

The Determinants of Trade Credit in Transition Countries

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Abstract:

The paper investigates the determinants of trade credit in transition countries. Traditional theories of trade credit extension suggest that both financial and commercial motives may induce non-financial companies to assume a role of financial intermediation. Furthermore, specific conditions of financing for companies in transition countries may reserve to trade credit an important role in financial structure. We test the determinants of trade receivables and trade payables on a sample of about 9 300 companies from nine Central and Eastern European Countries. Results suggest that both financial and commercial motives explain the credit behaviour of firms. However, we do not find generalised patterns in the use of trade credit among all transition countries.

Keywords: trade credit, transition economies

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1. Introduction

There is a wide consensus regarding the problems of financing for companies in European transition economies. Central and Eastern European countries are the only area in the only world where lack of financing is mentioned in the three main obstacles to business activity and company growth for small and medium-sized companies, as pointed out by Pissarides (1999). These difficulties result notably from the limited access to bank credit: Scholtens (2000) shows that the ratio of bank claims to the private sector divided by GDP in 1995 was 22.9 % in these countries, to be compared with 87.8 % in Western countries.

However, this lack of bank credit may induce companies in transition economies to rely on trade credit as a significant source of financing. Indeed, trade credit has been observed to play an important role in the external financing of companies in developed countries (Elliehausen and Wolken, 1993; Ng *et al.*, 1999; Summers and Wilson, 2002). In particular, trade credit appears as a substitute to bank credit for companies credit-rationed by banks (Nilsen, 2002; Marotta, 1997). Therefore, in transition economies, the conjunction of the communist heritage of inter-enterprise relationships system and the current limited access to bank credit may favour the generalized use of trade credit to mitigate problems of financing.

There is however a debate in the literature regarding the positive or negative impact of the use of trade credit in transition countries. On the one hand, some economists following Kornai (1980) consider as negative the generalized use of trade credit in transition countries, because they are afraid that this use may prevent efficient restructuring of companies. Indeed, trade credit may soften budget constraint for companies and therefore delay their restructuring. On the other hand, Coricelli (1996) and Cook (1999) give a positive role to the use of trade credit in these economies. According to Coricelli (1996), trade credit favours growth by providing to new established companies an access to private credit markets. Cook (1999) points out that trade credit may be a very useful tool of financing in these countries because of the advantage in information for suppliers, as compared to banks.

To provide evidence on the role of trade credit in transition economies, it is therefore of utmost interest to investigate the determinants of trade credit extension in transition economies. This is indeed motivated by three main objectives. Firstly, empirical studies in developed countries generally put into evidence two main categories of motives: financial and commercial motives (Pertersen and Rajan, 1997). It is therefore relevant to analyse whether the determinants of trade credit are similar in transition countries and in Western European

countries in the perspective of the EU enlargement. Indeed Demirgüç-Kunt and Maksimovic (2001) emphasize the link between the characteristics of trade credit use and the country's development. They observe that the development of the banking and legal systems favours the use of trade credit. Consequently, similarities in determinants of trade credit may support an optimistic view of the future economic evolutions of the transition European economies.

Secondly, it is interesting to test the persistence of soft budget constraints through soft trade credit in European transition countries. The importance of trade credit financing for non-profitable companies may therefore support or invalidate the negative role of trade credit use in these countries.

Thirdly, the relative financial development among European transition countries has to be compared. Indeed, these countries may notably have a very different behaviour in the use of trade credit, which may support a differentiated persistence of soft trade credit. This may reveal differences in the financial development in transition countries, especially if we observe similar groups in terms of trade credit among countries than those observed in terms of development of banking and financial systems. Indeed, Berglöf and Bolton (2002) point out the existence of a "great divide" between advanced and backwarded transition countries, the latter being Bulgaria, Romania, but also former USSR countries excepting Baltic countries.

In spite of the relevance of this issue, empirical literature is very scarce on the determinants of trade credit in transition countries. Hammes (2003) investigates these determinants on a sample of Polish and Hungarian companies. However his sample is very small with 58 companies and does only consider listed companies. Now trade credit can particularly be a substitute to bank credit for small and medium-sized companies, as large companies are generally expected to be less credit-rationed. Coricelli (1996) analyses the determinants of trade payables between 1992 and 1994. However, his analysis is limited to Polish companies, as well as the early years of transition, whereas the financial behaviour of companies may nowadays be very different.

The aim of this paper is therefore the investigation of the determinants of trade credit in transition countries. To assess these determinants on both sides of the balance sheet, we consider regressions of the ratio of trade payables to total assets and of the ratio of trade receivables to turnover on a set of variables. These regressions are performed in nine Central and Eastern European countries, all already planned to join the European Union, on a large sample of about 9 300 companies from Amadeus database for 1999 and 2000.

The structure of the paper is as follows. Section 2 provides a brief survey of the theories of trade credit extension. Section 3 develops the sources of financing for companies in transition countries. Section 4 describes the data and variables. Section 5 develops the empirical results. Finally, we provide some concluding remarks in section 6.

2. Theories of trade credit extension

Theories explaining why non-financial firms involve in trade credit fall into two categories: financial and commercial motives. We briefly present these theories.

2.1 Financial motives

According to financial motives, firms benefiting from an easy access to credit markets are able to use this borrowing capacity and act as financial intermediaries in favour of firms that suffer from limited access to credit (Emery, 1984; Schwartz, 1974). Suppliers may involve in credit activity as they hold a comparative advantage over traditional lenders in the resolution of information asymmetries. This triple advantage concerns information acquisition, enforcement of the contract, and liquidation process.

Firstly, suppliers have a better capacity to investigate the creditworthiness of buyers (Biais and Gollier, 1997; Jain, 2001). They have a better knowledge on the industry-wide economic climate. They also collect periodic information concerning the buyer's financial health in the normal course of business relationships. Smith (1987) also suggests that two-part payment terms allow sellers to identify risky borrowers.³ Foregoing the discount tied to early payment is costly for buyers, as there is a high implicit interest rate if they use the full credit period. This behaviour reveals a limited access to credit markets and may then be interpreted as a signal of financial difficulty - and a need for closer monitoring.

Secondly, suppliers benefit from a better ability to monitor their borrower, thus reducing moral hazard. Suppliers may threaten their clients to cut off future supplies if their risky behaviour compromises the probability of repayment (Cunat, 2003). This threat is particularly credible if the buyer is dependent on its supplier and accounts for a small part of the supplier's sales, or if specific products generate sunk costs.

³ Two-part offers induce early payment incentives, as they provide buyers a discount for an early payment. If the buyer foregoes this discount, the total amount of the invoice is due within the full period.

Thirdly, suppliers have an advantage in credit recovering if default occurs, because of the nature of collateral (Frank and Maksimovic, 1998). They bear lower seizure and resale costs than financial institutions. Mian and Smith (1992) find evidence that durable goods have a higher collateral value and favour credit extension.

Because of this triple advantage, suppliers reduce credit risk and may be induced to extend credit when banks face too high costs to grant a credit. Empirical evidence on US firms confirms this substitution between bank and trade credit for rationed firms. Petersen and Rajan (1997) find that small firms which do not have long-term banking relationships resort more on trade credit as a significant source of financing. During the phases of monetary contraction, small firms, probably more affected by credit rationing, compensate the lack of bank credit by increasing levels of trade payables (Nilsen, 2002).

2.2 Commercial motives

There are also commercial motives of trade credit extension. Ferris (1981) focuses first on trade credit as a way to reduce transaction costs, as it allows trade partners to disconnect the delivery of goods from payment and to regroup several invoices, especially in case of frequent purchases. Suppliers are then able to forecast more accurately cash inflows, then minimizing cash balance requirements.

Furthermore, the use of trade credit, which reduces effective prices as well as cash requirements, may be an active strategy of sales support or price discrimination. Suppliers are inclined to offer their financial support because they have an interest in the survival of their clients. They have made a sunk investment in their long-term relationship, and have consequently an implicit stake in the buyer. The credit extension is motivated by expected profits on future sales resulting from the preservation of the trade relationship.

Terms of payment are also a way of modifying the effective price of goods sold: net present value of price decreases as the delay of payment lengthens. Trade credit then allows sellers to discriminate among clients and to reach a segment of demand characterised by higher price elasticity due to credit rationing. Trade credit then constitutes a disguised pricing policy enabling firms to circumvent price restrictions and avoid rivals reactions (Schwartz and Whitcomb, 1979; Brennan *et al.*, 1988).

Petersen and Rajan (1997) find empirical evidence that US firms with high profit margins are inclined to use trade credit to induce additional sales. Emery (1987) considers that firms use trade credit to face demand fluctuations, offering longer delays of payment in

order to encourage sales in downturns. Indeed, firms experiencing variable demand tend to grant more trade credit than others, as observed by Long, Malitz and Ravid (1993) on US firms.

Because of this implicit modification of prices, trade credit constitutes a strategic tool, which affects the channel profit allocation between firms. Substantial credit comes from an involuntary mechanism of economic dependence, and reflects the relative power of trade partners (Wilner, 2000).

An alternative theory considers trade credit as a way for suppliers to offer implicit quality guarantees (Smith, 1987; Lee and Stowe, 1993; Emery and Nayar, 1998). Buyers consider trade credit extension as a signal of confidence, as the credit period gives them the time to assess product quality before paying. Long *et al.* (1993) show that young and small firms tend to grant more credit than firms benefiting from a well-established reputation. This argument is supported by Deloof and Jegers (1996) on Belgian firms.

3. The sources of financing for companies in transition countries

We now briefly describe the main characteristics regarding the sources of financing for companies in transition countries, and focus on the specificities of trade credit in these countries.

The first characteristic is the limited access to bank credit, underlined by the low level of financial intermediation in transition countries. The ratio of credit to private sector divided by GDP clearly shows a weak volume of bank loans granted to companies, as can be seen in table 1. This low ratio of loans relative to GDP may be explained by two main elements. The first one is the weakness of the ratio of deposits to GDP in these countries, which is only one third of the Euro area's (Caviglia *et al.*, 2002), as can be observed with the ratio of broad money to GDP. Resulting notably from the consumers' habits of the old regime, this characteristic strongly limits the amount of funds to be lent by banks. However, the low amount of deposits explains only partly the low amount of loans.

The second element concerns the risk-averse loan behaviour of banks. Indeed, Riess *et al.* (2002) consider that banks mobilize more funds than they lend, and consequently conclude to a risk-averse loan behaviour of banks. This risk aversion notably results from the high volumes of bad loans for banks in transition countries during the nineties, which still

exist in some countries⁴. This souvenir favours therefore a particularly cautious behaviour in the attribution of new loans. Moreover, the weak protection of creditors and the low availability of collaterals contribute to limit the loans granted by banks, and in particular long-term loans. This risk-averse behaviour of banks is supported by the observation of credit rationing by Hersch *et al.* (1997) in Hungary, and Bratkowski *et al.* (1998) in the Czech Republic, Hungary, Poland.

Table 1: Banking sector indicators

	Broad money / GDP	Credit to private sector / GDP
Bulgaria	36.5	12.2
Czech Republic	77.6	43.8 ^a
Estonia	49.2	25.9
Hungary	46.3	23.2
Lithuania	29.4	19.6
Latvia	23.3	10.1
Poland	42.0	18.8
Romania	22.0	7.2
Slovakia	58.9	37.6

Source: Bonin and Wachtel (2003). Data for 2000, except ^a in 1999.

The second characteristic is the important share of equity in the financial structure of companies. Table 2 shows the median ratios of equity to total balance sheet in the nine transition countries of our study. We observe values ranging from 35 and 50 % in most countries. This high level of capitalization mainly results from the difficulties to find external financing for companies in transition countries. Pissarides *et al.* (2000) support this view by observing from surveys of Bulgarian and Russian firm managers that one quarter mentions financing problems as constraints. These difficulties to obtain financing are notably due to the limited access to bank credit. Indeed, Bratkowski *et al.* (1998) point out that the high capitalization ratio in transition economies is the consequence of the reluctance of banks to provide loans.

The third characteristic is the relative importance of trade credit in financial structure. In comparison to total balance sheet, trade credit is not very high with median ratios ranging on average between 12 and 25 %. But its level relative to total liabilities is quite large with median ratios generally ranging from 30 to 50 %.

⁴ The ratio of bad loans to total loans was still 19.3 % in the Czech Republic, 26.2 % in Slovakia, and 32.5 % in Ukraine (figures from Bonin and Wachtel, 2003).

Table 2: Financial structure ratios

	Equity / Total Balance Sheet	Trade payables / Total balance sheet	Trade payables / Total liabilities
Bulgaria	42.01	23.33	49.19
Czech Republic	41.60	24.14	46.96
Estonia	43.20	17.03	36.09
Hungary	38.53	11.98	21.46
Lithuania	52.16	14.25	33.16
Latvia	37.26	18.38	34.15
Poland	35.99	20.24	37.17
Romania	36.89	15.51	27.57
Slovakia	48.05	19.67	44.44

Source : computations from the authors on the sample used in this paper and described in section 4. Data for 2000 from Amadeus database. Median values are presented.

Consequently, trade credit is an important source of external financing in transition countries. Several reasons can explain this observation. A first reason is the limited access to bank credit, as mentioned above. As Fisman and Love (2003) suggest, trade credit may provide an alternative source of funds for firms in countries with poorly developed financial markets. A second reason is the heritage from the vast system of inter-enterprise relationships during the communist era, which favours the persistence of large trade credit because of old habits and of personal relations between firm managers.

A third reason may be the persistence of a soft budget constraint through the use of trade credit. A soft budget constraint is a situation in which a company manages to survive even though it makes persistent losses (Kornai, 1980). Although also known in developed countries, this situation was well-known under socialism where the State could not commit not to bail out unprofitable companies. The persistence of soft budget constraints in transition countries would be negative, as it may prevent restructuring of unprofitable companies and sector reallocation.

The most notable situation of a soft budget constraint is the persistence of budgetary subsidies, preventing the bankruptcy of loss-making companies. Nevertheless, as Kornai (2001) mentioned, the soft budget constraint can take other forms than fiscal subsidies : soft taxation, soft bank credit, wage arrears and finally soft trade credit. Therefore, companies may have been inclined to use these different forms to survive even though they make losses, or even - if they were not in financial danger - to improve their low earnings.

Consequently, trade credit may be used in transition countries to prevent bankruptcy of companies. From the supplier's point of view, it can be done on a voluntary basis, when the supplier prefers to lengthen delays of payment than facing a bankruptcy of his client, or on an

involuntary basis, when the buyer decides not to pay back his trade payables. Though it could be observed in developed countries, evidence regarding soft budget constraints in transition countries nevertheless underlines the higher potential role of trade credit in such a constraint in this particular context. Furthermore, the less-constraining legislation on the protection of creditor rights allows a larger use of trade credit on an involuntary basis.

Schaffer (1998) however minimises the role of trade credit as a form of softening budget constraints of companies in transition countries. He concludes that a soft budget constraint still exists in these countries, but mainly through tax arrears. Indeed, his analysis shows that the ratios of trade credit to GDP and overdue trade credit to GDP are not larger in transition countries than in developed countries. However Kornai (2001) is less affirmative regarding the absence of soft trade credit. He considers that a high proportion of involuntary trade credit in transition countries denotes the existence of a soft budget constraint.

4. Data and variables

The sample includes 9 273 companies from nine Central and Eastern European countries.⁵ All of these countries are candidates to the membership or future members of the European Union. We use unconsolidated balance sheet data for 1999 and 2000, which are extracted from Amadeus database edited by Bureau Van Dijk. To be included in the Amadeus database, companies have to fulfil at least one of the following criteria: turnover greater than 10 million euros, number of employees greater than 150, total assets greater than 10 million euros. In other words, Amadeus database does not include very small companies.

Our choice to work on unconsolidated balance sheet data stems from the fact that Amadeus database only provides unconsolidated data for the countries of our study. Furthermore, Rajan and Zingales (1995) pointed out that the choice of using consolidated data leads to an increase of the indebtedness ratio in the year when a firm moves to consolidate accounts.

The aim of this work is to analyse the determinants of trade credit extended and received. We therefore use two explained variables: the ratio of trade payables to total assets (TP), and the ratio of trade receivables to turnover (TR). The usual measure to assess the

⁵ The sample includes 433 companies from Bulgaria, 1599 from the Czech Republic, 370 from Estonia, 342 from Hungary, 362 from Latvia, 192 from Lithuania, 3493 from Poland, 2181 from Romania, and 301 from Slovakia.

relative importance of trade payables is the ratio of trade payables to cost of goods sold, as trade payables are bundled to purchases of goods. However we do not use this ratio, because of missing data for a large number of observations in the database. We adopt the Tukey box-plot, based on the use of interquartile range, in order to clean the sample data from outliers. Firms with observations out of the range defined by the first and third quartiles more or less one and half the interquartile range were excluded for the two ratios used as explained variables in the analysis. We present first the variables by developing the assumptions on their relationship with the ratio of trade payables, before explaining those on the link with the ratio of trade receivables. These assumptions are derived from the trade credit theories mentioned above.

We now present the determinants we retain to explain the amount of trade credit that firms receive from their suppliers. Firstly, we assess the impact of the company's size. The variable ASSETS, defined as the logarithm of total assets, measures this size. This variable is designed to test two opposite hypotheses. On the one hand, size is a proxy for reputation, as large established companies may be considered as less risky. Therefore, we should expect a positive link between size and TP, as suppliers are more inclined to extend credit to large firms. On the other hand, large companies are supposed to have a better access to bank credit. If substitution between bank credit and trade credit exists, we should then observe a negative link between size and TP.

We then consider profitability with the variable PROFIT, which is the ratio of profit before tax to turnover. Two opposite effects of profitability on trade payables ratio can be suggested. Firstly, suppliers value high profitability as it reduces risk of default: consequently, a positive relationship between profitability and trade payables ratio may be observed. Furthermore, suppliers may be motivated by commercial motives to extend credit. Indeed, the most profitable firms have a higher life expectancy and therefore their suppliers are inclined to invest in a long-term relationship. However, high profitability is also considered as a positive signal for banks, and should therefore relax rationing in bank credit. If a substitution effect exists, we should then expect a negative link. Apart from these arguments, it has also to be stressed that the existence of a soft budget constraint through soft trade credit should allow less profitable companies to benefit from more trade credit from their suppliers.

GROWTH is measured by the growth rate of turnover between 1999 and 2000. In a similar line of reasoning than size and profitability, a high growth is positively valued by banks and suppliers, as it is generally considered as a positive signal for the health of the company. Therefore, the relationship between growth and trade payables ratio may be either

positive or negative, depending on the substitution or complementarity between bank and trade credit. It can be argued that growth is more valued by suppliers than banks. Indeed the growth of sales is only considered as an indicator of the firm's health by banks, while suppliers are also highly concerned by the increase of their own sales.

LEVERAGE is the ratio of short-term bank loans to total assets. It assesses the substitutability or complementarity between bank loans and trade payables as short-term sources of financing. If bank loans and trade payables were substitutable, we would observe a negative link between this variable and trade payables ratio, while the link would be positive if they are complementary.

We also include in each regression industry dummy variables to control for the well-known impact of industry structures and payment customs. We use an industry classification in six industries: wholesale trade, retail trade, other services, manufacturing, building, and agriculture.

Finally, we consider the following model :

$$TP = a + b_1 ASSETS + b_2 PROFIT + b_3 GROWTH + b_4 LEVERAGE + \sum_{i=5}^9 b_i INDUS TR Y_i$$

We now turn to the assumptions on the determinants of the ratio of trade receivables to turnover. We first include the variable EQUITY, defined by the ratio of equity to total assets. Indeed, the supplier's ability to offer trade credit to his clients depends on his own access to funds. Therefore, as this variable proxies internal funds availability, we should expect a positive link with the ratio of trade receivables. This assumption is in accordance with the financial motive according to which suppliers play a financial intermediary role to the benefit of their clients that are unable to raise funds through other channels.

Size, measured by the ASSETS variable, can influence trade receivables in two different directions. On the one hand, a larger size means a higher relative bargaining power in trade relations between suppliers and clients. Consequently, large companies should be more reluctant to hold large amounts of costly trade receivables, and may impose stricter conditions of payment to their clients. On the other hand, as large companies are supposed to have a better access to funds, the financial motive lets us expect that large companies should then be more in a position to grant trade credit to their clients.

The variable PROFIT, measuring profitability, may be positively linked with trade receivables ratio, as more profitable firms are more inclined to grant trade credit to their

clients, because of their better financial situation. On the contrary, non-profitable firms may exhibit a higher trade receivables ratio: clients noticing their supplier's difficulties may also take advantage of his fragility to postpone their payment. Indeed distressed firms are not in a position to enforce payment of receivables, as they are dependent on their remaining clients.

This argument may also explain a negative link between GROWTH and trade receivables ratio. Furthermore, we can stress that distressed firms may extend more credit in order to boost depressed sales. Nevertheless, a positive relationship may be observed: growing companies experiencing may have implemented a more aggressive commercial strategy. Indeed the increase of sales may be the result of more favourable conditions of payment.

We consider again the impact of the industry environment by including in the model industry dummies as presented before. Finally, the following model is regressed:

$$TR = a + b_1 ASSETS + b_2 PROFIT + b_3 GROWTH + b_4 EQUITY + \sum_{i=5}^{\xi} b_i INDUS TR Y_i$$

Table 3 displays the descriptive statistics by country. Several conclusions emerge from the analysis of the descriptive statistics of the sample. Firstly, the mean trade receivables ratio ranges from 8.65 % in Estonia to 17.72 % in Lithuania, while the mean trade payables ratio ranges from 15.11 % in Hungary to 29.04 % in the Czech Republic. Therefore, we can point out quite large differences in the use of trade credit among transition countries. In comparison to Western countries, these ratios have a rather similar order of magnitude. Indeed Petersen and Rajan (1997) observe on a sample of US companies a trade receivables ratio of 7,3 % for small firms and 18,5 % for large firms. Mian and Smith (1992) and Pike *et al.* (1998) both report a trade payables ratio of 21 % for US and UK firms respectively. Deloof and Jegers (1999) observe a mean value of 27.9 % on a sample of Belgian companies.

Secondly, the financial structure of companies shows a high level of capitalization and a low level of short-term bank loans, as described above in section 3. Thirdly, profitability is rather weak even if differences are quite large across countries, with some negative mean values in Bulgaria and Lithuania. Fourth, the mean growth rates are very high. These means should however be considered relative to high inflation rates in transition countries, reaching 45.8 % in Romania in 2000. The impact of exchange rates fluctuations between local currencies and dollar, in which all data are converted, could also play a role.

Table 3

Descriptive statistics for variables

The full sample consists of 9 273 firms across 9 countries. Information is extracted from the Amadeus database for the year 2000, except the variable GROWTH for the years 1999 and 2000.

TR the ratio of trade receivables to turnover, TP the ratio of trade payables to total assets, EQUITY the ratio of equity to total assets in 2000, ASSETS the logarithm of total assets, PROFIT the ratio of profit before tax to turnover, LEVERAGE the ratio of short-term bank loans to total assets in 2000, GROWTH the ratio of the variation in turnover between 1999 and 2000 to turnover in 1999.

All variables are in percentage, except ASSETS.

Mean values are displayed for each variable, standard deviations are in brackets.

	Bulgaria	Czech Rep.	Estonia	Hungary	Lithuania	Latvia	Poland	Romania	Slovakia
N	433	1599	370	342	192	362	3493	2181	301
TR	13.49 (9.97)	15.66 (8.07)	8.65 (5.34)	11.27 (7.61)	17.72 (10.02)	12.89 (7.92)	15.62 (8.40)	13.56 (9.68)	16.90 (9.50)
TP	28.41 (23.33)	29.04 (10.28)	21.27 (16.66)	15.11 (11.87)	19.68 (16.30)	23.30 (19.19)	25.07 (18.92)	19.24 (14.73)	24.52 (17.57)
EQUITY	40.14 (29.60)	39.63 (25.76)	43.86 (23.49)	39.73 (28.53)	49.52 (24.67)	38.86 (26.26)	36.36 (26.92)	35.30 (27.50)	46.11 (25.48)
PROFIT	-1.94 (12.51)	0.64 (6.97)	4.39 (10.77)	1.40 (6.11)	-0.09 (10.54)	2.25 (9.70)	0.51 (9.91)	2.92 (13.21)	-0.63 (9.43)
LEVERAGE	12.38 (13.96)	14.30 (12.82)	10.38 (10.88)	3.58 (5.42)	10.98 (11.39)	13.83 (14.19)	15.57 (14.34)	11.87 (12.48)	11.19 (11.41)
GROWTH	14.35 (47.32)	14.44 (49.68)	24.44 (48.88)	10.64 (41.63)	17.77 (56.35)	16.61 (55.44)	19.58 (50.36)	12.93 (55.26)	1.61 (33.55)
ASSETS	7.71 (1.55)	8.76 (1.34)	8.10 (1.24)	8.50 (1.19)	8.83 (1.30)	8.01 (1.32)	8.93 (1.24)	7.42 (1.38)	8.75 (1.39)

5. Results

This section is devoted to the presentation of our results on the determinants of trade credit. We first present the determinants of the trade payables ratio in table 4, before displaying the results for the trade receivables ratio in table 5.

Based upon the individual t-statistics and the value of the R^2 statistic, the fit of the equations is quite satisfactory with adjusted R^2 ranging from 0.0405 to 0.3167 with trade payables ratio, and ranging from 0.0740 to 0.2083 with trade receivables ratio.⁶ We use the condition index of Besley, Kuh and Welsch (1980) to assess the collinearity of the model. Following the propositions of these authors, the multicollinearity is considered as very weak for an index below 10, moderate when the index ranges from 10 and 30, excessive and biasing the estimations if the index is above 30. The computation of the condition index exhibits indices ranging from 17.76 to 26.84 for both regressions. We can then conclude that multicollinearity between explanatory variables remains acceptable in our estimations.

To begin with, we comment the determinants of the trade payables ratio. First of all, the variable PROFIT is significantly negative in all countries, except Lithuania and Hungary. As profitability increases, firms tend to reduce their recourse to trade credit financing. This sign seems to prove that there is a better access to bank credit for profitable firms. In the other way, it may also support the existence of a soft budget constraint in these countries, as less profitable firms may postpone their payments to their suppliers.

The initial inclusion of the GROWTH variable is inconclusive: it is only significant in three countries. Following Petersen and Rajan (1997), we then consider two distinct variables reflecting divergent increase (GRPOS) and decrease (GRNEG) of sales. Results show that GRPOS is significantly positive in all countries, except Hungary and Slovakia. This suggests that suppliers invest in commercial relationships with growing firms, to which they willingly provide financial support. GRNEG is only significantly positive in four countries (the Czech Republic, Lithuania, Poland, Romania). It means that in these countries suppliers act as classical financial intermediaries and try to limit their risk: they tend to reduce the amount of credit granted to clients suffering from a decrease of sales, as growth is negatively associated with probability of default. The absence of a significant negative relationship in other countries tends to suggest the existence of an opposite influence. This effect may result either

from the commercial incentives for companies to support clients experiencing a temporary fall of turnover, or from the difficulties of these clients to pay their invoices on time and their tendency to accumulate account overdue.

We clearly observe a significant and negative relationship with ASSETS in all countries, except Estonia and Hungary. It is then consistent with the hypothesis of substitution between bank and trade credit: larger firms with better access to bank credit hold significantly less trade payables compared to small ones. According to Petersen and Rajan (1997), it could also be argued that growth opportunities are typically thought to decrease with firm size. Smaller firms may have a higher demand of trade credit than larger ones, in order to finance these growth opportunities.

Finally, the variable LEVERAGE is significantly negative in five countries (Bulgaria, Estonia, Hungary, Poland, Romania). This provides support to the hypothesis of substitution between trade payables and bank loans in these countries, whereas we cannot conclude between substitution and complementarity in the four other countries.

We now turn to the regressions of the trade receivables ratio. As before, we choose to assess the impact of growth with two distinct variables for increase (GRPOS) and decrease (GRNEG) of sales. GRPOS is not significant in all countries, except Romania. This suggests the counterbalancing influences of two opposite behaviours. On the one hand, healthy firms that experience increase of sales lengthen terms of payment to their clients for commercial purposes. On the other hand, these firms are less dependent on their clients, and can consequently influence the commercial negotiations to their favour by reducing delays of payment. This negative effect seems to dominate in Romania.

GRNEG is significantly negative in four countries – Bulgaria, Czech Republic, Poland and Romania. Firms experiencing sales decline have therefore significantly higher trade receivables ratio. This may be explained by the fact that firms try to limit this decline by offering more favourable terms of payment.

Following inconclusive results, PROFIT is also included in the regression through two distinct variables for gains (PROFPOS) and losses (PROFNEG). We then observe a positive and significant sign for the variable PROFPOS in four countries (Bulgaria, Czech Republic, Poland, Romania). This positive relationship supports the argument that profitable firms transfer liquidities to their clients through trade credit. Furthermore, the PROFNEG variable

⁶ As a comparison, the adjusted R² ranges respectively from 0.15 to 0.20 and from 0.14 to 0.31 with the trade

is significantly negative in four countries (Czech Republic, Hungary, Lithuania, and Slovakia). This sign can be explained by the fact that distressed companies are in a deteriorated position of negotiation and are then unable to obtain fast payment from their clients.

ASSETS is significantly positive in all countries, except Lithuania. This suggests that large companies benefiting from a better access to bank credit are more inclined to grant trade credit to their clients. It is in concordance with the negative relationship we observed between this variable and trade payables ratio, supporting a better access to bank credit for large companies. Therefore, while this sign supports the financial motive, it does not provide evidence in favour of the commercial motive according to which larger companies use their higher bargaining power in trade negotiations.

We find mixed results for EQUITY: it is significantly positive in Hungary and Slovakia, significantly negative in Estonia, Poland, and Romania, while non significant in the four remaining countries. Results on PROFIT and ASSETS have suggested the existence of a transfer of funds, which should explain here a positive sign. However, the existence of a negative sign in some countries denotes an opposite influence. This negative relationship may be based on the expectations of clients: the lower the capitalization of a supplier because of cumulating losses, the more likely his bankruptcy. Therefore clients have more incentives not to pay back invoices. It could also be argued that the difficulties to obtain long-term bank loans in transition countries may explain the absence of relationship between equity and trade receivables ratio, even if there is a transfer of funds. Indeed, these difficulties of financing lead firms to use in priority equity to finance fixed assets, and therefore to resort to short-term funds to finance trade credit.

Finally, it has to be stressed that some industry dummy variables are significant in each country and each regression, suggesting that customs of payment vary across industries.

We now try to draw together the evidence we have accumulated about the determinants of trade credit in transition countries. Firstly, there are differences among transition countries regarding these determinants. It is of the utmost interest to observe that these differences do not underline the existence of several groups of countries, as the differences greatly vary depending on each determinant. Therefore, we do not observe a “great divide” between advanced and backwarded transition countries as the one put into evidence by Berglöf and

payables and the trade receivables ratios in Petersen and Rajan (1997).

Bolton (2002) in terms of banking and financial systems' development. Then regarding the differences among countries, it appears particularly difficult to provide some interpretations, as there are no groups of countries emerging from the results for all determinants. As a consequence, factors such as the legal protection of creditors, the credit to private sector relative to GDP, or the real bank rates on loans do not provide satisfactory clues for interpretation of the differences in determinants between countries.

Secondly, the results on trade payables ratio provide evidence in favour of a better access to bank credit for better-valued firms. Indeed, our conclusions on the positive sign of size and profitability support this relationship, which is also suggested by the observation of a substitution effect between bank loans and trade payables through the negative sign of leverage. This suggests that trade credit financing is lower in the "pecking order" than bank credit: companies gaining access to financial markets reduce their demand for trade credit.

Thirdly, the results on trade receivables ratio suggest that larger and more profitable suppliers play a role of transfer of funds in favour of their clients. This is consistent with the financial motive of trade credit extension. As traditional financial intermediaries, suppliers limit their risk exposure and tend to reduce their support to highly distressed firms. However, in some countries, firms accumulating losses seem to benefit from a short budget constraint through trade credit.

Fourthly, evidence is mixed on the commercial motives. On the one hand, the relationship between trade receivables ratio and sales growth is inconclusive: we cannot conclude that higher sales may result from a more aggressive commercial strategy. On the other hand, results show that suppliers suffering from either sales decline or losses have longer delays of payment. This could stem from a reaction of suppliers, willing to counteract the decrease of turnover and profits. However, these results also support the hypothesis that there is an involuntary mechanism of economic dependence: Clients may exploit suppliers' fragility to postpone their payment, as they know that suppliers are not in a position to ensure the respect of contractual terms. Finally, larger firms, which are typically thought to hold a higher bargaining power in trade negotiations, do not seem to exploit this advantage to impose to their clients stricter conditions of payment.

Table 4

Trade payables: Results of the regression model

(i) The explained variable is the ratio of trade payables to total assets.

(ii) ASSETS the logarithm of total assets, PROFIT the ratio of profit before tax to turnover, LEVERAGE the ratio of short-term bank loans to total assets, GROWTH the ratio of the variation in turnover between 1999 and 2000 to turnover in 1999 (GRPOS is equal to GROWTH if GROWTH is positive, else to zero; GRNEG is equal to GROWTH if GROWTH is negative, else to zero).

(iii) *, **, *** denote an estimate significantly different from 0 at the 10%, 5%, or 1% level.

(iv) The results for the industry dummy variables are not reported.

	Bulgaria	Czech Rep.	Estonia	Hungary	Lithuania	Latvia	Poland	Romania	Slovakia
N	433	1599	370	342	192	362	3493	2181	301
Intercept	0.451*** (6.59)	0.613*** (17.73)	0.382*** (7.14)	0.080 (1.33)	0.431*** (4.15)	0.482*** (7.33)	0.623*** (23.93)	0.283*** (12.87)	0.705*** (10.20)
PROFIT	-0.208*** (-2.77)	-0.342*** (-5.08)	-0.349*** (-4.91)	-0.166 (-1.55)	-0.108 (-0.98)	-0.246** (-2.58)	-0.253*** (-8.78)	-0.163*** (-6.58)	-0.264*** (-2.62)
GRPOS	0.074*** (3.20)	0.038*** (3.94)	0.029* (1.76)	0.444 ^E -3 (0.03)	0.077*** (3.69)	0.054*** (2.95)	0.023*** (3.71)	0.041*** (6.52)	0.025 (0.79)
GRNEG	0.086 (1.18)	0.106** (2.19)	0.144 (1.33)	-0.019 (-0.33)	0.183* (1.78)	0.114 (1.29)	0.135*** (4.72)	0.136*** (5.63)	0.113 (1.29)
ASSETS	-0.033*** (-5.51)	-0.029*** (-8.61)	0.010 (1.60)	0.002 (0.27)	-0.028*** (-3.26)	-0.020*** (-2.68)	-0.025*** (-11.14)	-0.006*** (-0.39)	-0.042*** (-6.10)
LEVERAGE	-0.220*** (-3.34)	-0.034 (-0.94)	-0.202*** (-2.90)	-0.302** (-2.48)	-0.028 (-0.29)	-0.060 (-0.90)	-0.122*** (-6.03)	-0.049** (-1.98)	-0.061 (-0.75)
Adjusted R ²	0.1678	0.1621	0.3167	0.0405	0.2190	0.2156	0.2463	0.0719	0.2251
Condition index	19.20	19.82	19.90	23.54	24.36	19.43	23.27	17.76	19.83

Table 5

Trade receivables: Results of the regression model

(i) The explained variable is the ratio of trade receivables to total assets.

(ii) EQUITY the ratio of equity to total assets, ASSETS the logarithm of total assets, PROFIT the ratio of profit before tax to turnover (PROFPOS is equal to PROFIT if PROFIT is positive, else to zero; PROFNEG is equal to PROFIT if PROFIT is negative, else to zero), GROWTH the ratio of the variation in turnover between 1999 and 2000 to turnover in 1999 (GRPOS is equal to GROWTH if GROWTH is positive, else to zero; GRNEG is equal to GROWTH if GROWTH is negative, else to zero).

(iii) *, **, *** denote an estimate significantly different from 0 at the 10%, 5%, or 1% level.

(iv) The results for the industry dummy variables are not reported.

	Bulgaria	Czech Rep.	Estonia	Hungary	Lithuania	Latvia	Poland	Romania	Slovakia
N	433	1599	370	342	192	362	3493	2181	301
Intercept	-0.064* (-1.76)	0.019 (1.26)	0.723E-3 (0.04)	-0.101*** (-2.99)	0.052 (0.76)	-0.034 (-1.16)	0.003 (0.24)	0.009 (0.64)	-0.658E-3 (-0.02)
EQUITY	-0.009 (-0.52)	0.010 (1.26)	-0.024* (-1.82)	0.037*** (2.82)	-0.025 (-0.82)	-0.018 (-1.06)	-0.018*** (-3.08)	-0.054*** (-6.93)	0.047** (2.06)
PROFPOS	0.171* (1.81)	0.110* (1.85)	0.036 (0.99)	0.140 (1.44)	-0.115 (-0.63)	-0.040 (-0.53)	0.080*** (2.87)	0.185*** (6.87)	-0.160 (-1.14)
PROFNEG	-0.065 (-1.26)	-0.110*** (-2.91)	0.026 (0.45)	-0.225** (-2.28)	-0.222** (-2.31)	-0.099 (-1.56)	-0.010 (-0.51)	-0.013 (-0.51)	-0.137* (-1.86)
GRPOS	0.016 (1.29)	0.002 (0.59)	0.287E-3 (0.05)	-0.010 (-1.00)	-0.020 (-1.42)	0.369E-4 (0.00)	0.005 (1.60)	-0.007* (-1.73)	-0.024 (-1.31)
GRNEG	-0.075** (-2.01)	-0.139*** (-6.62)	-0.063 (-1.58)	-0.027 (-0.79)	-0.070 (-1.020)	-0.041 (-1.03)	-0.048*** (-3.37)	-0.069*** (-4.35)	0.075 (1.46)
ASSETS	0.017*** (5.45)	0.006*** (4.19)	0.007*** (3.20)	0.018*** (5.32)	0.008 (1.36)	0.013*** (3.92)	0.012*** (10.30)	0.014*** (9.19)	0.008* (1.91)
Adjusted R ²	0.0994	0.1028	0.0912	0.2083	0.1024	0.1086	0.0740	0.0870	0.1048
Condition index	20.86	21.38	21.99	25.04	26.88	20.91	24.82	18.93	21.49

This evidence is to be compared with empirical studies concerning developed countries. When comparing with results on Western economies, we find the same substitution effect between bank credit and trade credit as Petersen and Rajan (1997) and Deloof and Jegers (1999). Both studies observe a negative relationship between trade payables ratio and short-term leverage for US and Belgian firms respectively. It has to be noted that Ono (2001) in Japan and Elliehausen and Wolken (1993) in the US view bank and trade credit as complements. Marotta (2001) and Demirguc-Kunt and Maksimovic (2001) also observe a positive relationship with assets for Italian and worldwide companies, unlike Petersen and Rajan (1997). But the latter note that “the positive relationship between firm size and accounts payable therefore comes mainly from the fact that large firms are offered more trade credit – presumably because they are better risks – not because they have greater demand to borrow from their suppliers” (p.684). Our results concerning the impact of growth and profitability are also consistent with Petersen and Rajan (1997), Deloof and Jegers (1999), Marotta (2001) and Ono (2001).

A few studies only consider the determinants of trade receivables ratio. Concerning this trade credit offer by suppliers, Petersen and Rajan (1997) also observe that larger firms are characterized by a higher trade receivables ratio. Demirguc-Kunt and Maksimovic (2001) nevertheless find an opposite influence. Furthermore, Petersen and Rajan (1997) and Marotta (2001) support the fact that firms suffering from losses and sales decline tend to extend more credit than others. Consequently, we can not provide clear conclusions on the similarities or differences in determinants of trade credit between developed and transition countries in Europe. Indeed, we do find some similarities between countries of both groups. However, on the one hand, there are different results provided by empirical studies on developed countries. On the other hand, our results on transition countries do not show some generalized determinants of trade credit in all these countries.

6. Conclusion

The research presented has analyzed the determinants of trade credit in nine transition countries from Central and Eastern Europe. Our main result is the existence of differences among countries regarding these determinants. Indeed we observe some common

characteristics for the use of trade credit in all investigated transition economies. Furthermore, the analysis of these cross-country differences does not allow the emergence of a classification of transition countries following legal or financial criteria, as there are no groups of countries with similar determinants of trade credit. In spite of the lack of generalized patterns among transition countries, we can however make some conclusive remarks to interpret our results.

We provide support to the financial motive of the extension of trade credit, meaning that suppliers act as financial intermediaries in favour of firms with a limited access to bank credit. This result then does not reject the hypothesis of the persistence of a soft budget constraint through soft trade credit. Furthermore, we rather support the substitution between trade and bank credit. Our results on the role of commercial motives in the extension of trade are less conclusive. We mainly support the view that clients exploit the financial fragility of their suppliers.

Therefore, our work provides new evidence for a better understanding of the financial behavior of companies in transition economies. These results should however be considered with care, as literature on this topic remains very scarce. The scope for further research is obvious. In particular, a simple comparison of the major conclusions of earlier studies concerning Western economies seems to show differences in firms' behaviour among countries. Therefore, it would be of utmost interest to directly compare determinants in a comprehensive study implying both developed and transition countries.

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