Trade Credit and Bank Loan Around Financial Crisis:

Study on Emerging Markets

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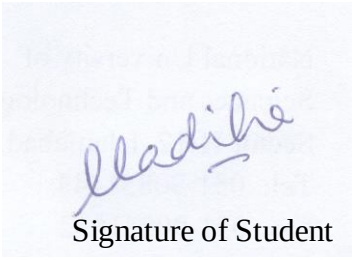
Declaration

I certify that this research work titled "*Trade Credit and Bank Loan Around Financial Crisis: Study on Emerging Markets"* is my own work. The work has not been presented elsewhere for assessment. The material that has been used from other sources it has been properly acknowledged / referred.



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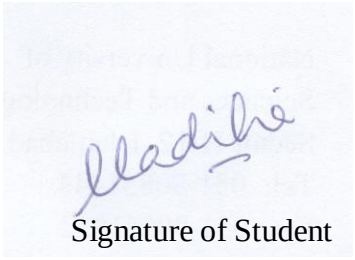

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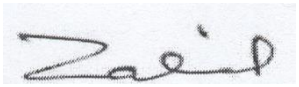

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To My Beloved Parents, Husband, Daughter and Nephew

Abstract

This study investigates the relationship between bank loan and trade credit from both demand and supply side. The study uses firm-level data of 19,065 non-financial firms from 25 emerging economies divided into three regions of the world vis-à-vis Americas, Europe, Middle East & Africa (EMEA) and Asia. Moreover, we divide the entire data set into two equal halves based on firms' size—large and small. Our analysis suggests a significant complementary relationship between the two modes of financing for all firms. However, for large firms, bank loan shows a complementary relationship with trade credit receivable while substitution relationship with trade credit payable around financial crisis. Moreover, for firms in EMEA region, bank loan shows a complementary relationship with trade credit payable while substitution relationship with trade credit receivable. Using year dummies shows an overall decrease in use of trade credit during financial crisis. However, firms in Americas and EMEA tend to increase the demand while decrease the extension of trade credit.

JEL Classification: G21, G32

Keywords: Trade Credit, Bank Loans, Emerging Markets, Financial Crisis

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CHAPTER 1: INTRODUCTION

1.1 Introduction

This study investigates the relationship between trade credit (TC) and bank loan (BL) around the time of global financial crisis (FC). TC refers to credit extended by a supplier to its customers. It is normally determined by accounts receivable and accounts payable. Accounts receivable or TC receivable refers to the outstanding claims a supplier has over his customers at any point of time and thus denotes the supply of TC. Accounts payable or TC payable refers to the outstanding amount a customer has to pay to its supplier, hence denotes the demand for TC. BL represents the amount of loan firms have taken from banks.

The global FC 2008-09 provides an opportunity to study the importance and behaviour of informal financing channels especially TC when there was a contraction in BLs. In times of financial crises, banks and even the high credit rated firms tend to credit ration while the firms are in a need of liquidity. As emerging markets are fragile for being in an actively developing phase, these are expected to be affected the most by such crisis. Moreover, in such economies firms would have much reliance on informal financing channels as formal financing is not sufficient. Hence, considering emerging economies to be a better platform for this study, 25 countries divided into three regions i.e. Americas, Europe, Middle East & Africa (EMEA) and Asia have been taken to study the relationship around the time of FC.

In times of crisis, as the monetary conditions tighten, banks credit ration and do prudent lending to reduce the risk of default. In such circumstances, firms that lose the access to institutional financing become financially constrained. Furthermore, with tightening of monetary policy interest rates become higher. This affects the collateral value of firms due to which their net worth

decreases. It decreases firms' creditworthiness and hence, ability to take more loan. Resultantly, firms become financially constrained and have to reduce their investments. In such scenario, credit constrained firms turn towards their suppliers for credit facility. Suppliers have an informational edge over banks about buyers, which the former use to provide liquidity. Consequently, it signals good credit quality of buyer to banks, so the financially constrained firms succeed in fetching credit facility from banks as well at the same time. Hence, TC is used by banks as a signal for credit quality of a buyer.

Theoretically, there are various reasons as to why firms lend even at the time of crisis. While it is expensive for a buyer to get a new supplier and forego the previous one, it is shown that losing a buyer is similarly costly for a supplier (Cuñat, 2007; Itzkowitz, 2013) since losing a customer means lost revenue for the supplier. Secondly, a buyer being lost due to bankruptcy has been shown to adversely affect supplier's total cost of bank lending (Houston et al., 2016) and thus performance of stock (Hertzel et al., 2008), which affects the profitability of firms leading to changes in competition among firms (Yang et al. 2015). Wilner (2000) shows that suppliers provide back up to their customers in the times of financial distress to develop a long-term trade relationship. Petersen and Rajan (1997) also suggest that firms provide credit to their customers when they start losing sales and cash flows. This is why, suppliers insure their buyers during adverse shocks (Cuñat, 2007; Itzkowitz, 2013). Some studies like Petersen and Rajan (1997) suggest that suppliers which are more creditworthy and have easy access to capital markets are more likely to act as insurers. It means that a better access to formal financing leads to increased supply of TC to the customers.

Specifically, this paper analyzes the data from 25 emerging economies to determine the effects of FC 2008-09 on firms' choice between TC and BL. This paper further attempts to study the aforementioned behavior of firms based on their sizes and regions. It also studies the changes in magnitude of TC receivable and payable during and around FC. Our sample consists of all non-financial firms from all the emerging countries. We use firm-fixed effects with indicator variables to control for unobserved heterogeneity among firms and over years. Indicator variables for each year give the magnitude of change in TC in that year. Furthermore, we take short term debt as the proxy for BL to study the vulnerability of firms to FC as the interest rates increase and rolling over of short term debt is difficult (Love et. al, 2007).

Overall, we find that firms rely on both TC and BL. As the BL increases, TC provided and received also increases; reason being the firms are in a need of liquidity and they obtain it from every possible source. On the contrary, when large firms get more BL, they extend more TC to their customers while demand less from their suppliers because loan from suppliers is costlier than BL as discussed in the next section. However, firms in EMEA when borrow more from their suppliers succeed in borrowing more from banks while they extend less credit to their customers. During crisis, all firms decrease the demand and supply of TC except Americas and EMEA. These two regions are the most affected by the banking crisis and liquidity crunch, that is why they increase the demand of credit from suppliers when there is acute shortage of liquidity during financial stress. Our findings contradict with previous studies which suggest that BL and TC are substitutes during FC (like Petersen and Rajan, 1997; Nilsen, 2002; Fisman and Love, 2003) but are consistent with many other studies like Love et al. (2007); Biais and Gollier (1997), Cook (1999), Wilner (2000), Ono (2001), Demirgüç-Kunt and Maksimovic (2001), Alphonse et al. (2006), Giannetti et al. (2011), Du, Lu, and Tao (2012), Tsuruta, D. (2014)

1.2 Scope and Contribution of the Study

Though there is ample literature available on the topic, but the existing empirical findings on the relationship between TC and BL are inconclusive. Most of the researchers have worked on SMEs and have not taken into account different firm sizes. while this study considers all the non-financial firms along with a comparative analysis of large and small firms. Moreover, previous studies have taken into account only one or a few economies simultaneously. There is no such comprehensive study which takes into account all the emerging markets at the same time. Moreover, this study examines the relationship of BL with both the supply and demand sides of TC around the time of global FC 2008-2009. Furthermore, there is no previous research which includes comparison of different regions of emerging markets while this study takes into account 25 emerging economies divided into three regions i.e. Americas, EMEA and Asia.

1.3 Research Objectives

- To check if there exists a complementary relationship between TC and BL around financial crisis 2008-09.
- To test whether small firms show complementary relationship while large firms show complementary relationship between BL and TC receivable and substitution relationship between BL and TC payable.
- To check the behavior of trade credit and bank loan in different emerging markets based on regions.

1.4 Structure of the Thesis

The research work in this dissertation has been presented in five chapters. First chapter is related

to the introduction of the study. The objective of this part is to give detailed background of the topic, scope and objective. The second chapter contains review of the past literature available on the topic. Third chapter describes data and methodology in detail. Fourth chapter gives the analysis and discusses results. Research is concluded in the fifth or last chapter of dissertation.

CHAPTER 2: LITERATURE REVIEW

This chapter gives the detailed review of literature and research done on the topic.

2.1 Substitution Theories

A part of literature shows that TC and BL substitute each other during FC. For instance, Nilsen (2002), Atanasova and Wilson (2004), Choi and Kim (2005), Mateut, Bougheas, and Mizen (2006) study this relationship with regard to financial shocks and find that small firms prefer TC on BL in the times of monetary contractions. Love, Preve and Sarria-Allende (2007) show that firms with greater short-term debt tend to supply more TC to their buyers before crisis, but they decrease the amount of TC offered to their buyers and increase their reliance on credit from their suppliers after the crisis. Miwa and Ramseyer (2008) show that as the suppliers are more familiar with the industry, they have information edge over banks. Hence, if the cost of TC is not high as in the times of easy access to BLs then firms tend to acquire additional TC because its acquisition is relatively quicker.

Coulibaly, Sapriza and Slate (2013) study the role of credit contraction in the recent subprime FC in six emerging economies of Asia and show that firms that are financially more vulnerable tend to divert to TC from suppliers in addition to other financing sources when credit conditions worsen. Choi and Kim (2005) find that both accounts receivable and accounts payable increase with tightening of monetary policy implying that increased use and supply of TC provides a cushion against credit contraction. Hence, during FC TC may become a more important source of financing for firms and its use may increase. Coulibaly, Sapriza, and Zlate (2013) suggest that firms will use more TC than BLs when economy is performing poorly.

There are studies which assert that cost of TC can be very high, sometimes reaching up to 40% per annum so firms use TC only when BLs become unavailable (Smith, 1987; Petersen & Rajan, 1994). Wilner (2000) and Cuna`t (2007) argue that due to high cost of TC, firms use TC only as a last option in the times of financial distress and liquidity contraction.

In a study Allen et al. (2012) found that Indian SMEs majorly depend on internal and informal sources of financing due to difficulties in access to formal channels of financing. Using primary data, Baker et al. (2017) found that Indian SMEs use informal financing channels more often than formal channels and rely on TC from friends, family and money lenders followed by funds from banks and government. They also found that as the Indian firms need liquidity on daily basis, they prefer short term financing over long term financing.

Corsten et al. (2017) in their study on French firms show that in times of unavailability of external financing like BLs, equity and debt, financially unconstrained suppliers having access to external financing channels may act as liquidity insurers. They further show that firms with financially unconstrained suppliers hold 10% less cash than others during crisis and normal times.

2.2 Complementarity Theories

On the contrary, another part of literature shows that TC and BLs are complements and not substitutes. Demirguc-Kunt and Maksimovic (2001) use manufacturing firms' data from 39 countries and show that TC and bank credit complement each other. Biais and Gollier (1997) suggest that the use of TC signals favourable information to other credit sources and thus it increases their willingness to provide loan. Cook (1999) shows a complementary relationship between TC and BL through their study on Russian data set during extreme financial unrest. Ono (2001) also provides evidence on existence of complementary relationship between the two in

Japan. Giannetti et al. (2011) support the above study by empirically showing that firms that use more TC tend to borrow more from banks and have short-term relationship with those banks. Moreover, these firms succeed in obtaining credit lines at low fees and better terms. This shows that there is a complementary relationship between TC and BL. Alphonse et al. (2006) also proves complementary hypotheses by analysing datasets from US companies. Wilner (2000) argues that TC is insecure loan while BL is secure loan and TCors often suffer great losses due to bad debts. If the availability of BL improves, there is a less chance of postponement of repayment of trade loan, so there is a complementary relationship between the two. Cook (1999) shows in her study on Russian firms that TC works as a positive signal to banks and credit markets for small firms. It helps the intermediaries by removing information asymmetry.

Similarly, some studies like Marotta (2005); Miwa and Ramseyer (2008); Uesugi et al. (2009) show that it is not necessary that cost of TC is always higher than that of loans from banks. Rather, it is shown that suppliers have information advantage over banks, hence, availability of TC also acts as a determinant of lending behavior of banks (Biais & Gollier, 1997; Jain, 2001; Aktas et al., 2012). Atanasova (2012) has empirically supported the signalling role of TC and shown that TC has a positive effect on BL for firms having high agency costs.

In the times of financial crises, banks may reduce or sometimes fail to provide liquidity. In a study Acharya and Mora (2015) show that US banks failed to provide liquidity to firms during FC until Government stepped in and backed the banking industry in 2008. Puri et al. (2011) show that banks in Germany rejected more loan applications during FC than the time before it. This study was significantly strong for smaller financially constrained firms as compared to larger firms. So, the firms which had more reliance on BLs got more affected during the crisis. On the contrary, Boissay

and Gropp (2013) and Garcia-Appendini and Montoriol-Garriga (2013) show that suppliers willingly provide necessary liquidity insurance to their buyers in the time of need.

In relation to the above, there are studies which show the existence of causal relationship between TC and BL. For example, Yang (2011) studies this relationship during sub-prime FC and finds that both are simultaneously determined and have a complementary/substitution effect. He also shows that financially constrained firms decrease the supply of TC to their customers and increase their reliance on credit from suppliers. Similarly, Lin and Chou (2015) study the relationship between TC and BL during FC 2008-2009 in China and find that with a decrease in BLs, there is a decrease in TC receivable which means that financially vulnerable firms reduce the supply of TC to their customers when BL crunches. Furthermore, they also find that with a decrease in BLs there is an increase in demand for TC which shows that a greater financial crunch causes the firms to turn to their suppliers for credit. In another study on sample firms of Turkey, Brazil and Argentina, Bastos and Pindado (2013) found substitution relationship between BL and TC supply in short run during a FC. In long run, firms' liquidity position tightens and they become unable to extend credit to their financially constrained customers. Du, Lu, and Tao (2012) suggest that TC cannot substitute BLs completely and informal financing cannot effectively fulfil the financing needs of fast-growing private firms. Similarly, substituting buyers and suppliers is costly for firms, they tend to provide TC in order to retain their financially constrained customers. Consequently, it signals good credit quality of buyer to banks, so the financially constrained firms succeed in fetching credit facility from banks as well at the same time. Hence, TC is used by banks as a signal for credit quality of a buyer.

Hypothesis 1(a): *There exists a complementary relationship between TC and BL.*

Hypothesis 1(b): *Small firms show complementary relationship while large firms show complementary relationship between BL and TC receivable and substitution relationship between BL and TC payable.*

CHAPTER 3: DATA AND RESEARCH METHODOLOGY

3.1 Data

For this study, yearly data of 25 emerging markets for the period 2001 to 2017 has been taken from Thomson Reuters Data Stream. Though various lists of emerging markets are prepared by different organizations but more or less the countries remain the same in all lists. For this study, the list of emerging markets is taken as per MSCI market classification and includes Argentina, Bangladesh, Brazil, Chile, China, Colombia, Pakistan, Poland, Czech Republic, Greece, India, Russia, Indonesia, Malaysia, Morocco, Mexico, Philippines, Peru, Portugal, South Africa, South Korea, Sri Lanka, Taiwan, Thailand and Turkey. The classification divides the emerging countries into three regions; the Americas, EMEA and lastly, Asia. Argentina, Brazil, Chile, Colombia, Mexico and Peru fall into the Americas. Czech Republic, Greece, Morocco, Russia, South Africa, Turkey, Poland and Portugal fall into EMEA. Bangladesh, China, India, Indonesia, Pakistan, Thailand, Taiwan, South Korea, Philippines, Malaysia and Sri Lanka fall into Asia.

After finalizing the list of markets, lists of firms in each market were extracted from Data Stream. The data collected from Data Stream needs cleaning as it contains errors (Ince and Porter, 2006) so the lists were cleaned first. Dead firms have been retained to avoid survivor and selection bias. For that matter, every available firm data has been retained regardless of the existence of the firm. Duplicate and financial firms have been removed. Lastly, after complete data collection, all the variables are winsorized at 1st and 99th percentile to remove outliers.

As in this study, three hypotheses are being tested; for the first hypothesis, complete dataset of 19,065 firms is taken. For the second hypothesis, the dataset is divided into two equal halves based on firm size. Larger 50% firms are regarded as large firms while smaller 50% as small firms. For

the third estimation, dataset is divided into three regions based on MSCI market classification vis-à-vis America; EMEA; and Asia.

3.2 Methodology

Panel data approach is used in this research to study the relationship between TC and bank credit. Initially, Hausman Test is applied to the data to check for suitability of Fixed Effects or Random Effects Model. Test Results very strongly suggest Fixed Effects Model which is consistent with the previous researches like Love, Preve and Sarria-Allende (2007) and Lin and Chou (2015). Hence, firm-fixed effects model with year dummies (i.e. dummies for Pre-crisis, crisis and post crisis years) is used to capture the unobserved heterogeneity in the firm-specific time-invariant levels of TC. To control for time, we have used years as binary variables in the model (discussed later in the section). This approach allows us to get pure effect of independent variables on dependent variables along with studying the relationship around the time of crisis. Love, Preve and Sarria-Allende (2007) and Lin and Chou (2015) used the same techniques.

Models are specified as:

$$TcRec_{it} = \alpha_0 + \beta_1 \text{BkLoan}_{it} + \beta_2 \text{Pre7} + \beta_3 \text{Pre6} + \beta_4 \text{Pre5} + \beta_5 \text{Pre4} + \beta_6 \text{Pre3} + \beta_7 \text{Pre2} + \beta_8 \text{Pre1} + \beta_9 \text{Crisis} + \beta_{10} \text{Post1} + \beta_{11} \text{Post2} + \beta_{12} \text{Post3} + \beta_{13} \text{Post4} + \beta_{14} \text{Post5} + \beta_{15} \text{Post6} + \beta_{16} \text{Post7} + \beta_{17} \text{Post8} + x_{it} + \varepsilon_{it} \quad \text{.....1.1}$$

$$TcPay_{it} = \alpha_0 + \beta_1 \text{BkLoan}_{it} + \beta_2 \text{Pre7} + \beta_3 \text{Pre6} + \beta_4 \text{Pre5} + \beta_5 \text{Pre4} + \beta_6 \text{Pre3} + \beta_7 \text{Pre2} + \beta_8 \text{Pre1} + \beta_9 \text{Crisis} + \beta_{10} \text{Post1} + \beta_{11} \text{Post2} + \beta_{12} \text{Post3} + \beta_{13} \text{Post4} + \beta_{14} \text{Post5} + \beta_{15} \text{Post6} + \beta_{16} \text{Post7} + \beta_{17} \text{Post8} + x_{it} + \varepsilon_{it} \quad \text{.....1.2}$$

$$TcNet_{it} = \alpha_0 + \beta_1 \text{BkLoan}_{it} + \beta_2 \text{Pre7} + \beta_3 \text{Pre6} + \beta_4 \text{Pre5} + \beta_5 \text{Pre4} + \beta_6 \text{Pre3} + \beta_7 \text{Pre2} + \beta_8 \text{Pre1} + \beta_9 \text{Crisis} + \beta_{10} \text{Post1} + \beta_{11} \text{Post2} + \beta_{12} \text{Post3} + \beta_{13} \text{Post4} + \beta_{14} \text{Post5} + \beta_{15} \text{Post6} + \beta_{16} \text{Post7} + \beta_{17} \text{Post8} + x_{it} + \varepsilon_{it} \quad \ldots\ldots 1.3$$

Equation 1.1 studies the relationship from supply side i.e. relationship between TC receivable and BL while Equation 1.2 studies the demand side of TC i.e. relationship between TC payable and BL before, during and after FC. Equation 1.3 takes into account the net position of the firm as a net supplier or user of TC. Normally, trade receivable will be more than trade payable for most of the firms. All the dependent and independent variables are enlisted and described in Table 1.

Table 1 List of Variables

Variable	Description
Dependent Variables	
$TcRec_{it}$	Accounts receivable divided by total assets for firm i at time t.
$TcPay_{it}$	Accounts payable divided by total asset for firm i at time t.
$TcNet_{it}$	Net TC. Accounts receivable less accounts payable divided by total assets.
Independent Variables	
$BkLoan_{it}$	Short term debt divided by total assets for firm i at time t.
Pre1, Pre2,…, Pre7	Set as 1 for each of the seven years before the crisis i.e. 2001, 2002,…,2007 respectively; and 0 otherwise
Crisis	Set as 1 in the year of FC i.e. 2008; and zero otherwise
Post1, Post2,… Post8	Set as 1 for each of the nine post-crisis years i.e. 2009, 2010,…,2017 respectively; and zero otherwise.
X_{it}	SIZE (measured as natural logarithm of total assets),
	SALES (scaled by total assets),
	CGS i.e. cost of goods sold (scaled by total assets),
	OP. CASHFLOW (operating cash flow divided by total assets) to measure liquidity class
	INVENTORY (inventory divided by total assets) to measure non-liquidity class;
	D/E Ratio (Long term debt divided by total equity) to measure leverage.
α_0	Firm-fixed effects
ε	Error term
β_1	Coefficient of BL. Shows the relationship between TC and BL.
$\beta_2, \beta_3, \ldots, \beta_{17}$	Coefficients. Show the reaction of TC to BL during the three periods i.e., the pre-crisis, crisis and post-crisis.

Note This table contains the list of dependent and independent variables and their description.

CHAPTER 4: EMPIRICAL FINDINGS AND DISCUSSION

4.1 Descriptive Statistics

Table 2 below shows the summary statistics i.e. mean, standard deviation, minimum and maximum of the entire data which includes 19,065 firms from 25 emerging economies. It can be seen that the mean of TC receivables is greater than the mean of TC payables which means on average firms tend to lend more than they borrow. It also implies their willingness to extend credit to their customers. Hence, mean of net TC is a non-negative value. Moreover, size has the largest standard deviation among the independent variables showing that there are large variations in the size of the firms as the data contains both large and small firms.

Table 2 Summary Statistics of Dependent and Independent Variables

(All Firms)					
Variable	**N**	**Mean**	**SD**	**Min**	**Max**
TcRec	161,403	0.192	0.16	0.000	0.783
TcPay	159,378	0.099	0.105	0.000	0.534
TcNet	158,395	0.05	0.203	-0.610	0.652
BkLoan	158,931	0.141	0.152	0.000	0.756
CGS	159,850	0.588	0.579	0.000	3.187
Op. Cash flow	158,980	0.051	0.113	-0.353	0.426
Inventory	160,617	0.108	0.126	0.000	0.568
Size	162,080	11.924	2.084	0.000	20.986
Sales	161,942	0.83	0.672	0.000	3.788
Debt-to-Equity	163,023	0.352	0.801	-1.245	5.232

Note: This table contains the summary statistics of all the variables for entire dataset. It contains total number of observations (N), mean, standard deviation (SD), minimum value (Min) and maximum value (Max) of dependent variables TC Receivable (TcRec), TC Payable (TcPay), Net TC (TcNet) and independent variables BL (BkLoan), Cost of Goods Sold (CGS), Op. Cashflow (Op. Cashflow), inventory, size, sales, Debt-to-Equity.

Table 3 below presents the summary statistics of two groups of firms based on their sizes. Noticeably, mean of all three TC ratios for small firms is greater than that of large firms. On the

contrary, BL ratio for large firms is greater. It implies that larger firms have better access to BLs so they borrow more from banks while small firms rely more on credit from their suppliers and extend credit to their customers.

Table 3 Summary Statistics for two groups of firms based on size

	Large Firms					Small Firms				
Variable	**N**	**Mean**	**SD**	**Min**	**Max**	**N**	**Mean**	**SD**	**Min**	**Max**
TcRec	80,663	0.16	0.14	0	0.783	80,740	0.225	0.171	0	0.783
TcPay	80,186	0.092	0.097	0	0.534	79,192	0.106	0.112	0	0.534
TcNet	80,000	0.018	0.18	-0.61	0.652	78,395	0.083	0.22	-0.61	0.652
BkLoan	80,338	0.142	0.141	0	0.756	78,593	0.14	0.162	0	0.756
CGS	80,061	0.562	0.556	0	3.187	79,789	0.613	0.601	0	3.187
Op. Cashflow	79,654	0.06	0.094	-0.353	0.426	79,326	0.043	0.128	-0.353	0.426
Inventory	80,341	0.099	0.115	0	0.568	80,276	0.117	0.135	0	0.568
Size	81,035	13.492	1.474	11.484	20.986	81,045	10.358	1.266	0	12.132
Sales	81,007	0.753	0.615	0	3.788	80,935	0.907	0.716	0	3.788
Debt-to-Equity	85,538	0.44	0.85	-1.245	5.232	87,292	0.245	0.703	-1.245	5.232

Note This table contains the summary statistics of all the variables for two groups of variables based on their sizes; large firms and small firms.

Table 4 below presents summary statistics of firms in above mentioned three regions of the world. Firms in Americas are the largest while firms in Asia are the smallest. It can be noticed that means of all the three TC ratios for EMEA are greater than the other two regions while, the mean of BL is greatest in Asia. The reason may be high level financial integration of EMEA region with US which caused a more severe monetary tightening in this region as compared to Asia during FC 2008-09. The crisis though started in US but it spread in EMEA region quickly due to financial fragility and vulnerability of this region. It can also be noticed in the table that means of TC and BL are smallest for Americas. Here opens an avenue for future research which can study the source of financing that is mostly used in Americas if not TC and BL.

Table 4 Summary Statistics for firms based on three regions

	Americas					Europe, Middle East & Africa					Asia				
Variables	**N**	**Mean**	**SD**	**Min**	**Max**	**N**	**Mean**	**SD**	**Min**	**Max**	**N**	**Mean**	**SD**	**Min**	**Max**
TcRec	12,080	0.146	0.138	0	0.783	22,943	0.215	0.182	0	0.783	126,380	0.193	0.157	0	0.783
TcPay	11,635	0.074	0.089	0	0.534	22,710	0.122	0.132	0	0.534	125,033	0.098	0.1	0	0.534
TcNet	11,722	0.048	0.175	-0.61	0.652	22,707	0.095	0.212	-0.61	0.652	123,966	0.042	0.203	-0.61	0.652
BkLoan	11,922	0.098	0.132	0	0.756	22,760	0.119	0.148	0	0.756	124,249	0.149	0.153	0	0.756
CGS	11,505	0.46	0.496	0	3.187	22,828	0.696	0.736	0	3.187	125,517	0.579	0.55	0	3.187
Op. Cashflow	11,045	0.084	0.137	-0.353	0.426	22,122	0.045	0.122	-0.353	0.426	125,813	0.05	0.108	-0.353	0.426
Inventory	11,880	0.093	0.113	0	0.568	22,890	0.114	0.129	0	0.568	125,847	0.109	0.127	0	0.568
Size	12,304	12.789	2.262	0.693	20.292	23,003	12.021	2.502	0	20.986	126,773	11.823	1.959	0	20.629
Sales	12,238	0.684	0.598	0	3.788	22,988	0.97	0.858	0	3.788	126,716	0.819	0.635	0	3.788
Debt-to-Equity	11,898	0.49	0.882	-1.245	5.232	22,911	0.398	0.892	-1.245	5.232	128,214	0.331	0.773	-1.245	5.232

Note This table contains the summary statistics of all the variables for three groups of firms divided on the basis of region.

4.2 Results for Total Sample

Table 5 presents the regression results of our study. Firm-fixed effects model is used to study the relationship between TC and BL along with controlling for time-invariant effects using time dummies for each year before, during and after crisis. Results show a significantly positive relationship between TC and BL. As the BL increases, suppliers increase the extension of TC and customers increase the demand for TC. So there is a complementary relationship between TC and BL. Our results are consistent with previous studies including Biais and Gollier (1997), Cook (1999), Wilner (2000), Ono (2001), Demirgüç-Kunt and Maksimovic (2001), Alphonse et al. (2006), Giannetti et al. (2011), Du, Lu, and Tao (2012), Tsuruta, D. (2014). The first portion of results i.e. positive relationship between accounts receivable and BL is consistent with Yang (2011) and Lin and Chou (2015) as well.

The behaviour of firms with respect to extension of TC i.e. receivable can be determined by comparison of coefficients of pre-crisis dummies with the crisis and post-crisis dummies[1]. It can be seen that the coefficient value decreased from 0.010 in pre-crisis 7 to -0.0002 during crisis. After crisis in year post crisis 8 it increased to 0.003. This shows that firms decrease the supply of accounts receivable during FC as compared to pre-crisis and then increase the supply after crisis in a conservative manner. For accounts payable, the coefficient value decreased from -0.013 in pre-crisis 7 to -0.010 during crisis. After crisis it again increased to 0.001 in year post-crisis 8. This shows that firms decrease the demand of TC during FC and increase afterwards. For net TC, coefficients show a similar pattern as that of TC receivables. It decreased to 0.00006 during crisis from 0.010 in pre-crisis 7 and increased to 0.002 in year post-crisis 8.

[1] We have also used interaction terms of year dummies*Bank loan to determine the relationship of bank loan with trade credit before, during and after crisis for which results can be provided on request.

Table 5 Panel Data Regressions Results for TC (All Firms)

	All Firms		
Variables	**TcRec**	**TcPay**	**TcNet**
BkLoan	0.019***	0.008***	-0.980***
	-8.44	-5.44	(-449.54)
CGS	0.002	0.051***	0.001
	-1.29	-46.69	-0.6
Debt-to-Equity	-0.005***	-0.001***	-0.005***
	(-14.30)	(-4.71)	(-13.38)
Sales	0.072***	0.010***	0.071***
	-54.72	-10.85	-55.19
Inventory	-0.158***	0.079***	-0.146***
	(-38.19)	-27.24	(-35.98)
Op. Cashflow	-0.122***	0.021***	-0.120***
	(-48.66)	-11.78	(-48.88)
pre_crisis7	0.010***	-0.013***	0.010***
	-6.37	(-12.19)	-6.4
pre_crisis6	0.009***	-0.008***	0.009***
	-6.05	(-8.08)	-6.45
pre_crisis5	0.010***	-0.005***	0.011***
	-7.28	(-5.25)	-7.59
pre_crisis4	0.008***	-0.005***	0.009***
	-5.92	(-5.03)	-6.22
pre_crisis3	0.011***	-0.003***	0.011***
	-8.3	(-3.37)	-8.63
pre_crisis2	0.010***	-0.005***	0.010***
	-7.61	(-5.69)	-8.19
pre_crisis1	0.007***	-0.005***	0.008***
	-5.81	(-5.17)	-6.29
Crisis	-0.022♦	-0.010***	0.006♦
	(-0.04)	(-11.34)	-0.2
post_crisis1	0.002*	-0.005***	0.002**
	-1.81	(-6.49)	-2.04
post_crisis2	0.001	-0.004***	0.001
	-0.44	(-4.79)	-0.86
post_crisis3	0.002	-0.004***	0.001
	-1.36	(-4.54)	-1.21
post_crisis4	-0.002**	-0.006***	-0.002*

♦ Value has been multiplied by 100 for being too small.

	(-2.04)	(-7.97)	(-1.79)
post_crisis5	0.002**	-0.004***	0.002*
	-2.01	(-4.65)	-1.83
post_crisis6	0.003***	-0.003***	0.003**
	-2.79	(-3.43)	-2.48
post_crisis7	0.002**	-0.001*	0.002
	-2.02	(-1.83)	-1.54
post_crisis8	0.003**	0.001	0.002**
	-2.31	-0.73	-2.07
Constant	0.150***	0.056***	0.149***
	-133.27	-71.18	-135.41
Observations	146,050	144,963	146,050
F-statistic	-0.004	0.007	0.583

Note This table contains the regression results of entire dataset. Pre_crisis7 to Pre_crisis1 represent year 2001 to year 2007 respectively while post_crisis 1 to post_crisis 8 represent year 2009 to year 2017 respectively and are binary variables. All other variables have been explained in the previous sections. t-statistics are in parentheses, *** is $p<0.01$, ** is $p<0.05$, * is $p<0.1$

Our results show that overall TC receivable and payable depend on monetary contraction and expansion. During periods of monetary contraction or FC, firms reduce the supply and demand of TC, thus showing a complementary relationship with BLs.

As for independent variables, there is a significantly negative relationship between TC receivables and all the independent variables except cost of goods sold and sales. These two have a significantly positive relationship with trade receivables. Independent variables show a significantly positive relationship with TC payables except debt-to-equity ratio. Debt-to-equity ratio shows a significantly negative relationship with trade payables.

4.3 Results for Small and Large Firms

For the purpose of study, the data were divided into two categories with respect to their size, vis-a'-vis, the larger 50 percent firms and the smaller 50 percent firms. Table 6 shows regression results for the two categories. It can be seen that there is a significantly positive relationship

between TC receivable of large firms and BL. This shows that in large firms there is a complementary relationship between the two types of loans under study. The more they obtain loan from banks, the more they allow credit to their trade customers. But results for TC payable are different from our previously reported results. There is a significantly negative relationship between trade payables and BL. On the contrary to TC receivables, as they obtain more loan from banks, they decrease their reliance on credit from their suppliers. It might be due to unrestricted access to finance from banks and the higher costs of TC that there is a substitution relationship between trade payables and BL in larger firms.

Table 6 Panel Data Regressions Results for TC (Large vs Small Firms)

	Panel A: Large Firms			Panel B: Small Firms		
Variables	TcRec	TcPay	TcNet	TcRec	TcPay	TcNet
BkLoan	0.027***	-0.016***	-0.960***	0.008**	0.016***	-0.997***
	-9.48	(-8.25)	(-339.19)	-2.41	-6.61	(-302.61)
CGS	-0.005*	0.055***	-0.005*	0.002	0.046***	0.032♦
	(-1.83)	-28.04	(-1.77)	-1.06	-31.63	-0.2
Debt-to-Equity	-0.002***	-0.001***	-0.003***	-0.008***	-0.001	-0.007***
	(-6.27)	(-5.28)	(-6.52)	(-12.58)	(-1.45)	(-11.50)
Sales	0.075***	0.003	0.074***	0.068***	0.011***	0.067***
	-29.59	-1.42	-29.24	-40.25	-9.28	-41.11
Inventory	-0.165***	0.113***	-0.166***	-0.162***	0.067***	-0.142***
	(-29.24)	-28.64	(-29.42)	(-26.41)	-15.38	(-23.97)
Op. Cashflow	-0.108***	0.025***	-0.106***	-0.129***	0.020***	-0.126***
	(-30.76)	-10.19	(-30.15)	(-36.22)	-8.05	(-36.79)
pre_crisis7	0.004**	-0.010***	0.004**	0.017***	-0.017***	0.017***
	-2.4	(-8.34)	-2.44	-6.25	(-9.12)	-6.43
pre_crisis6	0.002	-0.006***	0.001	0.018***	-0.011***	0.019***
	-1.11	(-5.28)	-0.93	-7.13	(-6.08)	-7.87
pre_crisis5	0.001	-0.006***	0.001	0.020***	-0.005***	0.021***
	-0.81	(-5.51)	-0.61	-8.35	(-3.04)	-8.99
pre_crisis4	0.021 Error! Bookmark not defined.	-0.006***	0.009♦	0.016***	-0.005***	0.017***
	-0.27	(-5.40)	-0.18	-6.94	(-3.04)	-7.47
pre_crisis3	0.002	-0.004***	0.002	0.019***	-0.002	0.020***

♦ Value has been multiplied by 100 for being too small.

	-1.23	(-4.27)	-1.25	-8.83	(-1.50)	-9.37
pre_crisis2	0.004***	-0.004***	0.003**	0.015***	-0.005***	0.016***
	-2.59	(-4.55)	-2.47	-7.26	(-3.39)	-8.1
pre_crisis1	0.003**	-0.005***	0.003*	0.011***	-0.004***	0.012***
	-2.05	(-5.01)	-1.94	-5.53	(-2.78)	-6.24
Crisis	-0.005***	-0.009***	-0.005***	0.006***	-0.010***	0.007***
	(-3.80)	(-9.95)	(-4.12)	-2.84	(-6.81)	-3.3
post_crisis1	-0.002	-0.004***	-0.002*	0.006***	-0.007***	0.006***
	(-1.40)	(-4.94)	(-1.67)	-2.87	(-4.93)	-3.3
post_crisis2	-0.003**	-0.004***	-0.003**	0.004**	-0.004***	0.005***
	(-2.43)	(-4.17)	(-2.55)	-2.1	(-3.15)	-2.73
post_crisis3	-0.028♦	-0.003***	-0.001	0.004**	-0.004***	0.004**
	(-0.14)	(-3.12)	(-0.38)	-2.02	(-2.93)	-1.99
post_crisis4	-0.045♦	-0.005***	-0.001	-0.004**	-0.008***	-0.004*
	(-0.35)	(-5.32)	(-0.42)	(-2.25)	(-5.89)	(-1.91)
post_crisis5	0.002	-0.002***	0.002	0.003	-0.005***	0.002
	-1.6	(-2.75)	-1.43	-1.39	(-3.57)	-1.26
post_crisis6	0.002*	-0.002*	0.002*	0.004**	-0.004***	0.004**
	-1.93	(-1.94)	-1.79	-2.3	(-2.77)	-2.05
post_crisis7	0.002**	-0.002***	0.002*	0.002	-0.037♦	0.001
	-2.03	(-2.79)	-1.89	-1.3	(-0.31)	-0.79
post_crisis8	0.004***	-0.008♦	0.004***	0.002	0.001	0.002
	-2.89	-0.01	-2.92	-1.1	-0.76	-0.84
Constant	0.127***	0.055***	0.126***	0.177***	0.062***	0.175***
	-95.26	-58.81	-94.33	-97.03	-48.45	-99.55
Observations	72,830	72,483	72,830	73,220	72,480	73,220
F-statistic	-0.0376	-0.00141	0.614	-0.0441	-0.0517	0.55

Note This table contains the regression results with firms divided into two categories based on their sizes; large firms and small firms.

Behaviour of large firms with respect to extension of TC before, during and after crisis is evident from the decrease in coefficient of pre-crisis 7 from 0.004 to -0.005 during crisis. The firms restored to 0.004 in post-crisis 8. With regard to demand of TC, it can be seen that the coefficient remained almost same during and before crisis in pre-crisis 7, while in post-crisis 8 it increased to -0.00008. However, the trend shows that firms initially increased the demand of TC but in crisis

♦ Value has been multiplied by 100 for being too small.

year they reduced the demand. Net TC endorses the previous results as the coefficient value reduces from 0.004 in pre-crisis 7 to -0.005 during crisis and increases back to original level of 0.004 in post crisis-8. This shows that large firms decrease the supply as well as demand for TC during FC and increase it afterwards.

Panel B of table 5 shows results for small firms. It can be seen that there is a positive relationship between TC and BL which means complementary relationship exists between the two. As it has already been discussed that TC reduces information asymmetry and signals the credibility of small firms to the banks, Cook (1999) in her study on Russian small firms argues that small firms receive TC to obtain BL since trade finance signals to reduce information asymmetry. Hence, **s**maller firms which obtain more TC find it easier to get loan from banks as well. On the other hand, while the firms obtain more loan from banks, they tend to lend more to their customers.

Behaviour of small firms with respect to extension and demand of TC before, during and post crisis can be seen from the changes in coefficients. During crisis, coefficient of TC receivable decreased to 0.006 during crisis from 0.017 in pre-crisis 7 which further decreased to 0.002 in post crisis-8. Coefficient of trade payables shows that it decreased from -0.017 in pre-crisis 7 to -0.010 during crisis which later increased to 0.001 in post-crisis 8. Net TC shows a similar decreasing pattern from 0.017 to 0.007 during crisis and further decrease to 0.002 in post crisis-8. It means that small firms decrease the supply as well as demand of TC during the time of crisis like the large firms.

In case of independent variables, large firms show a significantly negative relationship between trade receivables and all the independent variables under study except sales. Sales show a significantly positive relation i.e. as the sales increase trade receivables increase. However, there is a significantly positive relationship between trade payables and all the independent variables

except debt-to-equity ratio. Debt-to-equity ratio shows a significantly negative relationship with trade payables. On the other hand, evidence on small firms shows a significantly negative relationship between trade receivables and all the independent variables except sales and cost of goods sold. These two variables show a significantly positive relationship with trade receivables. However, there is a significantly positive relationship between trade payables and all the independent variables except debt-to-equity ratio. Debt-to-equity ratio shows a significantly negative relationship with trade payables.

4.4 Results for Region-wise Categorization

As discussed earlier, the list of emerging markets is taken as per MSCI market classification which divides the countries into three regions; the Americas, EMEA and lastly, Asia. Table 7 shows the estimation results for three regions in three panels A, B, and C as given in the table.

Panel A shows a significantly positive relationship between BL and TC receivable and payable. While net credit shows a significantly negative relationship with BL. It means that in American region, BL is complementary with TC but as the BL increases, firms demand more TC as compared to extending it. In American region, the behaviour of firms with regard to TC receivables in response to crisis is insignificant. However, trade payables increase from -0.035 in pre-crisis 7 to –0.029 in crisis year and a further increase to -0.006 in post crisis-8. As for independent variables, TC receivable has a significantly positive relationship with sales and significantly negative relationship operating cash flows while other independent variables are insignificant. All the independent variables have a significantly positive relationship with TC payables except debt-to-equity ratio which is insignificant.

Panel B of Table 7 displays estimation results for EMEA. Results for this region show that TC receivable has a negative (substitution) relationship while trade payables has a significantly positive (complementary) relationship with BL which means that as firms get more trade payables, they tend to get better access to BL. Net TC has a significantly negative relation with BL. The behaviour of firms with regard to TC around the time of FC shows that trade receivables decrease from 0.030 in pre-crisis 7 to 0.002 in the crisis year which further decreased to -0.001 in post-crisis 8. On the other hand, trade payables increase from -0.028 in pre-crisis7 to -0.025 during crisis which further increase to 0.007 in post crisis 8. All the independent variables show a significantly negative relationship with TC receivables except sales and cost of goods sold which show a significantly positive relationship. Independent variables show a significantly positive relationship with credit payables except sales and debt-to-equity ratio which show significantly negative relationship. With net TC, independent variables show relationship like trade receivables.

Panel C of Table 7 presents results for Asia. In this region, BL has a positive relationship with TC receivable and payable while a significantly negative relation with net TC. It means that in Asia BL and TC are complementary for each other in a way that when BL increases, firms demand more TC than extending it. With regard to the behaviour of TC around the time of FC, coefficient for TC receivable decreases from 0.008 in pre-crisis7 to -0.001 in crisis year which again increased to 0.004 in post-crisis 8. Coefficient for trade payables increased from -0.009 in pre-crisis 7 to -0.001 in pre-crisis 1 and then again decreased to -0.008 in crisis year and then again increased to 0.00006. Net TC shows a similar trend as of trade receivables. independent variables show a significantly negative relationship with TC receivable except sales and cost of goods sold where the former has a significantly positive relation and later is insignificant. Trade payables have a significantly positive relation with all the independent variables except debt-to-equity ratio which

has a significantly negative relationship. Net TC shows a similar relation with all the independent variables as that of receivables in this region.

Table 7 Panel Data Regressions Results for TC (Region-wise)

	Panel A: Americas			Panel B: Europe, Middle East & Africa			Panel C: Asia		
Variables	**TcRec**	**TcPay**	**TcNet**	**TcRec**	**TcPay**	**TcNet**	**TcRec**	**TcPay**	**TcNet**
Bkloan	0.024***	0.022***	-0.960***	-0.008	0.036***	-1.015***	0.025***	0.001	-0.973***
	-3.34	-4.35	(-136.06)	(-1.19)	-7.03	(-161.84)	-10.08	-0.72	(-400.94)
CGS	0.004	0.039***	-0.003	0.016***	0.060***	0.013***	-0.002	0.046***	-0.003
	-0.62	-8.3	(-0.47)	-4.77	-23.24	-4.07	(-1.30)	-36.91	(-1.40)
Debt-to-Equity	-0.001	-0.001	-0.001	-0.004***	-0.001	-0.003***	-0.006***	-0.002***	-0.005***
	(-1.18)	(-0.75)	(-1.40)	(-4.00)	(-0.92)	(-3.82)	(-14.06)	(-5.92)	(-13.03)
Sales	0.093***	0.019***	0.099***	0.055***	-0.042♦	0.054***	0.075***	0.014***	0.073***
	-17.54	-4.92	-18.77	-18.28	(-0.18)	-18.54	-48.61	-13.31	-48.72
Inventory	-0.047***	0.128***	-0.047***	-0.143***	0.111***	-0.126***	-0.169***	0.073***	-0.157***
	(-2.96)	-10.97	(-2.99)	(-11.86)	-11.71	(-10.73)	(-37.23)	-23.67	(-35.40)
Op. Cashflow	-0.069***	0.019***	-0.072***	-0.110***	0.023***	-0.110***	-0.129***	0.019***	-0.126***
	(-8.31)	-3.09	(-8.77)	(-16.47)	-4.44	(-16.94)	(-45.26)	-9.76	(-45.22)
Pre_crisis7	-0.005	-0.035***	-0.005	0.030***	-0.028***	0.029***	0.008***	-0.009***	0.008***
	(-1.14)	(-11.04)	(-1.11)	-6.23	(-7.41)	-6.08	-4.6	(-7.90)	-4.67
Pre_crisis6	-0.003	-0.031***	-0.002	0.022***	-0.015***	0.022***	0.008***	-0.006***	0.008***
	(-0.71)	(-11.11)	(-0.44)	-4.85	(-4.00)	-4.91	-4.74	(-5.13)	-5.04
Pre_crisis5	-0.006	-0.037***	-0.005	0.020***	-0.008**	0.019***	0.010***	-0.002**	0.011***
	(-1.54)	(-13.41)	(-1.20)	-4.54	(-2.19)	-4.38	-6.39	(-2.13)	-6.7
Pre_crisis4	-0.004	-0.032***	-0.002	0.020***	-0.006*	0.019***	0.007***	-0.003***	0.007***
	(-1.14)	(-11.72)	(-0.64)	-4.6	(-1.77)	-4.57	-4.44	(-2.62)	-4.63
Pre_crisis3	-0.003	-0.033***	-0.002	0.022***	-0.008***	0.021***	0.010***	0.033♦	0.010***
	(-0.72)	(-12.53)	(-0.60)	-5.5	(-2.68)	-5.47	-6.44	-0.31	-6.76
Pre_crisis2	0.003	-0.029***	0.003	0.019***	-0.014***	0.020***	0.008***	-0.001	0.009***
	-0.8	(-11.17)	-0.95	-4.98	(-4.72)	-5.19	-5.71	(-1.54)	-6.17
Pre_crisis1	0.004	-0.026***	0.004	0.007*	-0.016***	0.008**	0.007***	-0.001	0.008***

♦ Value has been multiplied by 100 for being too small.

	-0.99	(-10.07)	-1.09	-1.86	(-5.35)	-2.08	-5.36	(-0.70)	-5.71
Crisis	-0.003	-0.029***	-0.002	0.002	-0.015***	0.001	-0.001	-0.008***	-0.010♦
	(-0.70)	(-11.23)	(-0.65)	-0.52	(-4.88)	-0.41	(-0.37)	(-8.38)	(-0.09)
Post_crisis1	-0.002	-0.028***	-0.001	0.010†	-0.012***	-0.003♦	0.003**	-0.003***	0.003**
	(-0.45)	(-11.00)	(-0.26)	-0.05	(-4.16)	-0.02	-2.22	(-2.95)	-2.44
Post_crisis2	-0.003	-0.025***	-0.002	-0.001	-0.010***	-0.001	0.001	-0.002*	0.002
	(-0.73)	(-9.78)	(-0.64)	(-0.34)	(-3.35)	(-0.20)	-0.86	(-1.78)	-1.22
Post_crisis3	-0.005♦	-0.022***	0.048♦	0.001	-0.007**	0.046♦	0.002	-0.002**	0.002
	(-0.01)	(-8.69)	-0.14	-0.39	(-2.44)	-0.11	-1.44	(-2.30)	-1.35
Post_crisis4	-0.001	-0.020***	-0.049♦	-0.005	-0.009***	-0.005	-0.002	-0.005***	-0.001
	(-0.37)	(-7.98)	(-0.14)	(-1.46)	(-2.91)	(-1.33)	(-1.31)	(-6.11)	(-1.14)
Post_crisis5	-0.001	-0.015***	-0.013♦	-0.009**	-0.004	-0.009**	0.005***	-0.003***	0.004***
	(-0.30)	(-5.82)	(-0.04)	(-2.32)	(-1.34)	(-2.52)	-3.61	(-3.47)	-3.44
Post_crisis6	-0.004	-0.010***	-0.004	-0.002	0.033♦	-0.002	0.005***	-0.003***	0.004***
	(-1.20)	(-4.16)	(-1.06)	(-0.46)	-0.11	(-0.66)	-3.75	(-3.17)	-3.47
Post_crisis7	-0.005	-0.008***	-0.005	-0.003	0.004	-0.005	0.004***	-0.002**	0.004***
	(-1.54)	(-3.24)	(-1.41)	(-0.88)	-1.43	(-1.35)	-3.2	(-2.15)	-2.87
Post_crisis8	-0.004	-0.006**	-0.004	-0.001	0.007**	-0.001	0.004***	0.006♦	0.004***
	(-1.01)	(-2.48)	(-1.23)	(-0.17)	-2.51	(-0.36)	-3.11	-0.05	-2.98
Constant	0.090***	0.052***	0.088***	0.168***	0.071***	0.168***	0.151***	0.054***	0.149***
	-26.64	-21.41	-26.31	-48.46	-25.9	-49.58	-120.63	-63.98	-122.5
Observations	10,031	9,783	10,031	21,799	21,735	21,799	114,497	113,706	114,497
F-statistic	0.0542	0.0526	0.665	0.00422	0.0134	0.55	-0.00498	0.00912	0.588

Note This table contains the regression results with firms divided into three categories on the basis of region.

♦ Value has been multiplied by 100 for being too small.

CHAPTER 5: CONCLUSION

In this research work, we study the relationship between TC and BL around the time of FC in 25 emerging markets. We find a complementary relationship between the two i.e. a significantly positive relationship between TC receivable and banks loan. It means that as the BL increases, firms tend to extend more TC to their customers. On the other hand, there is a significantly positive relationship between TC payable and BL as well which shows that if firms get trade loan, it signals their credibility which allows the firms a better access to BLs. Moreover, as the credit crunches during FC, analysis of entire sample shows that firms reduce the supply and demand of TC. It is understandable that reduction in demand of TC is driven by reduction in its supply.

Moreover, data has been further categorized into small and large firms and the same relationship is studied. During the analysis of larger firms, it has been shown that there exists a complementary as well as substitution relationship between the two types of credit. Since larger firms have better access to institutional loans and TC is costlier, larger firms rely more on loan from banks than their suppliers and allow more credit to their customers. However, smaller firms show a different relationship. As they get more credit from their suppliers, they get better access to institutional loans and hence show only complementary relationship between TC and BL. It has been shown that both larger and smaller firms decrease the overall demand and supply of TC during the time of crisis as compared to pre-crisis period.

Data were also divided into three regions for study purpose. Firms from Americas despite being the largest in our sample relied both on TC and BL; reason being acute shortage of liquidity in the region during FC. Firms in Asia are the smallest in our sample and they show complementary relationship for the same reason as discussed earlier. Firms in EMEA show complementary as well as substitution relationship but in this region, firms tend to use both trade receivables and BLs

during FC, however, reduce the demand for TC and increase the use of BL around the time of crisis. Firms prefer BLs over trade payables because of higher costs of TC. Over all the study shows that firms in Americas turn to their suppliers for seeking financing as the banking sector almost collapsed during the time of crisis. In EMEA, firms decrease the overall supply of credit and increase the demand of credit from their suppliers as this region is most closely financially integrated with US. In Asia, firms decrease the supply as well as demand for TC during FC as compared to pre-crisis time. Our results are consistent with most of the previous studies on the same topic as given in the previous section.

This study implies that policy makers and firms should focus on development of this channel of financing i.e. TC that can act as last resort during times of financial stress when credit markets are tightened and there is shortage of liquidity. This is especially true for survival of small firms which rely on TC to fetch credit facility from banks. Regulatory bodies should also focus on devising policies for TC insurance. Insurance companies can make better products for insuring TC. Stronger policies for creditors' rights protection will help flourish TC channel of financing which will ultimately lead to a more stable and resilient economy.

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