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Accounts Receivable and Accounts Payable in Large Finnish Firms' Balance Sheets: What Determines Their Levels?

ABSTRACT

This study empirically examines the determinants of Finnish listed firms' accounts receivable and accounts payable. The results show that accounts receivable are most likely to be affected by the firms' incentive to use trade credit as a means of price discrimination. Increases in the interest rate level also increases the amount of accounts receivable through increased demand for trade credit. The most important determinants for the level of accounts payable appear to be the supply of trade credit, firm size, interest rate level, the ratio of current assets to total assets, and insufficient internal financing.

1. INTRODUCTION

Official statistics show that Finnish manufacturing companies' accounts receivable are on average 9.7% and accounts payable 6.1% of total asset (firms with more than 20 employees). For retail firms the respective percentages are 8.1% and 16.0% and for wholesale firms the num-

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bers are as high as 24.1% and 23%, respectively.[1] The importance of trade credit varies by country, and is likely to be highest in industrialized countries, although there is substantial variation across them (Marotta, 1997). Rajan and Zingales (1995) investigate non-financial firms in the G7 countries, and find that the proportional share of accounts receivable varies between 13% (Canada) and 29% (Italy), whereas the range for accounts payable is between 11.5% (Germany) and 17% (France). It is thus apparent that accounts receivable may form a substantial fraction of a firm's assets, and accounts payable may be an important source of outside funding. Several theories have been developed to explain trade credit use. However, firm level empirical evidence is scarce and it is all on U.S. data. This paper tests the available theories using data on Finnish listed firms.

2. THEORIES AND SOME EMPIRICAL EVIDENCE ON TRADE CREDIT

Several theoretical studies attempt to explain why suppliers provide financial intermediary services to their clients, and why these are willing to use trade credit instead of, e.g., bank debt even if trade credit is well known to be a more expensive source of funds.

Transaction costs have been stated to be one reason to maintain credit sales. Ferris (1981) argues that the existence of trade credit allows flexibility in payments and makes it possible to cumulate the payments of several successive shipments to be paid at once thus leading to savings of transaction costs. Furthermore, trade credit allows the buyers to hold smaller cash balances and save money accordingly. Other versions of the transaction costs theories relate to seasonalities in the consumption pattern of the selling firm's products (for a detailed description, see Petersen and Rajan, 1997).

Financial models are based on capital market imperfections relating to information asymmetries. Schwartz (1974) suggests that firms with better access to the institutionalized capital market and with lower cost of financing will offer trade credit to firms with high costs when borrowing from financial intermediaries. As Schwartz points out, the institutional arrangement of trade credit enables established firms to help finance the growth of their customers. It may also be argued that trade credit can serve to mitigate credit rationing while trade credit provides a signal on the buyer's good quality to the financial intermediary (Frank and Maksimovic, 1998; Biais and Gollier, 1997).[2]

Other financial models suggest that the seller has an advantage over financial intermediaries in information acquisition and controlling the buyer. In the Anglo-Saxon countries, all

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1 The percentages were computed from the Financial Statements Statistics published by *Statistics Finland*, 1997.
2 However, as Frank and Maksimovic (1998) point out, since essentially all firms both receive and offer trade credit, these theories seem to suggest that all firms are credit rationed which obviously is not the case.

these advantages relate to the closer and more 'physical' relationship between the seller and the buyer than between the buyer and financial intermediaries. E.g., if the buyer does not pay in time, the supplier can threaten to cut off future supplies. A financial intermediary may not have such powerful tools in use, since the threat to withdraw future finance may not have an immediate effect on the buyer's behavior (Petersen and Rajan, 1997).

Trade credit may serve as a means of *price discrimination* when law (e.g., the Robinson-Patman Act in the U.S.) prohibits companies from directly using different prices for different customers. This is possible when credit terms contain an early payment discount. Firms with market power are more likely to offer such terms (Brennan et al., 1988; Mian and Smith, 1992). Such firms are operating with a high contribution margin, and have a strong incentive to gather additional sales but without cutting the price to existing customers. Therefore, they offer trade credit that creditworthy customers will avoid because of its high price. On the other hand, risky customers will take the credit because it may still be cheaper than to borrow from other sources (Brennan et al., 1988; Petersen and Rajan, 1997).

Trade credit can be considered an *implicit guarantee* for the seller's products. The idea is that the buyer is given time to become convinced on the quality of the product before he pays for it (Lee and Stowe, 1993). Frank and Maksimovic (1998) argue that trade credit as a guarantee is likely to be of particular importance for small and less well established sellers.

Some studies discuss the effect of *changing macroeconomic conditions* on the use and terms of trade credit. Schwartz (1974) argues that trade credit reduces the efficacy of any given amount of monetary control, but also mitigates the discriminatory effects generated by restrictive monetary policy. When loan supply is constrained, larger firms with easier access to institutionalized capital markets can extend trade credit to smaller firms (Kashyap et al., 1993). Under those circumstances it can be expected that smaller firms are willing to extend the term of the offered trade credit because rising interest rates make trade credit a more competitive form of short-term financing.

As Petersen and Rajan (1997) point out, there is little empirical evidence on the above theories in addition to their own study. They use firm level data from the National Survey of Small Business Finances that was conducted in 1988–89, and find that firms use trade credit more when credit from financial institutions is not available. Their evidence also shows that well established suppliers might act as financial intermediaries by lending to firms with no access to the financial markets. The study further finds some evidence to support the theory that trade credit is used as a means of price discrimination.

There are several differences between our data set and Petersen and Rajan's (1997) data. One important difference is that between the Finnish and U.S. capital markets. The Finnish capital markets are bank-based and highly concentrated. A number of studies on relationship

lending suggest that close bank-borrower relationships enhance credit availability. These studies also suggest that firms operating in concentrated as opposed to competitive markets have easier access to funds (Petersen and Rajan, 1995; Boot and Thakor, 1999). One distinguishing feature of the bank-based systems is that banks monitor the performance of firms more closely than in the market-based systems such as that of the U.S., play an active part in the administration of many large corporations, and may even own substantial amounts of their share capital. Under the Finnish circumstances, this fact may provide banks a relative advantage over suppliers as opposed to the financial intermediaries in the U.S., and thus have an effect on the firms' patterns of using trade credit in their short and intermediate term funding.

Second, we use time series data that allow us to test the determinants of trade credit over time, whereas Petersen and Rajan (1997) used a cross-sectional one-year sample. We include explanatory variables such as the interest rate level and year-dummies that cannot be used when the data are available for only one year. A third difference is that our data consist of firms that are among the largest in Finland, whereas Petersen and Rajan's sample mainly consisted of small firms.

The study proceeds as follows. Section 3 describes the data sample used. Section 4 presents the results on the determinants of accounts receivable and accounts payable. Section 5 concludes the study.

3. DATA DESCRIPTION

The data sample consists of financial accounting data on firms that were listed on the Helsinki Stock Exchange either in the main list or in the OTC list during the research period 1989–1997. For some firms data are available for shorter periods. The entire sample size is 1018 observations from 121 firms.

Table 1 shows the time-series behaviour of median accounts receivable (divided by assets) in firm size quartiles during the research period. Table 2 reports the respective results for accounts payable. The data have been classified into firm size quartiles based on annual sales.

The relative amounts of trade credit offered and used remain quite stable during the research period, and neither accounts receivable nor accounts payable display a trend in time in any quartile of sales. However, there are certain differences in trade credit policies between the different quartiles. Especially, firms in the smallest sales quartile clearly have the smallest accounts receivable and accounts payable relative to assets, while differences between the three larger quartiles are smaller and less consistent. The relative difference between the lowest sales quartile firms and other firms is much larger for accounts payable. The lowest sales quartile firms borrow from suppliers on average only 50% compared to the

TABLE 1. Median accounts receivable to total assets: time-series behaviour in different firm size quartiles. The smallest firms are in quartile < 0.25 and the largest firms in quartile > 0.75.

Quartile of sales	Years									
	1989	1990	1991	1992	1993	1994	1995	1996	1997	All years
< 0.25	0.108	0.101	0.102	0.068	0.099	0.106	0.102	0.091	0.119	0.102
0.25 – 0.50	0.133	0.151	0.129	0.151	0.142	0.177	0.170	0.164	0.148	0.149
0.50 – 0.75	0.162	0.146	0.125	0.117	0.130	0.133	0.148	0.147	0.128	0.138
> 0.75	0.135	0.134	0.125	0.128	0.129	0.130	0.147	0.141	0.162	0.136
All firms	0.138	0.134	0.119	0.123	0.131	0.132	0.144	0.140	0.143	0.133

TABLE 2. Median accounts payable to total assets: time-series behaviour in different sales quartiles. The smallest firms are in quartile < 0.25 and the largest firms in quartile > 0.75.

Quartile of sales	Years									
	1989	1990	1991	1992	1993	1994	1995	1996	1997	All years
< 0.25	0.035	0.045	0.025	0.020	0.030	0.027	0.034	0.033	0.039	0.031
0.25 – 0.50	0.062	0.057	0.045	0.052	0.053	0.071	0.072	0.073	0.080	0.082
0.50 – 0.75	0.069	0.059	0.054	0.066	0.055	0.069	0.058	0.055	0.058	0.059
> 0.75	0.081	0.075	0.061	0.067	0.070	0.085	0.082	0.079	0.086	0.078
All firms	0.068	0.059	0.050	0.051	0.053	0.071	0.062	0.060	0.071	0.060

median firm of the total sample, whereas the respective ratio when lending to customers is about 75%.

The result concerning the differences between large and small firms may not be quite generalisable because there in fact are only large firms in our sample in the context of the entire population of Finnish firms. However, also Petersen and Rajan (1997) found that larger firms tend to offer more trade credit to their customers and they also hold larger balances of accounts payable. Their results were similar for a sample of large *COMPUSTAT* firms as well as for their primary sample consisting of small and medium sized firms.

Table 3 shows the median percentages of accounts receivable and accounts payable classified by industry. The data are divided into four industry categories (classification codes used by Statistics Finland since 1995 are in parentheses): manufacturing and mining (C, D), energy supply and construction (E, F), retail and wholesale firms (G, H) and other services (I, J, K, O). Firms in wholesale and retail industries have the largest accounts receivable and accounts payable (16.6% and 13.3%, respectively). Accounts receivable are an important part of assets (14.7%) also in manufacturing and mining firms, whereas the level of accounts payable in

TABLE 3. Accounts receivable and accounts payable by industry.

Industry (classification codes used by Statistics Finland are in parentheses)	Median Accounts Receivable to total assets	Median collection period (days)	Median accounts payable to total assets	Median payment period (days)
Manufacturing and mining (C, D)	.147	56	.067	59
Energy supply and construction (E, F)	.079	55	.041	57
Trade (G, H)	.166	44	.133	53
Other services (I, J, K, O)	.095	42	.042	74
Total	.133	51	.060	60

these firms' balance sheets is only 6.7% of total liabilities. In general, it is true for all industries that firms hold more accounts receivable than accounts payable. The medians for the whole sample are 13.3% and 6%, respectively.

4. RESULTS

We regress accounts receivable and accounts payable on variables that can be argued to be their determinants based on the theories discussed earlier. We shortly discuss the theoretical relevance of each variable while presenting the empirical results from the estimations. Table 4 first summarises the variables of primary interest and presents correlations between them.[3]

4.1. Accounts receivable

Table 5 presents the results from regressing accounts receivable (scaled by assets) on the different explanatory variables.[4] Model I in table 5 is estimated using the variables listed in table 4 above. Since it seems possible that the relationship of accounts receivable with sales growth and cash flow is not linear, we estimate model II. The sales growth and cash flow variable are now both separated into two variables by multiplying them with (0,1) dummies indicating whether a particular observation has been positive or negative.

Demand for trade credit. It is convenient to think that the level of a firm's accounts receivable depends on how much it decides to lend to its customers. However, as Petersen and Rajan (1997) point out, there is most probably also a demand factor that affects the amount of

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3 The number of observations varies slightly across the different regressions because of listwise deletion of observations with missing data on some variable(s).
4 As it is the common practice in related literature, assets is used as the scaling variable for both the dependent variable and independent variables when scaling is needed. Potential problems related to this practice are discussed in Kasanen and Lukka (1993).

TABLE 4. Correlations between the primary variables (two-tailed significance levels in parentheses).

Variable	Ln(Assets)	Ln(1+firm age)	Cash flow	Contribution margin	Purchases	Current assets	Growth	Market interest rate	Accounts receivable	Accounts payable
Ln(Assets)	1									
Ln(1+firm age)	.401 (.000)	1								
Cash flow	–.009 (.779)	.040 (.203)	1							
Contribution margin	–.251 (.000)	–.081 (.010)	.433 (.000)	1						
Purchases	–.188 (.000)	–.126 (.000)	–.084 (.007)	–.010 (.740)	1					
Current assets	–.184 (.000)	.035 (.268)	.184 (.000)	.260 (.000)	.301 (.000)	1				
Growth	–.070 (.028)	–.137 (.000)	.011 (.726)	–.040 (.207)	.153 (.000)	.063 (.046)	1			
Market interest rate	–.030 (.332)	–.025 (.432)	–.318 (.000)	–.279 (.000)	–.043 (.174)	.025 (.431)	.050 (.116)	1		
Accounts receivable	–.064 (.043)	.053 (.094)	.134 (.000)	.254 (.000)	.179 (.000)	.470 (.000)	–.004 (.907)	–.069 (.029)	1	
Accounts payable	.027 (.381)	.061 (.055)	.054 (.090)	.140 (.000)	.361 (.000)	.295 (.000)	.026 (.419)	–.041 (.196)	.472 (.000)	1

TABLE 5. *The determinants of accounts receivable.*

Dependent variable: accounts receivable/assets				
	Model I (N = 896)		Model II (N = 894)	
Variable	Coefficient	Significance level	Coefficient	Significance level
LN(book value of assets)	.002	.094	.002	.289
LN(1 + firm age)	−.002	.493	−.002	.279
% sales growth	−.0002	.566		
% sales growth if positive, 0			−.008	.078
% sales growth if negative, 0			.078	.001
Operating cash flow	−.046	.227		
Cash flow when positive, 0			−.082	.067
Cash flow when negative, 0			−.007	.992
Contribution margin	.091	.000	.087	.000
Market interest rate	1.198	.080	1.111	.099
Year-dummy 1989	−.094	.141	−.088	.159
Year-dummy 1990	−.120	.101	−.113	.119
Year-dummy 1991	−.122	.069	−.111	.096
Year-dummy 1992	−.126	.066	−.118	.081
Year-dummy 1993	−.059	.059	−.054	.080
Year-dummy 1994	−.025	.138	−.022	.189
Year-dummy 1995	−.031	.106	−.029	.123
Year-dummy 1996	−.009	.356	−.008	.371
Manufacturing and mining	.049	.000	.049	.000
Wholesale and retail trade	.041	.000	.042	.000
Other services	−.015	.133	−.012	.203
Constant	.009	.790	.035	.298
Adjusted R-squared	.238	.000	.248	.000

trade credit a firm is able to extend. This demand is practically impossible to measure directly. Most firms have many customers whose individual attitudes towards trade credit differ from each other. For instance, a retail firm may have thousands of credit customers who may be either individuals or other firms. On the contrary, the accounts payable of a given firm may be more homogenous since they usually are payables to other firms whose number at least in certain industries may be relatively small.

Since we don't know the demand curve for trade credit, this issue must be taken into account when interpreting the estimated coefficients. Petersen and Rajan (1997) illustrate the alternative interpretations of the result that large firms have higher accounts receivable. First, this result may mean that larger firms are less capital constrained because they have better

access to capital markets. An alternative interpretation is that a part of large firms' customers may be credit rationed for one reason or another, and the larger than average accounts receivable of large firms may be explained by the demand factor. However, we believe that the use of industry dummies in our regression partly mitigates this problem since they divide the customers of the sample firms into more homogenous groups.

Creditworthiness and access to capital markets. A firm's creditworthiness and access to capital markets are most commonly measured by firm size and age. We use the natural log of the firm's total assets (Ln (Assets)) and the natural log of firm age (Ln(1 + Firm Age)) to proxy for the supplier's access to external capital.[5]

The results in table 5 show that asset size is significant in model I (p = 0.094), but insignificant in model II. Firm age remains insignificant in both models, even when the square of the log of firm age is added in the model (the coefficient of the squared age variable is not reported in table 5). We added the squared age variable, because Petersen and Rajan's (1997) results show that after 19 years of operation a firm's level of accounts receivable peaks and starts to decrease.

The result that a firm's creditworthiness and access to capital markets does not affect the level of trade credit it extends is theoretically unexpected, and it also differs from previous empirical findings by Petersen and Rajan (1997). Table 4 shows that firm size and age are correlated by factor 0.4. Although the correlation is not very large, it may be one reason behind the insignificance of firm size and age as predictors for trade credit extended.

Growth. Firms may have trade credit policies that are in connection with their target growth rates. Traditionally, credit terms such as trade credit discounts and time of payment are believed to be used as competitive tools. A firm willing to grow may choose a strategy of extending trade credit with longer due periods than its competitors. This suggests that growth should be positively related to the level of accounts receivable. However, also firms whose sales have developed inadequately, may use trade credit to enhance their sales. Especially, a firm whose sales are declining may extend more trade credit than the average firm in its industry (Petersen and Rajan, 1997). In this study, we measure growth by the annual sales growth percentage.

Empirically, it appears that neither of the above theories holds. When negative and positive observations are in the same variable, the regression coefficient is insignificant. However, when the variable is partitioned on the basis of the signs of the observations, it appears that the coefficient of the variable with negative sales growth numbers has a significant positive coefficient. When interpreted, this result means that the more negative a firm's sales growth,

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5 One reason for using a logarithmic age variable is that additional years may add significantly to a firm's reputation early in its life but this effect probably reduces when the firm gets older.

the less trade credit it extends. On the other hand, the coefficient of the variable including positive growth observations is significantly negative (p = 0.078), indicating that firms with high growth rates extend less trade credit than lower-growth firms. The results are exactly the mirror image to Petersen and Rajan's (1997) results, who found that firms with high growth rates extend more credit than firms with lower growth rates. Additionally, their results showed that the more a firm's sales declined the more it used trade credit to finance its customers' purchases, and thus support both the above mentioned theories.

Internal financing. We use operating cash flow (earnings before depreciation and interest minus taxes) divided by assets to measure the firm's ability to generate cash from internal sources to finance the trade credit that it offers to its customers. The results in Table 5 are mixed and difficult to interpret. When the initial cash flow variable is used, the coefficient is insignificant. However, when positive and negative observations are separated into two variables, the variable with positive observations has a negative coefficient (significant at the 6.7% level), while the variable with negative observations is insignificant. This result means that the larger positive cash flow the supplier has, the less trade credit it is willing to extend to its customers. Petersen and Rajan (1997) find that the firm's ability to generate cash internally from operations is statistically significant but its sign is unexpectedly negative. However, when they elaborate their analysis, they find that only losses are significantly negatively correlated with accounts receivable, and conclude that firms in trouble extend more credit to maintain sales. Our results may be considered exactly the opposite to theirs.

Price discrimination. Price discrimination is a practice whereby different buyers are charged different prices for the same product for reasons other than any differences which exist in the costs of supplying them. Monopolists will often enjoy the power to discriminate in this way. Our measure for price discrimination is the monopoly power of the firm measured by the ratio of contribution margin (sales minus variable costs) to assets. (See, e.g., Ferguson et al., 1993, for formal derivation and discussion).

In our sample of large Finnish firms, it appears that price discrimination is by far the most important variable explaining accounts receivable management policies. Its coefficient is positive and statistically very significant in both models I and II in table 5.

Cost of alternative capital. We use the annual average three-month HELIBOR rate to measure the underlying cost of capital. We expect to find a positive association between accounts receivable and the interest rate level, because the demand for trade credit can be expected to be highest when the cost of alternative sources of funds is high. Table 5 shows that the interest rate has a significant positive coefficient in both models I and II (p = 0.099).

Time. Our model includes eight year-dummies to control for annual changes with 1997 serving as the control year. All coefficients of the year-dummies are negative indicating that the

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level of trade credit was highest in 1997. Interestingly, the negative coefficients are statistically significant during the period 1991–1993, when the economic conditions in Finland were weak. Thus, it seems that the deep economic recession reduced the amount of trade credit extended.

Industry. The coefficients of the industry dummies for manufacturing and mining firms and for retail and wholesale firms are both positive and very significant. This indicates that firms in these industries extend more trade credit than in the two other industries (electricity supply and construction; other services).

4.2. Accounts payable

Table 6 presents the results from regressing accounts payable on their suggested determinants. The variables (including control variables) are for the most part the same as above in the model estimated for accounts receivable. Additionally, there are two new variables: purchases (scaled by assets) describing the supply of trade credit and the ratio of current assets (financial assets and inventories) to total assets measuring asset maturity.

Model III in table 6 is estimated using the 'original' explanatory variables, whereas in model IV the sales growth and cash flow variables are both separated into two variables one containing positive observations and the other negative observations.

Supply of trade credit. Petersen and Rajan (1997) use the fraction of the firm's annual purchases made on account as a proxy for the quantity of trade credit offered to the firm. Their sample consists of small firms some of which may be credit rationed by suppliers. Since our sample firms are larger firms we make an assumption that all purchases are on credit and use their annual purchases as a proxy for the supply of trade credit. We believe that this assumption is not very restrictive, since large firms typically don't pay their purchases in cash. In measuring the supply of trade credit we have an advantage over previous research since we know the exact amounts of the sample firms' annual purchases. Petersen and Rajan had to estimate the amount of purchases to measure supply of trade credit since U.S. firms do not provide information on the division of cost of goods sold into different cost categories such as wages and purchases.

Because we use a proxy for the supply of trade credit, we can be more confident in interpreting the coefficients of the other variables in the model. The regressions for accounts receivable and accounts payable differ in this respect, since the coefficients of the former regression are reduced form coefficients that include both demand and supply side. (Petersen and Rajan, 1997).

The result concerning the supply of trade credit is clear and expected: purchases are statistically significantly associated with accounts payable, and their coefficient is positive. That is, an increase in the supply of trade credit enhances the level of its use.

TABLE 6. The determinants of accounts payable.

Dependent variable: accounts payable/assets				
	Model III (N = 911)		Model IV (N = 909)	
Variable	Coefficient	Significance level	Coefficient	Significance level
Purchases	.018	.000	.019	.000
LN(book value of assets)	.005	.000	.004	.000
LN(1 + firm age)	−.001	.402	−.002	.134
% sales growth	−.0006	.006		
% sales growth if positive, 0			−.012	.000
% sales growth if negative, 0			.082	.000
Operating cash flow	.085	.000		
Cash flow when positive, 0			.083	.001
Cash flow when negative, 0			−.128	.062
Current assets % total assets	.041	.000	.043	.000
Market interest rate	.825	.037	.795	.037
Year-dummy 1989	−.076	.040	−.074	.039
Year-dummy 1990	−.091	.020	−.085	.038
Year-dummy 1991	−.091	.020	−.082	.029
Year-dummy 1992	−.088	.027	−.085	.026
Year-dummy 1993	−.044	.016	−.041	.019
Year-dummy 1994	−.019	.049	−.016	.083
Year-dummy 1995	−.027	.014	−.026	.014
Year-dummy 1996	−.007	.163	−.007	.194
Manufacturing and mining	.023	.000	.023	.000
Wholesale and retail trade	.047	.000	.049	.000
Other services	.004	.528	.006	.299
Constant	−.062	.001	−.053	.005
Adjusted R-squared	.241	.000	.281	.000

Creditworthiness and access to capital markets. The results in table 6 show that asset size is a very significant explanatory variable for accounts payable in both models III and IV. However, firm age remains insignificant in both models, even when the square of age is added in the model (coefficient not reported). We add the squared age variable, because previous research provides evidence that older firms have less investment opportunities than younger firms, and therefore they need less external funding.

The results concerning size and age contradict the notion that larger and older firms would use less trade credit than smaller and younger firms. The positive sign of the size variable indicates that large firms which even otherwise have easier access to the capital market use

more trade credit in their financing. Also Petersen and Rajan (1997) find that there is a weak positive correlation between the level of accounts payable and firm size.

Growth. Theoretically, it may be argued that rapidly growing firms have better investment opportunities than other firms and would thus be willing to use more trade credit as a partial source of financing for new investments. However, the empirical results show just the opposite. As a whole, sales growth is negatively associated with accounts payable (model III). When this variable is separated into two variables one containing the positive values (negative values are set to be zeros) and another containing the negative observations (positive values set to be zeros), both variables are very significant. On one hand, the coefficient of positive growth is negative indicating that the faster a firm is growing the less it uses trade credit in its financing. On the other hand, the larger the sales decrease, the less trade credit a firm will use. Therefore, the maximum amount of trade credit is used by firms who grow slowly or not at all. Consistently with the theory explained above, Petersen and Rajan (1997) observe the mirror image of our results while they find that the more a firm's sales is growing or decreasing the more it uses trade credit. One explanation to the different results is that Finland is traditionally a bank-dominated environment, and firms may rather turn to financial intermediaries (banks) than to extend the use of trade credit when their level of growth deviates from normal growth in one direction or another.

Internal financing. The results show that operating cash flow is a significant explanatory variable for accounts payable with an initially positive coefficient (model III). However, when it is separated into two variables (model IV), it appears that the coefficient of positive cash flows is positive and the coefficient of negative cash flows is negative. This result means that the most liquid firms use more trade credit than the average firm and the same holds for firms with negative internal financing. The latter part of this result is consistent with the notion that firms in trouble use more trade credit, and it is also in line with Petersen and Rajan's (1997) results.

Asset maturity. The proportional share of current assets (current assets/total assets) is a (very) significant explanatory variable for the level of accounts payable. This is in line with the theories stating that firms attempt to finance assets of certain maturity with funds having the same maturity. This is done to schedule repayments of the financial capital to correspond with the decline in value in the firm's assets (Myers, 1977; Diamond, 1991; Hart and Moore, 1991). Therefore, short-term (current) assets are financed using short-term debt such as accounts payable, while long-term assets are financed using long-term debt or equity.

Cost of alternative capital. Market interest rate is a significant explanatory variable for accounts payable. It may be noted that it is statistically more significant than in the model(s) estimated for accounts receivable. This result may support the notion that movements of the market rate affect in particular the demand side of trade credit.

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Time. The results concerning the year-dummies indicate that the level of accounts payable was highest during the control year 1997. All dummies except that of the year 1996 have statistically significant negative coefficients.

Industry. Industry effects are similar to the regressions for accounts receivable. The coefficients of the manufacturing and mining industries and the retail and wholesale industries are both positive and very significant indicating that firms in these industries use more trade credit in their financing than in the two other industry groups.

5. CONCLUSION

This study empirically examined the determinants of Finnish listed firms' accounts receivable and accounts payable management policies. The results show that accounts receivable are strongly affected by the firms' incentive to use trade credit as a means of price discrimination. Market cost of capital also has an effect on their level. The latter result may be largely explained by increasing demand of trade credit when market interest rates rise.

All the variables that were used to explain the level of accounts payable were statistically significant although their signs were not always expected. The results show that the most important variables behind accounts payable policies are supply of trade credit, firm size, level of interest rates, asset maturity, and internal (insufficient) financing.

The results of this study differ in many aspects from previous results obtained using U.S. data. These differences may largely be due to differences between the Finnish and U.S. capital markets, since Finland has a bank-based system much like those of Germany and Japan. Corporate bond markets are basically nonexistent, and banks form the major source of capital even for most large firms. One obvious line of further research would be to examine the role of bank-borrower relationships, as financial intermediaries are an alternative source of capital for trade credit. However, data on relationships between firms and banks is private, and data samples containing such information are not publicly available. ■

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