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WORKING CAPITAL MANAGEMENT, PROFITABILITY AND RISK – ANALYSE OF COMPANIES LISTED ON THE WARSAW STOCK EXCHANGE

Monika Bolek*

Abstract   This paper presents the problem of working capital management, profitability and risk represented by working capital strategy. According to the theory the more working capital is engaged in the company resulting in higher liquidity the lower the profitability and risk connected to the liquidity. On the other hand we can expect that the lower the working capital level and hence the liquidity the higher the profitability and risk., The author decided to test companies listed on the Warsaw Stock Exchange to see if balance sheet structure and risk connected to working capital strategy were related to the return measured by ROA and ROE in non-financial companies in the period 1997–2007. The results presented below show alack of correlation between working capital strategies (and the related risk levels) and the returns on assets and equity.

Introduction

Working capital management is related to balance sheet structure and therefore influence financial management to a certain degree. Short-term financial management is the basis of liquidity management and efficiency in the management of current assets and liabilities. This issue is complicated and managers have to decide if they focus on liquidity or profitability to find a trade-off between these two groups of ratios, which are fundamental for companies. Both liquidity management and efficiency management may be sources of risk. A lack of liquidity may lead to bankruptcy, while poor efficiency management may influence profitability and affect market expectations. In this paper the author focuses on the working capital management problem using balance sheet structure measures as indicators of the working capital management strategy as well as liquidity and moreover profitability measures (ROA and ROE) as results for more or less aggressive management strategies to evaluate the efficiency of management in Poland. Companies with aggressive working capital strategies involve less capital and operate more efficiently, therefore the return on equity and assets should be higher. Moreover the more aggressive strategy the higher the risk. Opposite situation is when we take into account the conservative working capital strategy, involving more capital and operating less efficient – the ratios of return and risk should be lower. In the table below we can see, that profitability varies inversely with liquidity and profitability moves together with risk.

Table 1: Summary of working capital strategies

Policy	Liquidity	Profitability	Risk
Conservative	High	Low	Low
Moderate	Average	Average	Average
Aggressive	Low	High	High

Source: J. C. Van Horne, J. M Wachowicz Fundamentals of Financial Management, 12/E, Financial Times Press, 2004

The capital structure, investments, dividend policy and company valuation are subject to a company's decision making, while working capital management is the result of negotiations with its customers or subcontractors and inventory management (Filbeck & Krueger, 2005). Usually these decisions are made by many managers in different departments, so synchronization is one problem and management is another, more advanced technique. A lack of working capital management may give rise to specific risk on the capital market and lead to wrong decisions connected with the capital structure, investments and so on, because they are connected with the cost of equity, which is calculated on the market basis (CAPM for example), where the market and specific risk is taken into account. These problems were analyzed by Harris (2005), who stated that working capital management is a simple way of ensuring the ability of an organization to finance the difference between its current assets and current liabilities, and such an approach is represented by many CFOs. In more advanced research, working capital management has become one of the most important issues in organizations and many financial executives are trying to identify the basic determinants of working capital and their optimal levels (Lamberson, 1995).

The more developed the market, the more advanced the techniques of working capital management. The Polish market is an example of a transforming economy that uses the achievements of western knowledge. Researchers can observe the growth and development of the market and apply the methodology created at a time when Western countries were discovering free market rules and experienced economic system growth. Such observations may help to build a model for transforming countries all over the world to help them with starting and performing transition. The Western economic system makes people responsible for it, with knowledge being the most important factor of development for societies.

Efficient working capital management should optimize liquidity, minimize risk and maximize the profitability. It is extremely difficult to achieve all of these objectives and keep them stable over time especially that the problem is three dimensional. Managers knowing these rules should try to be as close as possible to the optimal levels while making decisions. They should take into account the market expectations as well. Aggressive, conservative and moderate working capital management policies are connected to current assets and liabilities levels.

This study deals with the influence of working capital strategies on the risk run by companies and their profitability, indicating that the higher the risk the higher the return. Analysis was conducted on Polish companies listed on the Warsaw Stock Exchange, which was the leader in Central and Eastern Europe in the period 1997–2007. The sample data is limited to the year 2007 because of the crisis period taking place in fallowing years.

Working capital, liquidity, profitability and risk

Working capital can be defined within the capital approach, which determines the amount of net working capital as the difference between constant capital and fixed assets, bearing in mind that invested capital consists of equity and long-term debt. The asset approach defines the value of working capital as the difference between current assets and the amount of short-term financing of current assets, while the latter includes: current liabilities, short-term debt, income and short-term accruals. The higher the level of working capital the more capital has to be engaged and therefore the return on equity is lower since we can expect that this difference between current assets and short – term liabilities is financed by equity. Long – term debt is connected to investments in fixed assets usually. The conservative strategy in working capital

* Ph. D., Monika Bolek, University of Lodz, Department of Economics, ul. Rewolucji 1905r. 41, 90-214 Lodz, Poland, mbolek@ki.uni.lodz.pl.

may influence the efficiency of company performance and therefore it may influence ROA in the same way. too.

There are many papers analyzing the problem of working capital, liquidity, efficiency and profitability. The fundamental work of Gupta and Huefner (1972) investigated the differences in financial ratios among industries. They found differences in profitability, activity, leverage and liquidity ratios. Richards and Laughlin (1980) pointed out the cash conversion cycle as a dynamic liquidity measure and proved that the relationship between the current and quick ratios and the cash conversion cycle is positive. Basing on mentioned papers a large group of researchers try to find out the relationship between the working capital strategy and liquidity, profitability and risk analyzing home markets all over the world and looking for explanations to their different results. Garcia-Teruel, Martinez-Solano (2007) examined the effects of working capital management on the profitability firms. Chakraborty (2008) examined the relationship between working capital management and firm profitability for a sample of Indian companies. Dash and Hanuman (2009) studied the conflicting firm objectives of optimizing liquidity and profitability using a goal programming model for working capital management. Nobanee and AlHajjar (2009a) studied the relation between working capital management as proxied by the cash conversion cycle, corporate performance (firm profitability) as proxied by the operating income to sales ratio and operating cash flows as proxied by the operating cash flows to sales ratio.

Working capital is strongly connected to liquidity and profitability. Companies have to look for the optimal level of working capital to maintain current operations and to generate an appropriate rate of return. Efficient working capital management involves planning and controlling current assets and current liabilities in a manner that eliminates the risk of inability to meet short-term obligations on one hand and avoids excessive investment in these assets on the other hand (Eljelly, 2004). An aggressive working capital policy is connected with a low level of current assets as a percentage of total assets and a high level of current liabilities as a percentage of total liabilities. Excessive levels of current assets may have a negative effect on the firm's profitability whereas a low level of current assets may lead to a lower level of liquidity resulting in difficulties in maintaining smooth operations (Van Horne & Wachowicz, 2004). A conservative working capital policy is connected with a high level of current assets as a percentage of total assets and a low level of current liabilities as a percentage of total liabilities. A moderate policy can be characterized by either a low level of current assets as percentage of total assets and a low level of current liabilities as percentage of total liabilities or a high level of current assets as percentage of total assets and a high level of current liabilities as percentage of total liabilities.

The level of current assets and current liabilities should be monitored and also established in a long-term strategy. This can reduce haphazard decisions and uncertainty connected with risk assessment. This can also create a predictable stream of processes and projects in a company. The more transactions the higher the level of current assets and liabilities, which can also influence the level of working capital. The more conservative policy the more long-term capital will be used to finance working capital and the lower the return and value added ratios we can expect. Working capital indicators can be obtained by analyzing the balance sheet structure according to Sierpińska and Nesterak (1996) as shown in *Table 2*.

Table 2: Working capital strategy, risk and return

|	Low CA/TA ratio	High CA/TA ratio
High CL/TL ratio	High return, high risk Aggressive policy	Medium return, medium risk Moderate policy
Low CL/TL ratio	Medium return, medium risk Moderate policy	Low return, low risk Conservative policy

Notes: CA – current assets, TA – total assets, CL – current liabilities, TL – total liabilities.
Source: Sierpińska, M., Nesterak, J. (1996). Przedsiębiorstwo na rynku kapitałowym, Wydawnictwo Uniwersytetu Łódzkiego, pp. 197–206

Analyzing the structure of the balance sheet, we can distinguish four approaches as presented in *Table 2*. The first scenario is connected with a high level of current liabilities and a low level of current assets, indicating negative working capital and an aggressive approach. The moderate approach can be represented by either a high level of current liabilities and a high level of current assets or a low level of current liabilities and current assets. In the last scenario, the conservative approach is characterized by a low level of current liabilities and a high level of current assets.

The relationship between working capital and liquidity is also connected to profitability. The literature describing the relationship between the liquidity and profitability of companies indicates the character of this relationship. Although generally an increase in liquidity ratios also means a rise in a company's profitability, at some point the relationship changes and a further increase in liquidity ratios may lead to bankruptcy. This dependence is presented in *Figure 1*.

Figure 1: The relationship between liquidity and profitability
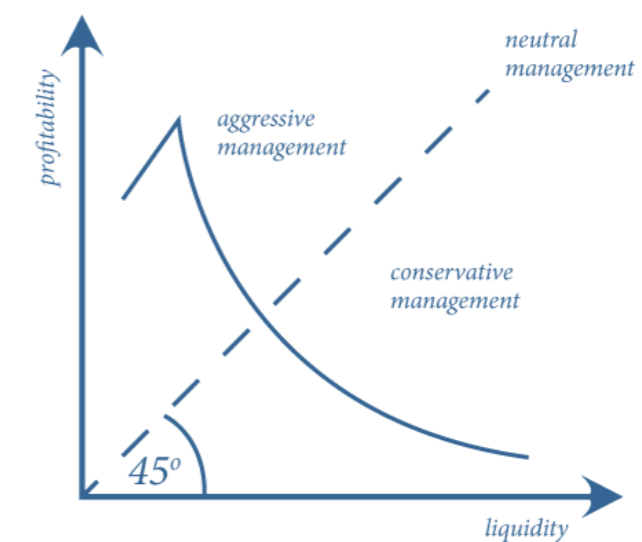
Source: Gajdka, J., Walińska, E. (1998). Zarządzanie Finansowe. Teoria i praktyka. Warsaw: FRR, Vol. II, p. 467

Traditionally, the main indicators of liquidity are the current and the quick ratios (CR and QR, respectively). High current and quick ratios (current assets minus inventory (I)) indicate a liquid firm. A high current or quick ratio can be achieved by having either a high level of current assets (CA) or a low level of current liabilities (CL). They can be presented as follows:

$$CR = CA / CL \qquad\qquad (1)$$

$$QR = (CA - I) / CL \qquad\qquad (2)$$

Nobanee and AlHajjar (2009b) recommended more accurate measures of working capital management, such as the optimal cash conversion cycle, the optimal operating cycle, and the optimal net trade cycle. The cash conversion cycle (CCC) is a liquidity indicator providing dynamic insights. Based on the model developed by Richards-Laughlin (1980), the CCC is defined as the sum of the receivables conversion period (RCP) and the inventory conversion period (ICP) minus the payment deferral period (PDP), that is:

$$CCC = RCP + ICP – DPD \qquad\qquad (3)$$

where:
RCP = receivables conversion period = 360/Accounts Receivable Turnover,
ICP = inventory conversion period = 360/Inventory Turnover,
PDP = payment deferral period = 360/Payables Turnover.

Therefore, the cash conversion cycle shows that the smaller its value, the quicker the firm can recover its cash from the sales of its products and the more cash the firm will have, hence the more liquid

the firm. If the CCC is high, it takes the company longer to recover cash. Thus, a high CCC would indicate a liquidity problem. If the cash conversion cycle is a dynamic way of measuring liquidity and provides the managers with clear information about receivables, inventory and payables turnover, it may be considered as a better measure of liquidity (and also efficiency, if we take into account the number of cycles in a year). If the cash conversion cycle is the efficiency indicator than we can expect, that the more aggressive the strategy performed by a company the lower the cash conversion cycle. The relationship between current ratio and cash conversion cycle may be positive as Richards-Laughlin (1980) argue, or negative as Lyroudi-McCarty (1993) have found. Lyroudi (2012) analyzed the relationship between the current ratio and cash conversion cycle for Polish companies and found the positive relationship between them.

As profitability indicators the author proposes the return on assets ratio (ROA) and the return on equity ratio (ROE), following Jose, Lancaster and Stevens (1996) who used both ratios ROA and ROE to distinguish the profitability due to assets management (ROA) from the profitability due to financing (ROE). Profitability indicators can be described as follows: The return on assets ratio (ROA), which is given by the equation:

$$ROA = EAT / TA \qquad (5)$$

where:
EAT – earnings after taxes,
TA – total assets.

The return on equity ratio (ROE), which is given by the equation:

$$ROE = EAT / E \qquad (6)$$

where:
E – Equity.

The higher these profitability ratios are the better for the firm but we should expect a negative relationship between them and liquidity.

A company's risk from the market point of view can be divided into two categories. One is connected with market fluctuations including exchange rates, interest rates, or commodity prices and is called market risk, while the other is considered the internal risk of a company and called a specific risk. A company's specific risk may have many sources, one of them being working capital strategy risk strongly connected with the company's liquidity. The more liquid the company is the lower its specific risk and vice versa the lower the company liquidity is the higher its specific risk. In recent years, there has been an increased emphasis on consolidated risk management in companies. The coordination of risk management in an enterprise is crucial because there are many departments dealing with exposition to risk at different levels and according to various categories. The working capital and liquidity problem is only one of them. Moreover, risk can be assessed by investors analyzing the performance and decisions of the companies they invest their money in. In this paper the problem of the correlation between risky working capital strategies and return on assets and equity is analyzed.

MODEL, TESTABLE HYPOTHESIS AND RESULTS

The main hypothesis states that working capital strategy and the risk connected to the liquidity are correlated to profitability ratios in non-financial companies listed on the Warsaw Stock Exchange in the period 1997-2007. A new methodology is proposed to analyze this problem. The aggressive strategy is represented by lower than average assets structure ratio and higher than average liability structure ratio. The conservative strategy is represented by a higher than average assets structure ratio and lower than average liabilities structure ratio. Moderate strategy is connected to the average amount of mentioned ratios. The author decided to divide companies by their balance sheet ratios into four groups representing aggressive, conservative and moderate working capital strategies. Based on Sierpinska and Nesterak's statement (1996) given in *Table 2*, the following hypotheses will be tested:

1. For aggressive strategy CL/TL should be positively correlated to ROA and CA/TA should be negatively correlated to ROA.

2. For conservative strategy CL/TL should be positively correlated to ROA and CA/TA should be negatively correlated to ROA.

3. For moderate strategy CL/TL and CA/TA should be negatively or positively related to ROA in the same direction.

Moreover

1. For aggressive strategy CL/TL should be positively correlated to ROE and CA/TA should be negatively correlated to ROE.

2. For conservative strategy CL/TL should be positively correlated to ROE and CA/TA should be negatively correlated to ROE.

3. For moderate strategy CL/TL and CA/TA should be negatively or positively related to ROE in the same direction.

Data used in this analyze was taken from the Notoria Database. Results of 2,176 observations according to the strategy adopted are presented in *Table 3*.

Table 3: Results of policy structure analysis

	Low CA/TA ratio	High CA/TA ratio
High CL/TL ratio	Aggressive Policy 22.56% of companies (A)	Moderate Policy 9.15% of companies (C)
Low CL/TL ratio	Moderate Policy 26.38% of companies (B)	Conservative Policy 41.91% of companies (D)

Most of companies perform the conservative and moderate working capital strategy that should be connected to lower return on equity and assets.

To test the hypotheses, Pearson correlation coefficients were calculated between variables in the above-mentioned four groups of companies. The results are presented in *Table 4* for ROA and in *Table 5* for ROE.

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Table 4: Results of correlation analysis for ROA

Scenario/Correlation	CA/TA& ROA	CL/TL & ROA
A Aggressive Strategy		
Pearson coefficient	0.017906216	0.024733822
t-Statistic	0.429071244	0.592761602
Ref t value	1.964105441	1.964105441
Result	no correlation	no correlation
Degrees of freedom	489	489
Significance	0.05	0.05
B Moderate Strategy		
Pearson coefficient.	0.085733922	-0.134508727
t-Statistic	1.895071309	-2.98941401
Ref t value	1.964867287	1.964867287
Result	no correlation	**correlation**
Degrees of freedom	572	572
Significance	0.05	0.05
C Moderate Strategy		
Pearson coefficient.	0.170718076	0.052105458
t-Statistic	2.444155223	0.736037779
Ref t value	1.971956544	1.971956544
Result	**Correlation**	no correlation
Degrees of freedom	197	197
Significance	0.05	0.05
D Conservative Strategy		
Pearson coefficient	-0.016363138	-0.018916683
t-Statistic	-0.494222093	-0.571373541
Ref t value	1.962568556	1.962568556
Result	no correlation	no correlation
Significance	0.05	0.05
Degrees of freedom	910	910

Table 5: Results of correlation analysis for ROE

Scenario/Correlation	CA/TA & ROE	CL/TL& ROE
A Aggressive Strategy		
Pearson coefficient	-0.013094308	0.061401394
t-Statistic	-0.313744208	1.473853784
Ref t value	1.964105441	1.964105441
Result	no correlation	no correlation
Degrees of freedom	489	489
Significance	0.05	0.05
B Moderate Strategy		
Pearson coefficient.	0.023256175	0.003428796
t-Statistic	0.512302674	0.075511837
Ref t value	1.964867287	1.964867287
Result	no correlation	no correlation
Degrees of freedom	572	572
Significance	0.05	0.05
C Moderate Strategy		
Pearson coefficient.	0.085078333	-0.164350014
t-Statistic	1.204544948	-2.350402829
Ref t value	1.971956544	1.971956544
Result	no correlation	**correlation**
Degrees of freedom	197	197
Significance	0.05	0.05
D Conservative Strategy		
Pearson coefficient	0.038872407	-0.008054918
t-Statistic	1.174808903	-0.243261092
Ref t value	1.962568556	1.962568556
Result	no correlation	no correlation
Significance	0.05	0.05
Degrees of freedom	910	910

In scenario A representing the aggressive strategy the correlation is very low and insignificant. Since the author stated that the CL/TL relationship to profitability should be positive and the CA/TA relationship should be negative such a joined result has not been found and the hypothesis should be rejected. Scenario D represents the conservative strategy. Here both correlation indicators are very low and insignificant as well but they are negative this time. Basing on these results the next hypothesis may be rejected and we can conclude that the relationship between the working capital strategy and profitability does not exist in this case, either. The moderate strategy represented by B and C scenarios show significant correlations only for one factor. The coefficients signs are the same in the scenario B indicating the same ratios movement direction as it was expected. We should note, that the correlation is stronger in these two cases but results are irrelevant

The working capital indicators correlation to ROE were also analyzed. The results for the aggressive strategy are not significant and moreover the signs of the Pearson coefficient are opposite to expectations. For the conservative strategy the results are not significant as well, but the coefficient signs directions are according to expectations. The moderate strategy represented by scenario B is characterized by the same signs as it was expected but unfortunately the results are not significant. The results for the scenario C are partially significant but the coefficient signs directions are not the same.

The results are not satisfactory but it may be connected to the lack of professional management in Polish companies on the level of liquidity, profitability and risk joined decisions.

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Conclusions

The Polish economy is a developing one, catching up with the Western countries. Efficient management in companies requires knowledge and experience. Since the economy is developing, knowledge is also likely to be developing. The most skilled people work for international corporations that offer better salary and career path. As a result Polish companies do not have many choices. Moreover the lack of experienced and successful managers creates a gap of knowledge in companies and young employees do not have positive patterns to follow.

In the first stage of research, the author analyzed the percentage of companies following aggressive, conservative, and moderate strategies. The majority of Polish companies listed on the Warsaw Stock Exchange are following a conservative strategy. Conservative strategy should be connected to lower returns on assets and equity. The results of hypothesis verification are as follows.

The hypothesis stated that for aggressive strategy CL/TL should be positively correlated to ROA and CA/TA should be negatively correlated to ROA. The analysis showed that the Pearson coefficient equals 0.02 for both ratios. Results are not significant and the hypothesis should be rejected.

The hypothesis stated that for conservative strategy CL/TL should be positively correlated to ROA and CA/TA should be negatively correlated to ROA. The analysis showed that a Pearson coefficient equals -0.02 for both ratios. Results are not significant and the hypothesis should be rejected.

The hypothesis stated that for moderate strategy CL/TL should be correlated to ROA and CA/TA should be correlated to ROA in the same direction. The analysis showed that a Pearson coefficient equals 0.09 for CA/TA and -0.13 for CL/TL in a first scenario and 0.17 for CA/TA and 0.05 for CL/TL. Results are partially significant and the hypothesis should be rejected.

The hypothesis stated that for aggressive strategy CL/TL should be positively correlated to ROE and CA/TA should be negatively correlated to ROE. The analysis showed that the Pearson coefficient equals -0.01 for CA/TA and 0.06 for CL/TL. Results are not significant and the hypothesis should be rejected.

The hypothesis stated that for conservative strategy CL/TL should be positively correlated to ROE and CA/TA should be negatively correlated to ROE. The analysis showed that the Pearson coefficient equals 0.04 for CA/TA and -0.01 for CL/TL. The hypothesis should be rejected.

The hypothesis stated that for moderate strategy CL/TL and CA/TA should be correlated to ROE in the same direction. The analysis showed that a Pearson coefficient equals to 0.02 for CA/TA and 0 for CL/TL in a first scenario and 0.08 for CA/TA and -0.16 for CL/TL in a second scenario. Results are partially significant and the hypothesis should be rejected.

The lack of relationship between working capital indicators and profitability ratios may indicate weak and not integrated management in the field of liquidity, risk and profitability in companies listed on the Warsaw Stock Exchange. Development of a market and knowledge in future may change this situation.

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