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The Relationship between Working Capital Management and Profitability: a Latvian Case

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In order to ensure the financial sustainability of companies under current economic conditions successful management of current assets is crucial. In practice it is quite often observed that the decisions related to current assets management in Latvian companies are made in the short-term aspects without making analysis. Efficient management of working capital is an essential condition of increase in profitability of a company. Potentialities of working capital management in the context of efficient running of business have not been studied in Latvia up until now. The main aim of this article is to examine the effect of working capital on profitability of Latvian companies. The results of the research that has been performed in relation to Latvian manufacturing enterprises confirm the existence of a correlation [tie?] between components of working capital and profitability. The developed regression equations meant for forecasting profitability of a company applying working capital management methods can be used by Latvian manufacturing enterprises. It follows that managers of an enterprise can forecast indices characterizing profit, managing components of working capital and maintaining it on the optimum level.

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1. Introduction

Working capital is of major importance for ensuring activities of an enterprise that are aimed at decision making in the short term. The importance of working capital management (WCM) is determined by the specific weight of current assets in a balance sheet of an enterprise. According to statistical data the specific weight of current assets in Latvian enterprises was 36.72% in 2010, in their turn, current assets in enterprises of a manufacturing sector exceed 40% (2010) of the total assets. The objective of this study is to establish a relationship between Working Capital Management and profitability for Latvian companies.

This study investigates the effects of WCM on profitability of Latvian companies. The focus in this study is on the WCM performance of manufacturing sectors by using different WCM measures which include Cash Conversion Cycle (CCC), Receivables Collection Period (RCP), Inventory Conversion Period (IDP) and Payables Deferral Period (PDP).

Two main issues have been dealt with within the framework of this research:

Is there a relationship between WCM components and profitability in Latvian companies?

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Can profitability of a company be forecast by managing components of working capital?

Historically the relationship of WCM and corporate profitability has been studied by various authors, for example, Shin and Soenen (1998); Deloof, 2003; Lazaridis and Tryfonidis (2006), Padachi (2006) Garcia-Tereul and Martinez-Solano (2007); Raheman and Nasr (2007); Mathuva (2009); Dong and Su (2010); Sharma and Kumar (2011) and others. Studies focused on the relationship between working capital and profitability in different respects.

Successful management of current assets of a company plays an essential role in ensuring financial sustainability of an enterprise under current economic conditions. Current assets and potentialities of their management in the context of business activity practically have not been studied in Latvia. In their turn, such studies are widely represented in Russia, EU, America and other countries.

The main source of information on financial indicators of business activity is financial reports of enterprises on the grounds of which economic activity and financial standing of an enterprise have been evaluated and possibilities of future development have been determined. Data of annual reports of 182 companies of the Latvian manufacturing sector have been used for this research. The research covers the period of 2004–2010.

The research is based on the data obtained by the Latvian Central Statistics Bureau and Lursoft database of companies registered in Latvia (www.lursoft.lv). The statistical processing and analysis of the data have been implemented with the use of the application package IBM SPSS Statistics 19.

2. Literature Review

Working capital characterizes the inter-connection between current assets and short-term liabilities. The main function of capital is generation of income, it is a factor of production (Samuelson, Nordhaus,1989). Working capital is a difference between current assets and short-term liabilities (Breili and Maier, 1997).

WCM appertains to the decisions which directly affect types, amount of current assets and the structure of their financing as well as the decisions and actions taken by an enterprise for efficient management of current assets. Positive working capital characterizes efficient WCM.

The importance of working capital is emphasized in scientific as well as industry-specific literature. The purpose of working capital is to balance costs and maintain the optimum level of cash, raw materials and finished goods. Different types of current assets have impact on working capital during the whole cycle of capital turnover (Arnold, 2008).

Working capital is the result of the time lag between the expenditure for purchasing raw materials and the collection from the sale of the finished goods.

In relation to potentialities of WCM and its effects upon corporate performance, a substantial amount of theoretical and empirical research was performed for many years and in different environments.

The main financial goal of each enterprise is increase of the volume of sales and profit. To attain this goal, working capital management is a part of the financial management of an enterprise having an impact upon the liquidity and profitability of the enterprise (Shin and Soenen, 1998; Deloof, 2003; Raheman and Nasr, 2007; Dong and Su, 2010).

The liquidity and profitability of the enterprise are competing goals. Smith (1980) pointed out that it was important to reach a compromise between these goals and WCM. Making decisions on ensuring liquidity, profitability indices must be evaluated simultaneously.

According to Mathuva (2010) concentration of attention on liquidity definitely lowers profitability and vice versa. A balance between the liquidity and profitability has to be reached in WCM. It is observed in research that both goals are of vital importance and must be attended to simultaneously (Raheman and Nasr, 2007; Dong and Su, 2010).

Van Horne and Wachowicz (2004) concluded excessively big amounts of current assets may have a negative impact upon profitability of an enterprise but excessively small amounts lower liquidity. The optimum level of current assets ensures even and efficient activity.

In a number of studies which describe the relationship between profitability and WCM, it is concluded that there is a negative correlation between profitability and elements of working capital management, for example, receivables collection period, inventory conversion period and cash conversion cycle (CCC). In relation to the relationship between profitability and average receivables collection period, the results are not convincing (Binti Mohamad and Binti Mohd Saad, 2010; Dong and Su, 2010; Garcia-Tereul and Martinez-Solano, 2007; Raheman en Nasr, 2007; Deloof, 2003; Shin and Soenen, 1998).

It is emphasized in studies conducted by different researchers that the profitability of an enterprise can be improved by reduction of CCC. Most studies conducted in this field evidence that there is a negative correlation between these indices (Deloof, 2003; Karaduman et al, 2004; Lazaridis and Tryfonidis, 2006; Padachi, 2006; Mathuva, 2009). It is worth mentioning that this correlation is positive in recent research (Gill et al 2010; Sharma and Kumar 2011).

Studying Belgian companies, Deloof (2003) concludes that there is a negative relationship between profitability and inventory, indices of conversion of receivables and payables. Similar conclusions were made by other researchers (Karaduman et al, 2004; Lazaridis and Tryfonidis, 2006; Padachi, 2006; Mathuva, 2009).

A negative relationship between profitability and conversion of receivables and payables points to the fact that reduction of indices of conversion of receivables and payables can increase the profit of an enterprise (Deloof, 2003). Extending the cycle of the receivables conversion, profitability may increase (Padachi, 2006). Upon extension of the cycle of the receivables conversion, profitability of an enterprise can go down in the short term because such policy of management of receivables may substantially affect the reputation of an enterprise and result in loss of suppliers (Garcia, 2011).

As a result of the study of the literature it can be concluded that working capital management has an impact upon profitability of an enterprise. Studies conducted in different time periods and related to companies of different countries and branches of industry point to the similar inter-relationships.

3. The Methodology and Model

The initial sample of the research was created on the grounds of data of annual reports of companies according to the following attributes:

- industry attribute – companies that, according to NACE classification, belong to a manufacturing sector have been selected;
- long history – all companies were founded within the time period from 1991 till 1996;
- economic activity of a company has been continuous within the whole period.

The population is formed by data of annual reports of 182 companies for 2004-2010 sampled according to the Stepwize method.

As an algorithm of an exception of independent variables the Stepwize method has been applied. It is a step-by-step method that initially includes all independent variables into the regression equation and then serially deletes all variables whose correlation with the criterion has a significance value above the set threshold value. The basic idea of this method is the change of a share of influence of an independent variable on a criterion at occurrence of other independent variables in the equation. If the influence of any of the included variables becomes too weak, it is excluded from the equation.

As a result of sampling according to the Stepwize method 165 accounting objects have been selected and they have been used for analysis.

The analysis of the summarized and selected data has been performed according to the following stages:

- descriptive statistics - describes the main features of the collected data. In the descriptive statistics, a summary of the mean, median, standard deviation, the minimum and the maximum of the sample and measures will be given;
- correlation analysis - describes the relationship between variables. In this investigation of the relationship between working capital management and the profitability of a company the Pearson correlation analysis will be used. Other researchers that have used the Pearson correlation are Deloof (2003), Padachi (2006), Mathuva (2009), Gill et al (2010).
  As a result of the Pearson correlation analysis a conclusion can be made on a relationship between variables though it does not provide a possibility to establish an inter-connection between causes and consequences (Shin and Soenen, 1998; Deloof, 2003; Mathuva, 2009; Dong and Su, 2010).
- regression analysis – multi-factor regression analysis is used to study the impact of working capital management upon corporate profitability.

Choice of variable was based on theoretical and empirical research, where research made by Deloof (2003), Raheman and Nasar (2007) was taken as a ground as well

as taking into account other available data. All variables that were used as well as their abbreviations and formulas are summarized in Table 1.

Table 1: Formulas of Variables and Abbreviations

Variable	Abbreviation	Formula
The dependent variable		
Gross Operating Profitability	GOP	(Sales - Cost of Goods Sold) / (Total Assets - Financial Assets)
Return on Assets	ROA	Net income / Total assets
The Explanatory variables		
Receivables Collection Period	RCP	(Accounts receivable / Sales)*365
Inventory Conversion Period	ICP	(Inventories / Cost of Goods sold)*365
Payables Deferral Period	PDP	(Accounts payable / Cost of Goods sold)*365
Cash Conversion Cycle	CCC	RCP + ICP – PDP
The control variables		
Size of Companies	LnS	Natural Logarithm of Sales
Debt Ratio	DR	Total Debt / Total Assets
Current Ratio	CR	Current assets / Current liabilities

Two indicators were determined in relation to dependent variables:

Gross Operating Profitability (GOP) a measure of company profitability was used as a dependent variable. It is defined as sales minus the cost of goods sold and divided by total assets minus financial assets.

Return on Assets (ROA) is one of the most important indices of activities of a company. This index allows passing judgment on how efficiently a company uses assets to receive income. It is defined as net income and divided by total assets.
The choice of two indices is determined by the fact that GOP reflects the result of operational activity excluding financial activities. Due to the fact that GOP absolutely excludes financial activity and its results the author deems that it provides a possibility to determine relationships with WCM components more accurately. Connection between GOP and WCM was studied by Lazirdis and Tryfonidis (2006) and Garcia (2011).

ROA has been used by Samiloglu and Demirgunes (2008), Garcia-Teruel and Martinez-Solano (2007), Nazir and Afza (2009), Uyar (2009) in their studies. The return on assets is a better measure since it relates the profitability of the company to the asset base (Padachi, 2006).

With regards to independent variables, Receivables Collection Period (days), Inventory Conversion Period (days), Payables Deferral Period (days) and Cash Conversion Cycle (days) were used for measuring WCM.

Size of Company (Natural Logarithm of Sales), Debt Ratio and Current Ratio were used as control variables having an impact upon corporate profitability. The regression analysis was used for research to determine the factors affecting GOP and ROA. The multi-factor statistical analysis method is most widely used in

economics for formation of regression models nowadays. The multi-factor statistical analysis model of conventional multiple linear regression means searching for parameters (forecasting of variables) that determine a value of the quantitative variable. It is expected that a relationship in this model is linear.

The impact of working capital management upon corporate profitability was modeled using the following regression equations:

GOP = f (RCP, ICP, PDP, CCC, LnS, CR, DR, λ) *(model 1)*

$GOP = \beta_0 + \beta_1(RCP_{it}) + \beta_2(CR_{it}) + \beta_3(DR_{it}) + \beta_4(LnS_{it}) + \varepsilon$ *(model 2)*

$GOP = \beta_0 + \beta_1(ICP_{it}) + \beta_2(CR_{it}) + \beta_3(DR_{it}) + \beta_4(LnS_{it}) + \varepsilon$ *(model 3)*

$GOP = \beta_0 + \beta_1(PDP_{it}) + \beta_2(CR_{it}) + \beta_3(DR_{it}) + \beta_4(LnS_{it}) + \varepsilon$ *(model 4)*

$GOP = \beta_0 + \beta_1(CCC_{it}) + \beta_2(CR_{it}) + \beta_3(DR_{it}) + \beta_4(LnS_{it}) + \varepsilon$ *(model 5)*

and

ROA = f (RCP, ICP, PDP, CCC, LnS, CR, DR, λ) *(model 6)*

$ROA = \beta_0 + \beta_1(RCP_{it}) + \beta_2(CR_{it}) + \beta_3(DR_{it}) + \beta_4(LnS_{it}) + \varepsilon$ *(model 7)*

$ROA = \beta_0 + \beta_1(ICP_{it}) + \beta_2(CR_{it}) + \beta_3(DR_{it}) + \beta_4(LnS_{it}) + \varepsilon$ *(model 8)*

$ROA = \beta_0 + \beta_1(PDP_{it}) + \beta_2(CR_{it}) + \beta_3(DR_{it}) + \beta_4(LnS_{it}) + \varepsilon$ *(model 9)*

$ROA = \beta_0 + \beta_1(CCC_{it}) + \beta_2(CR_{it}) + \beta_3(DR_{it}) + \beta_4(LnS_{it}) + \varepsilon$ *(model 10)*

The quality of the created models is evaluated using the determination coefficient which fixes the dispersion part of the explained resulting feature taking into account the included factors.

4. The Findings

A two-stage cluster analysis in the space of investigated attributes allowed singling out a homogeneous population consisting of 165 companies. Firstly the descriptive analysis is presented followed by the correlation analysis.

4.1 Descriptive Statistics

The descriptive statistics of investigated attributes are presented in Table 2.

Table 2: Descriptive statistics

	GOP	ROA	RCP	ICP	PDP	CCC	LnS	DR	CR
Mean	16,93	1,76	47,99	74,28	102,543	19,74	12,87	0,73	3,14
Median	14,71	1,55	40,41	40,55	71,47	10,74	13,05	0,57	1,55
Std. Deviation	16,84	1,20	40,79	91,42	98,90	104,01	1,89	3,57	4,15
Range	104,95	5,60	203,15	491,58	633,90	694,75	9,41	42,19	34,37
Minimum	-27,81	,10	2,37	,00	6,56	-311,44	7,68	-26,78	,09
Maximum	77,13	5,70	205,52	491,58	640,46	383,30	17,10	15,42	34,46

Table 2 presents the descriptive statistics of different variables considered in this research.

Looking at Table 2, we can see that GOP is on average 16,93%. GOP fluctuates in the range from 27,81 till 77,13 in relation to the mean value 16,93; it exceeds 14,71 for half of the companies. ROA fluctuates in the range from 0,1 till 5,70 in relation to the mean value 1,76; it exceeds 1,55 for half of the companies.

RCP average is on 48 days. The minimum amount of time taken by companies to collect cash from customers is 2.37 days while the maximum time is 206 days. On average, it takes 74 days to sell inventory, the maximum time taken by companies is 492 days, and minimum time is 0 days. On average, companies wait 103 days to pay their purchases. Here, the maximum time taken by companies is 640 days, and minimum time is 7 days. On average, the companies in this sample have a 20 days CCC. The median is 11 days.

Control variables

CR is on average 3,14, with a standard deviation of 4,15. CR averages is on 1.55. The works of foreign authors (Alexander et.al., 2009; Robinson et.al, 2009;) do not indicate the norms of theoretical sufficiency for current ratios, but according to norms of theoretical sufficiency for CR accepted in Latvia 1 to 2 (Rurane, 2007), it can be concluded that the CR of companies in average correspond to the norms of theoretical sufficiency.

The mean of DR, which is used to verify the relationship between debt financing and profitability, is 0,73. The maximum debt financing used by a company is 15,42 and minimum -26,78.

The LnS measures the size of the company and allows checking its relationship with profitability. The mean of this variable is 12.16 and the average is 2.27.

4.2 Correlation Analysis

Table 3 shows correlation coefficients of the dependent and independent variables. The purpose of this analysis is to find out the relationship between the different variables under consideration. Correlation explains how two variables react to each other e.g. what change will occur in one variable with the change in other variable (Kohler, 1994).

Table 3: The correlation matrix

Correlation Profitability	GOP	ROA	RCP	ICP	PDP	CCC	LnS	DR	CR
GOP	1,000	0,044	-0,157*	0,456**	0,193*	0,058	0,283**	0,073	0,090
ROA		1,000	-0,298**	0,014	-0,084	-0,151	0,277**	0,527**	-0,339**
RCP			1,000	-0,192*	-0,086	0,342**	-0,111	-0,192*	0,372**
ICP				1,000	0,465**	0,301**	0,267**	0,192*	0,022
PDP					1,000	-0,459**	0,218**	0,444**	-0,587**
CCC						1,000	-0,154*	-0,382**	0,797**
LnS							1,000	0,557**	-0,268**
DR								1,000	-0,593**
CR									1,000

*Correlation is significant at the 0.05 level (2-tailed).
**Correlation is significant at the 0.01 level (2-tailed).

The correlation analysis allowed indentifying direct significant correlation of GOP with such values as ICP, PDP, LnS. The strongest correlation was observed between GOP and ICP (r=0,456).

The direct significant correlations between ROA and LnS (r=0,277), ROA and DR (r=0,527) were observed as well. Between ROA and PCR (r=-0,298), ROA and CR (r=-0,339), significant correlations were reversed.

Analysis also shows a positive relationship between LnS, used to measure the size of a company, and the GOP and ROA. Its correlation coefficient accordingly is 0,283 and 0.277. It is highly significant at α = 1%.

The CR, in the analysis, has a significant negative relationship with ROA. The coefficient is -0,339 (significant at α = 1%). It reveals the need for balance between CR and profitability because these two objectives have an inverse relationship.

Based on the research data it can be concluded that companies have to deal with problems of management of receivables and inventory seriously because they have an essential impact upon profit indicators.

4.3 Regression Analysis

The formulae for calculation of GOP and ROA are developed as equations of multiple linear regression where GOP and ROA are used as the dependent variable but the factors that are capable of affecting GOP and ROA are used as the independent variables.

As a result, the following formulae were received:

- *RCP, LnS, DR, CR;*
- *ICP, LnS, DR, CR;*
- *PDP, LnS, DR, CR;*
- *CCC, LnS, DR, CR.*

The received equations and correlation coefficients and determination coefficients corresponding to these equations are given in Table 4.

Table 4: Result of regression model for GOP

	R	R^2
*GOP=0,082*ICP+1,570*LnS-9,369*	*0,489*	*0,239*
*GOP=0,058*PDP+1,813*LnS+0,762*CR-14,732*	*0,392*	*0,153*

The share of dispersion of GOP that is explained by ICP factors amounts to 24%, the same explained by PDP, LnS, CR -15%.

Table 5 contains the equations expressing ROA in terms of the groups of independent factors.

Table 5: Result of regression model for ROA

	R	R^2
*ROA=0,003*ICP-0,118*LnS-0,096*CR+0,775*	*0,470*	*0,220*
*ROA=-0,005*PDP+0,126*LnS-0,131*CR+1,067*	*0,561*	*0,315*
*ROA=-0,006*RCP-0,086*CR+2,326*	*0,421*	*0,178*

The share of dispersion of ROA that is explained by ICP factors amounts to 22%, the same explained by PDP – 32%, RCP –18%.

5. Summary and Conclusions

The purpose of this research was to determine what relationship lies between the working capital management components and profitability in Latvian companies. Upon onset of the economic crises, Latvian companies have to concentrate on WCM to increase their profitability, seriously and professionally considering conditions of their cash conversion cycle which are affected by accounts payable, receivables collection period, number of days of inventory conversion. The research confirms that it is possible to influence corporate profitability by improving conversion of working capital components.

The results of the research allow making conclusions on the relationship of components of working capital management with profitability in Latvian companies:
The previous studies forecast a negative correlation between PDP, ICP, RCP, CCC and corporate profitability (Deloof, 2003; Karaduman et al, 2004; Lazaridis and Tryfonidis, 2006; Enqvist et al, 2009). The research conducted by the author does not conform to these conclusions. A significant negative correlation was observed in Latvian companies only between ROA and RCP and less significant between GOP and RCP.

Most studies have not found the expected negative relationship between ICP and profitability to be significant (Lazaridis and Tryfonidis, 2006; Padachi, 2006). Mathuva (2009) concluded that there was a positive correlation between profitability and ICP which was confirmed by this research as well. To a degree, it points to conservative WCM policies.

The cash conversion cycle and ROA also have a negative but insignificant coefficient. This is consistent with the view that the time lag between the expenditure for the purchases of raw materials and the collection of sales of finished goods can be too long and that decreasing this time lag increases profitability (Deloof, 2003). In

this research, the author can make a similar conclusion, moreover, the negative but insignificant coefficient in Latvian companies is among ROA and PDP and CCC.

A significant relationship between GOP and size of a company as well as between ROA and size of a company were discovered in this research. This shows that as the size of a company increases, it will increase its profitability and vice versa.

The regression models created on the grounds of Fisher's F-criterion are adequate in general and all regression coefficients are significant. Such models can be used for analysis and decision-making, though insufficiently high values of determination coefficients make their use problematic for implementation of forecasts.

Due to the fact that liquidity indicators play an important role in all regression equations, further research shall be aimed at in-depth regression analysis classifying companies according to the liquidity level. It will allow attaining the most optimal regression equations where the competing goals, liquidity and profitability, are taken into account.

The results of the conducted research supplement the results of the previous research on WCM impact upon corporate profitability. Moreover, such research has not been conducted in relation to companies of countries of Eastern Europe which had been formed in the post-soviet period. It can be concluded that companies have to pay attention to indices of payables, receivables and inventory conversion because successful management of these indices affects the value of a company.

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