

The Sustainability of Trade Credit as a Resource during SME's Life Cycle

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Abstract

Constraint access for bank credit by the SMEs can create hindrance to the contribution given by SMEs to the growth of economy. This paper focuses on the effect of business life cycle of SMEs on their financing through trade credit. This study will investigate whether various firm related determinants which affect their decision for trade credit affect differently in different stages of life cycle of SMEs. The empirical analysis was done on panel data of 464 manufacturing SMEs of Himachal Pradesh (India) over a period 2013-2017 with fixed effect applied on it. There are a total 2,320 number of observations. The results show a non-linear relationship between trade credit and age of the firm. The SMEs and determinants of trade credit are affected differently for trade credit in different stages of life cycle with young firms are affected the most. The determinants of trade credit also differ in different stages of life cycle. The study will help managers and policy makers to solve financial problems by considering various determinants of trade credit on the basis of business life cycle of SMEs.

Keywords: bank credit; trade credit; firm's life cycle; SMEs; manufacturing sector; age

1. Introduction

The MSME (Micro, Small and Medium Enterprises) in India are providing significant contribution across all sectors of economy and are producing wide range of products and services for domestic and global markets. According to the data available at Central Statistics Office (CSO), the share of MSMEs in GDP of India is 28.77%. The manufacturing SMEs contribute about 33% in total manufacturing Gross Value of Output (GVO) of India. There are around 6 crore 34 lakh MSMEs in India in which 1 crore 97 lakh MSMEs are of manufacturing category. The total number of MSMEs in Himachal Pradesh are 3 lakh 92 thousand in which small and medium enterprises are 6000 in number. SMEs in India, do not have the access for financial markets. The only source they have for raising their funds is from bank credit or from the trade creditors. In India, there are many studies which have shown that there is credit rationing by banks on SMEs. The firms which have better access to the credit market play very important role in financing the firms which are financially constrained. In the situation of constraint bank loan excess, trade credit acts as a very important source of finance to the SMEs. It is understood that trade credit is very important for the SMEs but is it equally important throughout its acts as life line for the SMEs. The study conducted by Banerjee et al. (2004) shows that there is substantial under-lending by the banks to the Indian firms. It was also found in the same study that in more than 78% cases the amount granted by the bank was less than the amount permitted which means that there is semi credit rationing present in India. Many other studies have also shown that there is the problem of credit rationing in India by the banks. Singh(2016) in his study found that the SMEs in India are constraint for formal bank credit and it is mainly due to the reason that these SMEs are lacking in collateral or guarantee, longer loan process and lack of knowledge of schemes. Moreover, it was also found in his study that the requirement of loan amount also depends upon the stage of life cycle of SME in which it is present. The IFC report 2018 shows that the credit gap between the addressable demand for credit by MSMEs and formal supply by the banks is about 25.8 trillion. Due to these restrictions in finance, the contribution of SMEs in the growth of economy of India can be limited. The small and medium size enterprises are always constraint for bank credit as seen from the results of

various previous studies (Ferrando and Mulier, 2013; Petersen and Rajan, 1994; Rajan and Zingales, 1995). To substitute this constraint, the SMEs are required to switch on to other source of credit which is trade credit. Traded credit plays a very important role in the growth of the SMEs and is a very common method of transaction in SMEs (Wilson et al., 2000; Raan&Zingales, 1995).

Trade credit is a method of transaction in which the two parties agree to make payment at an agreed future date (Mian& Smith, 1992). Here, the goods are purchased by the buyer without paying the money at the time of delivery. The money is paid to the supplier at a future data. This transaction is written as current liability as accounts payable in the balance sheet of the buyer. For the supplier, it is an investment and is entered in the current assets as accounts receivable in the balance sheet. The buyer pays the cost of the financing the capital and in this way the supplier earns the return on those investments (Martinez-Sola et al., 2014).

When the SMEs are constraint for credit by the banks, the only source they have for the funds is trade credit. According to IFC report 2018, the trade credit is the second best alternative after bank credit. It means that the trade credit plays a very important role in providing funds and to remove the problem of finance. There are empirical studies which show that those SMEs which are in the early stage of their life cycle face the problem of information asymmetry. They have small size and have more growth opportunities. It means that the SMEs in the different stages of their life cycle apply different financing strategies (Casey et al., 2014). There is availability of trade credit for the SMEs in all the stages of life cycle (Berger & Udell, 1998). From the empirical literature two approaches can be seen for the relationship between the age and trade credit. The first approach is of the linear relationship which shows that the difference in the degree of trade credit between various SMEs is due to the difference in the reputation, opacity and experience of younger companies and older companies. The results which are present in the literature for this approach are of mixed nature. Singh (2016) in his study found that young SMEs in India use their own personal savings, family and friends for their working capital need. Casey and O'Toole (2014) found that with the increase in the age the requirement for trade credit also increases. Andrieu et al. (2018) found that age does not affect significantly the requirement for trade credit. Yazdanfar and Ohman (2017) also found the same results. Some other studies like the study of

Canto-Cuevas et al. (2016) and Deloof and La Rocca (2015) found that there is negative relationship between age and trade credit.

The second approach is of the non-linear relationship between age and trade credit. There is no such empirical study conducted on this approach in the context of India. There are studies conducted for other countries but those studies are very less conclusive. The study conducted by Garcia-Teruel & Martinez-Salano (2010) and Cuevas et al. (2019) show that there is non-linear relationship between the age and trade credit for SMEs. But the study of McGuinness et al. (2018) show not such evidence of non-linear relationship. It shows that the relationship between trade credit and life cycle of business need further investigation as it is very difficult to find the correct way to find how age of firm affect the trade credit.

It has been found that the relationship between SME and life cycle may vary on the basis of the sector to which the firm is situated (Yazdanfar & Ohman; 2017). This heterogeneity was not taken into account by the previous empirical studies. The business sector plays a very important role while taking any financial decision related to SME (Psillaki & Eleftheriou; 2015). The determinants of trade credit may also vary depending on the sector to which the firm is situated (Marotta, 2005). For this reason, in this study one homogeneous sector which is manufacturing sector has been taken for the study in which the trade credit plays a very important role to provide finance to the companies.

In this study we will understand the trade credit in different stages of business life cycle of manufacturing SMEs. The study is focused on whether life cycle is an important factor to take decision for trade credit, how different stages of life cycle of SME affect the trade credit and how the various determinants which affect the trade credit change in different stages of life cycle of SMEs. The study will be conducted on manufacturing SMEs of Himachal Pradesh (India) over a period 2013-2017.

In the rest of the paper first there is review of literature and after that the hypothesis are mentioned for the study in section 2. The sample of SMEs, the variables which are required to be studied, descriptive statistics for all the variables, the model and the methodology of the study have been shown in section 3. The empirical results are shown in section 4. In section 5 there is the conclusion of the article.

2. Literature Review

2.1. Relationship between Business Life Cycle and Trade Credit

Table 1. Empirical studies related to the relationship between business life cycle and trade credit in SMEs worldwide

Author / Year	Topic / Focus / Question	Context/ Sample	Paradigm/ Method	Findings
Petersen and Rajan (1997)	Trade credit: Theory and Evidence The aim of the paper is to find whether the firms use more trade credit when they are constrained for credit from banks.	Secondary data has been taken from the National Survey of Small Business Finances for the year 1987. A total 3404 number of firms were taken in the sample. The data includes the balance sheets, income statements and current financing information of the firms.	The coefficients are estimate by using the ordinary least square technique.	The results show that the trade credit is used to discriminate the prices. The firms which are having good access to bank finance provide more trade credit to others. Suppliers lend more than the others because they have more information about the customer than the others and also they have the ability to liquidate the good.

Banerjee et al. (2003)	Bank financing in India The paper will investigate the following: Whether there is under-lending for firms by banks in India The lending practice of banks in India	Data was taken from Indian public sector banks and 253 firms from 1997 to 1999	Ordinary least square regression model was used.	The results show that there is under-lending to the firms by the banks The results also show that there are 78% of the firms to which the granted limit was smaller than amount permitted. There are 64% of SMEs which got the same amount of credit as much as they had got in the previous year.
Alphonse, Ducret, and Severin (2006)	When trade credit facilitates access to bank finance: evidence from US small business data The aim of paper is to find whether trade payables improve the reputation of the firm and helps them to have access for the bank credit.	The secondary data was collected from National Survey of Small Business finance (NSSBF) containing the cross-sectional data of small firms from year 1999 to 2001.	Simultaneous equation model has been used to find the relationship between trade credit and bank debt. The simultaneous equations were estimate using two stage least square	The results show that the trade payables can also be used as a complementary source of financing from the banks. They provide a signal to the firms that the quality of firm is good and it increases the access for the bank credit to them.

		The firms in the sample are 3561.	method.	
Becchetti et al. (2008)	Investment-cash flow sensitivities, credit rationing and financing constraints The main objective of the study is to investigate the investment and cash flow sensitivities.	Secondary data was taken from balance sheets and quantitative information of firms which were denied credit which include 4500 firms form year 1998 to 2000.	The findings were obtained using logit econometric.	The results show that there is discrimination between the firms which were self-declared credit rationed and the firms which were not.
Rocca et al. (2009)	Capital structure decisions during firm's life cycle The aim of study is to study the choice of finance by SMES and to find the various determinants like stage of life cycle, and information opacity and their effect on capital structure.	Secondary data of 10242 Italian SMEs have been taken for a period of 1996 to 2005	Least square dummy variable (LSDV) approach was applied	The results show that the capital structure of the SMEs is highly affected by the stage of life cycle of SME. The debt is fundamental in the early stages of SMEs. in the maturity stage they substitute some of the debt with the internal funds. The results are homogeneous to the different sectors and

				remain same over time.
García-Teruel and Martínez-Solano (2010)	A dynamic perspective on the demand of accounts payable. The aim of the paper is to find the various determinants of trade credit payables. It is also aimed to test whether trade payables follow model of partial adjustments.	A sample of 3509 SMEs of UK was used to achieve the objectives for a period 1997-2001.	Dynamic panel data model and GMM method was used to control the unobservable heterogeneity and endogeneity problem.	The result shows that the firms which are large, having lower cost and have good access to internal and external financing use less trade credit. Those firms which have high growth use more trade credit to finance sales growth.
Tang (2014)	Trade credit and Profitability in Small and Medium Enterprises The aim of paper is to find the impact of trade credit from demand side as well as from supply side on the profitability of SMEs.	The secondary data taken from Reach database from year 2009 to 2013 for 71 SMEs of Netherlands	Multivariable linear regression model has been used with profitability as dependent variable and receivables, payables, leverage and growth are independent variables.	The results show that there is neither positive nor negative relation between profitability and accounts receivables. The results also show that there is positive significant relationship between trade payable and profitability of the firm.
Matias Gama and Van	The interdependence between trade credit and bank lending:	The study was conducted on 468 SMEs of	OLS mode was used to get the results.	The results show that Portuguese SMEs have relationship with single

(2015)	Commitment in intermediary firm relationships The aim of the study was to find the relationship between trade credit and bank credit.	Portugal		bank only. Through the relationship between bank and borrower. There is monopoly for information due to the relationship between borrower and single bank which causes high rate of interest.
Kumar and Rao(2015)	Financing patterns of SMEs in India during 2006 to 2013- and empirical analysis The aim of the study is to provide comprehensive view on financing state of SMEs in India.	Secondary data was taken from PROWESS database which includes 1524 SMEs of India from period 2006 to 2013.	The study was conducted on panel data using hierarchical regression analysis.	The results show that the SMEs are dependent on trade credit and bank loans for short term bank debt. The results also revealed that the various determinants of capital structure of SMEs are tangibility, profitability, age and liquidity of SMEs.
Singh (2016)	Finance for Micro, Small, and Medium-Sized Enterprises in India: Sources and Challenges The main objective of the study is to find the various challenges faced by the SMEs in raising their funds while going through different stages of life	From the sample of 85 MSMEs of Bangalore which include sectors like weavers, jewelers, metal works, textiles, book shops retailers and precision	Personal interview using structured questionnaire	The results show that the type of resource of finance used by the firm depends on its stage in which it is present in its business life cycle. It was also found that in the younger stage and survival stage the firms get difficulty in raising funds due to the reasons like provision of collateral or

	cycle of SME. It also focuses on the factors which affect the use of sources of finance by the SMEs	tools.		guarantee, long process of loan and lack of knowledge of various available schemes. In growth stage the problem is mainly on high interest rates.
Rawat and Dave (2017)	A conceptual study of trade credit management of SME's The paper investigated the various determinants of trade credit in India	The study is based on the previous studies conducted in context of Indian SMEs and on the quantitative data.	The study is based on the results of previous studies	The results show that inventory management is the main motive behind the existence of trade credit. Firms which are highly profitable receive and give less trade credit. The firms which have more access to bank credit provide less trade credit to other SMEs but they receive more trade credit.
Yazdanfar and Öhman (2017)	Substitute or complement? The use of trade credit as a financing source among SMEs The aim of the paper is to investigate whether trade credit is a good source of financing for SMEs and effect of	Data includes 15897 Swedish SMEs from five different industry sectors from 2009 to 2012.	Ordinary least square fixed effect model and generalized method of moments (GMM) models were used to get the results.	The results show that profitability and long term debt affect negatively on trade credit whereas short term debt affect the trade credit positively. Age of the firm is negatively related to trade credit whereas size of SME is positively related to trade credit.

	profitability, short term debt and long term debt on decision for trade credit.			
Andrieu et al. (2018)	Bank debt and trade credit for SMEs in Europe: firm-, industry-, and country – level determinants	The survey data on European SMEs from 2009 to 2014 was used.	Binary probit model was used to test hypotheses.	The results show that the access for bank loan by SMEs is highly dependent on age and size. The size is positively related to the requirement of trade credit. The results also show that there is a complementary relationship between bank loan and trade credit for SMEs. Manufacturing SMEs have more access to bank loan as compared to non-manufacturing SMEs.
McGuinness et al. (2018)	European trade credit use and SME survival The aim of study is to examine whether trade credit helped the SMEs which were credit constrained to survive in recent financial crisis.	The secondary data was including 202,696 SMEs from 13 European countries from 2003 to 2012.	The relationship was analyzed using Z-score. The binary choice regression model is used.	The results show that the trade credit helped the financial constrained firms to survive especially in financial crisis. It was also found that SMEs which are not constrained for bank credit, supply more trade credit.
Cuevas et	Trade credit as a	Sample was	Fixed effect	The results show that there

al. (2019)	Sustainable Resource during an SME's life cycle The objective is to investigate the relationship between requirement of trade credit and its business life cycle of SMEs. Also to investigate the change in the degree of determinants of trade credit with the change in stages of life cycle of SMEs.	taken from 12 European Union countries for manufacturing SMEs over a period 2008 to 2014.	model was used on the panel data	is non-linear relationship between trade credit and life cycle of firm. The determinants of trade credit vary across the various life cycle stages of SMEs. The firms in the initial stage of life cycle need more trade credit as compared to the later stages.
Huang et al. (2019)	Trade credit financing and sustainable growth of firms: Empirical evidence from China. The aim of study is to provide evidence for relationship between growth of firm and trade credit.	Secondary data includes financial statements of Chinese firms which are A-share listed firms from year 2003 to 2017.	Cross section regression method was used to run the regression. Two stage IV (Instrumental Variable) least square method was used to check for endogeneity.	The results show that trade credit plays positive and significant role in the growth of firms. Moreover, the firms having high internal control ability and have more trade credit grow more.
Canto-Cuevas et	Trade credit as a sustainable resource	The study was conducted on	The fixed effect model	The results show that there is negative relationship

al. (2019)	during an SME's life cycle. The aim of the paper is to find the relationship between the decision for trade credit and the life cycle of the SMEs. The various factors which affect the decision for trade credit of European Union countries SMEs are studied in this study.	the manufacturing SMEs of European Union countries from the year 2008 to 2014. The data was collected from AMADEUS database collected by Bureau Van Dijk. The SMEs in the sample are from 12 EU countries sharing common currency. There is unbalanced panel data including 140358 observations.	has been applied on the panel data model. The analysis of SMEs of different life cycles has been done using the Analysis of Variance (ANOVA).	between trade credit and life cycle of firms. The younger SMEs use more trade credit as compared to the older firms which have more choices available because they find difficulties in getting loans from banks. The results also show a non-linear relationship between trade credit and age of SME. It was also observed that the various determinants of trade credit change their importance according to the age cluster to which firm belongs.
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2.2.Hypotheses formulation

So far, a number of studies have been made to find the relationship between the life cycle of company and trade credit. But there is always a controversy related to the influence of age of firm on use of trade credit. It shows that the same results cannot be applied in all economies. In many studies it has been shown that the sector of the firm is a very important factor to determine the trade credit and the firms in that particular sector show similar trade credit use. Whereas, the use of trade credit remains different in different sectors.

In this study the main focus is on the manufacturing sector to find the relationship between trade credit and age of SMEs. According to National Sample Survey (NSS) 73rd round, Manufacturing sector is a very important sector which includes 1crore97 lakh SMEs in India providing employment to 360.41 lakh people which is 32% of total MSME sector employment and contributes about 33% of total country's manufacturing output.

After the study of various empirical studies on trade credit, the following hypotheses are formulated in this research work

Hypothesis 1:*Younger the SME, more will be the trade credit.*

The firms which are younger have more problems of information asymmetry and due to this reason they suffer a lot to raise funds from banks. In the early stage of life cycle they create good relationship with the trade creditors or suppliers to ensure their continuous production. This helps the new firms to use trade credit in a much better way (Mateut et al., 2006, Tsurata, 2015, Matias-Gama & Van Auken, 2015).

Hypothesis 2:*There is a non-linear relationship between the age of firm and trade credit in manufacturing sector*

With the passage of time, the company which was younger and was having the problem of information asymmetry becomes more transparent and the management becomes more experienced. It increases the confidence of the formal creditors like banks and financial institutions on the company and the company now switches over to formal credit with the trade credit and starts following pecking order theory (Fluck, 2006). But the negative relationship between the age of the firm and trade credit does not remain indefinitely. In the later stage of the

life cycle of a firm it does not remain much interested in reducing its level of trade credit and the level of trade credit again increases in this stage because in the long run a strong relationship builds up between the supplier and the company. The supplier grants the trade credit to its old customers so as to maintain turnover. Moreover, when a company reaches in its later stage, the requirement for long term assets gets over and there is the need to invest in stock only in this stage which can be fulfilled only by the suppliers.

Hypothesis 3:*The trade credit determinants for manufacturing SMEs are different in different life cycle stages.*

Serrasqueiro and Nunes (2012) in their study found that the SMEs which are younger have different determinants for debt than those which are old. LaRocca et al. (2011) found that the SMEs which are in different stages of their life cycle have different determinants for their capital structure. The change in structure, environment, characteristics and activities of SMEs in different stages of life cycle affect the determinants of financial resources of firms (Lester, Parnell & Carraher, 2003). Therefore, with the progression of the firm through different stages of life cycle, the factors which determine trade credit for the firm also change and depend upon the stage of life cycle in which the firm is situated.

3. Data, Variables and Research Methodology

3.1. Data and Sample

The data for SMEs has been collected from the PROWESS Database which contains the profit and loss accounts and balance sheets of all the firms. The data includes all the manufacturing SMEs of Himachal Pradesh. The manufacturing SMEs are defined here on the basis of Micro, Small and Medium Enterprise Development (MSMED) Act 2006 of India. According to the definition, the manufacturing SMEs are the firms which have total investment in plant, machinery or equipment not more than 10 crore rupees (100 million).

The sample includes the SMEs of Himachal Pradesh from the year 2013 to 2017. There are a total 464 number of manufacturing SMEs which make a balanced panel data of 2,320 observations.

3.2.Variables

The dependent variable used here is trade credit which is shown as TC. It is defined as the ratio of the trade payable to the total assets. Fukuda, Kasuya and Akashi (2007), Yang (2011) and Petersen and Rajan(2012) also used the same formula to calculate the variable in their research work.

The impact of life cycle of firm on trade credit was measured using the variable AGE which is the number of years from which the firm was established to the year of observation.

To investigate the non-linear relation between age and trade credit, another variable has been used which is AGESQ which is the square of AGE and is a quadratic term (McGuinness& Hogan, 2014).

The previous empirical studies have shown that there are many control variables which are determinants of trade credit in different stages of life cycle of firm. The first one is size of the firm which is shown as SIZE and is calculated as the logarithm of total assets (Petersen &Rajan, 1997).

The second determinant is 'profitability of the firm' which is shown as PROFIT and is defined as the ratio of EBIT (EarningsBefore Interest and Tax) to the total assets(Kestens, Cauwenberge&Bauwhede, 2012)

The third determinant is sales growth which is shown as (GROWTH) and is calculated as percentage of annual sales growth (Teruel& Solano, 2010).

The fourth determinant is liquidity which is shown as CASH and is measured as ratio of cash to the total assets (Yang, 2011).

The fifth determinant is term bank debt shown as SRTDEBT and is calculated as ratio of short term loan to the total assets (Huang, Shi & Zhang, 2011).

The sixth and final determinant is long term bank debt shown as LONGDEBT and is calculated as ratio of long term loan to the total assets (Sanchez, Cuevas & Di-Pietro, 2018).

3.3.Descriptive Statistics

Table 2 shows the descriptive statistics for the variables of the study in the sample which includes the mean, median, standard deviation, minimum and maximum. The outliers are not removed from the sample because all the SMEs which are present in the sample include the SMEs declared by MSME act 2006 of India. Whatever characteristics shown by the firms, they are SMEs after considering all these characteristics also. The table shows that the SMEs in the sample engaged in operations have mean age of 19 years which on an average, 20% of their financing resources are from trade credit. It can also be seen from the table that the usage of trade credit exceeds the usage of bank credit. The average short term credit used by SEMs is 16.8% and the average long term credit used by the SMEs is 9.8%. The other studies done by McGuinness et al.(2018) and Garcia-Teruel and Martinez-Solano (2010) also show the importance of trade credit by the suppliers to the manufacturing SMEs. Here, the age is the number of years from the date of establishment.

Table 2.Descriptive statistics

Variables	Mean	Median	Std.Dev.	Min	Max
TC	.203	.122	.463	0	15.5
AGE	18.987	17	10.939	3	62
SIZE	3.549	3.471	1.684	-3.912	8.451
PROFIT	.007	.019	.207	-3.953	1.267
GROWTH	881.327	6.516	25057.86	-274.684	1074240
CASH	.202	.142	.18	0	.909
SRTDEBT	.168	.129	.164	0	2.344
LONGDEBT	.098	.046	.136	0	.957

Table 3 shows the correlation between all the variables used in the study. It can be seen from the table that the correlation between the variables is very low, which shows that the problem of multicollinearity does not exist.

Table 3.Correlation coefficient matrix

Correlation	TC	AGE	SIZE	PROFIT	GROWTH	CASH	SRTDEB	LONGD
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							T	EBT
TCOAT	1.000							
AGE	-0.059	1.000						
SIZE	-0.116	-0.113	1.000					
PROFIT	-0.124	-0.002	0.142	1.000				
GROWTH	-0.046	-0.085	0.103	0.053	1.000			
CASH	0.043	-0.052	0.066	0.042	-0.019	1.000		
SRTDEBT	-0.107	0.105	-0.200	-0.144	-0.054	-0.232	1.000	
LONGDEB	-0.159	-0.162	0.034	-0.292	0.147	-0.139	-0.022	1.000
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3.4. Model Specification

First of all, the hypothesis 1 and hypothesis 2 will be verified which is the baseline of the study and shows the influence of life cycle of firm on the trade credit. The AGE variable and AGESQ variable which is the quadratic term of the variable age are included in the following model equation. The control variables which include variables which are firm-specific and time dummies are also added in the equation model.

$$TC_{i,t} = \beta_0 + \beta_1 AGE_{i,t} + \beta_2 AGESQ_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 PROFIT_{i,t} + \beta_5 GROWTH_{i,t} + \beta_6 CASH_{i,t} + \beta_7 SRTDEBT_{i,t} + \beta_8 LONGDEBT_{i,t} + time\ dummies + v_{i,t} + e_{i,t}$$

Here i is the i th firm in time t and $e_{i,t}$ is the error term. The AGE here in the equation model has been transformed into logarithm of $(1+age)$ and the variable AGESQ has been transformed into logarithm of $(1+age)^2$.

The equation above will be estimated using fixed effect model and random effect model to get the individual effects ($v_{i,t}$) with the clustered standard errors at the firm level. After getting individual effects, it has to be ascertained whether the individual effects are fixed or random, which is known by performing the Hausman test. The null hypothesis is that the random effect model is appropriate. The result of Hausman test verifies that the fixed effect model is appropriate than random effect model. The model will be estimated with only fixed effect model to get the results.

To verify the third hypothesis which tests whether the various variables which affect trade credit, affect differently in different stages of life cycle of SMEs, the different clusters have been made for SMEs in same stages of life cycle and then the determinants are estimated. The same approach was used by Keasey et al. (2015) and LaRoca et al. (2011) in their research for capital structure. They used age as a discriminating variable to determine the various stages of business life cycle. Different studies determine stages of life cycle using different quantitative variables, but there is no definition regarding how many stages must be there or the nature of each stage (Levie& Lichtenstein, 2010).

4. Results

4.1. Baseline Analysis

In this section, the regression results will show the effect of age on the trade credit. The table above represents the results by using the fixed effect panel model and the various other variables related to firm characteristics and the year dummies are used as controlled variables. The results show that there is negative and significant relationship at 3% level between the age and trade credit. It verifies the hypothesis 1 and shows that the SMEs which are younger and have less access to the formal credit due to the problem of high information asymmetry, use more trade credit. It shows that trade credit acts as a life line for younger SMEs. This result is also in line with the financial theory of information asymmetry. This also helps the firms to make good relationships with the trade creditors or the suppliers.

Table 4.Regression using fixed effect panel model

TC	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
AGE	-0.772	0.355	-2.17	0.030	-1.470	-0.074	**
AGESQ	0.244	0.112	2.19	0.029	0.025	0.464	**
SIZE	0.027	0.014	1.97	0.050	0.000	0.054	*
PROFIT	-0.405	0.074	-5.51	0.000	-0.550	-0.261	***
GROWTH	0.000	0.000	0.09	0.926	0.000	0.000	
CASH	-0.118	0.054	-2.17	0.030	-0.224	-0.011	**
SRTDEBT	-0.214	0.052	-4.12	0.000	-0.317	-0.112	***
LONGDEBT	-0.106	0.060	-1.78	0.076	-0.223	0.011	*
YEAR Dummy ^a	.	.	.	.	.	.	.

2014	-0.030	0.017	-1.72	0.086	-0.063	0.004	*
2015	-0.069	0.032	-2.19	0.030	-0.131	-0.007	**
2016	-0.100	0.047	-2.13	0.034	-0.192	-0.008	**
2017	-0.136	0.062	-2.19	0.029	-0.259	-0.014	**
Constant	0.337	0.181	1.86	0.064	-0.020	0.693	*

Mean dependent var	0.188	SD dependent var.	0.150
R-squared	0.133	Number of obs.	553.000
F-test	4.570	Prob.> F	0.000
Akaike crit. (AIC)	-1792.581	Bayesian crit. (BIC)	-1736.481

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

a: 2013 is the base year

The other variable which is square of the age (AGESQ) is also coming out to be significant and is having positive sign. The variable AGESQ which is having opposite sign with respect to AGE shows that there is non-linear significant relationship between AGE and trade credit. This result verifies the second hypothesis. Teruel and Solano (2010), Alphonse et al. (2006) and Petersen and Rajan (1997) in their study had shown the same result of non-linear relationship between AGE and trade credit. The results show that the relationship between age and trade credit show opposite directions at specific stages in business life cycle. The SMEs in their start-up stage use more trade credit to keep their business smoothly because SMEs have more asymmetric information and they have least access to formal credit. But with the passage of time, the SMEs become more transparent and they get more reputation and due to this they get access to cheaper sources of finance like bank credit. In this stage, the firms use less trade credit and use cheaper sources of finance like bank credit. In the consolidation stage, trade credit again starts playing a significant role as the need for long term credit from banks does not remain. In this stage the need remains only for stock which is fulfilled by the trade creditors. But in this stage the trade credit plays its role but lesser than the early stage of life cycle. In older stage the trust factor between supplier and firm plays very important role which builds up in the long term. It helps them to take trade credit very easily. Figure 1 shows the non-linear relationship between age and trade credit with trade credit as a function of variable age for manufacturing SMEs. it can be seen

from the figure that age is a driving factor for trade credit. The firms in the early stage of their life use more trade credit and it keeps on increasing for certain period of time because in the initial years of SMEs life cycle, they fulfill their need for funds through trade credit and make long term relationship with the trade creditors. But with the passage of time they become more transparent and their reputation increases in the market. Because of this the banks start providing them credit which is cheaper than the trade credit and the SMEs switch over most of their fund raising from banks. From the graph it can be seen that in the mature and declining stage, the requirement for trade credit decreases. In the later stage, the suppliers provide credit to SMEs because trade creditors trust more on old SMEs than new SMEs.

Fig.1 shows the non-linear relationship between age and trade credit with trade credit as a function of variable age for manufacturing SMEs. It can be seen from the figure that age is a driving factor for trade credit. The firms in the early stage of their life use more trade credit and it keeps on increasing for certain period of time because in the initial years of SMEs life cycle, they fulfill their need for funds through trade credit and make long-term relationship with them. But as the time passes, they become more transparent and their reputation increases in the market. Because of this the banks start providing them credit which is cheaper than the trade credit. From the graph it can be seen that in the mature and declining stage, the requirement for trade credit decreases. In the later stage, the suppliers provide credit to SMEs because trade creditors trust more on old SMEs than new SMEs. The series1 in the figure represents the mean.

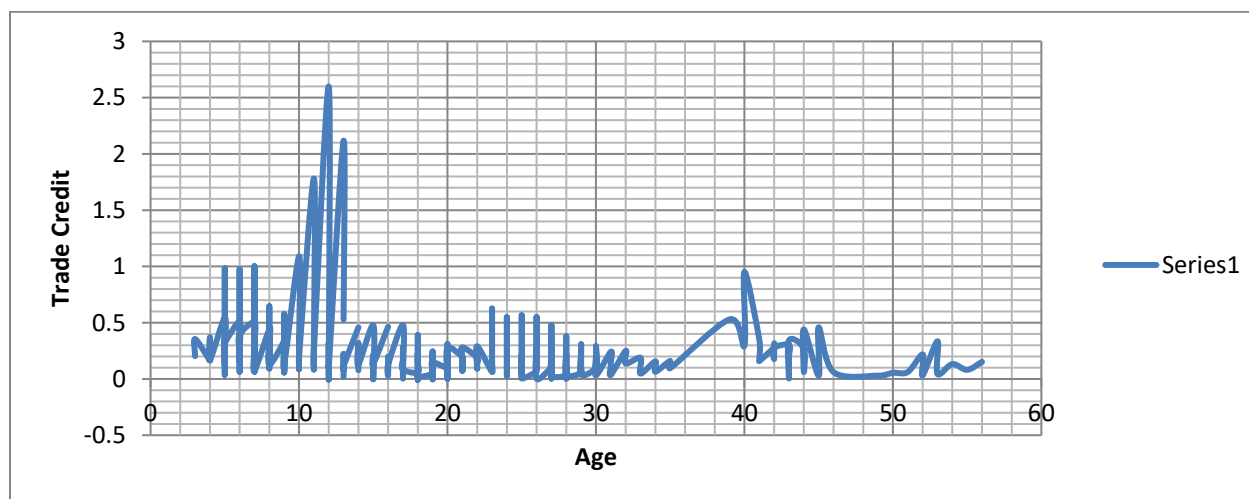


Figure 1 . The effect of age on trade credit

Now, the impact of age on trade credit will be investigated for different years. Tables 5 shows the estimated results from year 2013 to 2017 for AGE and AGESQ. The control variables are also enclosed. For the year 2013 and 2014 the AGE and AGESQ variables are not significant. For the year 2015, 2016 and 2017 the results are statistically significant. The coefficient for AGE is positive and coefficient for AGESQ is negative which shows that there is non-linear relationship between age and trade credit for the SMEs of manufacturing sector for the period under consideration.

Table 5. Relationship between age and trade credit each year

Variables	2013	2014	2015	2016	2017
	TC	TC	TC	TC	TC
AGE	-0.069 (0.188)	-0.185 (0.206)	0.450* (0.254)	0.159* (0.313)	0.397* (0.371)
AGESQ	0.010 (0.034)	0.031 (0.037)	-0.073* (0.044)	-0.039* (0.053)	-0.072* (0.061)
Constant	0.376 (0.255)	0.578** (0.282)	0.986*** (0.357)	0.203 (0.460)	-0.248 (0.554)
Obs.	119	117	108	107	102
R-squared	0.080	0.133	0.153	0.165	0.295

Notes: Ordinary least squares regression (OLS); Standard errors are in parenthesis;

*** p<0.01, ** p<0.05, * p<0.1

From the table 4 the results show that size is having positive and significant effect on trade credit. It shows that SMEs which are large, use more trade credit (Canto-Cuevas & Palacín-Sánchez, 2016). But it is surprising to know that sales profit is not significant which was not as expected. The reason could be the trade-off between payables and profitability which causes unclear relationship.

There is negative and significant effect of profit on the trade credit. This result is in line with the pecking order theory. It shows that the firms which have more profit use less trade credit because they use internal funds for their profits and if the internal funds are insufficient, they only they use the option of trade credit.

The variable CASH is also showing negative and significant effect on the trade credit. It shows that the firms which are more liquid use less trade credit (Love, Preve & Sarria-Allende, 2007).

The negative and significant values for short term and long term bank debt show that the firms which are constraint for short and long term bank debt use more trade credit. So, trade credit acts as substitute for bank debt (Yazdanfar & Öhman 2017). The coefficient for short term bank debt is more negative than long term bank debt which shows that substitution of short term bank debt is more as compared to long term bank debt for trade credit. This is mainly due to the reason that trade credit is mainly for fulfillment of short term needs and for fulfillment of their stocks as shown by many empirical studies (McGuinness & Hogan 2014).

4.2. Cluster Analysis

Now we will investigate the effect of AGE, AGESQ and other determinants in the different stages of life cycle of business. For this, the cluster of SMEs will be prepared for different stages of life cycle of SMEs on the basis of age of SMEs. Cluster 1 include the young SMEs having average age of 8.5 years. Cluster 2 includes mature SMEs having average age of 16.8 years and cluster 3 includes the old SMEs having age more than 30.1 years.

Descriptive Table

The descriptive statistics has been represented in the table 6 for three clusters. The analysis of variance (ANOVA) shows that the null hypothesis of 'Bartlett's test for equal variance' is rejected for all variables which means that there is significant difference in the mean value of all variables in the three stages of life cycle of business. It can be seen from the table that the variable trade payable for young firms is showing an average value of 25.04% which is almost 7.5% higher than the average values of mature firms and old firms. Whereas, in mature firms and old firms, the average trade credit is remaining almost stable and important. Here the hypothesis 1 and hypothesis 2 are again verified because we can see that the young firms are using more trade credit and this trend is not remaining linear. However, sales growth is not significant here also. The table shows same as can be seen in previous literature that the young SMEs have smaller size, less cash and less profit. Here, the profit of old firms is not declining.

Table 6.Descriptive statistics of each cluster

Variables	Mean	Std. Dev.
Cluster of young firms		
TC	.2504	.647
AGE	8.533	2.131
SIZE	3.806	1.793
PROFIT	-.014	.246
GROWTH	2091.981	42534.09
CASH	.193	.166
SRTDEBT	.165	.172
LONGDEB	.126	.161
T		
Cluster of Mature firms		
TC	.176	.393
AGE	16.842	2.258
SIZE	3.427	1.748
PROFIT	.015	.182
GROWTH	157.055	1772.18
CASH	.206	.192
SRTDEBT	.153	.18
LONGDEB	.086	.111
T		
Cluster of Old Firms		
TC	.178	.259
AGE	30.107	9.088
SIZE	3.405	1.499
PROFIT	.022	.183
GROWTH	349.087	6919.106
CASH	.206	.184
SRTDEBT	.179	.145
LONGDEB	.082	.125
T		

The regression of various determinants of trade credit payable using fixed effect model has been shown in table—for three clusters. For first cluster which is for young SMEs, all the

determinants of trade credit payable are showing same sign and significant results as that of the whole sample. The magnitude of coefficient is different which is quite obvious.

For SMEs in maturity stage, the results are not same for size and profit. The size and profit are not significant which is very surprising result. It may be due to the reason that up to maturity, the SMEs are able to make good relationship with the SMEs that size and profit of the firms are ignored by the trade creditors. Moreover the banks also start providing loan to SMEs in this stage.

Table 7.Determinants of trade credit for three clusters

Variables	Cluster of young firms TC	Cluster of mature firms TC	Cluster of old firms TC
SIZE	0.008 (0.021)	-0.018 (0.014)	0.014 (0.013)
PROFIT	-0.776*** (0.107)	-0.185 (0.153)	-0.108 (0.114)
GROWTH	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
CASH	0.011 (0.081)	-0.164* (0.091)	-0.228*** (0.080)
STDDEBT	-0.245** (0.103)	-0.197** (0.094)	-0.227*** (0.069)
LONGDEBT	0.076 (0.099)	-0.322*** (0.107)	-0.133 (0.084)
YEAR Dummy ^a			
2014	0.012 (0.015)	0.005 (0.015)	0.007 (0.013)
2015	0.002 (0.017)	0.015 (0.017)	-0.003 (0.014)
2016	0.022 (0.019)	0.014 (0.017)	-0.008 (0.014)
2017	0.011 (0.021)	0.014 (0.019)	-0.008 (0.015)

Constant	0.209*** (0.078)	0.311*** (0.063)	0.219*** (0.050)
Observations	167	155	231

Standard errors are in parenthesis

a: 2013 is suppressed year

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

For SMEs in declining stage, the age, size and profit are not showing the same results as that of the whole sample. Also the value for long term debt from bank is not significant. The reasons could be that in declining stage there is no need of long term debt and SMEs are mostly dependent up on trade creditors for fulfillment of short term needs like stock and other working capital. Moreover, trade creditors are also more confident upon old firms for increasing their sales on credit.

The Wald test has been conducted to check the difference between the trade credit determinants of all three clusters. The null hypothesis is that there is no difference in the determinants of three clusters. The result of Wald test shows that the result of difference between mean of each determinant of one cluster with the each determinant of other cluster is not coming out to be zero and the null hypothesis is rejected. It shows that the determinants in different stages are influencing differently on the trade credit. This result verifies the third hypothesis. The variations of short term bank debt and long term bank debt among the various clusters carries great importance. The short term bank debt in the early stage is having high negative as compared to the second and third stage. This is due to the substitution effect as explained earlier. This effect is high in the early stage. In the mature stage, the SMEs start looking for cheaper alternatives for raising funds like credit from banks. But in the later stage, it can be seen that the short term bank debt again increases and is more than mature stage. It is due to the reason that in this stage the SMEs are not in need of long term debt and are required to fulfill their stock for which they are dependent up on trade creditors.

In case of cash, the magnitude of cash is low in the beginning stage and is higher for maturity stage and much higher in the declining stage. It is due to the reason that the SMEs in the early

stage cannot have much liquidity. But with the passage of time, they become more liquid and their reliance on decreases in the later stages.

5. Conclusion

This paper aims to the examination of effect of business life cycle on the trade credit of SMEs in Himachal Pradesh. The topic is under studied and shows many controversial results as can be seen in the literature. This paper will show whether the various determinants of trade credit are different in the different stages of life cycle of business.

The results show that there is a negative relationship between the life cycle of firm and trade credit. The firms which are younger are credit constraint because of the problem of information asymmetry. So, these firms are more dependent on the trade credit. As the firms mature they start looking for alternative cheap sources of fund like bank credit and their dependence on bank credit reduces. It is also shown by the results that this trend does not remain for the whole life cycle of the firm. It is shown that in the later stages, the trade credit plays its role but the role is lesser as compared to the younger stages.

It is also observed that determinants of trade credit change in their degree of importance on the basis of their age cluster. It is also shown that trade credit is a very important source of financing for many SMEs in all stages of life cycle. So the managers should make good relationship with the trade creditors in the early stage of their life cycle.

This study also indicates to the policy makers that they should make policies related to trade creditors so that the SMEs may keep getting finance from trade creditors without restrictions in the whole life cycle.

There are two limitations in the study. The first limitation is that the business life cycle has been classified on the basis of age variable only. There are many other variables which can be classified on the basis of considering these factors also with the age variable. The second limitation is that this study is focused on only manufacturing sector. The other sectors like services sector possess many other features and there could be many other factors which can

affect them. So, other sectors can also be taken into study with new factors affecting their trade credit on the basis of their life cycle.

References

1. Annual report (2017-18), Ministry of Micro, Small and Medium Enterprises, Government of India, available at <https://msme.gov.in/sites/default/files/MSME-AR-2017-18-Eng.pdf>
2. MSME Development Act 2006, Ministry of Micro, Small and Medium Enterprises, Government of India
3. Bancilhon, C.; Karge, C.; Norton, T. Win-Win-Win: The Sustainable Supply Chain Finance Opportunity. Report BSR, Paris 2018. Available online: https://www.bsr.org/reports/BSR_The_Sustainable_Supply_Chain_Finance_Opportunity.pdf (accessed on 14 May 2015).
4. Berger, A.N.; Udell, G.F. The economics of small business finance: The roles of private equity and debt markets in the financial growth cycle. *J. Bank. Financ.* **1998**, *22*, 613–673.
5. La Rocca, M.; La Rocca, T.; Cariola, A. Capital structure decisions during a firm's life cycle. *Small Bus. Econ.* **2011**, *37*, 107–130.
6. Casey, E.; O'Toole, C.M. Bank lending constraints, trade credit and alternative financing during the financial crisis: Evidence from European SMEs. *J. Corp. Financ.* **2014**, *27*, 173–193.
7. Andrieu, G.; Staglianò, R.; Van der Zwan, P. Bank debt and trade credit for SMEs in Europe: Firm-, industry-, and country-level determinants. *Small Bus. Econ.* **2018**, *51*, 245–264.
8. Yazdanfar, D.; Öhman, P. Substitute or complement? The use of trade credit as a financing source among SMEs. *Manag. Res. Rev.* **2017**, *40*, 10–27.
9. Deloof, M.; La Rocca, M. Local financial development and the trade credit policy of Italian SMEs. *Small Bus. Econ.* **2015**, *44*, 905–924.
10. García-Teruel, P.J.; Martínez-Solano, P. Determinants of trade credit: A comparative study of European SMEs.
11. *Int. Small Bus. J.* **2010**, *28*, 215–233.

12. McGuinness, G.; Hogan, T.; Powell, R. European trade credit use and SME survival. *J. Corp. Financ.* **2018**, 49, 81–103.
13. Marotta, G. When Do Trade Credit Discounts Matter? Evidence from Italian Firm-Level Data. *Appl. Econ.* **2005**, 37, 403–416.
14. Van de Ven, A.H. Suggestions for studying strategy process: A research note. *Strateg. Manag. J.* **1992**, 13, 169–188.
15. Hall, G.; Hutchinson, P.; Michaelas, N. Determinants of the capital structures of European SMEs. *J. Bus. Financ. Account.* **2004**, 31, 711–728.
16. Rodríguez-Rodríguez, O.M. Trade credit in small and medium size firms: An application of the system estimator with panel data. *Small Bus. Econ.* **2006**, 27, 103–126.
17. Atanasova, C. Access to institutional finance and the use of trade credit. *Financ. Manag.* **2007**, 36, 49–67.
18. Petersen, A.; Rajan, G. Trade credit: Theories and Evidence. *Rev. Financ. Stud.* **1997**, 10, 669–691.
19. Atanasova, C. How do firms choose between intermediary and supplier finance? *Financ. Manag.* **2012**, 41, 207–228.
20. Huang, H.; Shi, X.; Zhang, S. Counter-cyclical substitution between trade credit and bank credit. *J. Bank. Financ.* 2011, 35, 1859–1878.
21. Yang, X. The role of trade credit in the recent subprime financial crisis. *J. Econ. Bus.* **2011**, 63, 517–529.
22. McGuinness, G.; Hogan, T. Bank credit and trade credit: Evidence from SMEs over the financial crisis. *Int. Small Bus. J.* **2014**.
23. Atanasova, C. How do firms choose between intermediary and supplier finance? *Financ. Manag.* **2012**, 41, 207–228.
24. Kestens, K.; Van Cauwenberge, P.; Bauwhede, H.V. Trade credit and company performance during the 2008 financial crisis. *Account. Financ.* **2012**, 52, 1125–1151.
25. Petersen, A.; Rajan, G. Trade credit: Theories and Evidence. *Rev. Financ. Stud.* **1997**, 10, 669–691.
26. Danielson, M.G.; Scott, J.A. Bank Loan Availability and Trade Credit Demand. *Financ. Rev.* **2004**, 39, 579–600.