

# DETERMINANTS OF TRADE CREDIT IN EUROPEAN CONSTRUCTION FIRMS: A PRELIMINARY STUDY

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**Abstract:** *The aim of this paper is to present a comparative study of trade credit indicators and the possible determinants of trade credit for firms acting in the construction sector, using a sample of 958 medium and large firms for the period 2004-2013. The objective of the study is to identify and examine selected variables that may determine trade credit used and provided by selected firms. The sample is derived from the Amadeus database. The examined firms were ones that have sold and bought on credit. The data was organised as panel-data and quantitative analyses were performed. This study demonstrates results that firms with higher trade receivables are less profitable; a positive correlation was found between trade receivables and liquidity, whereas a negative correlation was detected between trade receivables and gearing; larger firms provide and obtain more trade credit than medium firms; more profitable firms use less gearing; firms with higher profit margin are more liquid and more liquid firms use less gearing; based on an average and overall terms, there is not such a clear distinction between Western and Eastern European countries from viewpoint of net trade credit and net trade period.*

**Key words:** *construction sector, medium and large firms, trade credit, trade period, correlation.*

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## 1. Introduction

Firms usually have various funding solutions to finance their investments and operational activity. It quite often occurs that firms have difficulties in accessing financial markets and the solution of financing is buying on credit, which means the use of trade credit. Any company uses buying and selling on credit at the same time, meaning that both situations can occur simultaneously; thereby are generated, on the one side, accounts payable and, on the other side, accounts receivable. It shows that firms do not realise all sales in cash, as they do not pay all invoices with cash on the transaction date. In this process between debtor and creditor, goods are delivered and/or services are provided without cash involvement.

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Trade credit is a funding source more used particularly by small and medium European firms, but also in large firms (Delannay and Weill, 2004; Ono, 2001; Yang, 2011). These firms have more trade receivables than a third of total assets, and use trade payable in a smaller measure than trade receivable. Trade credit is an important short term funding source that contributes to ensuring the continuity of business and, in general, to the increase of firms' turnover and development. Trade credit allows financial managers to make realistic forecasting of cash-flow according to the trade credit periods and has no cost at first sight. It is easy to get in the business relations between firms.

Thus, the aim of this paper is to study the trade credit indicators and the possible determinants of increase/decrease trade credit using a sample of medium and large firms acting in construction sector, which is a sector with great periods of collection and credit. Firms were selected from 8 countries of Western and Eastern Europe, with similar growth rate in the construction sector.

Trade credit indicators in relation to each country, analysed for medium and large firms, were as follows: current assets, current liabilities and non-current liabilities on total assets, the share of debtors and creditors in total assets, collection and credit period, net trade credit and trade period. In order to establish the possible determinants of trade credit, we arranged a correlations analysis between trade credit indicators and firm performance indicators, such as profitability, liquidity, gearing and activity indicators.

The paper contributes to the managerial approach of trade credit in the sense that, depending on firm performance, the decision making of increasing or decreasing the use of trade credit is achieved by managers if this decision is to lead to the increase of firm activity, performance and value. The paper is organised as follows: Section No. 2 presents short background literature with representative results in this field and the Section No. 3 describes the data used in the analysis and develops the methodology. Section No. 4 reflects the summary statistics and analyses; section No. 5 reflects the variables analysis on medium and large firms followed by the results and discussions in the Section No. 6. The final conclusions are presented in Section No. 7.

## **2. Background literature**

The concept of trade credit explains the relationships between a firm, its customers and suppliers. Yang (2011) investigated impacts of trade credit on firms' inventory dynamics and analysed the relationship between trade credit and bank loans; he found that, during tight monetary periods, trade credit operates mainly as a substitute for bank borrowing, while, during looser monetary episodes even when the economy is weak, trade credit and bank loans are dominated by a complementary effect.

By panel-data regressions, the main findings were these: firms end up using a mix of trade credit and bank loans trade (Yang, 2011), credit reduces treasury uncertainties (Brennan et al., 1988), trade credit can be a loan substitute for firms that were shut out of formal credit markets (Cull et al., 2009); trade credit can be both a substitute for and

a complement to bank credit (Chant and Walker, 1988; Yang, 2011), trade credit is a complement to bank credit (Ono, 2001), trade credit offers control benefits in the early stages of a venture (Huyghebaert, 2006).

There is no fixed level of receivable and payable accounts that a firm should have, this level being affected by many factors: suppliers' willingness to price discriminate, information asymmetry between suppliers and customers, market structure, stages of business cycles and customers' creditworthiness (Altunok, 2011). Delannay and Weill (2004) have examined the determinants of trade credit and found that both financial and commercial motives explain the credit behaviour of firms and that suppliers act as financial intermediaries in favour of companies with a limited access to bank credit.

Petersen and Rajan (1997) found that firms with better access to credit offer more trade credit; Garcia-Teruel and Martinez-Solano (2010), analysing 3,589 small and medium-sized firms in the UK, found evidence that larger firms, with better access to alternative internal and external financing and with a lower cost, use less credit from suppliers. Performing an analysis of trade credit, used by Chinese industrial companies divided by the type of owners and then by the profitability, Cull et al. (2009) found that lending becomes less severe when the allocation of lending becomes more efficient and that the amount of trade credit extended by private firms declined.

In countries with poorly developed financial institutions, compared to state-owned firms, non-state owned firms use more trade credit, and this higher usage is primarily for financing their prosperous growth opportunities rather than transactional purposes (Ge and Qiu, 2007). Poorly performing state-owned enterprises are more likely to redistribute credit to firms with less privileged access to loans via trade credit (Cull et al., 2009).

Kohler et al. (2000) found that firms with direct access to capital markets, quoted on the UK stock exchange, both extend more and receive less trade credit during a recession. Firms use the trade credit channel to manage growth and companies that are more vulnerable to financial market imperfections, in consequence being more likely to be financially constrained, rely more on the trade credit channel to manage growth (Ferrando and Mulier, 2013).

The effect of financial deepening on the relationship between trade credit and cash holdings among Chinese listed firms studied by Wu et al. (2012) show that firms in regions with higher levels of financial deepening hold less cash for payables while substituting more receivables for cash; also, a more highly developed financial sector helps firms to better use trade credit as a short-term financing instrument.

Regarding the relationship between profitability and trade credit use, the profitable private firms are more likely to extend trade credit than unprofitable ones (Cull et al., 2009).

### 3. Data and methodology

Data used in our study is taken from the Amadeus database, a commercial electronic database provided by Bureau van Dijk. This is a comprehensive database containing financial information on over 20 million public and private firms from European countries. There were selected firms acting in the construction sector (buildings, bridges and tunnels, other civil engineering projects, roads and railways, underground railways) between 2004 and 2013 and from 8 countries: Belgium, Germany, France and Netherlands (Western European countries); and Romania, Bulgaria, Poland and Hungary (Eastern European countries). The selection of the firms was done using the following criteria: number of employees between had to range between 100 and 1000 in the year 2013; sales had to be higher than 1,000 thousand Euros for the year 2013 and non-negative values to the collection period and credit period and the results amounted to 2,703 firms. Later, we kept in the analysis only those firms which had reported data in the interval analysed, and had resulted 958 firms with totally 9,580 observations. This situation show us high fluctuation in this sector and a short life of firms in the period analysed, taking into account that this interval includes a period of financial crisis when many firms have been closed and other have been founded.

In order to examine the possible determinants of trade credit, there were selected 24 indicators of trade credit, profitability, liquidity, gearing, financing, activity and firm size, as described in Table 1. Also, Table 1 describes the methodology of measuring variables used in this study.

We have selected the variables by taking into account the used variables in previous works, such as the following: Grave (2011) examined trade receivables divided by total assets and trade payables divided by total assets; Alatalo (2010) used trade credit provided (trade receivables per sales), trade credit obtained (trade credit payables per cost of goods sold) and net trade credit (difference between trade receivables and payables divided by sales); as a dependent variable, Ge and Qiu (2007) use accounts payable/total assets, accounts payable/sales,  $(\text{accounts payable} - \text{accounts receivable})/\text{total assets}$ ,  $(\text{accounts payable} - \text{accounts receivable}) / \text{sales}$ .

Further, data was corrected by some routine checks and observations with inconclusive values of the variables were eliminated, especially those registered to sales, trade receivables, trade payables, current assets to total assets, current liabilities to total assets, and non-current liabilities to total assets. Thus, after the adjustments, a total of 8,473 observations are examined. The deductive and result-oriented approach and the case study as a research method was used in the study because it is limited by two aspects: the sample comprised just medium and large firms that belong to the construction sector and the study is limited in the aspect of time covering a period from 2004 to 2013, because the Amadeus database, the source of the data, provides data covering only 10 years. Data is organised in the form of panel-data. Unbalanced panel-data is used. Quantitative analyses are performed using the Stata software package.

TABLE 1. Description of variables

Description	Abbreviation	Calculation
Trade receivables	TR	Debtors / Total assets
Trade payables	TP	Creditors / Total assets
Current Ratio (x)	Currentrat~x	Current assets/current liabilities
Liquidity ratio (x)	Liquidityr~x	(Current assets - Stocks) / Current liabilities
Gearing (%)	Gearing	((Non current liabilities + Loans) / Shareholders funds) × 100
ROE using Net income (%)	ROE	(Net income / Shareholder funds) × 100
ROA using Net income (%)	ROA	(Net income / Total Assets) × 100
Profit margin (%)	Profitmargin	(Profit before tax / Operating revenue) × 100
Collection period (days)	Collection~s	(Debtors / Operating revenue) × 360
Credit period (days)	Creditperi~s	(Creditors / Operating revenue) × 360
Working Capital	Workingcap~r	Indicates how much capital is used by day to day activities = Stocks + Debtors - Creditors
Creditors	Creditorst~R	Debts to suppliers and contractors (trade creditors)
Debtors	DebtorsthEUR	Trade receivables (from clients and customers only)
Current Assets	Currentass~R	Total amount of current assets (Stocks + Debtors + Other current assets)
Non-Current Liabilities	Noncurrent~r	Long term liabilities of the company (Long term financial debts + other long term liabilities and provisions)
Current Liabilities	Currentlia~R	Current liabilities of the company (Loans + Creditors + Other current liabilities)
Dividing firms based on size	Size	Small with number of employees between 0-49; medium 50-249; and large - starting from 250
Measuring firm size	Firmssize	Logarithm of sales
Coding firms	Size2	Medium == 0 and large == 1
Portion of current assets	Currentass~s	Current assets / Total assets
Short-term financing	Currentlia~s	Current liabilities / Total assets
Long-term financing	Noncurrent~s	Noncurrent liabilities / Total assets
Portion of debtors	DebtorsCur~s	Debtors / Current assets
Portion of creditors	Creditorsc~s	Creditors / Current liabilities

Source: Bureau van Dijk database (Amadeus database). Abbreviations made by the authors.

#### 4. Summary of statistics and analyses

In this section we show how firms' observations are distributed per country. As we can see, Romania (20.64%), France (17.47%), Bulgaria (15.80%) and Belgium (14.76%) are countries with more observations, while the rest are with less (31.33% together). Slightly concerning is the case of Hungary, participating with 4.59%.

Moreover, in order to examine the size of the firm, we categorised them into three categories: small, medium and large. A firm is considered small if the number of employees is between 0-49; 50-249 for a medium firm; and a large firm if the number of employees is 250 or higher. The sample composition denotes that majority of selected firms are me-

dium (62%), followed then by large firms (27%). Further analyses are focused just on the medium and large firms due to lack of information for the number of employees; hence, some firms couldn't be classified (7.27 %).

Descriptive statistics presented in table No. 2 include the number of observations, mean, standard deviation, minimum and maximum. As the results denoted, the selected firms have at least one to a maximum of 2644 employees over the period analysed. On average, the examined firms have 32% trade receivables, whereas trade payables are 24%. In other words, examined firms for the selected period have sold more than they have bought on credit. This result is in harmony with the collection and credit period (roughly 83 vs. 65 days).

On average, firms are profitable and the profitability is measured by profit/loss after tax, return on equity (ROE), return on assets (ROA) and profit margin.

TABLE 2. Summary statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Numberofem~s	7857	231.62	193.82	1.00	2644.00
DebtorsthEUR	8407	9587.22	28987.04	0.00	927366.00
Totalasset~R	8473	32210.33	92416.91	1.00	2114000.00
Currentass~R	8473	23944.95	72133.40	0.00	1651000.00
Currentlia~R	8473	18510.93	61669.29	0.00	1832000.00
Creditorst~R	7836	8033.43	21366.87	0.00	620977.00
Noncurrent~r	8439	5148.11	25635.27	0.00	1274626.00
Salestheur	8311	38286.45	63716.53	0.00	1382567.00
Plaftertax~r	8455	1509.56	6927.54	-206520.00	222079.00
Workingcap~r	7768	6502.30	29869.62	-73161.00	916106.00
ROE	8345	21.11	54.30	-894.64	965.63
ROA	8447	6.25	9.90	-71.75	85.50
Profitmargin	8288	5.10	8.88	-93.61	100.00
Collection~s	8235	82.74	70.79	0.00	894.46
Creditperi~s	7693	65.32	66.09	0.00	965.54
Currentrat~x	8438	1.73	2.52	0.23	97.11
Liquidityr~x	8417	1.40	2.35	0.05	92.59
Gearing	7563	94.47	130.19	0.00	999.76
Firmsize	8298	9.79	1.30	0.45	14.14
TR	8473	0.32	0.19	0.00	1.00
TP	8473	0.24	0.18	0.00	0.95
Currentass~s	8473	0.71	0.20	0.01	1.00
Currentlia~s	8473	0.53	0.23	0.00	1.00
Noncurrent~s	8473	0.14	0.15	0.00	0.99
DebtorsCur~s	8473	0.45	0.23	0.00	1.00
Creditorsc~s	8473	0.43	0.27	0.00	1.00

Source: authors' calculations

Debtors to current assets on average are 45%, whereas creditors to current liabilities are 43%. Current assets to total assets are on average 71%, thus 29% are long-term assets. Current liabilities, respectively to non-current liabilities to total assets, are 53%, respectively 14%. In other words, assets are financed more with current than non-current liabilities. However, assets are 67% financed by liabilities and rest part (33%) is financed by capital. On the other hand, gearing on average is 95%, hence signalling that shareholder funds are enough lower as compared with non-current liabilities and loans.

## 5. Variables analyses

Further analyses are performed to see whether there is a difference between medium and large firms. Figure 1 shows that, on average, there is no highlighted discrepancy between medium and large firms per country for current assets to total assets, current liabilities to total assets and non-current liabilities to total assets.

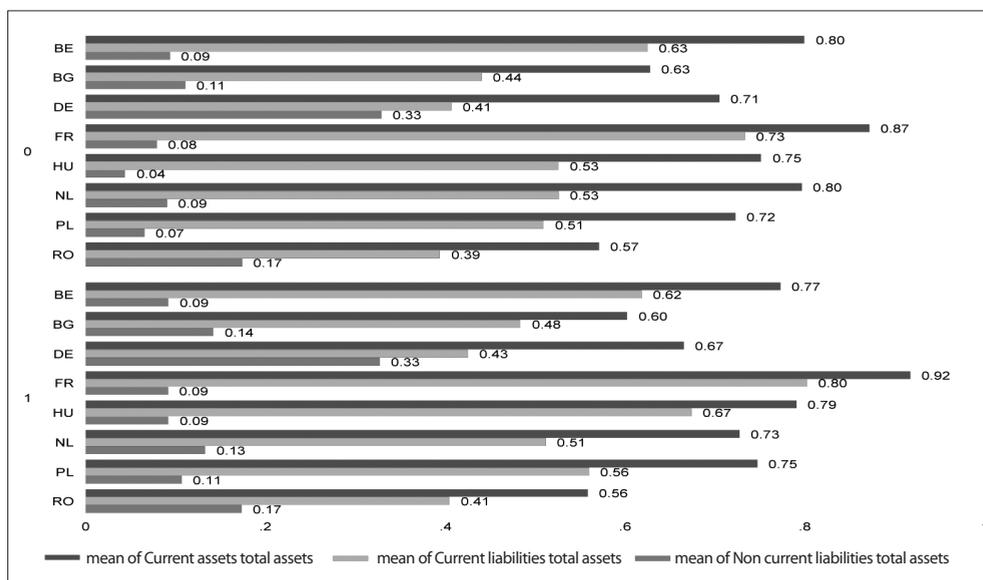


FIGURE 1. Mean of current assets, current liabilities, and non-current liabilities to total assets

Source: authors' calculations

Also, based on the results of figure 1, it can be noticed that there are not such emphasised discrepancies between medium and large firms related to the same variables, these ratios being almost same for medium and large firms. French medium and large firms, compared with other selected countries, have higher current assets and current liabilities to total assets ratios.

Non-current liabilities to total assets in each country are evidenced in a low level. In German (denoted by DE hereafter) large firms, these ratios are highest among any other firms (33%). Hence, it can be concluded that the selected medium and large firms

have more current liabilities than non-current liabilities. Figure No. 2 presents the mean of debtors to current assets and creditors to current liabilities. The figure presents that medium Belgian firms have lower debtors to current assets ratio, whereas the creditors to current liabilities ratio is the same in comparing with large firms. Medium firms have a 7 per cent difference between debtors to current assets and creditors to current liabilities, and there are no differences in large firms.

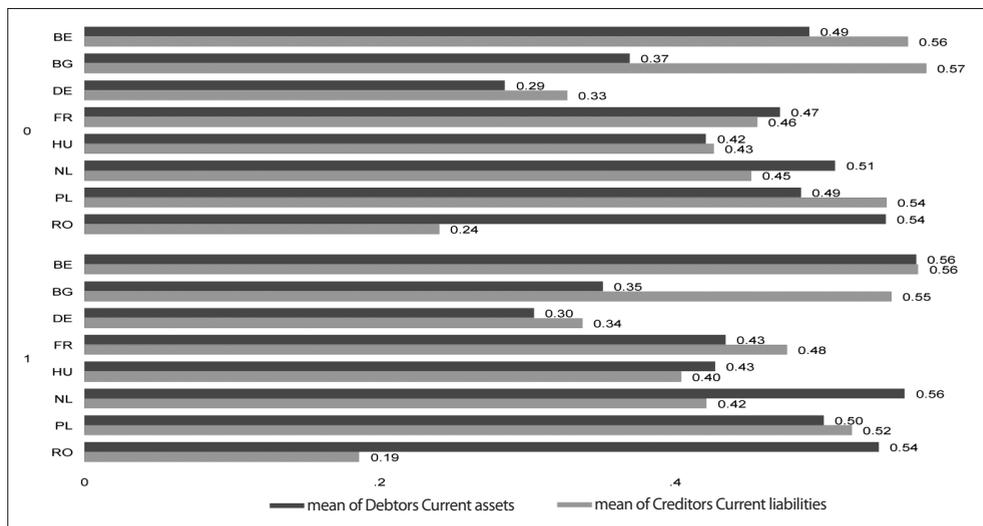


FIGURE 2. Mean of debtors to current assets and creditors to current liabilities

Source: authors' calculations

In Bulgaria, debtors to current assets ratio and creditors to current liabilities ratio are slightly same in the proportion between medium and large firms. In both medium and large firms there is a 20 percent difference. In the case of Germany, there is a 4 percent difference in the debtors to current assets ratio and creditors to current liabilities between medium and large firms.

Figure 3 shows the mean of trade receivables and payables according to the firms' size and countries.

On average, Belgian firms have sold more than they have bought on credit. The relationship is more expressed in large firms. Hence, we can say that large Belgian firms have provided more net trade credit (trade receivables minus trade payables) than medium firms. Averagely, Bulgarian and German firms have sold less than they have bought on credit. The relationship is almost identical as expressed between medium and large firms.

French and Hungarian firms, on average, have sold more than they have bought on credit. The relationship is more expressed in medium firms. Hence, we can say that medium French firms have provided more net trade credit than large firms. Averagely, German and Polish firms have sold more than they have bought on credit. The relationship is expressed in the same percentage for both medium and large firms in the Netherlands and is almost identical as expressed for medium and large firms in Poland.

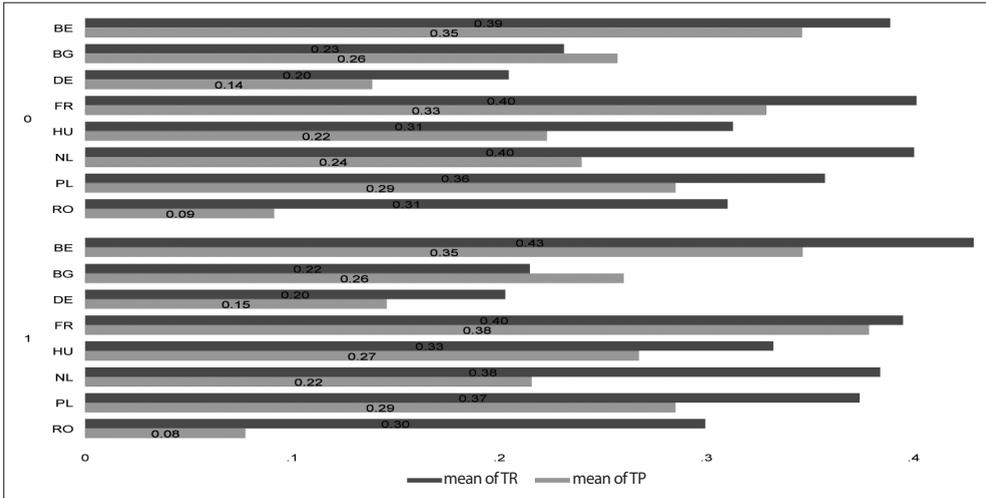


FIGURE 3. Mean of trade receivables and trade payables

Source: authors' calculations

On average, Romanian firms have sold more than have bought on credit. The relationship is expressed in the same percentage for both medium and large firms. Romania is the case where net trade credit is highest as compared with other selected countries, i.e., it is higher by 22 per cent.

Figure 4 shows the mean of collection and credit period according the firms' size and countries.

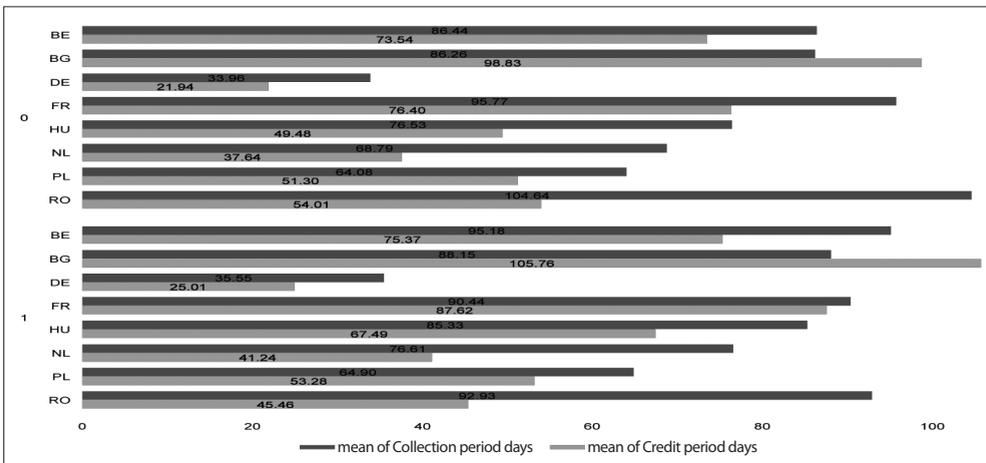


FIGURE 4. Mean of collection and credit period

Source: authors' calculations

Medium Belgian firms, on average, need 86 days to collect money from debtors, while large firms require 95 days. On the other hand, medium and large Belgian firms have an average of 74 and 75 days respectively to pay creditors. Medium and large Belgian firms have a longer collection period compared with credit period. A difference is examined for the collection period between medium and large firms. Credit period is almost the same between medium and large firms.

Medium Bulgarian firms need an average of 86 days to collect money from debtors, while large firms require 88 days; medium and large Bulgarian firms have an average of 99 and 106 days respectively to pay creditors. Medium and large Bulgarian firms have a shorter collection period as compared with the credit period. A difference is examined between medium and large firms for the credit period. The collection period is almost the same between medium and large firms.

Medium German firms, on average, need 34 days to collect money from debtors, while large firms require 36 days; medium and large German firms have an average of 22 and 25 days respectively to pay creditors. Medium and large German firms have a longer collection period as compared with the credit period. A slight difference is examined at the collection and credit period between medium and large firms.

Medium French firms need an average of 96 days to collect money from debtors, while large firms require 90 days; medium and large French firms averagely have 76 and 88 days respectively to pay creditors.

Medium Hungarian firms, on average, need 77 days to collect money from debtors, while large firms require 85 days; medium and large Hungarian firms have an average of 50 and 68 days respectively to pay creditors. Medium and large Hungarian firms have a longer collection period compared with the credit period.

Medium German firms need an average of 69 days to collect money from debtors, while large firms require 77 days; on average, medium and large German firms have 38 and 41 days respectively to pay creditors. Medium and large German firms have a longer collection period compared with the credit period. A slightly higher difference is examined at the collection than the credit periods between medium and large firms. Medium Polish firms, on average, need 64 days to collect money from debtors, while large firms require 65 days; medium and large Polish firms have an average of 51 and 53 days respectively to pay creditors. Hence, medium and large Polish firms have longer a collection period as compared with credit period.

Averagely, medium Romanian firms need 105 days to collect money from debtors, while large firms require 93 days; medium and large Romanian firms, on average, have 54 and 46 days respectively to pay creditors. Medium and large Romanian firms have a longer collection period compared with the credit period. A difference is examined at the collection and credit periods between medium and large firms to French, Hungarian and Romanian firms.

From the selected countries, the longest collection period is examined at medium Romanian firms (105 days), while the shortest is found at medium German firms (34 days).

The longest credit period is examined at large Bulgarian firms (106 days) while the shortest at medium German firms (22 days). German firms have both shorter collection and credit periods.

Table 3 shows net trade credit and trade period per country. Countries are divided in two groups: Western and Eastern European countries.

TABLE 3. Net trade credit and trade period per country

Country	TR (%)	TP (%)	NTC (%)	Collection period (days)	Credit period (days)	Net trade period (days)
<i>Western countries:</i>						
BE	39.79%	34.52%	5.26%	89	74	14
DE	19.94%	13.77%	6.17%	34	23	11
FR	39.60%	34.35%	5.24%	96	81	14
NL	39.45%	22.00%	17.45%	73	40	32
<i>Eastern countries:</i>						
BG	22.43%	25.94%	-3.50%	87	102	-15
HU	29.21%	21.45%	7.77%	77	49	28
PL	36.58%	28.76%	7.83%	65	52	13
RO	30.90%	8.29%	22.62%	100	49	52

Net trade credit = Trade credit - Trade payables; Net trade period = Collection period - Credit period.

Source: authors' calculations.

Out of Western European countries, French firms have the longest net trade credit, whereas German firms have the highest. On the other hand, out of Eastern European countries, Bulgarian firms have the lowest net trade credit – even negative – whereas Romanian firms have the highest. By comparing two groups, it is found that Bulgarian firms used the lowest net trade credit and Romanian firms used the highest.

German firms have the shortest net trade period out of Western European countries, whereas Bulgarian firms match this type out of Eastern European countries. Bulgarian firms have the shortest net trade period as compared with the rest of the selected countries. Out of Western European countries, German firms have the longest net trade period, whereas Romanian firms match this type out of Eastern European countries. Romanian firms have the longest net trade period as compared with the rest of the selected countries. However, on average and overall, there is not a clear distinction between Western and Eastern European countries in relation to the net trade credit and net trade period.

Figure 5 shows current and liquidity ratios according the firms' size and countries. Medium and large Belgian firms have almost the same current and liquidity ratios. The difference between those two ratios is emphasised more at medium firms. This indicates that medium firms hold higher inventory percentage.

Medium Bulgarian and German firms have current and liquidity ratios higher than larger firms. The difference between those two ratios is emphasised more at medium Bulgarian firms and this indicates that medium firms hold higher inventory percentage. The difference between those two ratios is slightly larger at large German firms.

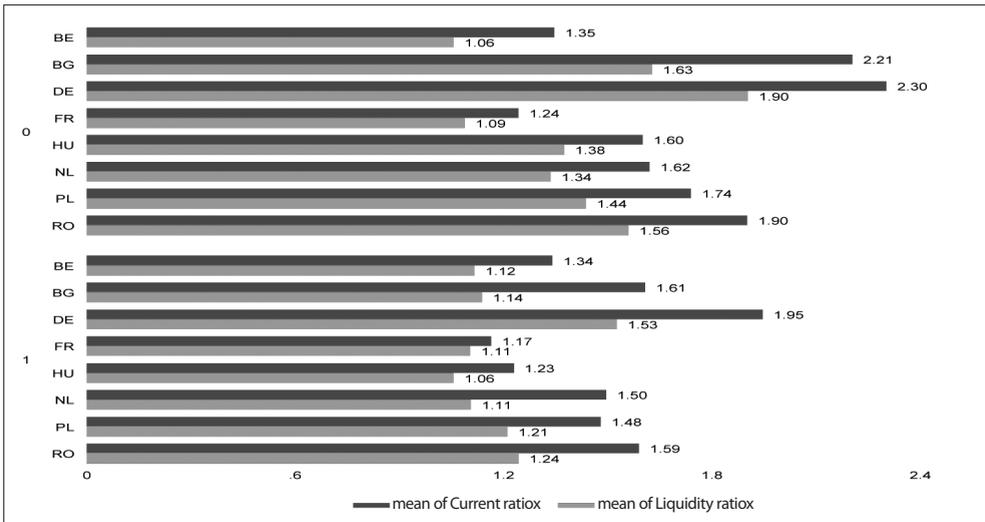


FIGURE 5. Mean of current and liquidity ratio

Source: authors' calculations

Medium and large French firms have almost the same current and liquidity ratios and medium Hungarian firms have higher current and liquidity ratios. In these countries, the difference between those two ratios is slightly larger at medium firms. This indicates that medium firms hold higher inventory percentage.

Medium German firms have slightly higher current and liquidity ratios than large firms. The difference between those two ratios is slightly larger at large firms. This indicates that large firms hold higher inventory percentage. Medium Polish and Romanian firms have higher current and liquidity ratios than large firms. The difference between those two ratios is almost the same at medium and large firms.

Figure 6 shows the trend mean of sales per country. Expressed with thousands of euros on average, Netherlands is the country with higher sales, whereas Bulgaria is the one with lower sales. Netherlands has higher sales per each year. Each country has a positive trend of sales. At some countries, this trend is more highlighted, whereas at some others it is highlighted less. For example, the trend is accelerated more at Romanian firms rather than German firms.

Figure 7 shows the trend mean of profit/loss after tax per country. Expressed with thousands of euro on average for the period 2004-2013, France is the country with higher, whereas Poland is the one with lower profit/loss after tax. Countries such as Belgium, Bulgaria, Netherlands and Poland have a positive trend. Hungary has an almost linear trend. Countries such as France, Netherlands and Romania have negative trends.

Figure 8 shows the working capital per country. Netherlands has a higher working capital per each country year as compared with other countries. Each country has a positive trend, some more and some less, except for Netherlands that has a negative working capital trend.

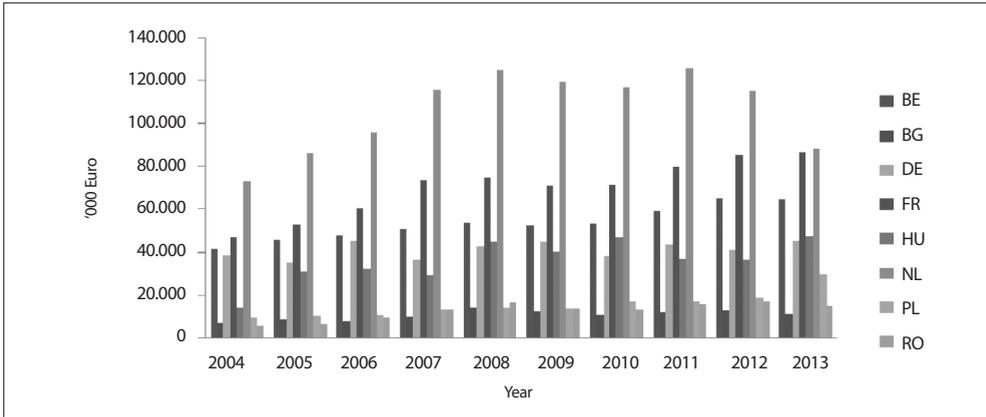


FIGURE 6. Mean of sales per country

Source: authors' calculations

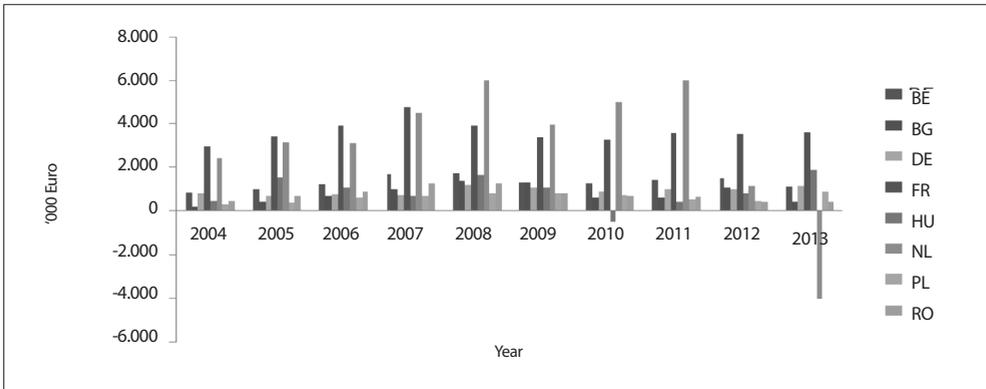


FIGURE 7. Mean of profit/loss after tax per country

Source: authors' calculations

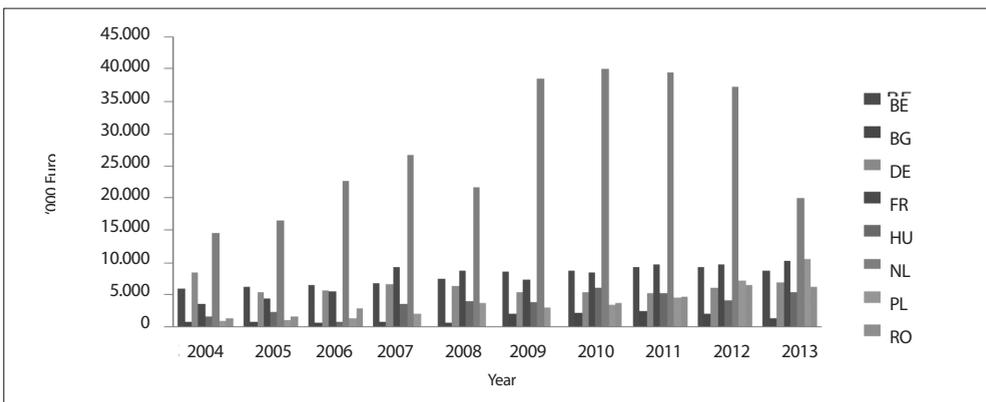


FIGURE 8. Mean of working capital per country

Source: authors' calculations

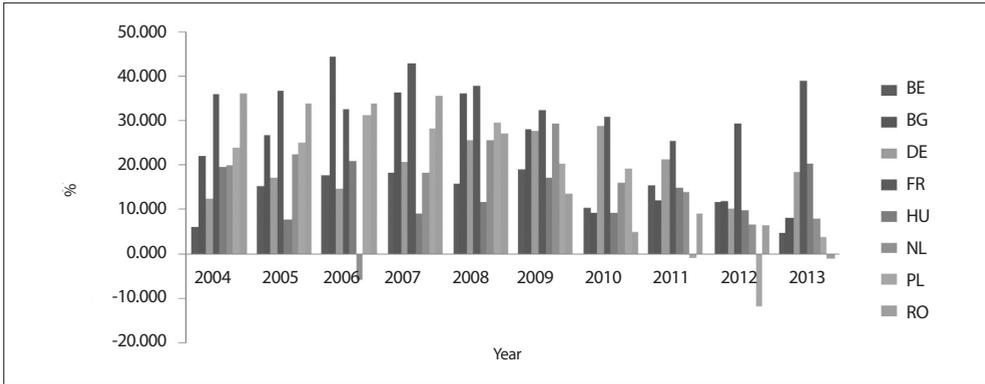


FIGURE 9. Mean of ROE per country

Source: authors' calculations

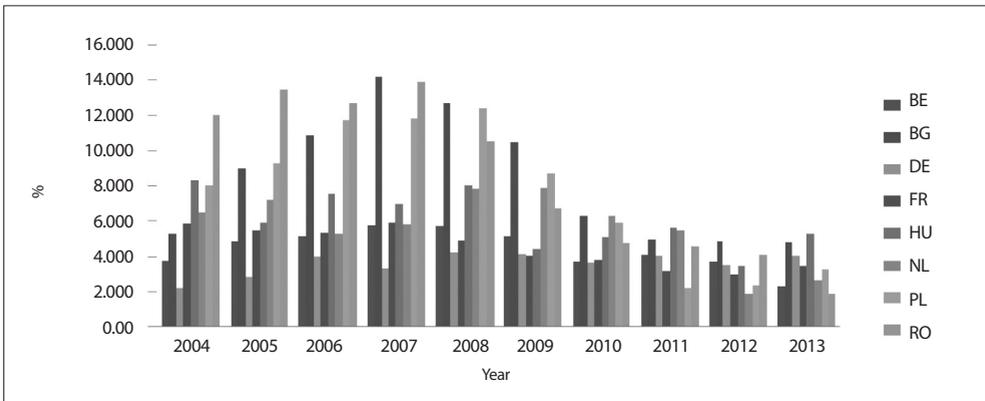


FIGURE 10. Mean of ROA per country

Source: authors' calculations

Figure 9 shows the return on equity (ROE) per country for the period 2004-2013. Except for Germany, at which the positive trend was evidenced (expressed with equation  $y = 0.390x + 17.53$ ), other selected countries have negative ROE trends. But, as it can be noticed, Romania has a more negative trend, whereas Hungary has less.

Figure 10 shows the return on assets (ROA) per country for the period 2004-2013. Except for Germany, at which the positive trend was evidenced (expressed with equation  $y = 0.134x + 2.869$ ), other selected countries have negative ROA trends. But, as it can be noticed, Romania has a more negative trend, whereas Belgium has less.

Figure 11 shows the profit margin per country for the period 2004-2013. Except for Germany, each other selected country has a negative profit margin trend, some more and some less. Romania has a more negative trend, whereas Belgium has less. Germany has a slightly positive profit margin trend, expressed with equation  $y = 0.024x + 2.674$ .

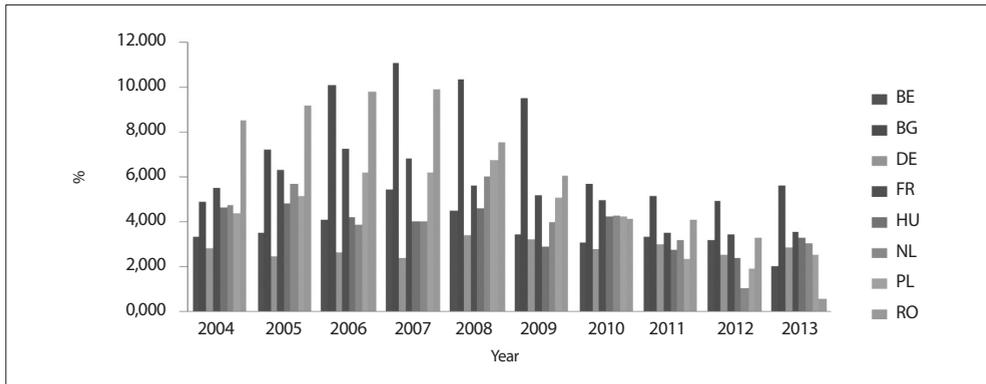


FIGURE 11. Mean of profit margin per country

Source: authors' calculations

This comparative analysis of the last indicators shows the difference of performance between firms from Western and Eastern European countries.

## 6. Results and discussion

The analysis is continued between medium and large firms, Eastern and Western European countries and between countries for detecting correlations between the selected variables. Thus, Table 4 shows the correlation results of all countries for selected variables.

There is a positive correlation between trade receivables and trade payables. It means that firms have sold and bought on credit. Although, these two ratios are not on the same level. Firms with higher trade receivables are less profitable. A positive correlation is found between trade receivables and liquidity, whereas a negative correlation is detected between trade receivables and gearing. Larger firms have provided and obtained more trade credit.

TABLE 4. Correlation results for all countries

	TR	TP	ROE	ROA	Profitm~n	Liquidit~x	Gearing	Firmsize
TR	1							
TP	0.422***	1						
ROE	-0.0414***	0.0513***	1					
ROA	-0.0649***	-0.160***	0.589***	1				
Profitma~n	-0.138***	-0.177***	0.457***	0.746***	1			
Liquidit~x	0.0249*	-0.172***	-0.00437	0.107***	0.0959***	1		
Gearing	-0.0417***	0.0368**	-0.0505***	-0.234***	-0.173***	-0.0388***	1	
Firmsize	0.153***	0.258***	0.0662***	-0.116***	-0.0624***	-0.0571***	0.147***	1

\* p<0.05, \*\* p<0.01, \*\*\* p<0.001

Source: authors' calculations

There is a positive correlation between trade payables and ROE, whereas a negative correlation is found between trade payables and ROA, profit margin and liquidity. A significant positive relationship is found between trade payables and gearing, even the correlation coefficient is almost zero. Larger firms provide more trade credit. Positive relationships are found between ROE, ROA and profit margin. On the other hand, more profitable firms measured by ROE, ROA and profit margin use less gearing. Positive relationships are found between ROA, profit margin and liquidity .

Firms with a higher profit margin are more liquid. A negative significant relationship is found between a profit margin and the firm's size. More liquid firms use less gearing. A positive relationship is found between gearing and the firm's size.

Trade credit, as a concept, is not isolated from other financial and economic measures. Hence, it is known that some other indicators are welcomed and better interpretations can be given. Results show that selected firms have more short-term than long-term assets, i.e., 71% versus 29%. On the other hand, assets financed by short-term liabilities are 53%, those with long-term are 14% and the rest part is, of course, capital. So, firms are financed more with debt rather than capital.

Analyses were performed based on countries, years, sizes of firms, and Western as well as Eastern European countries. Obtained results show that there are not such emphasised discrepancies between medium and large firms regarding current assets, current liabilities and non-current liabilities to total assets. These ratios are almost same for medium and large firms.

Two-sample t test is performed for current assets, current liabilities, and non-current liabilities to total assets; debtors to current assets, creditors to current liabilities, trade receivables, trade payables, collection and credit period, current and liquidity ratios between medium and large firms. Results denoted that variables, such as current liabilities and non-current liabilities to total assets, debtors to current assets, creditors to current liabilities, credit period, current and liquid ratio have p-values less than 0.05 and t-statistics higher than 2 in absolute values. Mean differences for rest variables are not statistically significant between medium and large firms.

Hence, larger firms have significantly more current liabilities and non-current liabilities to total assets, and debtors to current assets than medium firms. Larger firms have significantly less creditors to current liabilities as well as lower current and liquidity ratios than medium firms. Moreover, larger firms have a significantly longer credit period than medium firms. Table 5 presents the variables interpretations using p-value and t-statistic.

Grouping countries into Western and Eastern European countries is another performed analysis. From Western European countries, French firms have the lowest net trade credit (trade receivables – trade payables), whereas German firms have the highest. From Eastern European countries, Bulgarian firms have the lowest – even negative – net trade credit, whereas Romanian firms have the highest. By comparing the two groups, it is found that Bulgarian firms used the lowest net trade credit and Romanian firms used the highest.

TABLE 5. Variables interpretations

Variable	Interpretation
<b>Current assets to total assets</b>	Two-tailed p-value is 0.1129 and t-statistic is not statistically significantly ( $t = 1.5855$ ). Therefore, the mean difference of this ratio is not significantly different between medium and large firms.
<b>Current liabilities to total assets</b>	Two-tailed p-value is 0.0000 and t-statistic is statistically significantly ( $t = -6.3783$ ). Therefore, the mean difference of this ratio is significantly different between medium and large firms.
<b>Non-current liabilities to total assets</b>	Two-tailed p-value is 0.0020 and t-statistic is statistically significantly ( $t = -3.0874$ ). Therefore, the mean difference of this ratio is significantly different between medium and large firms.
<b>Debtors to current assets</b>	Two-tailed p-value is 0.0199 and t-statistic is statistically significantly ( $t = -2.3279$ ). Therefore, the mean difference of this ratio is significantly different between medium and large firms.
<b>Creditors to current liabilities</b>	Two-tailed p-value is 0.0001 and t-statistic is statistically significantly ( $t = 3.8886$ ). Therefore, the mean difference of this ratio is significantly different between medium and large firms.
<b>Trade receivables</b>	Two-tailed p-value is 0.3939 and t-statistic is not statistically significantly ( $t = -0.8526$ ). Therefore, the mean difference of this ratio is not significantly different between medium and large firms.
<b>Trade payables</b>	Two-tailed p-value is 0.4835 and t-statistic is not statistically significantly ( $t = -0.7007$ ). Since p-value (0.4835) is higher than 0.05, then the mean difference of this ratio is significantly different between medium and large firms.
<b>Collection period</b>	Two-tailed p-value is 0.3594 and t-statistic is not statistically significantly ( $t = -0.9165$ ). Since p-value (0.3594) is higher than 0.05, then the mean difference of this ratio is significantly different between medium and large firms.
<b>Credit period</b>	Two-tailed p-value is 0.0025 and t-statistic is statistically significantly ( $t = -3.0231$ ). Since p-value (0.0025) is less than 0.05, then the mean difference of this ratio is significantly different between medium and large firms.
<b>Current ratio</b>	Two-tailed p-value is 0.0000 and t-statistic is statistically significantly ( $t = 6.3185$ ). Since p-value (0.0000) is less than 0.05, then the mean difference of this ratio is significantly different between medium and large firms.
<b>Liquidity ratio</b>	Two-tailed p-value is 0.0000 and t-statistic is statistically significantly ( $t = 5.0764$ ). Since p-value (0.0000) is less than 0.05, then the mean difference of this ratio is significantly different between medium and large firms.

German firms have the shortest net trade period out of Western European countries, whereas Bulgarian firms match this type out of Eastern European countries; Bulgarian firms have the shortest net trade period compared with the rest of any other selected countries. Out of Western European countries, German firms have the longest net trade period, whereas Romanian firms match this type out of Eastern European countries. Romanian firms have the longest net trade period compared with the rest of any selected countries. However, on an average and overall term, there is not such a clear distinction between Western and Eastern European countries in relation to the net trade credit and net trade period viewpoint.

Each country has a positive trend, some more and some less, except for Germany that has a negative working capital trend. Also, each country is examined with a positive

trend of sales. At some countries, this trend is more highlighted, whereas at some others less. The sales trend is not associated similarly with the profit/loss after tax trend. Except for Germany, each other selected country has a negative ROE trend, some more and some less. Romania has more negative trend, whereas Hungary has less (almost zero); Germany has a positive ROE trend.

Except for Germany, each other selected country has a negative ROA trend, some more and some less. Romania has a more negative trend, whereas Belgium has less. Germany has a positive ROA trend. Except for Germany, each other selected country has a negative profit margin trend, some more and some less. Romania has a more negative trend, whereas Belgium has less. Germany has a slightly positive profit margin trend.

## **7. Conclusions**

Considering the features of the selected sample, the characteristics of the studied countries of the construction sector and the world economy evolution with its influence in the economy of the countries in the period analysed, the results of our study suggest the following: firms with higher trade receivables are less profitable, whereas Cull et al. (2009) found that profitable private firms are more likely to extend trade credit than unprofitable ones; larger firms have provided and obtained more trade credit than medium firms; more profitable firms have used less gearing; firms with a higher profit margin are more liquid; more liquid firms have used less gearing; there are no significant differences for trade receivables and payables between medium and larger firms. These results are the starting point for future researches aimed on creation of a model for estimating the share of trade receivable / trade payable in total assets, considering the indicators analysed and interpreted in this paper as independent variables.

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## **REFERENCES**

- Alatalo, R. (2010). Trade credit use during a financial crisis: evidence from the U.K. of a non-existing trade credit channel, Aalto University, School of Economics.
- Altunok, F. (2011). Determinants of trade credit contract terms, North Carolina State University.
- Brennan, M.J., Maksimovic, V., Zechner, J. (1988). Vendor financing, *Journal of Finance*, Vol. 43, Issue 5, p. 1127–1141.
- Chant, E.M., Walker D.A. (1988). Small business demand for trade credit, *Applied Economics*, Vol. 20, p. 861–876.
- Cull, R., Colin Xu, L., Zhu, T. (2009). Formal finance and trade credit during China's transition, *Journal of Financial Intermediation*, Vol. 18, Issue 2, p. 173–192.

Delannay, A.F., Weill, L. (2004). The determinants of trade credit in transition countries, *Economics of Planning*, Vol. 37, Issue 3-4, p. 173-193.

Ferrando, A., Mulier, K. (2013). Do firms use the trade credit channel to manage growth?, *Journal of Banking and Finance*, Vol. 37, Issue 8, p. 3035–3046.

Garcia-Teruel, P. J., Martinez-Solano, P. (2010). A dynamic perspective on the determinants of accounts payable, *Review of Quantitative Finance and Accounting*, Vol. 34, Issue 4, p. 439-457.

Ge, Y, Qiu, J. (2007). Financial development, bank discrimination and trade credit, *Journal of Banking and Finance*, Vol. 31, Issue 2, p. 513–530.

Grave, Th. (2011). Trade credit as a shock absorber?: The effects of the financial crisis on the use of trade credit by Dutch manufacturing firms. University of Twente.

Huyghebaert, N. (2006). On the determinants and dynamics of trade credit use: empirical evidence from business start-ups, *Journal of Business Finance and Accounting*, Vol. 33, Issue 1&2, p. 305–328.

Kohler, M., Britton, E., Yates, T. (2000). Trade credit and the monetary transmission mechanism, Bank of England, London.

Ono, M. (2001). Determinants of trade credit in the Japanese manufacturing sector, *Journal of the Japanese and International Economies*, Vol. 15, p. 160–177.

Petersen, M.A., Rajan, R.G. (2007). Trade Credit: Theories and Evidence, *Review of Financial Studies*, Vol. 10, Issue 3, p. 661-669.

Wu, W., Rui, O.M., Wu, C. (2012). Trade credit, cash holdings, and financial deepening: Evidence from a transitional economy, *Journal of Banking and Finance*, Vol. 36, Issue 11, p. 2868–2883.

Yang, X. (2011). Trade credit versus bank credit: Evidence from corporate inventory financing, *The Quarterly Review of Economics and Finance*, Vol. 51, Issue 4, p. 419–434.