

Investigation of Trade Credit Patterns in Effect with Bank Loan Availability*

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Abstract— this research paper attempts to investigate the behavior of non-financial firms towards the use of trade credit. State owned firms are considered as more credit worthy and the bank loan is easily available to them. We hypothesized that the state owned firms do not face any problem to obtain bank loans. According to trade credit literature the firms with better access to bank loans have a better capacity to grant goods on credit. We have also hypothesized that the bank loan availability makes the non-financial firms able to increase the level of trade credit supply. On the other hand, the bank loan availability makes the non-financial firms able to decrease the level of trade credit demand. We have applied Pooled Ordinary Least Square to estimate the relationship between bank loan availability and the behavior of firms towards the use of trade credit supply. The results of the study explain that bank loan is easily available to state owned firms and they are also interested to extend more trade credit to their buyers. Most of our results are in line with the theories of trade credit and the previous empirical findings.

Keywords—*trade credit; state ownership; commercial bank; bank loan*

I. INTRODUCTION

Trade credit is a contract where firms buy goods on credit from 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 [1] 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 account payables in the balance sheet. In tier 2 when the resources are enough to grant goods on account to customers then this transaction will be recorded as account receivables in the balance sheet.

Account receivables and payables are the major components of the current assets and current liabilities respectively. [2] 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 [3] have mentioned that there is 70 percent of short term debt in the form of account payables. [4] has found that there is 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 [5].

Trade credit is an expensive form of financing [6-9] 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 [10-12]. 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 [13-15]. Further, transaction cost theory put forward by [16] suggests that trade credit could also be used as a means to reduce transaction costs. Inventory management model developed by [17] states that after the producer produce goods then either sell finished goods or holds them in inventory at cost. In order to reduce that cost the producer 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 [18,19].

Remainder of the study is organized as follows. Section II contains the discussion about the relationship between state ownership and bank loan availability. In addition, the use of trade supply in the presence of bank loan availability is also the part of this section. Section III describes the sample selected for the study, preliminary data analysis and econometric methodology. Section IV contains the results obtained. Finally, conclusion of the study has been presented in section V.

II. RELATIONSHIP BETWEEN TRADE CREDIT, STATE OWNERSHIP AND BANK LOAN AVAILABILITY

In most of the countries like China, bank loan is not easily available to non state owned firms as compared to state owned firms. The World Bank Report (2000) states that, in China, non state owned firms have received less than one percent of total bank loans in late 1990s. Although bank loan was easily available to state owned firms but they were far behind from non state owned firms in growth. Being a state owned firm, either financial or non-financial firm, is considered as creditworthy. [20] Have mentioned that state owned firms always have a safe side in obtaining financing from state owned financial institutions. After analyzing the data from 1989 to 1991 collected from 370 cities of China, they have mentioned that it is straightforward for state owned firms to obtain bank loans as compare to non-state owned firms. Another study [21] have mentioned that, although privately funded firms contributes in 20 percent of total industrial output in China but still, state owned banks are biased in their lending behavior towards state owned firms. [22] Have investigated the data from 700 state owned enterprises and found bank lending biasness in China. [23] Have investigated the bank lending discrimination in China. They have mentioned that non state owned firms have an inadequate access to bank loans.

According to our best knowledge, nobody has investigated the impact of state ownership on bank loan availability in the context of Pakistan economy. Moreover, we could not find any study that examined the relationship between bank loan availability and trade credit supply. [24] Has 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 supply when they have good relationships with banks due to their credibility and being the state owned firm. In line with the literature available on state ownership and bank loan availability we have hypothesized that:

H₁: bank loan is available to those non-financial firms which are in state ownership.

H₂: state owned firms increase/decrease their level of trade credit supply/demand in the presence of bank loan availability.

III. DATA AND METHODOLOGY

A. Preliminary Data Analysis

We have collected the data from all the non-financial firms which are owned by Government of Pakistan and those which are listed at The Karachi Stock Exchange (KSE). 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. Those firms which have not provided the complete information regarding trade credit supply and other control variables were excluded. Firms having missing and extreme values of assets and liabilities were also excluded. Due to the common practice and special nature of trade credit contracts, we have not included the financial sector. Table I shows the industrial distribution and their contributions in overall sample selected. According to Table I, 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. The frequency and the percentages show the major contribution of firms in corresponding industrial group.

Table II 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 II into different subparts. From the trade credit demand (TCD) 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.

TABLE I. FREQUENCY DISTRIBUTION

Industrial Group	Number of Firms	Percentage	Industrial Group	Number of Firms	Percentage
1	66	30	7	09	04
2	27	12	8	08	03
3	32	15	9	06	03
4	20	09	10	05	02
5	17	08	11	06	03
6	18	08	12	06	03

Table II shows the results of trade credit in twelve different industrial groups where, 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. Mean is the average value for each industrial group. Minimum and Maximum are the columns that contains the information about minimum and maximum values respectively. SD stand for standard deviation.

TABLE II. USE OF TRADE CREDIT IN DIFFERENT INDUSTRIAL GROUPS

	TCD					TCS				
	Mean	Minimum	Maximum	Variance	SD	Mean	Minimum	Maximum	Variance	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

IG1 = Textile, IG2 = Food, IG3 = Chemicals, chemical products and Pharmaceuticals, IG4 = other manufacturing, IG5 = other non-metallic, IG6 = Motor vehicles, trailers and auto parts, IG7 = Fuel and Energy, IG8 = Information, Communication & transport Services, IG9 = Coke and refined petroleum products, IG10 = Paper, Paper Board and Products, IG11 = Electrical machinery and apparatus, IG12 = other services.

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.

Information regarding the use of trade credit in different industrial groups can also be obtained from the Fig. 1. Solid lines are representing the average use of trade credit demand (TCD). On the other hand dotted lines are used to present the average use of trade credit supply (TCS). Y-axis contains the volume of trade credit used. On the X-axis we have mentioned the twelve industrial groups. According to Fig. 1, use of trade credit demand and supply is very small in Industrial Group 2 (IG-2, FOOD). Average use of trade credit is comparatively high in industrial group 12 (i.e. other services). It has also been observed that use of trade credit supply is very high in industrial group 7 and 11 (i.e. Fuel and Energy and Electrical Machinery and Apparatus) respectively.

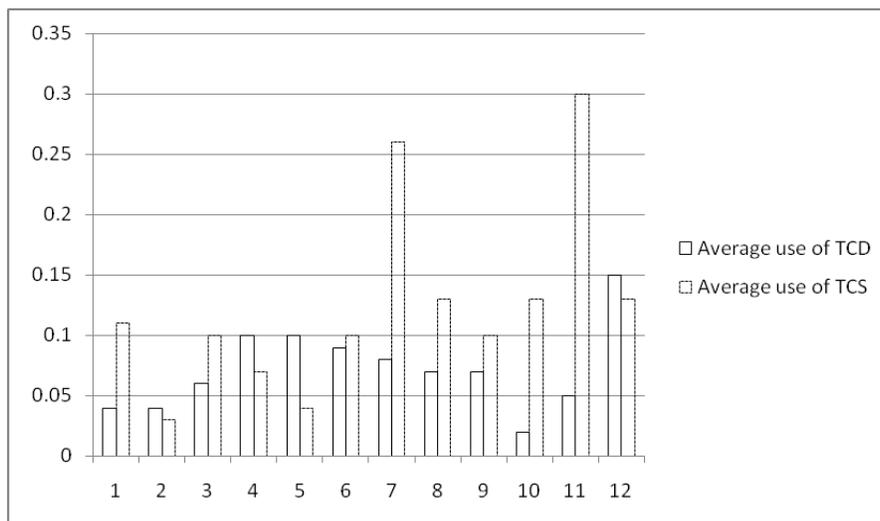


Fig. 1. Use of TCD and TCS in twelve industrial groups

Table III provides descriptive statistics for the overall selected sample for this study. As discussed earlier, these statistics prove 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.

Table III 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.

B. Econometric Methodology

In this research paper we have used the Pooled Ordinary Least Square (POLS) to observe the relationship between state ownership, bank loan availability and trade credit supply. We have estimated different models to explore such relationship. [25] have also found the relationship between bank loan availability and the behavior of non-financial firm towards the used of trade credit. Our study is different in a way that we are using the state ownership as the measure of bank loan availability. Rather they have used different measures to estimate the bank loan availability.

Equation (1) is used to find the relationship between the state ownership and bank loan availability. Equation (2) is used to find the relationship between the state ownership and trade credit supply that is our core hypothesis. Equation (3) is used to explain the relationship between the state ownership and trade credit supply

$$BL_{it} = \beta_0 + \beta_1 SO_i + \beta_2 NI_{it} + \beta_3 FA_{it} + \beta_4 INV_{it} + \beta_5 Size_{it} + \epsilon_{it} \quad (1)$$

$$TCS_{it} = \beta_0 + \beta_1 SO_i + \beta_2 NI_{it} + \beta_3 FA_{it} + \beta_4 INV_{it} + \beta_5 Size_{it} + \epsilon_{it} \quad (2)$$

$$TCD_{it} = \beta_0 + \beta_1 SO_i + \beta_2 NI_{it} + \beta_3 FA_{it} + \beta_4 INV_{it} + \beta_5 Size_{it} + \epsilon_{it} \quad (3)$$

Where, BL is short term bank loan availability. Bank Loan (BL) is the ratio of short term bank loan to total assets. Trade Credit Supply (TCS) is the dependent variable in (2) that is the ratio of account receivables to total assets. Trade Credit Demand (TCD) is another dependent variable that is used to find the relationship between state ownership and trade credit demand. TCD is the ratio of account payables to total liabilities. State Ownership (SO) is a dummy variable that is used to identify those firms which are in state ownership. We have used 1 for those firms which are state owned and zero otherwise. Net income (NI) is the ratio of net income to total assets. Fixed assets over total assets (FA) 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 (INV) 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. All formulas and ratios which are used for these control variables are derived from the previous studies [17, 26-28] 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, autocorrelation and heteroskedasticity. We have checked multicollinearity by dropping each variable from 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.

TABLE III. DESCRIPTIVE STATISTICS

	Mean	Median	Minimum	Maximum	Standard Deviation
TCS	0.1044	0.0700	0.0000	0.5700	0.1095
TCD	0.1245	0.0300	0.0000	0.9800	0.2096
Bank Loan	11.600	2.1912	0.0000	262.70	29.404
Net income	0.0386	0.0340	-3.8501	1.7321	0.1547
Fixed assets	0.5045	0.5100	0.0000	0.9700	0.2159
Inventory	0.1898	0.1800	0.0000	0.7500	0.1448
Size	7.9468	7.7550	2.5500	12.1400	1.5935

IV. RESULTS AND DISCUSSION

Table IV contains the information regarding relationship between trade credit and bank loan availability. We tried to prove our first hypothesis that due to back of the Government, bank loan is easily available to these non-financial firms. We have also used net income, fixed assets, inventory and size of the firm as the determinants of bank loan availability. We have found that state ownership is the significant determinant of short term bank loan availability. The positive and larger value of the coefficient indicates that if a firm is backed by Government it would lead to the great opportunities for short term bank loans in Pakistan. This result proves our first hypothesis that bank loan is easily available to state owned firms in Pakistan. In addition, we have found the net income as the insignificant determinant of short term bank loan availability. Fixed assets and Inventory has negative and significant impact on short term bank loan availability. These results indicate that firms with greater fixed assets and with large inventories are less interested to obtain bank loans. It might be due to the fact that we have selected the firms which are listed at The Karachi Stock Exchange and they are less interested to acquire expensive form of bank financing. Moreover, they have enough sources to generate financing for a project. We have also reported the value of adjusted R-square as this value may overcome the problem of simple R-square. We have found the 59 percent adjusted R-square which is a satisfactory value for the model. The probability value of the F-statistic is indicating that the model used to determine the level of short term bank loan availability is significant.

Table V contains the information about the relationship between state ownership and trade credit supply. The results to the second hypothesis of positive and significant relationship between state ownership and trade credit supply are explained in Table V. Our results are in line with the second hypothesis. The results are indicating that state ownership is the signal of bank loan availability and in the presence of bank loan availability non-financial firms increase their level of trade credit supply. Positive and significant value of the variable state ownership indicates that a percent increase in state ownership would lead to 7 percent increase in trade credit supply. All other control variables have negative and significant relationship with trade credit supply. According to the theory of product quality, larger and older firms have standardized products and they always have less intention to get involved in credit transactions. Moreover, [26] has 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 intention towards trade credit. Our results of fixed assets are in line with the theory of product quality and empirical evidence of [26,28]. 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, inventories. Results of the fixed assets, inventories and size are indicating that these control variables have an inverse and significant relation with trade credit supply. An increase in control variables will lead to decrease in the use of trade credit supply. From the results of our control variables we can conclude that large non-financial firms in Pakistan are less intended to supply trade credit. It might be due to the fact that large firms do not need to observe the quality of their product and use trade credit do not attract them.

Table VI explains the relationship between state ownership and trade credit demand. Results of the variable of state ownership explain that state ownership does not have any effect on trade credit demand. Negative and insignificant values of the variable of state ownership explain an insignificant relationship between state ownership and trade credit demand. We have also found the income as insignificant determinant of trade credit demand in this case.

TABLE IV. DETERMINANTS OF BANK LOAN AVAILABILITY

Variables	Coefficients	Standard Error	t-statistics	p-value
State ownership	52.18116	2.172029	24.02416	0.0000
Net income	-3.847721	2.968757	-1.296072	0.1951
Fixed assets	-5.100647	2.505436	-2.035832	0.0419
Inventory	-11.67258	3.693953	-3.159915	0.0016
Size	8.147258	0.301359	27.03506	0.0000
Constant	-51.58342	2.923467	-17.64460	0.0000
R-square	0.590184			
Adjusted R-square	0.588825			
F-statistics	434.3396			
Prob. (F-statistics)	0.000000			

TABLE V. REGRESSION RESULTS

Variables	Coefficients	Standard Error	t-statistics	p-value
State ownership	0.074911	0.012388	6.047196	0.0000
Net income	-0.078616	0.017044	-4.612617	0.0000
Fixed assets	-0.326439	0.014592	-22.37107	0.0000
Inventory	-0.235702	0.021400	-11.01415	0.0000
Size	-0.004932	0.001744	-2.828411	0.0047
Constant	0.359024	0.017161	20.92049	0.0000
R-square	0.291031			
Adjusted R-square	0.288618			
F-statistics	120.6048			
Prob. (F-statistics)	0.000000			

The literature available on trade credit reports that larger (in size) and older firms always has a better access to the financial institutions and markets. Good relationships with banks may also leads to the bank loan availability. According to the trade credit literature firms which do not face any liquidity problem they are not interested to use trade credit. The results of the study report an inverse and significant relationship between fixed assets of the firm and trade credit demand. On the other hand, the variables of inventory and size are positively related with trade credit demand.

Larger the value of R-square is an indication that the regression line is the good representative of the observations. In the third model of trade credit demand, the R-square of the model is 12 percent which is quite satisfactory. The study has also reported the value of Adjusted R-square that may overcome the problem of simple R-square. The study has found the 10 percent adjusted R-square which is again a satisfactory value for the model of determinants of trade credit demand. The significant value of F-statistic indicates towards the significance of the model of trade credit demand.

TABLE VI. REGRESSION RESULTS

Variables	Coefficients	Standard Error	t-statistics	p-value
State ownership	-0.019417	0.032319	-0.600778	0.5482
Net income	0.076816	0.062044	1.238083	0.2161
Fixed assets	-0.113345	0.039474	-2.871356	0.0042
Inventory	0.218856	0.060524	3.616001	0.0003
Size	0.016046	0.004948	3.243101	0.0012
Constant	0.008474	0.048525	0.174634	0.8614
R-square	0.116063			
Adjusted R-square	0.103403			
F-statistics	9.167300			
Prob. (F-statistics)	0.000000			

V. CONCLUSION

This study investigates the relationship between bank loan availability and the behavior of non-financial firms towards the use of trade credit. Annual data have been collected from non-financial firms of Pakistan. We have also created a dummy variable to identify the state owned firms. Because we hypothesized that bank loan is easily available to state owned firms. Moreover, bank loan availability leads firms towards the granting goods on credit. After applying Pooled Ordinary Least

Square (POLS) method we have found that state ownership is the significant determinant of short term bank loan availability. In addition, the state owned firms share their goods on account with the deprived buyers. In this way their size of trade credit supply increases. We have also found an insignificant relationship between state ownership and trade credit demand. It has also been observed that firms with large fixed assets are less interested to use trade credit transactions. We have found that firms which have large investment in fixed assets also hesitate to get involved in credit transaction. Results indicate that firms with large inventories are also less interested to grant goods on credit but they are interested to receive goods on credit from their suppliers. It is may be due to the fact that they want to make their sales on cash and accumulation of inventory results in the short of liquidity. According to trade credit literature the firms with short of liquidity also interested to increase the size of the trade credit transactions. In the similar fashion, we have noticed that an increase in the size of the firm leads to decrease the level of trade credit supply and increase in the level of trade credit demand. 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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