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RETURN ON CURRENT ASSETS, WORKING CAPITAL AND REQUIRED RATE OF RETURN ON EQUITY

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Abstract The problem of return on current assets and return on working capital related to the cost of equity invested in a company is analyzed in this paper. Risk – return and liquidity – profitability trade-offs influence the company's equilibrium and management decisions. Liquidity is measured by the cash conversion cycle and it is related to the working capital strategy, measured by current ratio. Rate of return on current assets should be related to the rate of return on working capital that is linked to the cost of capital and the required rate of return. The results indicate that there is a positive relationship between the return on current assets and cash conversion cycle, a positive relationship between cost of equity and return on working capital meaning that the working capital, cash conversion cycle and current assets management are related to profitability, and cost of equity is determined by the required rate of return calculated based on the Capital Asset Pricing Model.

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INTRODUCTION

Working capital management is a subject of liquidity-profitability relationship analysis in many papers. The higher the working capital, the more capital invested to finance it and the lower the return on equity (ROE). The problem of the cost of working capital has not yet been widely discussed. The liquidity is connected to the cash conversion cycle (CCC) and the current assets level related to the short–term liabilities (CR), but the higher it is, the more capital is invested and the return on equity will decrease as a result. The problem of current assets level and working capital invested to finance it is discussed to show that investors are financing liquidity but not over-liquidity related to bad current assets management. Their consideration of this problem will be analyzed in this paper.

Investors require a certain rate of return from the capital they put into a business. This rate may be calculated based on the Capital Asset Pricing Model. Moreover, companies may take a conservative, moderate or aggressive strategy on working capital and thus liquidity is affected. This division is subjective and according to the author an aggressive strategy is when the current ratio (CR) is lower than 1, a moderate strategy is when CR is between 1 and 2, and conservative – when it is over 2. This solution was proposed in previous papers by the author and is related to the academic consideration of working capital management. Investors establish their required rate of return in relation to the performance of the company. In a conservative strategy the risk

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and return on equity are lower and the required rate of return should be lower as well. In the case of an aggressive strategy the risk and ROE are higher, so the required rate of return is also higher.

In this paper the idea of return on current assets (ROCA), return on working capital (ROWC), cost of working capital and required rate of return on working capital will be developed. The hypothesis related to the research are as follows: 1. ROCA is negatively related to the liquidity measured by CCC and CR because the more aggressive the working capital management policy is the higher the profitability. 2. Cost of equity is related to the ROCA, CCC and CR because investors take into account the results of company performance. 3. There is a negative relationship between CR representing the working capital strategy and cost of equity because lower liquidity is connected to higher specific risk and the rate of return should grow based on the risk-return trade-off theory. 4. There is a positive relationship between ROWC and cost of equity because investors should take the profitability into account when establishing the required rate of return. This paper is divided into the following sections: literature overview, discussion of the issue, results of research and conclusions.

Literature overview

Optimal working capital level can be defined as the amount of capital that finances the optimal current assets level related to maximal earnings. There are many papers considering the problem of liquidity-profitability trade-off, but in this article the author would like to focus on returns on current assets and working capital as derivatives of ROA and ROE, related to operational and liquidity factors. This approach is rather new but the author was inspired by several papers where other researchers were signaling the problem. Cost of capital is a widely discussed problem mainly in the context of optimal capital structure and company value as Modigliani and Miller stated in their paper (1963). Graham and Harvey (2001) surveyed CFOs about the cost of capital, capital budgeting, and capital structure. They found that large firms rely heavily on present value techniques and the Capital Asset Pricing Model, while small firms are relatively likely to use the payback criterion. Gebhardt et al. (2001) proposed an alternative technique for estimating the cost of equity. They used a discounted residual income model to generate a market implied cost of capital. The CAPM will be used in this paper to calculate the cost of equity since the largest companies on the Polish market (listed on the Warsaw Stock Exchange) are the subject of this analysis.

Lang and Lundholm (1996) suggested that potential benefits to disclosure include an increased number of investors following a reduced estimation risk and reduced information asymmetry, each of which have been shown to reduce a firm's cost of capital in theoretical research. The author of this paper expects that there is a relationship between risk related to the liquidity management and cost of capital. Easley and O'Hara (2004) investigated the role of information in affecting a firm's cost of capital. They showed that differences in the composition of information between public and private information affect the cost of capital, with investors demanding a higher return to hold stocks with greater private information. They proved that firms can influence their cost of capital by choosing features like accounting treatments, analyst coverage, and market microstructure. The quality of information delivered to investors may be increased by reporting the new ratios mentioned in this paper. Francis at al. (2005) investigated whether investors price accruals quality, as a proxy for the information risk associated with earnings. Measuring accruals quality as the standard deviation of residuals from regressions relating current accruals to cash flows, they found that poorer accruals quality is associated with larger costs of debt and equity.

Lambert et al. (2007) examined whether and how accounting information about a firm manifests itself in its cost of capital, despite the forces of diversification. They built a model that is consistent with the Capital Asset Pricing Model and which explicitly allows for multiple securities whose cash flows are correlated. They demonstrated that the quality of accounting information can influence the cost of capital, both directly and indirectly. If equity instruments would be divided into long and short-term as are debt instruments, the required rate of return would directly be affected by long and short term decisions in the company.

Cost of working capital is mentioned in the following papers and shows the importance of this problem: Viskari et al. (2012) introduced an internal information tool, the advanced cash conversion cycle (ACCC), for controlling the amount and cost of working capital, by refining and extending the concept of the weighted cash conversion cycle. The

ACCC offers visibility through the value chain, elimination of the problem of a negative margin, a more simple calculation of accounts payables compared to the prior model, and new metrics to control working capital in companies. Holdren and Hollingshead (1999) integrated inventory control with corporate financial management and commercial lending practices. They suggested that inventory management influences the cost of working capital. Commercial loan officers can use this information to adopt a market-based lending strategy that segments inventory and closely matches inventory loan risks and return. Ahmed (1998) showed that the cost of working capital, i.e. the interest rate, affects the supply of goods by firms. Sygit (1992) described the problem of determining the cooperation in a company that is connected with a number of decisions of an economic and organizational character. Raymond (1988) stated that to prevent the accumulation of accounts in the „greater than 120 days" category, receivable management strategies must be revised. With industries such as healthcare likely to remain credit-oriented, those organizations that effectively manage receivables and minimize their cost of working capital will win a real competitive advantage. The problem of cost of working capital is important and will be extended in the next section.

Required rate of return influencing the cost of capital is related to the risk of the company. Kang and Stulz (1997) studied stock ownership in Japanese firms by non-Japanese investors who considered the investments from the international risk point of view. Controlling for size, there is evidence that small firms that export more, firms with greater share turnover, and firms that have ADRs have greater foreign ownership. Their findings suggested the relationship existence between specific factors of companies and required rate of return. These specific factors affect the company risk in many fields. Lord (1996) investigated a complete theoretical model relating the operating characteristics of a firm to the total, systematic, and unsystematic risk of its equity. The degree of operating leverage, the ratio of net profits to firm value, and the variability of unit output are all found to be positively correlated with each of the three risk measures. The degree of financial leverage, while positively related to total and unsystematic risk, does not appear to be related to systematic risk. After controlling for the business risk of the firm, no evidence can be found of an interaction between the degree of operating leverage and the degree of financial leverage. Quijano (2013) demonstrated that a firm's unsystematic risk is positively related to its cost of bank debt. Roden and Manuel (2012) argue that financial managers should include the cost of permanent current liabilities as a component in calculating the opportunity cost of capital. Cost of working capital, return on current assets and the required rate of return seem to be interesting aspects and they will be analyzed more deeply in the next section.

Problem overview

Working capital can be defined as the difference between current assets and current liabilities or long term capital minus fixed assets. When we look at a company from the financing point of view it is important to find the costs of financing working capital. In a conservative working capital policy, when WC is positive and CR > 2, long term capital finances the fixed assets and it will also finance the current assets in the part not matched by short-term liabilities. In the aggressive strategy, current assets will be low and short-term liabilities will finance part of fixed assets. Such a situation will make ROE increase and the required rate of return should be higher as well.

There is a question about the optimal level of current assets. It can be established based on comparison with other companies in a sector or as a trade-off between liquidity and profitability related to the investors' required rate of return. Managers have to justify investment in inventory, cash or accounts receivables to calculate the current asset level necessary to perform on a competitive market. The lower the level of current assets, the more sophisticated management techniques should be introduced, the more stress for employees and the higher risk related to liquidity and bankruptcy. The optimal level of current assets should be analyzed by investors who should answer the question of whether they want to finance the conservative working capital policy and accept lower profitability or they rather prefer to invest money in a company with an aggressive working capital strategy with higher risk and profitability. The return is lower in the case of a conservative strategy, following the lower risk related to liquidity. For the analysis of return on assets we should exclude all financial investments (Deloof, 2003) and current assets should be decreased by all securities bringing return. Return on current assets may be calculated as follows:

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$$ROCA=((OP-T)(CA/TA))/(CA-S) \quad (1)$$

where:
ROCA – return on current assets,
OP – operating profit,
T – tax, CA – current assets,
TA – total assets,
S – securities.

Operating profit is taken into consideration since the financial assets are excluded from analysis. Moreover the interest is related to the debt financing but in most cases the conservative working capital strategy is financed by equity. Long term debt in the form of credit is related to the fixed assets financing based on business planning.

When the difference between ROCA and WCWACC (working capital weighted average cost of capital - cost of equity engaged in WC plus short term interest) is positive then the level of current assets proxies by payables and accruals is at a good level. This statement may be criticized by the fact that current assets are not bringing the return, but calculating ROA is connected to total assets and moreover current assets are necessary to generate profit. It does not mean that current assets generate profit directly, but the profit after all may be divided into fixed assets and current assets since both of them are necessary for the performance of the company.

Return on working capital may correspond to ROE. The rate of return on working capital may be calculated as follows:

$$ROWC = ((OP - T)(CA/TA))/WC \quad (2)$$

where:
ROWC – return on working capital,
WC – working capital.

Operating profit is taken again into account to omit the financial costs. The current assets to total assets factor enables us to calculate the profit due to the current assets investment in a company. The second problem is associated with equity cost. Investors invest money in a company and usually they do not distinguish purposes. They do not know if they invest in fixed assets or in current assets, they only analyze the profit when using the fundamental analysis. The usual argument for having a higher level of current assets is that the large amount of current assets decreases the risk of bankruptcy, but is this reduced risk matching the costs? Investors should have this information in mind when making decisions since some companies may use an overly conservative working capital strategy. Does it mean any additional level of safety or is it just bad management that should be punished somehow by investors? If the cost of equity is negatively related to CR, then such a result will indicate that investors take this information into account when establishing the required rate of return. The author would be able to calculate the required rate of return on equity invested in working capital when investors invest in fixed assets and current assets separately, but such an approach will be possible only if the accounting standards are changed and exchanges enable trading of long and short-term equity instruments, as in the case of bills and bonds.

To find the profitability sufficient to satisfy investors we should find corresponding costs. Current theory uses the formulas for equity cost (CAPM or APT models) and debt (yield or interest) and the WACC is calculated based on these data with a tax shield when calculating the cost of debt. Cost of capital is related to risk that is taken all together by a standard deviation for analysis that is made by investors. If we look closer at this problem we will see that working capital is related to liquidity risk that is affecting the cost of capital.

Short-term financial management is the basis for liquidity management and efficiency in the management of current assets and liabilities. Companies with aggressive working capital management involve less capital and operate more efficiently, therefore the rate of return on equity should be higher since the risk is higher as well as expectations of investors. The opposite situation is when we take into account the conservative working capital management, involving more capital – ratios of return should be lower, the same as risk. In the table below we can see that profitability varies inversely with liquidity and profitability moves together with risk.

Table 1: Working capital strategies

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

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

Cost of working capital is connected to the current assets level and ability to finance the company on the market. Liquidity risk is the important factor of working capital cost. Investors analyze the performance of the company, its risk and based on such an assessment the expectations toward the rate of return are created. Different risk factors considered by investors may be taken into account: economic risk, business risk, operating risk, financial risk, asset risk, product risk, market risk, technological risk, regulatory risk and many others. There should be a relationship between cost of equity and liquidity risk determined by current ratio and cash conversion cycle, the dynamic ratio associated with the operations and liquidity. According to the risk return trade-off theory the higher the risk, the higher the expected rate of return. The lower the CR, the higher the cost of equity we should expect.

In this paper the cost of equity was calculated using the Capital Asset Pricing Model (Sharpe, 1964; Litner, 1965; Mossin, 1966) and beta was calculated according to the methodology proposed by Wolski (2010).

Results

The research has been done on the data of non-financial companies listed on the Warsaw Stock Exchange in the period 1997–2012. The annual beta coefficients for the CAPM model were calculated using the daily data on listings of companies. The listings included both splits and possible pre-emption rights or dividends. The method of least squares and linear regression were used to calculate the beta coefficient.

There are four hypotheses to be verified in this paper. First of all the relationship between ROCA and CCC and CR will be analyzed to see if operational management influences profitability together with the working capital strategy. The analysis starts with ROCA as a measure of current assets return that should be related to liquidity indicators. The most popular liquidity indicator is CCC and it is expected that the lower the CCC, the higher the profitability and the speed of operations influencing the return. The results of regression with ROCA as a dependent variable and CCC are shown in Table 2.

Table 2: Regression analysis, dependent variable: ROCA, n = 2493

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
Const	0.0545898	0.0211571	2.5802	0.00993	***
CCC_360	0.427707	0.0672421	6.3607	<0.00001	***

Mean dependent variable	0.071796	S.D. dependent var	1.055964
R-squared	0.015982	Adjusted R-squared	0.015587
F(1, 2491)	40.45852	P-value(F)	2.38e-10

Source: Own study in Gretl

CCC was taken as the ratio of CCC/360. The model variables are significant even if the R2 for this model is quite low. Correlation analysis has been done additionally. Correlation coefficient (with 5% critical value p = 0.0392) is positive and equal to 0.1264. Based on this analysis we can conclude that there is a significant and positive correlation between ROCA and CCC. This observation is interesting and it stresses the problem of optimal current assets level.

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Decreasing CCC may reduce the ability to generate the profit.

Based on the results indicating the relationship between ROCA and CCC, more analyses have been done to verify the hypothesis about the relationship between ROCA and working capital strategy represented by CR. The results for the regression model with ROCA as a dependent variable are given in Table 3.

Table 3: Regression analysis, dependent variable: ROCA, n = 2837

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
Const	-0.55569	0.375332	-1.4805	0.13884	
CR	0.15863	0.149969	1.0578	0.29026	

Mean dependent variable	-0.244492	S.D. dependent variable	12.41386
R-squared	0.000394	Adjusted R-squared	0.000042
F(1, 2835)	1.118848	P-value(F)	0.290257

Source: Own study in Gretl

The model variables are not significant and the R2 is very low. Correlation coefficient (with 5% critical value p = 0.0368) is positive and equal to 0.0199. It may be concluded that there is no relationship between ROCA and CR representing the working capital strategy. The second hypothesis is related to the cost of equity and its relationship with the working capital and current assets factors. There should be a relationship between ROCA and cost of equity since investors evaluate the profitability of the company. Table 4 shows the results of the regression model with cost of equity as a dependent variable.

Table 4: Regression analysis, dependent variable: cost of equity, n = 2926

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	0.157707	0.00295261	53.4127	<0.00001	***
ROCA	1.01574e-06	5.26245e-06	0.1930	0.84696	

Mean dependent var	0.157701	S.D. dependent var	0.159679
R-squared	0.000013	Adjusted R-squared	-0.000329
F(1, 2924)	0.037255	P-value(F)	0.846960

Source: Own study in Gretl

The model parameters indicate the insignificance of ROCA and very low R2. Correlation coefficient (with 5% critical value p = 0.0362) is equal to 0.0036. ROCA is not influencing the cost of equity, but this cost may be related to CCC since it is the indicator of dynamic liquidity management. The results of the model with cost of equity as the dependent variable and CCC are shown in Table 5.

Table 5: Regression analysis, dependent variable: cost of equity, n = 2492

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	0.161237	0.00331589	48.6256	<0.00001	***
CCC_360	0.0355776	0.010537	3.3764	0.00075	***
Mean dependent variable	0.162671		S.D. dependent variable	0.164508	
R-squared	0.004558		Adjusted R-squared	0.004158	
F(1, 2490)	11.40037		P-value(F)	0.000746	

Source: Own study in Gretl

The model parameters are significant but the R2 is very low. Correlation coefficient (with 5% critical value p=0.0393) is equal to 0.0675. CCC is significantly influencing the cost of equity, the relation is economically insignificant, but statistically significant. The higher the CCC, the higher the cost of equity because the ROCA is falling as shown in the model and results presented in Table 2.

Working capital strategy is related to the risk. The third hypothesis is related to the cost of equity that should take into account the liquidity risk. CR is determining the working capital strategy related to the risk level. As stated earlier, the working capital strategy may be determined by the CR value. The aggressive strategy is when the CR is lower than 1, the moderate strategy - when CR is between 1 and 2, and finally the conservative when CR is higher than 2. For the aggressive policy the average cost of equity is equal to 15%. The model results with the cost of equity as a dependent variable are presented in Table 6.

Table 6: Regression analysis, dependent variable: cost of equity, n = 642, aggressive strategy

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
Const	0.115288	0.015609	7.3860	<0.00001	***
CR	0.0468991	0.0221918	2.1134	0.03496	**
Mean dependent variable	0.145716		S.D. dependent variable	0.153142	
R-squared	0.006930		Adjusted R-squared	0.005378	
F(1, 640)	4.466259		P-value(F)	0.034957	

Source: Own study in Gretl

The model variables are significant but R2 is very low. Correlation coefficient (with 5% critical value p=0.0774) is equal to 0.0832. CR influences cost of equity significantly, correlation is low but positive and it can be concluded that the higher the CR, the higher the cost of equity for the aggressive strategy. For the moderate strategy the average cost of equity is equal to 16% and the results of the model are presented in Table 7.

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Table 7: Regression analysis, dependent variable: cost of equity, n = 1262, moderate strategy

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
Const	0.121951	0.0223482	5.4569	<0.00001	***
CR	0.0239433	0.0155405	1.5407	0.12364	**

Mean dependent variable	0.155762	S.D. dependent variable	0.150100
R-squared	0.001880	Adjusted R-squared	0.001088
F(1, 1260)	2.373771	P-value(F)	0.123640

Source: Own study in Gretl

The model results indicate the lack of significance of CR and very low R2. Correlation coefficient (with 5% critical value p=0.0552) is equal to 0.0434. The results are not significant and if there is a relationship between CR representing the moderate strategy and cost of equity, it is very low but positive. For the conservative policy the average cost of equity is equal to 17% and the results of the model are presented in Table 8.

Table 8: Regression analysis, dependent variable: cost of equity, n = 943, conservative strategy

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
Const	0.180591	0.0135895	13.2890	<0.00001	***
CR	-0.00283813	0.00341363	-0.8314	0.40595	

Mean dependent variable	0.170376	S.D. dependent variable	0.178353
R-squared	0.000734	Adjusted R-squared	-0.000328
F(1, 941)	0.691246	P-value(F)	0.405952

Source: Own study in Gretl

The model results indicate the CR insignificance and very low R2. Correlation coefficient (with 5% critical value p= 0.0638) is equal to -0.0271. The results are not significant, but the correlation sign is negative and we can expect that the higher the CR and the more conservative the working capital strategy the lower the cost of equity.

In the last part of this research the return on working capital has been analyzed in relation to cost of equity since it is expected that the higher the ROWC, the higher the cost of capital invested by investors financing also the working capital. The analysis has been done only for observations with CR > 1 because of investment in working capital.

Table 9: Regression analysis, dependent variable: cost of equity, n = 2202

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
Const	0.180591	0.0135895	13.2890	<0.00001	***
CR	-0.00283813	0.00341363	-0.8314	0.40595	

Mean dependent variable	0.170376	S.D. dependent variable	0.178353
R-squared	0.000734	Adjusted R-squared	-0.000328
F(1, 941)	0.691246	P-value(F)	0.405952

Source: Own study in Gretl

The model results indicate the ROWC to be a significant variable and very low R2. Correlation coefficient (with 5% critical value p= 0.0418) is equal to 0.0668. The return on working capital influences

the cost of equity in a positive way and the correlation is low but significant. Investors may take into account the return on equity invested in working capital, expecting higher return.

Conclusions

The problems of return on current assets and working capital in relation to cost of equity referring to required rate of return are discussed in this paper. First of all the author has checked if ROCA is negatively related to CCC and CR because the more aggressive the working capital policy (and lower CR and CCC), the higher the profitability measured by ROCA should be. As a result the author has realized that ROCA is positively related to CCC and the higher the CCC the higher the ROCA. The relaxed policy makes the ROCA higher and this result goes against the theory that states that the higher the liquidity, the lower the profitability. A cash conversion cycle which is too short influences trade contracts and clients are not willing to buy products with a very short payment term. The relationship between ROCA and CR is very low and insignificant suggesting no influence of CR on ROCA but it is positive and the higher the CR the higher the ROCA. The result is coherent with the previous model results.

The second hypothesis is related to the cost of equity relationship with ROCA, CCC and CR because investors take into account the results of company performance. The relationship of ROCA with cost of equity calculated based on CAPM is insignificant. The relationship of ROCA with CCC is significant and positive and the higher the CCC, the higher the cost of capital. Investors apparently asses the increasing days in the cash conversion cycle as increasing risk that increases the expectations of the return.

The third hypothesis states that there is a negative relationship between CR representing the working capital strategy and cost of equity because lower liquidity (lower CR) is connected with higher risk and the required rate of return should grow based on the risk-return trade-off theory even though the profitability should fall, according to the liquidity-profitability trade-off. First of all, the results show that the average cost of equity is growing when the policy becomes more conservative. The average cost of equity for the aggressive strategy is equal to 15%, for the moderate strategy 16% and for the conservative 17%. Cost of equity is growing along with a more conservative working capital management policy. CR ratio influences the cost of capital significantly and the correlation is positive but low, indicating that together with the growth of CR from 0 to 1 the cost of capital is growing. Investors deciding to invest in companies with the risky approach to working capital and liquidity do not like the decisions about more conservative management. For the moderate policy (with CR between 1 and 2) the situation is similar but the results are insignificant. When we consider the conservative policy with CR > 2 the correlation between cost of equity and CR is low but negative indicating that when the CR is growing the cost of equity is falling. Such a result may indicate that investors deciding to purchase shares of companies with the conservative approach to working capital may assess the growth of CR as a positive signal connected to the even more conservative policy and lower risk. On the other hand, such a result may indicate that the profitability should be falling together with the growth of liquidity; lower rate of return influences the expectations that are lower as well.

It was expected that there is a positive relationship between return on working capital ROWC and cost of equity. This hypothesis was confirmed and it can be concluded that ROWC influences the cost of equity and investors take it into account when the shares are purchased on the market.

Working capital and liquidity are not accounting subjects solely but they are related to decisions on the capital market as well. The optimal level of current assets and working capital financing are subjects of investors' assessments. Owners are not solely interested in investment projects, but they also analyze the liquidity and working capital levels since these factors influence the profitability of a company and are related to the risk.

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