FINANCING: A CASE OF MANUFACTURING FIRMS LISTED IN PAKISTAN

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Abstract

This paper is aimed to highlight the firm level financial factors that determine the use of trade credit financing by listed manufacturing firms (LMFs) in Pakistan. For this purpose, balanced panel data are used that consist of 327 manufacturing firms listed on PSX during the time period from 2005 to 2013. Results of System GMM estimator applied on dynamic panel dataset reveal that the use of trade credit financing by LMFs is significantly affected by its first lag, trade credit provided to customers, use of short-term bank financing, their sales growth, profitability, creditworthiness, collateral and financial leverage. Positive coefficient for the first lag of dependent variable shows that LMFs' policy for the use of trade credit financing is dynamic. The findings of this study have managerial implication for trade credit financing decisions of LMFs. For future research, investigation of impact of financial depth and credit information sharing on the use of trade credit financing is proposed.

Keywords: Trade Credit Financing, Listed Manufacturing Firms, Dynamic Model, System GMM.

JEL Classification: F 130

Introduction

Trade credit is an indispensable component of financing policy of companies and is used as an important alternative to long-term debt (Nilsen, 2002). It is extensively used by non-financial firms to finance their operating activities (Demirguc-Kunt & Maksimovi, 2001). Its usage shows variations across firms in different countries. For instance, it represents 40% of total liabilities of manufacturing firms in the USA (Mian & Smith,1992) while about 12 percent of their total liabilities of non financial firms in Belgium (Deloof & Jegers, 1996). Report on sources and uses of funds by manufacturing firms listed in Pakistan prepared by the State Bank of Pakistan in 2013 shows that on average trade credit used by listed manufacturing is 15.63 % of their total external financing and it has grown up on average by 6.18% during 2010-13 in Pakistan [3].

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The wider use of trade credit by companies provide motivation for the investigation of its determinants. Literature survey revealed that a few prior studies investigated the determinants use of trade credit financing used by firms in developing countries (for detail see Ahmad, Afza & Nafees, 2017). In the context of Pakistan, Khan et al. (2012) studied the factors influencing the use trade credit by listed textile companies but ignored the manufacturing companies belonging to other industries. Further, these studies used the static model to test the trade credit financing decision. While in corporate finance, most of the financing and investment decisions are dynamic instead of static. The role of dynamic panel models is well recognized in testing the payout policy, capital structure, investment decisions, and cash management, etc. (Flannery & Hankins, 2013). As companies in all manufacturing sectors extensively use trade credit, therefore, this study is aimed to extend the investigation of determinants of trade credit financing in the following perspectives.

First, it considers the listed firms belonging to all manufacturing sectors in Pakistan. Second, it emphasizes on the dynamic phenomenon followed by these firms for making trade credit financing decisions. Third, this study applied system GMM estimators on the dynamic panel data set to control the endogeneity that is considered a grave apprehension in corporate finance (Roberts & Whited, 2013).

After describing the motivation and significance of this study in the introduction section, hypotheses are developed for this study in section 2. Data and estimation strategy are explained in section 3. Results of the analysis are discussed in section 4. At last, results of the study are concluded.

Hypotheses Development

Based on theoretical explanation and empirical findings of previous studies, we developed the following hypotheses.

Previous Trade Credit Financing

Trade credit financing used by companies in the current year is influenced by its past realization (Bastos, 2010). Later, some recent studies reported similar results (see for example Oliveira Marques, 2010; Garcia-Teruel & Martinez-Solano, 2010; Gibilaro & Mattarocci, 2011; Kwenda & Holden, 2014). They established that past trade credit relationship of companies with their suppliers has significant bearing on the use of trade credit in current year. They also stated that up to some extent firms emphasize on the consistency of their trade credit contracts and the stability of their trade credit policy. Moreover, like capital structure and dividend policy, trade credit policy of firms is dynamic. Kwenda and Holden (2014) emphasized that firms make partial amendments in their trade credit policy to achieve its optimal level. These theoretical arguments and empirical findings suggest the following hypothesis:

H1: There is a significant positive effect of past realization of trade credit financing on its current usage by firms.

Trade Credit Extended

Firms' decisions to use trade credit and to allow it to their customers are simultaneously determined (Frank & Maksimovic, 2005). Kiyotaki and Moore (1997) established positive association between the use and extension of trade credit by companies. They stated that firms use credit provided by suppliers to finance their customers by allowing them delayed payments. Later it is confirmed by Gibilaro and Mattarocci (2011). Al-Dohaiman (2013) emphasized that both trade payables and trade receivables are complements of each other. He stated that firms simultaneously receive credit from their suppliers and provide credit to their customer. It is very common practice of companies to delay payments in response to delayed collection in each industry. Recently Murfin and Njoroge (2015) proposed that firms which are required to supply more credit to their customers also demand more credit from their suppliers. Aforementioned discussion suggests a complementary relationship between credit allowed to customers and credit received from suppliers and justify the following hypothesis.

H2: There is positive relationship between trade credit allowed to customers and the use of trade credit financing by firms.

Short Term Bank Financing

The availability of short-term bank financing to firms affects their use of trade credit financing (Petersen & Rajan, 1997). Afterward, similar findings were also described by some recent studies (e.g., Bougheas, Mateut & Mizen, 2009; Yang, 2011). These studies found that trade credit financing facilitates the access to short-term bank financing. Vaidya (2011) provided empirical evidence about the positive impact of short-term bank financing on trade credit financing and later, similar results were reported by Agostino and Trivieri, (2014). Aforementioned discussion suggests the following hypothesis.

H3: There is a significant effect of short-term bank financing on trade credit financing.

Sales Growth

Ranjan and Zingales, (1998) observed that firms using trade credit to finance their operations had demonstrated higher growth in countries where the banking system is less developed. Similar findings were reported by Petersen & Rajan, (1997). Recently, Deloof and Rocca (2015) established that trade credit facilitate the sales growth of companies. On the contrary, growing firms which receive more short-term bank financing reduce their dependence on trade credit financing (Oliveira Marques, 2010). Later, Khan et al. (2012) and Al-Dohaiman (2013) found that sales growth is negatively related to trade credit financing. The above explanation justifies the following hypothesis:

H4: Sales growth is negatively related to trade credit financing used by firms.

Profitability

Profitable companies are expected to have less default risk and longer expectancy of life (Commercial motive). Firms generating sufficient funds from operations are less likely to emphasize on trade credit financing (Kwenda & Holden, 2014). Less usage of trade credit financing by profitable

companies is also supported by pecking order theory presented by Myers and Majluf (1984). Later Niskanin and Niskanin (2006) reported profitability is negatively related to trade credit financing used by companies. Thus based on the above discussion, the following hypothesis is established:

H5: Profitably of companies is negatively related to their use of trade credit financing.

The Creditworthiness of Firms

Initially, Meltzer (1960) reported that larger and publicly traded firms having access to financial market and institutions emphasize less on trade credit financing. But Schwartz (1974) found positive relationship between trade credit financing and creditworthiness of companies and later supported by Mateut, Mizen, and Ziane (2011). Contrary to Meltzer (1960), Deloof and Rocca (2015) and Desai, Foley, and Hines (2016) established that large sized firms having more bargaining power receive more trade credit. Further, these studies concluded that larger firms being less exposed to default risk, get more credit from their suppliers. On account of contradictory findings of previous studies, We are unable to specify the direction of relationship between creditworthiness of firms and their use of trade credit. Thus we state the following hypothesis to examine the effect of creditworthiness of firms on the use of trade credit financing.

H6: There is a significant effect of the creditworthiness of firms on their trade credit financing.

Stock-in-Trade

Stock in trade is easy to liquidate from the suppliers' point of view. Hence suppliers having an advantage in liquidating inventory over financial institutions, supply more credit to their customers. Sellers pursuing transaction cost motive offer delayed payment to their customers while buyers request for delayed payment for minimizing the complexities and uncertainties regarding cash budgeting. Vaidya (2011) established negative relationship between stock-in-trade and trade credit used by firms. While the significant and positive association between stock in trade and trade credit financing was reported by Yang (2011) and Al-Dohaiman (2013). Considering the contradictory findings of previous studies, the following relationship between stock-in-trade and trade credit financing is expected:

H7: There is a significant effect of stock-in-trade on the usage of trade credit financing.

Liquidity Position

Liquidity position shows the ability of firms to pay their short-term claims on the due date. Higher liquidity position implies lower liquidity risk of a firm. Banks readily extend loans to firms holding good liquidity position and consequently, these firms demand less credit from their suppliers. Cunat (2007) observed that trade credit received by firms is negatively related to their liquidity position. Later Mateut et al. (2011) reported similar findings. On the contrary, Kwenda and Holden (2014) established a positive linkage between credit received by firms from suppliers and their liquidity position. They describe that like banks, suppliers provide more credit to firms having good liquidity position. The above discussion leads to the following hypothesis:

H8: Liquidity position has significant negative effect on the trade credit financing used by firms.

Collateral

Firms carrying higher value of fixed assets as collateral are expected to receive more funds from financial market and institutions. Marques (2010) and later Zhang (2011) established that collateral is negatively related to trade credit financing. Considering mixed evidence, the following hypothesis is stated:

H9: A collateral value held by firms has a significant negative effect on trade credit financing used by them.

Financial Leverage

Financial leverage indicates the use of fixed cost funds by firms for financing their assets and operations. It also shows the level of financial risk of a firm. Garcia-Teruel and Martinez-Solano (2010) revealed the negative effect of long-term debt financing on credit received by firms from their suppliers. Latter, similar results were reported by Desai et al. (2016). Based on the above discussion, the following hypothesis is developed:

H10: Financial leverage has negative effect on the use of trade credit financing.

Data and Methodology

Data and Sample

This empirical study is focused on examining the determinants of credit financing provided by suppliers of LMFs in Pakistan. For this purpose, we used financial data of 327 manufacturing firms listed on PSX for the period 2005 to 2013. In order to develop appropriate sample of LMFs for this study we used sampling routine specified in our earlier study (for detail see Ahmad, Afza & Nafees, 2017). We first select 386 LMFs as part of initial sample. Later we dropped 59 LMFs, for which data of five consecutive years were not available in the above stated database of the State Bank of Pakistan. Finally we were left with 327 LMFs that is equal to 84.7 percent of the initial sample of LMFs.

Regression Model and Variables

The use of trade credit by firms is observed to be dynamic and is likely to be influenced by its past realization. Similar to Kwenda and Holden (2014), this study used the following dynamic panel regression model to estimate the effect of financial characteristics of listed manufacturing firms on their usage of trade credit financing.

$$TCF_{it} = \alpha_0 + \beta_0\,TCF_{i,t-1} + \beta_1\,TCE_{it} + \beta_2\,SBF_{it} + \beta_3\,SG_{it} + \beta_4\,PR_{it} +$$
$$\beta_5\,SIZ_{it} + \beta_6\,ST_{it} + \beta_7\,RLIQ_{it} + \beta_8\,COLLA_{it} + \beta_9\,FL_{it} + \rho_t YD_t + \mu_{it} \quad (1)$$

Where; i=1.......N (Company) and t= 1.......T (Year). α_0 is

YD_t = Year dummy variables are used for controlling the effect of time variant variables which are constant across firms.

μ_{it} = It is the residual term and explains the impact of unobserved random variables for the company *I* and year *t*.

After data collection, similar to Ahmad et al. (2017) trade payables to sales ratio is used as a proxy for trade credit financing used by listed manufacturing firms. Independent variables are selected on the basis of their use in previous empirical studies and their findings. We used first lag of trade credit financing, credit supplied to customers, short-term bank financing, sales growth, profitability, liquidity, creditworthiness of LMFs, liquidity position, stock-in-trade, collateral and financial leverage. These variables and their measurements are described in Table 1.

Estimation Choice

We used System GMM with two step option to estimate the model 1. Further, advantages of Dynamic panel model and superiority of System GMM (with two step) over static panel estimators we have discussed in our prior study (for detail see Ahmad et al., 2017).

Table 1

Variables, their Proxies, Measurement and Symbols

Variables, their Proxies, Measurement and Symbols

The dependent Variable = Trade payable to sales ratio is used to describe trade credit financing (TCF) =.(Trade Payables / Sales)				
Firm's Characteristics used as independent variables				References
Variable	Proxy	Formula	Symbol	
First lag of Trade Credit Financing	(Trade Payables Ratio)$_{t-1}$	= (Trade Payables / Sales) $_{t-1}$	TCF$_{t-1}$	García-Teruel and Martínez-Solano (2010), Kwenda and Holden (2014);
Trade Credit Extended by Firm	Trade Debtors Ratio	= (Trade Debtors / Sales)	TCE	Desai et al., (2016)
Short-term Bank Financing	Short-term Bank Loans used by Firm	= Short-term Bank loans/ Sales	SBF	Mateut et al. (2011);
Growth	Sales growth	=(Sales – Sales $_{t-1}$) / Sales $_{t-1}$	SG	Khan et al,(2012);
Profitability	Operating Profit Margin Ratio	= (Operating profit before taxes+ Depreciation)/ Sales	PR	Vaidya, (2011).
The creditworthiness of a Firm	Size of LMFs	= NL(Total Assets)	SIZ	Al Dohaiman (2013); Ahmad et al. (2017)
Stock-in-Trade	Closing Balance of Stock in Trade to Sales Ratio	= Closing Balance of inventory / Sales	ST	Ahmad et al. (2017); Bougheas et al. (2009),
Liquidity Position	Quick Ratio	= (Cash and Cash Equivalent+ Marketable Securities + Trade Debtor) / Current Liabilities	LIQ	Al Dohaiman (2013),
Collateral	Net Plant Assets Ratio	= Net plant Assets / Total Assets	COLLA	Zhang, R. (2011);
Financial Leverage	Debt Equity Ratio	= (Total Debt –Trade Payables) / Total Equity	FL	Chou, Yang and Line (2011);

Data Analysis Results and Discussion

Determinants of Trade Credit Financing

To investigate the effect of firms' specific financial factors on trade credit financing used by them, Equation 1 is estimated by applying panel regression analysis techniques: Pooled OLS, Fixed Effect within group, and System GMM and results are presented in Table 2. Statistics of panel specification test shows the existence unobserved time-invariant firm-specific effects. The existence of a correlation between unobserved heterogeneity of firms and explanatory variables and expected presence of simultaneity bias gives rise to endogeneity (Roberts & Whited, 2013).

System GMM estimator is consistent one irrespective of the level of endogeneity or persistence of trade credit financing, i.e., dependent variable. Further, coefficients produced by this estimator are more consistent and efficient, particularly, if the coefficient of first lag of dependent is of main interest (Kabango, 2009).

Diagnostics tests for dynamic panel estimation are presented in Table 2. Results of these tests show that all coefficients are jointly significant and the absences of serial correlation. Further, Hansen J-statistic provides evidence of the validity of 321 instruments used in System GMM Models. To control heteroskedasticity, robust option is used in each model and robust standard errors are presented in parenthesis.

Table 2

Determinants of Trades Credit Financing (TCF)

Determinants of Trades Credit Financing (TCF)

Independent Variables	Exp. Sign		1 Pooled OLS	2 Fixed Effect (WG)	3 System GMM One Step	4 Two Step
TCF $_{t-1}$	+	Coefficient	0.447***	0.216***	0.373***	0.372***
		Robust Std. Err.	(.032)	(0.038)	(0.039)	(0.040)
TCE	+	Coefficient	0.042**	0.049	0.065***	0.065***
		Robust Std. Err.	(0.018)	(0.034)	(0.022)	(0.022)
SBF	+/-	Coefficient	0.029**	0.037*	0.038**	0.038**
		Robust Std. Err.	(0.012)	(0.020)	(0.017)	(0.017)
SG	+/-	Coefficient	-0.068***	-0.033***	-0.059***	-0.059***
		Robust Std. Err.	(0.006)	(0.006)	(0.007)	(0.007)
PR	+/-	Coefficient	-0.138***	-0.129***	-0.143**	-0.143***
		Robust Std. Err.	(0.019)	(0.017)	(0.026)	(0.026)
SIZ	+/-	Coefficient	0.045***	0.068***	0.048***	0.048***
		Robust Std. Err.	(0.004)	(0.007)	(0.006)	(0.006)
ST	- /+	Coefficient	-0.0007	0.062	-0.008	-0.008
		Robust Std. Err.	(0.018)	(0.042)	(0.018)	(0.018)
LIQ	+	Coefficient	-0.025***	-0.019***	-0.027***	-0.027***
		Robust Std. Err.	(0.003)	(0.005)	(0.005)	(0.005)
COLLA	-	Coefficient	-0.046	0.021	-0.036**	-0.038***
		Robust Std. Err.	(0.009)	(0.021)	(0.013)	(0.013)
FL	-	Coefficient	-0.002*	-0.002*	-0.002*	-0.002*
		Robust Std. Err.	(0.000)	(0.001)	(0.001)	(0.001)
Constant		Coefficient	0.056***	-0.012	0.052***	0.026**
		Robust Std. Err.	(0.008)	(0.014)	(0.009)	(0.010)
Adj.R^2/ Overall R^2			0.816	0.778		
R^2 Within				0.646		
R^2 Between				0.852		
Wald chi2(9)					1728.05	1774.87
Prob > chi2					(0.000)	(0.000)
F-test			241.70	51.18		
Prob > F			(0.000)	(0.000)		
Root MSE			.0621			
F-Test (Fixed Effect) F(326, 2273)			3.02	Prob > F = 0.000		
Breusch-Pagan (LM) Test				Prob > chibar2= 1.000		
Hausman Test (Fixed / Random) chi2(17)			1564.21	Prob>chi2 = 0.000		
m 1-first order serial correlation of error term					-4.62 (0.000)	-3.94 (0.000)
m 2- second-order serial correlation of error term					-0.11 (0.911)	-0.11 (0.910)
Hansen J statistic					317.90 (0.241)	317.90 (0.241)
No. of Instruments					321	321
No. of firms			327	327	327	327
No. of observations			2616	2616	2289	2289

*Significant at 10 %, **Significant at 5%, ***Significant at 1 %.
The heteroskedasticity-robust standard errors are presented in parenthesis. On the basis of results presented in above table 2, all hypotheses stated earlier in this study are accepted at the 0.05 level except hypothesis 7 and 9.

The coefficient of TCFt-1 is positive and significant at the 0.01 level for all the estimators and justified the use of dynamic panel model in this study. Size of the coefficient for the first lag of trade credit used is found varying across estimators. Pooled OLS estimator produced 0.4479 coefficient for the TCFt-1 which is biased upward in the presence of correlation between first lag of trade credit used and unobserved time-invariant firm-level heterogeneity (Bond, 2002). While Fixed Effect (within) estimator yielded 0.2161 coefficient for the first lag of dependent variable which is biased downward due to the presence of correlation between first lag of trade credit used and regression error (Nickell, 1981). Further, fixed effect (within group) estimation perform poor in the presence of short panel.

The coefficient of first lag of TCFt-1 estimated by using two-step system GMM is 0.3722. This is less than the coefficient estimated by Pooled OLS and more than the coefficient estimated by Fixed Effect (within group). It suggests that the coefficient of first lag of TCFt-1 produced by System GMM is less biased. Further, Kabango (2009) highlighted that heteroskedastic robust results of System GMM (two-step) are more efficient. Thus, we discussed the results of System GMM (two-step) in the following section.

Time dummies affect the trade credit used by firms but are not expressed in Table 2 for the sake of brevity. The coefficient for the first lag of trade credit financing (TCF t-1) is 0.3722 and significant at the 0.01 level. It means companies decision to receive credit financing from suppliers in the current period is significantly influenced by its past realization. It also implies that LMFs emphasize on the stability of their trade credit contract over time. The results support the opinion of prior studies (see for example Gibilaro & Mattarocci, 2011; Kwenda & Holden, 2014). Further, coefficient is more than zero but less than 1 which implies LMFs have optimal level for trade credit financing and pursue it by making partial changes in their trade credit policy over time. The coefficient for TCFt-1 is lower than 0.5 which implies that lower adjustment cost is faced by firms while making an adjustment in their trade credit financing policy. The speed at which firms adjust their trade credit financing is computed by deducting the coefficient of TCF t-1 from one, i.e. (1 - 0.3722. = 0.6288). Value of adjustment speed shows that manufacturing firms listed in Pakistan adjust their trade credit financing policy at the rate of 62.88 percent over the time to attain its target level. Thus, it is concluded that in Pakistan, listed manufacturing firms' trade credit financing policy is dynamic.

The coefficient for trade credit extended (TCE) by firms is positive and significant at 5%. Findings support the maturity matching theory, i.e. Firms use short-term credit to finance their current assets. The results confirm the findings of prior studies (e.g., Gibilaro & Mattarocci, 2011; Al-Dohaiman, 2013; Murfin & Njoroge, 2015).

The coefficient for short-term bank financing (SBF) shows that short-term credit received from banks and suppliers are positively related at the 0.05 level. It shows listed manufacturing firms having access to multiple sources uses both trade credit and short term bank credit as a complement to each other. It might be due to the reason that listed manufacturing firms are credit worthy and receive credit from financial institutions and suppliers. Moreover, findings are supported by optimal capital structure theory and the complementary hypothesis of trade credit proposed by Burkart and Ellingsen (2004). Findings of the study confirm the empirical evidence reported by prior studies (see,

for example, Vaidya, 2011; Agostino & Trivieri, 2014).

Negative coefficient of sales growth (SG) infers that firms exhibiting growth in sales volume are financed by banks and are expected to demand less trade credit. Similar findings were reported by Khan et al. (2012) and Al-Dohaiman (2013). The significant and negative coefficient of profitability (PR) shows that highly profitable firms prefer internally generated funds over trade credit financing. The finding of this study confirmed the pecking order theory proposed by Myers and Majluf (1984) and strengthened the empirical findings of former studies (see for instance Niskanin & Niskanin, 2006; and Akinlo, 2012).

Size (SIZ) of the firms is predicted to be positively related to the credit received from suppliers. The results confirm the findings of Desai et al. (2016). The findings are supported by the fact that larger firms have good standing and reputation in the market. These firms influence their suppliers by their bargaining power and get trade credit for the delayed term. The coefficient -0.0084 for stock in trade (ST) is not significant at the 0.10 level. One reason for the insignificant relationship might be the use of overall inventory in this study, while the use of trade credit is more closely related to raw material inventory.

Liquidity (LIQ) position of firms is found negatively related with trade credit financing at the 0.01 level of significance. It implies that firms having strong liquidity position, prefer to make early payment to their suppliers. The results are supported by the earlier studies (e.g., Zhang, 2011; Mateut et al., 2011).

Negative coefficient of collateralizable assets (COLLAT) shows that firms with a larger value of collateralizable assets receive more funds from banks and demand less credit from suppliers. The findings support the results of Zhang (2011). Similarly, negative sign of coefficient for financial leverage (FL) implies that highly leveraged firms demonstrate more default risk and get less credit from their suppliers. The results strengthen the findings of Desai et al. (2016).

Conclusion

The findings of the study revealed that trade credit used by manufacturing firms listed on PSX is dynamic and depends on its past realization. Further, we established that these firms incorporate partial changes in their use of trade credit for achieving the target level. Moreover, these firms use trade credit to finance the credit provided to customers. Both trade credit and short-term bank credit are used by these firms as a complement of each other. It is, therefore, established that for achieving an optimal capital structure firms are using a mixture of alternative sources of capital. The findings of the study also suggest that growth, profitability, creditworthiness, liquidity position and collateral value have significant impact on the use of trade credit financing. Thus the findings of the study confirm all the hypotheses at the 0.05 level except hypothesis 7 and 9.

Moreover, the findings of this study suggest that managers should consider their credit experience with suppliers, customers demand for trade credit, availability of short-term bank financing and changes in the financial characteristics of their firms while incorporating marginal changes in

trade credit financing. We confined to time horizon from 2005 to 2013 and focused only on the manufacturing firms listed in Pakistan. Thus, generalizing the results of this study is not free from reservations.

As financing choices of firms are likely to be affected by financial development in a country, so we proposed the investigation of the impact of financial development on trade credit financing decisions.

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