IG8	0.07	0.00	0.68	0.02	0.14	0.13	0.01	0.44	0.01	0.10
IG9	0.07	0.00	0.31	0.01	0.08	0.10	0.01	0.35	0.01	0.08
IG10	0.02	0.00	0.09	0.00	0.03	0.13	0.00	0.43	0.01	0.09
IG11	0.05	0.00	0.15	0.00	0.04	0.30	0.05	0.70	0.03	0.18
IG12	0.15	0.00	0.58	0.04	0.19	0.13	0.00	0.64	0.02	0.15

Notes: This table shows the results of trade credit in twelve different industrial groups. TCD is trade credit demand and is the ratio of accounts payable to total liabilities. TCS is trade credit supply and is the ratio of accounts receivable to total assets. IG stand for industrial group which is presenting each group mentioned in Table 2. Mean is the average value for each industrial group. Min and Max is the column that contains the information about minimum and maximum values respectively. Var. is the column for variance and SD stand for standard deviation

Table 2 provides the descriptive statistics of trade credit from the sample data. To analyze the industry level transactional volume of trade credit in non-financial firms, we have divided the Table 2 into different subparts. From the trade credit demand results it has been observed that non-financial listed firms are much interested in receiving goods on credit as compare to granting goods on credit. On average industrial group twelve, other services activities, has more volume of trade credit demand as compare to other industrial groups i.e. 15 percent. Manufacturing and non-metallic mineral products also depicts larger amount of trade credit demand as shown by the higher accounts payables in their balance sheets.

It has been observed from trade credit supply results that industrial group eleven, Electrical machinery and apparatus, have greater mean value of trade credit supply than any other group. It means electrical machinery and apparatus group deals more in credit sales as compare to other groups and on average, their investment in accounts receivable is 30 percent. On the other hand it is clear that trade credit supply is less prevalent in second and fifth industrial groups i.e. food and other non-metallic minerals. Variation in industrial group seven (Fuel and Energy) and eleven (Electrical machinery and apparatus) has been found more than any other group. Although, on average industrial group twelve has greater trade credit demand, however it also shows higher variation in data. Industrial group ten (Paper, paperboard and products) have lesser variation in the data of trade credit demand.

Table 3: Descriptive statistics

	Mean	Median	Minimum	Maximum	Standard deviation
TCS	0.104	0.070	0.000	0.570	0.109
TCD	0.124	0.030	0.000	0.980	0.209
Net income	0.038	0.034	-3.850	1.732	0.154
Fixed assets	0.504	0.510	0.000	0.970	0.215
Inventory	0.189	0.180	0.000	0.750	0.144
Size	7.946	7.755	2.550	12.140	1.593
Sales growth	0.111	0.160	-1.560	3.990	0.397

Notes: This table reports the descriptive statistics of the selected variables. TCS is trade credit supply which is measured as account receivables/total assets. TCD is trade credit demand that is the ratio of accounts payables to total liabilities. Bank loan is the ratio of short term bank loan to total assets. Net income is calculated as net income divided by total assets. Fixed assets are divided by total assets. Inventory is also the ratio of inventory to total assets. Size is natural logarithm of total assets. Sales growth is calculated as current year sales minus last year sales divided by last year sales. Liquidity is the ratio of liquid assets to total assets.

Table 3 provides descriptive statistics for the overall selected sample for this study. As discussed earlier, these statistics proofs that as the overall mean value of TCD is greater than the mean value of TCS, on average non-financial firms in Pakistan demand more trade credit than they would like to extend trade credit. On the other hand variation in TCD data set is greater than the variation in data set of TCS. By looking at the minimum and maximum values of the other independent variables, they are indicating that extreme values do not exist in the ratios of these variables. To measure the bank relationship we have used three variables. First, bank relationship 1 is a dummy variable that is measured as if a non-financial firm and a commercial bank have a common member in their board of directors then one otherwise zero (Deloof & Overfelt, 2011).

Every listed non-financial firm in Pakistan posted their details of board members on their websites. The data of bank relationship 1 has been extracted directly from the websites of non-financial firms in Pakistan. We have found 34 non-financial firms which have a director who is at the same time member of board of directors of a commercial bank. Second, bank relationship 2 is a dummy variable that is used to measure that whether a commercial bank has an equity stake in a non-financial firm or not (Deloof & Overfelt, 2011). We write one for that that year in which a commercial bank has an equity stake otherwise zero. Our data in table 1 is showing that there are 55 non-financial firms in Pakistan which are operating with bank equity stake. We have collected this information from the financial statements of each firm. Third, bank relationship 3 is a dummy variable that is created in the combination of bank relationship 1 and bank relationship 2. Bank relationship 3 is measured as one for those firms which have a board of director who is simultaneously board member of a commercial bank and a commercial bank have purchased shares of that non-financial firm. According to our data set there are 27 non-financial firms in which have a bank director in their BOD and a commercial bank have an equity stake in these non-financial firms. Information of bank relationship 3 is obtained from the websites of the selected non-financial firms.

Net income is the ratio of net income to total assets. Fixed assets (FIX) over total assets show the capacity of a firm to arrange finance from bank. By keeping these fixed assets as a collateral firm can get bank loans. Inventory is the ratio of inventory to total assets. Size is the measure of size of a non-financial firm which is calculated as natural log of assets. Sales growth show the amount of sales increased in current year as compare to last year. It is calculated as sales of the current year less last year's sales divided by last year's sales. All formulas and ratios which are used for these control variables are derived from the previous studies (Niskanen & Niskanen, 2006; Cunat, 2007; Bougheas *et al*., 2009; Vaidya, 2011; Yang, 2011) on trade credit.

In order to check the violation of ordinary least square assumptions we have performed different tests to check the problems of multicollinearity, autocrrelation and heteroskedasticity. We have check multicollinearity by dropping each variable form the model and then looked at the results. We found that neither variable change its significance and its sign of coefficients. Moreover, by looking at the variance inflation factor (VIF) it appears that problem of multicollinearity does not exist because all variables have VIF less than five. As Durbin Watson stats was closer to two which indicates that data selected for analysis do not carry out any problem of autocorrelation. To check the problem of heteroskedasticity we draw standard residuals against standard predicted and found them random.

4. RESULTS

Table 4 contains the information regarding relationship between trade credit and bank relationships. Panel A is containing the information about regression where we find the relationship between trade credit demand and bank relationship 1 along some other control variables. As bank relationship 1 is a dummy variable that is measured of a relationship between

a commercial bank and a non-financial firm in shape of joint director. Bank relationship 1 has a negative and significant relationship with trade credit demand. This result is line with our hypothesis of relationship between bank relationship and trade credit demand. It can be stated that if a non-financial firm in Pakistan have a bank director in its board of directors have a good access to bank loan and have no need to get financing from its suppliers on account. Moreover, we can interpret the coefficient of bank relationship 1 as non-financial firm who have a bank director in its board of directors have 3.8 percent less need to get financing from its suppliers.

According to the theory of product quality, larger and older firms have standardized products and they always have less intension to get involved in credit transactions. Moreover, Niskanen and Niskanen (2006) have mentioned that due to smaller opportunities of investment smaller and younger firms always need to use trade credit. They have also mentioned that larger and older firms have less intension towards trade credit. Our results of fixed assets are in line with the theory of product quality and empirical evidence of Niskanen and Niskanen (2006) and Ahmed *et al*. (2014). As our sample consists of listed large firms (large in number of employees) it means they have an adequate amount investment opportunities and sound fixed assets. Negative and significant results of fixed assets are indicating that non-financial firms in Pakistan are less intended to demand trade credit. Net income, inventory and size have positive and significant impact on trade credit demand. Panel B and C are showing the results of regression 2 and 3 respectively. We have found that bank relationship 2 and bank relationship 3 have a negative but insignificant relation with trade credit demand. Other control variables remained identical in panel B and C. We have estimated different regressions to check the relationship between bank relationship variables and trade credit supply. We have found all bank relationships measures as insignificant and we did not report those results.

5. CONCLUSION

This study investigates the relationship between trade credit and firm-bank relationship. Annual data have been collected from non-financial firms of Pakistan. After applying pooled ordinary least square method we have found that good relationships with banks exclude non-financial firms to obtain trade credit from their suppliers. As compare to other source of finance trade credit is considered as an expensive form of financing. It means bank loan availability keep out non-financial firms to obtain trade credit. When a non-financial firm has board of director who is in board of directors of a bank at the same time may prevent that firm to demand trade credit. It has also been found that firms which have large investment in fixed assets also prevent firms to get involved in credit transaction. Moreover, results are showing that non-financial firms which have high level of net income keep a tendency towards trade credit demand.

Table 4: Relationship between trade credit and bank relationship

	Panel A				Panel Bilal Hassan				Panel C			
	1	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
Bank Relationship 1	-0.0385	0.0208	0.0654	*								
Bank Relationship 2					-0.0134	0.0170	0.4309					
Bank Relationship 3									-0.0126	0.0222	0.5686	
Net income	0.1269	0.0623	0.0421	**	0.1217	0.0624	0.0516	*	0.1247	0.0625	0.0465	**
Fixed assets	-0.1341	0.0406	0.0010	***	-0.1284	0.0406	0.0016	***	-0.1296	0.0407	0.0015	***
Inventory	0.1864	0.0625	0.0030	***	0.2005	0.0621	0.0013	***	0.1992	0.0624	0.0015	***
Size	0.0184	0.0051	0.0003	***	0.0158	0.0048	0.0012	***	0.0158	0.0049	0.0015	***
Sales Growth	0.0129	0.0179	0.4688		0.0122	0.0179	0.4954		0.0126	0.0179	0.4820	
Constant	0.0076	0.0512	0.8812		0.0195	0.0507	0.7003		0.0183	0.0509	0.7192	
R-square	0.0750				0.0716				0.0712			

Notes: This table is showing the regression estimates for the relationship between trade credit and three dummy variables for bank relationship. Trade credit demand is used as a dependent variable which is measured as account payables divided by total liabilities. Columns 1, 2, 3 and 4 in each panel are showing the estimates of coefficient, standard error, p-values and significance respectively. Net income is calculated as net income divided by total assets. Fixed assets are divided by total assets. Inventory is also the ratio of inventory to total assets. Size is natural logarithm of total assets. Sales growth is calculated as current year sales minus last year sales divided by last year sales. ***, ** and * are showing the significance at 1%, 5% and 10% level of significance, respectively

It can be hypothesized that non-financial firms which are capable to obtain bank loan are interested to grant trade credit only to that group of non-financial firms which maintained the relationships with similar bank or their redistributed behavior remain similar for all type of non-financial firms. Due to data limitations this study cannot observe such relation. Moreover, we cannot establish a group of those non-financial firms which have equity relationship with similar banks. This is the open call for researchers to establish these groups and analyze redistribution hypothesis of trade credit according to formulated groups.

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