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Working Capital Management in Czech SMEs: An Econometric Approach

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Abstract In this paper we investigate the relationship of working capital management and corporate profitability on a sample of Czech small and medium firms. Capital structure and working capital management are two areas widely investigated by economic researchers in order to investigate forces determining profitability of firms. We use an initial sample of 3053 Czech SMEs for the period of 2009-2012 and we employ the panel data methodology to find whether there is the statically significant relationship between profitability and components of working capital – mainly inventories, receivables and payables and other variables based on the previous literature.

Key words: cash conversion cycle, profitability, SMEs, working capital management, panel data

JEL classification: C53

1. Introduction

In this paper we investigate the relationship of working capital management and firms' profitability on a sample of Czech SMEs (Small and Medium Sized companies). Relationship of assets management to company profitability will be relevant because majority of Czech SME companies uses short term debt for their overall funding. It is therefore interesting to investigate the details of the cash conversion cycle. We expect to find out what is the statistical significance between profitability, measured through ROA and the cash conversion cycle. We expect that the results of our research on working capital

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management will elucidate the major characteristics of working capital management in Czech SMEs.

In the previous studies on this problem it has been found that managers can create profits for their companies by handling correctly the cash conversion cycle and keeping each different component to an optimum level [e.g. Solano and Teruel, 2006; Lazaridis, Tryfonidis, 2006]. In this paper we would like to verify whether such relation exists on the Czech market as well.

2. Literature Review

In general and in accordance with liberal theory the main goal of each enterprise in its profit maximization and strive to increase the volume of sales to generate earnings. Working capital management is a part of the financial management of an enterprise having an impact upon its liquidity and profitability [Shin, Soenen, 1998; Deloof, 2003; Dong and Su, 2010]. The liquidity and profitability of the enterprise are competing goals. Smith (1980) pointed out that it was important to satisfy both goals and a compromise.

To attain this goal, working capital management has been a focus on of many studies especially in the segment of SMEs, because these companies typically do not use the long term capital resources. Therefore the small and medium sized companies use predominantly short term capital resources. Thus the suppliers' credit typically plays the dominant role, because it is believed to be cheaper and more accessible source of financing than bank loans.

In previous studies on the Czech market this tendency was verified by e. g. [Polak, Kotora, 2000; Polak and Kocurek, 2007; Jindrichovska and Körner, 2008; Jindrichovska, 2013; and lately Jindrichovska, Ugurlu and Kubickova, 2013].

Another relevant source of SMEs funding can be retained capital, however this is subject to the fact that companies manage to create capital surplus in previous years. In this study we expect that the results of our research will elucidate the major characteristics of working capital management in the Czech Republic. The findings will be relevant because majority of Czech SME companies uses short term debt for their overall funding. We expect to find out what is the statistical significance between profitability, measured through gross operating profit, and the cash conversion cycle. In previous studies on this problem which we analyse here Previously it has been found hat managers can create profits for their companies by handling correctly the cash conversion cycle and keeping each different component (accounts receivables, accounts payables, inventory) to on optimum level.

These decisions and relevant management actions taken by an enterprise management represent efficient handling of current assets. Positive working capital mostly characterizes efficient Working Capital Management. The purpose of working capital is to balance costs and maintain the optimum level of cash, raw materials and finished goods in order for the company to remain liquid at any moment. However, for some companies it is rational to maintain negative net working capital. This is typically the case when a company can use its dominant position on the market and "work" with the money of its suppliers. In this case the company uses financing provided by its supplies to finance its own long term needs.

3. Empirical Application

3.1 Data

We collect data for the 2008-2009 period. The collected data represent accounts payable² (AP), accounts receivable³ (AR), cash conversion cycle⁴ (CCC), debt⁵ (DEBT), inventory⁶ (INV), return on asset (ROA), assets and sales. We use the return on assets (ROA) as the dependent variable and the logarithm of assets (SIZE), the sales growth (SGR), natural logarithm of debt (LDEBT), INV, CCC, and GDP growth (GDPGR) as independent variables. The variables INV and CCC is the variables to measure the working capital management. In the consequence of calculating SGR as $(\text{sales}_t - \text{sales}_{t-1}) / \text{sales}_{t-1}$ we have lost one year and the data period is therefore 2009-2012.

3.2 Characteristic of firms in the sample

The age of firms in years was determined according to date of establishment. The oldest firm was established in 1951 and the youngest is 2008.

Table 1: Years of Establishment

Year	Freq.	Percent	Year	Freq.	Percent	Year	Freq.	Percent	Year	Freq.	Percent
1951	1	0.03	1989	2	0.07	1996	183	6.01	2003	113	3.71
1972	1	0.03	1990	43	1.41	1997	178	5.85	2004	105	3.45
1974	1	0.03	1991	335	11	1998	162	5.32	2005	83	2.73
1981	1	0.03	1992	379	12.45	1999	138	4.53	2006	78	2.56
1984	2	0.07	1993	265	8.7	2000	158	5.19	2007	89	2.92
1985	1	0.03	1994	256	8.41	2001	115	3.78	2008	37	1.22
1988	2	0.07	1995	213	7	2002	104	3.42	Total	3,045	100

Source: Authors Calculation

In total, we have 3045 firms from 99 different regions. Table 2 shows number of regions investigated in the empirical application. The largest region is region no 6220 with 146 firms which represents approximately 5 per cent of the total.

Table 2: Regions

Region	Freq.	Percent	Region	Freq.	Percent	Region	Freq.	Percent	Region	Freq.	Percent
1110	6	0.2	1190	21	0.69	4120	23	0.76	6140	39	1.28
11J0	13	0.43	2110	18	0.59	4130	19	0.62	6150	39	1.28
11K0	8	0.26	2120	16	0.53	4210	44	1.44	6210	45	1.48
11L0	3	0.1	2130	28	0.92	4220	26	0.85	6220	146	4.79
11M0	6	0.2	2140	22	0.72	4230	20	0.66	6230	69	2.27
21A0	30	0.99	2150	15	0.49	4240	14	0.46	6240	46	1.51
21B0	27	0.89	2160	23	0.76	4250	23	0.76	6250	53	1.74
21C0	5	0.16	2170	21	0.69	4260	27	0.89	6260	19	0.62
11A0	42	1.38	2180	24	0.79	4270	27	0.89	6270	33	1.08
11B0	4	0.13	2190	29	0.95	5110	14	0.46	7110	10	0.33

² (Short term payables total /Sales) *365

³ (Accounts receivable/sales)*365

⁴ Days Receivable +Days in Inventory-Days Payable

⁵ Short term payables total

⁶ (Inventories/purchases)*365

11G0	10	0.33	3110	58	1.9	5120	23	0.76	7120	63	2.07
11F0	3	0.1	3120	26	0.85	5130	48	1.58	7130	26	0.85
11E0	1	0.03	3130	20	0.66	5140	39	1.28	7140	38	1.25
11H0	5	0.16	3140	11	0.36	5210	68	2.23	7150	32	1.05
11C0	13	0.43	3150	16	0.53	5220	25	0.82	7210	38	1.25
11D0	9	0.3	3160	21	0.69	5230	59	1.94	7220	57	1.87
110E	1	0.03	3170	42	1.38	5240	33	1.08	7230	68	2.23
1110	38	1.25	3210	24	0.79	5250	46	1.51	7240	101	3.32
1120	16	0.53	3220	26	0.85	5310	38	1.25	8110	24	0.79
1130	19	0.62	3230	59	1.94	5320	49	1.61	8120	58	1.9
1140	47	1.54	3240	16	0.53	5330	37	1.22	8130	38	1.25
1150	23	0.76	3250	18	0.59	5340	72	2.36	8140	38	1.25
1160	20	0.66	3260	12	0.39	6110	40	1.31	8150	45	1.48
1170	8	0.26	3270	17	0.56	6120	38	1.25	8160	62	2.04
1180	22	0.72	4110	19	0.62	6130	25	0.82	Total	3,045	100

Source: Authors Calculation

Table 3 shows the descriptive statistics of the variables. It is worthwhile to point out a high variability of INV (inventories) and CCC (cash-conversion cycle) variable. Standard deviation and difference between minimum and maximum values of these variables are very high relatively to other variables.

Table 3: Descriptive Statistics of Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	12180	0.054586	0.143489	-3.52106	1.729839
INV	12180	104.5021	425.3807	-25.0064	43617.5
CCC	12180	49.85429	6397.297	-665862	48029.55
SIZE	12180	10.7561	1.380063	5.846439	14.22098
SGR	12157	0.241159	8.834666	-17.9809	574.375
LDEBT	12158	9.624735	1.473706	4.094345	13.91082
GDPGR	12180	-0.35	2.719027	-4.5	2.5

Source: Authors Calculation

Correlation between variables is shown in table 4

Table 4: Correlation Matrix of used Variables

	ROA	INV	CCC	SIZE	SGR	LDEBT	GDPGR
ROA	1						
INV	-0.0270***	1					
CCC	0.0362***	0.0600****	1				
SIZE	0.0682***	0.0208**	-0.0118	1			
SGR	0.0078	0.0059	0.0008	0.002	1		
LDEBT	-0.0334***	-0.0051	-0.0256***	0.8531***	0.0111	1	
GDPGR	0.0308***	0.0059	-0.0109	0.0195	0.0023	0.0271***	1

Notes:** and *** indicate significance at the 5% and 1% level

Source: Authors Calculation

Table 4 shows the correlation matrix for the variables. We find a significant negative correlation between the INV and the ROA and positive correlation between the CCC and the ROA. Although these two variables have significant relationship between ROA the relationship is not strong. The relationships between the variables are generally low. The highest correlation coefficient is between LDEBT and SIZE variable thus these two variables related strongly for the investigated sample of Czech SMEs.

3.3 Model

Subsequently two models capturing the relation between profitability and elements of net working capital including the cash conversion cycle were formulated:

$$ROA_{it} = \beta_0 + \beta_1 INV_{it} + \beta_2 SIZE_{it} + \beta_3 SGR_{it} + \beta_4 DEBT_{it} + \beta_5 GDPGR_{it} + \eta_i + \varepsilon_{it} \quad [1]$$

$$ROA_{it} = \beta_0 + \beta_1 CCC_{it} + \beta_2 SIZE_{it} + \beta_3 SGR_{it} + \beta_4 DEBT_{it} + \beta_5 GDPGR_{it} + \eta_i + \varepsilon_{it} \quad [2]$$

In these two models INV and CCC are the working capital management variables. Estimating models from panel data requires us first to determine whether there is a correlation between the unobservable heterogeneity η_i of each firm and the explanatory variables of the model. If there is a correlation we would obtain the consistent estimation by using fixed effect model (FEM) otherwise we should use random effect model (REM). To decide to use FEM or REM the [Hausman,1978] test is used under the null hypothesis $E(\eta_i/x_{it}) = 0$. If the null hypothesis is rejected, the effects are considered to be fixed.

Table 5: Estimation Results of the Model (Dependent Variable : ROA)

	Model 1	Model 2	Model3	Model 4
Variable	Coefficient	Coefficient	Coefficient	Coefficient
C	-1.00882*** (.0614608)	-1.004542*** (0.0614073)	-1.008815*** (.164512)	-1.004542*** (0.164606)
INV	-3.81x10-6 (3.06e-06)	-	-3.81x10-6 (4.17 x10-6)	-
CCC	-	8.79 x10-6*** (1.98e-07)	-	8.79 x10-6*** (8.43e-08)
SIZE	0.150336 (0.0071)	0.149502*** (0.0071)	.1503361*** (0.0202)	0.149502*** (0.0202)
SGR	0.000141*** (0.0001)	1.41E-05 (0.0001)	0.000141 (.0002)	1.41E-05 (0.0002)
LDEBT	-0.05745*** (0.0038)	-0.05701*** (0.0038)	-.0574535*** (0.0079)	-0.05701*** (0.0079)
GDPGR	0.000978** (0.0004)	0.001** (0.0004)	.0009781*** (.0004)	0.001** (0.0004)
R squared	0.0498	0.0517	0.0498	0.0517
F stat	95.29***	99.13***	13.71	187.70***
Hausman	268.95***	268.48***	-	-
Wald Test (χ^2)	2.1x 10 ⁸ ***	1.8x10 ⁸ ***	-	-
Wooldridge (F)	36.920***	36.191***	-	-

Notes: The values in parenthesis shows standart errors. *, ** and *** indicate significance at the 10%,5% and 1% level for the coefficients and rejection of null hypothesis for the test statistics.

Source: Authors Calculation

Modified Wald test for groupwise heteroskedasticity is used to test for the existence of heteroskedasticity in the models. The null hypothesis of the Wald test is those residual variances are homoscedastic [Baum, 2001]. [Wooldridge, 2002] test is used to test for autocorrelation under null hypothesis no first-order autocorrelation.

Before interpreting models the Wald and Wooldridge tests are examined. In the first model we reject the null hypothesis for both tests. Thus we conclude that the first model has heteroskedasticity and the first order autocorrelation. To solve these problems we use “cluster” option of Stata to have standard errors are completely robust to any kind of serial correlation and/or heteroskedasticity. Model 3 is the model with robust standard errors. Although the explanatory ratio (R squared) is very low, coefficients and model are statistically significant and model does not include autocorrelation and heteroskedasticity.

The results of Model 3 show that the model is statistically significant at 1% level and that the variables SIZE, LDEBT and GDPGR are statistically significant at 1% level. Size of the SME and GDP growth of the country has positive effect on ROA of the SME and debt has a negative effect on ROA. But the INV variable has no effect on ROA for Czech firms for the period investigated. This finding is in contrast to previous research by Solano and Teruel, 2006, where the authors found significant negative relation.

According to Wald and Wooldridge test our Model 2 has heteroskedasticity and autocorrelation, too. We thus use the “cluster” option for Model 2 once again to have model with robust standard errors without autocorrelation and heteroskedasticity. In this model CCC has positive and significant effect in 1% level on profitability measured by ROA. As it was expected the other variables’ effects have the same direction as in Model 1.

Conclusions, Limitations and Future Research

In this empirical paper we have found that the profitability of Czech SMEs is influenced by short term capital management, especially by the length of the Cash-Conversion-Cycle. This finding is in line with the previous literature in other countries. Surprisingly though, the profitability measured by ROA is not influenced by inventories in the Czech Sample. This is in contrast to previous research and calls for further investigation.

It must be highlighted that our sample is very heterogenous, which was established by measuring descriptive statistics of used data namely standard deviation and min-max range of used dependent variables (especially Inventories and Cash-Conversion-Cycle).

For further and more detailed investigation it would be worthwhile to split the sample according to industries (NACE codes) and search more homogeneity of results. Another suggestion would be to compare our findings with the sample of large forms for the same economy and for the same period. As another topic for future research is that it may be worthwhile to look more closely into the sub-sample of companies with negative net working capital and investigate the reasons, why companies use it and whether this style of aggressive short-term financing really leads to desired higher profitability in their segment.

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