

# Value maximizing corporate current assets and cash management in relation to risk sensitivity: Polish firms case<sup>1</sup>

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## Abstract

Current assets and cash in enterprise are maintained for risk reduction purposes. The basic financial purpose of an enterprise is maximization of its value. Cash and current assets management should also contribute to realization of this fundamental aim. The enterprise value maximization strategy is executed with a focus on risk and uncertainty. This article presents the consequences that can result from operating risk that is related to current assets management policy. An increase in the level of current assets in a firm increases both net working capital requirements and the costs of holding and managing working capital. Both of these decrease the value of the firm. But not always it works in the same way, it depends on risk sensitivity. Collected data shows how the Polish firms liquidity management model works in emerging markets reality. In the paper the relation between liquid levels and risk sensitivity is illustrated by empirical data from Polish firms.

Key words – liquidity, cost of capital, firm value

JEL Classification: G32, G31, D24

## 1. INTRODUCTION

The hypothesis of the paper is presumption that higher risk shown by beta coefficient, should results with more flexible and more conservative current assets strategies. Financing of the current assets has its cost depending on risk linked with current assets strategies used by the financed firm. If we have higher risk, we will have higher cost of financing (cost of capital) and as result other firm value growth. There are no free lunches.

Cost of financing of current assets depends on kind of financing, next on level of current assets in relation to sales and last but not least management risk sensitivity.

According to kind of financing we have three strategies: aggressive strategy with the most risky but the cheapest, mainly short-term financing, compromise strategy with compromise between risk and costs of financing and conservative strategy with the most expensive long-term financing and with the smallest level of risk.

Figure 1: Influence of the current assets financing strategy choice on the key value creating indicators

<b>Aggressive</b>		<b>Conservative</b>
-	<b>CR</b>	-
-	<b>CE</b>	-
-	<b>FCF</b>	-
↗	<b><math>\beta</math></b>	↘
↗↘	<b><math>k_D</math></b>	↘↗
↗	<b><math>k_E</math></b>	↘
↗↘, ↗	<b>CC</b>	↗↘, ↘
↗↘, ↘	<b><math>\Delta V</math></b>	↗↘, ↗

Source: own proposal (Michalski 2008a).

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Choosing between various levels of current assets in relation to sales, we use one from three strategies: restrictive strategy when management use the most risky but the cheapest, the smallest as possible, level of current assets, moderate strategy when management moderate between risk and costs of holding current assets, and flexible strategy when management use the most expensive and rather high levels of current assets wanting to hedge the firm before risk of shortage of current assets.

Figure 2: Influence of the current assets investing strategy choice on the key value creating indicators

Restrictive		Flexible
↘	CR	↗
↘	CE	↗
↗↘	FCF	↗↘
↗	$\beta$	↘
↗	CC	↘
↗↘, ↗	$\Delta V$	↗↘, ↘

Source: own proposal (Michalski 2008b).

Risk sensitivity depends on position of the firm in its business branch. If the risk sensitivity should be higher, then more smart is to choose more flexible and more conservative solutions to have better results. It works in opposite direction also, the safe firms with near to monopoly positions can use more restrictive and more aggressive strategies to have better results.

Company's property consists of total assets, i.e. fixed assets and current assets known also as current assets. We can see that property as fixed capital and current assets also. Generally current assets equal to current assets is defined as a sum of inventory, short term receivables (including all the accounts receivable for deliveries and services regardless of the maturity date) and short-term investments (cash and its equivalents) as well as short-term prepaid expenses [Gentry 1988, Mueller 1953; Graber 1948; Khoury 1999; Cote 1999, Michalski 2008c]. Money tied in current assets serve enterprise as protection against risk [Merton 1999, p. 506; Lofthouse 2005; p. 27-28; Parrino 2008, p. 224-233, Poteshman 2005, p. 21-60, Gentry 1988, Michalski 2012] but that money also are considered as an investment. It is because the firm resigns from instant utilization of resources for future benefits [Levy 1999, p. 6; Reilly 1992, p. 6; Fabozzi 1999, p. 214, Gentry 1988, Michalski Michalski 2008d]. In that paper the terms: current assets and current assets are treated as approximately equivalent and interchangeable [Michalski 2010].

Current assets level is the effect of processes linked to the production organization or services realization. So, it results from the processes that are operational by nature and therefore correspond to the willingness to produce on time products and services that are probably desired by customers [Baumol 1952, Beck 2005, Beranek 1963, Emery 1988, Gallinger 1986, Holmstrom 2001, Kim 1998, Kim 1978, Gentry 1988, Lyn 1996, Tobin 1958, Stone 1972, Miller 1966, Miller 1996, Myers 1998, Opler 1999, Rutkowski 2000, Michalski 2007]. It exerts influence mainly on the inventory level and belongs to the area of interest of operational management [Peterson 1979, p. 67-69; Michalski 2010, Orlicky 1975, p.17-19; Gentry 1988, Plossl 1985, p. 421-424]. Nevertheless, current assets are also the result of active customer winning and maintaining policy [Bougheas 2009, Gentry 1988, Michalski 2009]. Such policy is executed by finding an offer and a specific market where the product or service is sold. This policy consequences are reflected in the final products inventory level and accounts receivable in short term.

Among the motivating factors for investing in current assets, one may also mention uncertainty and risk. Due to uncertainty and risk, it is necessary to stock up circumspect (cautionary) cash, material and resources reserves that are inevitable in maintaining the continuity of production and producing final goods.

Many firms act in a fast changing environment where the prices of needed materials and resources are subject to constant change. Other factors – like exchange rates for instance, are very changeable, too. It justifies keeping additional cash sources allotted for realization of built-in call options (American type) by buying the raw materials more cheap than the long term expected equilibrium price would suggest.

Company's relationships with suppliers of materials, resources and services that are necessary to produce and sell final products usually result in adjourning the payments. Such situation creates Accounts payable and employees (who are to some extent internal services providers). Similarly, enterprise charged with obligatory payments will eventually face tax burdens. We will call both categories of obligations the non financial current obligations in order to differentiate between them and current obligations that result from taking on financial obligations, e.g. short term debt.

Required payments postponement exerts impact on reducing the demand for these company's resources that are engaged in current asset financing. Current assets reduced by non financial current obligations (non financial short term obligations) are called net current assets. Net current assets are the resources invested by the company in current assets equated with the capital tied in these assets.

Figure 3. The expected change in cash and current assets indicators after changes in risk indicators.

Change	Indicator	Change
↗	$\beta$	↘
↗	CC	↘
↗↘	CA/Rev	↘↗
↗↘	CASH/TA	↘↗
↗↘	CA/EBIT	↘↗
↗↘	Ds/DI	↘↗
↗↘	CA/TA	↘↗
↗↘	CASH/EBIT	↘↗

Source: own proposal (Michalski 2010).

After the risk indicator  $\beta$  go up (at Figure 3 the arrow in the first left column), at least two sources of change are influenced in firms. First, the higher cost of capital make the investment in current assets more costly, so it works up to make current assets levels smaller. In the same time, the higher risk in general, cause the managing team of the firms to think more conservative and more flexible about the liquidity levels. It is a part of their risk sensitivity feelings about general situation in the firm. That is illustrated by the couple of arrows in different destinations (the first up, and the second down) but it is not true that both influences are the same, almost always the one of them is stronger than the other.

Net current assets (as a synonym for net current assets), i.e. current assets reduced by non financial current liabilities, are the sources tied by the firm during its realization of operational cycle [Michalski 2008b]. If it is required by the character of business, sources tied in current assets may be quite huge sums. This paper aims at analyzing the influence of investment in net current assets on enterprise value represented by a sum of future free cash flows discounted by the cost of financing the enterprise and next reflecting on the difference between investments in net current assets and operational investments in fixed assets in terms of their effects on enterprise value growth.

Current assets investment strategies are the set of criteria and specific code of conduct revolved around attaining multiplication of owners wealth. Company's management implement such strategies into practice while making the crucial decisions concerning obtaining sources for financing current and future needs and defining ways and directions of utilization of these sources, taking into consideration at the same time: opportunities, limitations and business environment that are known to the board today [Michalski 2008a]. The same set of strategies come in consequence of market conditions and personal inclinations of the board members who are representatives of the owners (first of all – their attitude to risk). Based on this attitude, the board defines appropriate structure of current assets and financing sources. It is possible to apply one of the three current assets financing strategies (or their variations): aggressive, compromise or conservative.

Aggressive strategy consists in the significant part of the enterprise fixed demand and the whole enterprise variable demand on liquidity-linked financing sources coming from short term financing.

## 2. LIQUID ASSETS FINANCING STRATEGY TO RISK RELATION

There is a relationship between the three above mentioned approaches based on the relation between expected benefit and risk (Figure 4). In case of capital providers for companies that have introduced this specific strategy it is usually linked with diversified claims to the rate of return from the amount of capital invested in the firm.

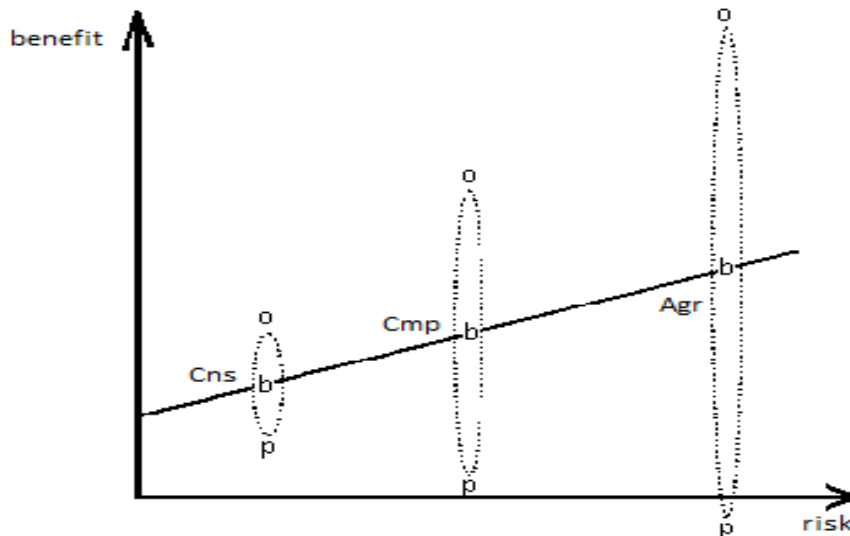


Figure 4. Diversified levels of expected benefits connected with different current assets financing strategies. Where: Cns – conservative strategy, Cmp – Compromise strategy, Agr – aggressive strategy, b – base situation, o – situation better than expected, p – situation worse than expected. Source: Hypothetical data (Michalski 2008c).

The connection of these claims with the chosen way of financing may be insignificant (as it is shown on figure 5 or in variant 1 of the example beneath). Nevertheless, it also might be important to such a considerable degree that it will have an effect on the choice of strategy (figures 6 and 7).

**Example.** The aim of the example is to show how changes in liquid assets policies can influence the financial efficiency of the firm. In the example managing team is pondering over the choice of current assets financing strategy. The question it want to answer is: what is the best, from firm maximization point of view, liquidity strategy?

Equity/engaged capital ratio is 60%  $\{E/(E+D) = 60\%$ }. Anticipated average annual sales revenues (CR) are 1000 in basic cases. Forecasted earnings before interest and taxes (EBIT) will amount to about 50% of sales revenues (CR). Fixed assets (FA) will be going for around 80% of CR, current assets (CA) will be constituting almost 30% of forecasted sales revenues (CR), property renewing will be close to its use (NCE = CAPEX), and changes in relations of net current assets constituents will be close to zero and might be omitted ( $\Delta NWC = 0$ ). The company may implement one of the three current assets financing strategies: the conservative one with such a relation of long run debt to short run debt that ( $D_s/D_l = 0,1$ ), Compromise one ( $D_s/D_l = 1$ ) or the aggressive one ( $D_s/D_l = 2$ ). Accounts payable will be equal to 50% of current assets.

It is necessary to consider the influence of each strategy on the cost of enterprise financing capital rate and on enterprise value.

In the first variant, one must assume that capital providers seriously consider while defining their claims to rates of return the current assets financing strategy chosen by the company they invested in.

Let us also assume that the correction factor CZ function graph connected with strategy choice is even and linear (Figure 5).

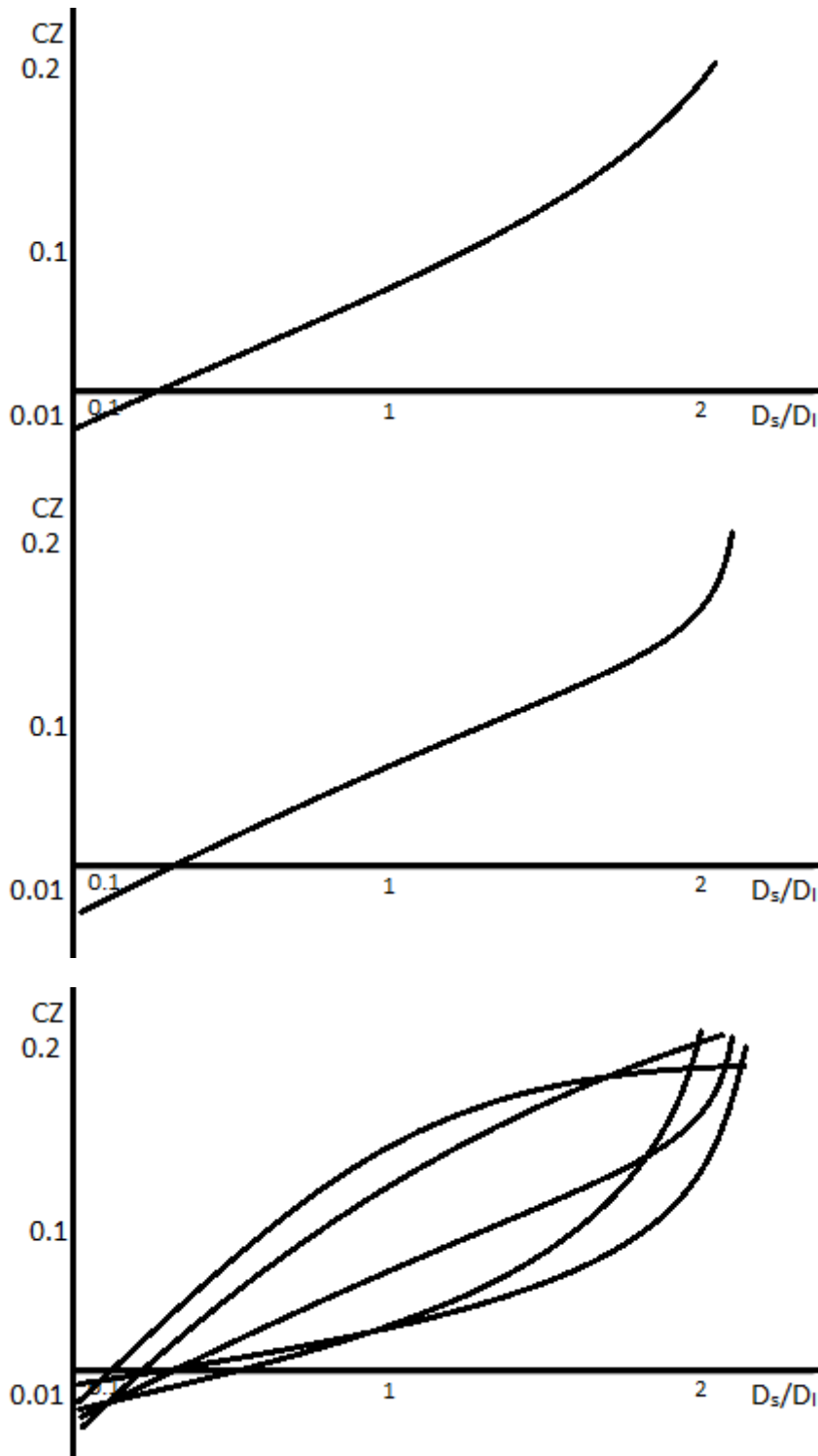


Figure 5. Some possible shapes of correction factor CZ line as a function of  $D_s/D_1$ .  
Source: Hypothetical data (Michalski 2012).

**CZ1 variant.** We assume here that capital providers take into consideration the company's current assets financing strategy while defining their claims as regards the rates of return. Of course, aggressive strategy is perceived as more risky and therefore depending on investors risk sensitivity level, they tend to ascribe to the financed company applying aggressive strategy an additional expected risk premium. To put it simply, let us assume that ascribing the additional risk premium for applied current assets financing strategy is reflected in the value of  $\beta$  coefficient. For each strategy, the  $\beta$  coefficient will be corrected by the corrective coefficient CZ corresponding to that specific strategy in relation to the situation  $D_k/D_d = 0$ . Risk free rate is 4,0%, rate of return on market portfolio is 10,5% (ERP = 6,5%).

The firm is a representative of the sector for which the non-leveraged risk coefficient  $\beta_u = 0,5$ . On the basis of Hamada relation, could be estimated the equity cost rate that is financing that enterprise in case of each of the three strategies in the first variant.

$$\beta_l = \beta_u \times \left(1 + (1 - T) \times \frac{D}{E}\right)$$

Where: T – effective tax rate, D – enterprise financing capital coming from creditors ( $D_s + D_l$ ), E – enterprise financing capital coming from owners,  $\beta$  – risk coefficient,  $\beta_u$  – risk coefficient linked with assets maintained by the firm (for an enterprise that has not applied the system of financing by creditors capital),  $\beta_l$  – risk coefficient for an enterprise that applying the system of financing by creditors capital (both the financial and operational risks are included).

Thanks to that information, could be calculated cost of equity rates for each variant.

$$k_e = \beta_l \times (k_m - k_{RF}) + k_{RF}$$

Where:  $k$  – rate of return expected by capital donors and at the same time (from company's perspective) – enterprise cost of financing capital rate,  $k_e$  – for capital coming from owners (cost of equity rate),  $k_m$  – for average rate of return on typical investment on the market,  $k_{RF}$  – for risk free rate of return whose approximation is an average profitability of treasury bills in the country where the investment is made.

Table 1 presents the calculated indicators for each hypothetical strategy.

Table 1. Cost of capital and changes in enterprise value depending on the choice of strategy, the best conservative case:

	Aggressive	$\Delta$	Compromise	$\Delta$	Conservative
Sales revenues (CR)	1000		1000		1000
Fixed assets (FA)	800		800		800
Current assets (CA)	300		300		300
Total assets (TA) = Total liabilities (TL)	1100		1100		1100
(AP)	150		150		150
Engaged capital (E+D)	950		950		950
Equity (E)	570		570		570
Long term debt ( $D_l$ )	127	$\nearrow$	190	$\nearrow$	346
Short term debt ( $D_s$ )	253	$\searrow$	190	$\searrow$	35
Earnings before interest and taxes (EBIT)	500		500		500
Net operational profit after taxation (NOPAT)	405		405		405
Free cash flows from 1 to n period ( $FCF_{1..n}$ )	405		405		405
Free cash flows in 0 ( $FCF_0$ )	-950		-950		-950
Risk premium correction factor CZ	0,2	$\searrow$	0,1	$\searrow$	-0,01
Complete risk coefficient $\beta_l$	0,9	$\searrow$	0,85	$\searrow$	0,76
Equity cost ( $k_e$ )	10%	$\searrow$	9,5%	$\searrow$	9%
Cost of long term debt ( $k_{dl}$ )	8,5%	$\searrow$	8,1%	$\searrow$	7,7%
Cost of short term debt ( $k_{ds}$ )	7,8%	$\searrow$	7,4%	$\searrow$	7,1%
Cost of capital financing enterprise (CC)	8,6%	$\searrow$	8,2%	$\searrow$	7,9%
Enterprise value growth ( $\Delta V$ )	3761	$\nearrow$	3973	$\nearrow$	<b>4206</b>

Source: Hypothetical data (Michalski 2011).

As it is shown in the table, cost of enterprise financing capital rates are different for different approaches to current assets financing. The lowest rate is observed in conservative strategy. That results in the highest expected growth of enterprises value calculated with perpetuity assumption:

$$\Delta V = FCF_0 + \frac{FCF_{1..n}}{CC}$$

**In the CZ2 variant,** we will also assume that capital providers while defining their claims to rates of return take into consideration the company's current assets financing strategy to a lesser extent. Obviously, the aggressive strategy is perceived as more risky and therefore, depending on their risk sensitivity, they tend to ascribe an additional risk premium for an enterprise that implemented this type of strategy.

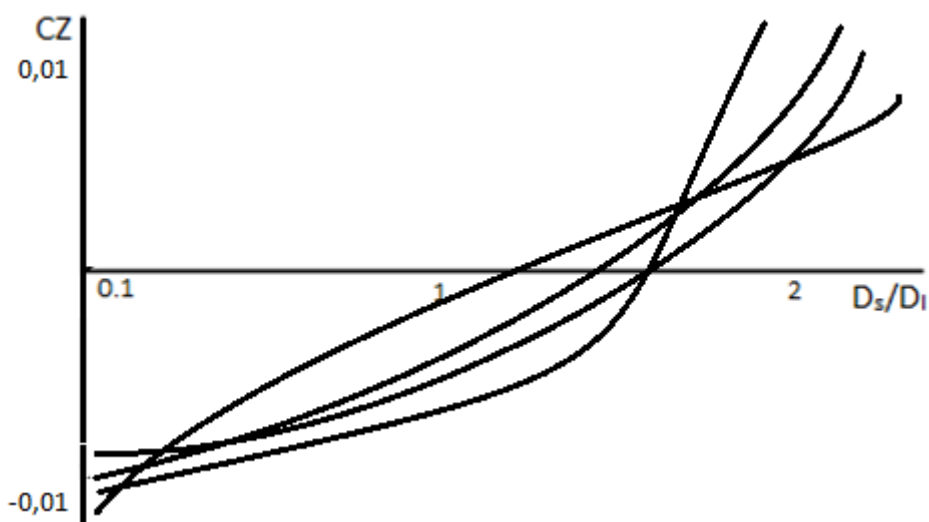


Figure 6. Hypothetical correction line depending on the  $D_s/D_1$  relation in the second variant CZ2  
Source: Hypothetical data (Michalski 2012).

For each strategy, the firm risk premium is differ than previously.

For each hypothetical strategy the firma value growth and cost rate  $CC$  will be on another level (calculations in the table below).

Table 2. Cost of capital and changes in enterprise value depending on the choice of strategy in variant CZ2, the best aggressive case

	Aggressive	$\Delta$	Compromise	$\Delta$	Conservative
Sales revenues (CR)	1000		1000		1000
Fixed assets (FA)	800		800		800
Current assets (CA)	300		300		300
Total assets (TA) = Total liabilities (TL)	1100		1100		1100
Accounts payable (AP)	150		150		150
Engaged capital (E+D)	950		950		950
Equity (E)	570		570		570
Long term debt ( $D_l$ )	127	$\nearrow$	190	$\nearrow$	346
Short term debt ( $D_s$ )	253	$\searrow$	190	$\searrow$	35
Earnings before interest and taxes (EBIT)	500		500		500
Net operational profit after taxation (NOPAT)	405		405		405
Free cash flows from 1 to n ( $FCF_{1..n}$ )	405		405		405
Free cash flows in 0 ( $FCF_0$ )	-950		-950		-950
Risk premium correction CZ	0,009	$\searrow$	0,0045	$\searrow$	-0,0045
Complete risk coefficient $\beta_l$	0,78	$\searrow$	0,77	$\searrow$	0,767
Equity cost ( $k_e$ )	9,1%	$\searrow$	9,03%	$\searrow$	8,98%
Long term debt cost ( $k_{dl}$ )	7,777%	$\searrow$	7,773%	$\searrow$	7,74%
Short term debt cost ( $k_{ds}$ )	7,2%	$\searrow$	7,14%	$\searrow$	7,12%
Capital cost of capital financing the enterprise (CC)	7,82%	$\nearrow$	7,83%	$\nearrow$	7,88%
Enterprise value growth ( $\Delta V$ )	<b>4231</b>	$\searrow$	4221	$\searrow$	4191

Source: Hypothetical data (Michalski 2011).

As it is shown in table 2, taking into consideration the risk premium resulting from implementation of a certain current assets financing strategy has an additional impact on the enterprise financing capital. Enterprise financing

capital cost rates are different for different approaches to current assets financing. In this variant, the lowest level is observed in aggressive strategy. As a consequence, the highest enterprise value growth is characteristic for this type of strategy.

**In the third CZ3 variant**, we also assume that capital providers to a lesser extent consider while defining their claims to rates of return the current assets financing strategy chosen by the company they invested in.

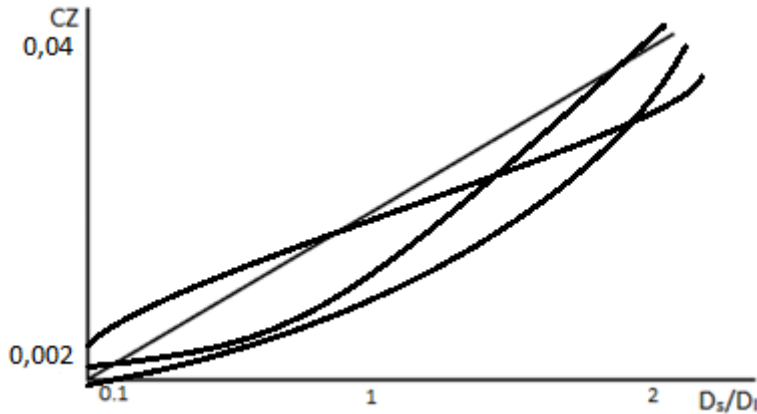


Figure 7. Hypothetical correction lines depending on the  $D_k/D_d$  relation in the CZ3 variant  
Source: Hypothetical data (Michalski 2012).

For CZ3 case, conservative strategy, the firm risk premium is again different.

For each strategy in CZ3 case, the firm value expected change and capital cost rate will be on another level (calculations in Table 3).

Table 3. Cost of capital and changes in enterprise value depending on the choice of strategy in the CZ3 variant, the best compromise case.

	Agressive	$\Delta$	Compromise	$\Delta$	Consevative
Sales revenues (CR)	1000		1000		1000
Fixed assets (FA)	800		800		800
Current assets (CA)	300		300		300
Total assets (TA) = Total liabilities (TL)	1100		1100		1100
Accounts payable (AP)	150		150		150
Engaged capital (E+D)	950		950		950
Equity (E)	570		570		570
Long term debt ( $D_l$ )	127	$\nearrow$	190	$\nearrow$	345,45
Short term debt ( $D_s$ )	253	$\searrow$	190	$\searrow$	34,55
Earnings before interest and taxes (EBIT)	500		500		500
Net operational profit after taxation (NOPAT)	405		405		405
Free cash flows from 1 to n ( $FCF_{1..n}$ )	405		405		405
Free cash flows from 0 ( $FCF_0$ )	-950		-950		-950
Risk premium correction CZ	0,036	$\searrow$	0,018	$\searrow$	0,0018
Complete risk coefficient $\beta_l$	0,798	$\searrow$	0,784	$\searrow$	0,771
Equity cost ( $k_e$ )	9,19%	$\searrow$	9,10%	$\searrow$	9,01%
Lon term debt cost ( $k_{dl}$ )	7,89%	$\searrow$	7,82%	$\searrow$	7,76%
Short term debt cost ( $k_{ds}$ )	7,24%	$\searrow$	7,19%	$\searrow$	7,14%
Enterprise financing capital cost (CC)	7,93%	$\searrow$	7,89%	$\nearrow$	7,90%
Enterprise value growth ( $\Delta V$ )	4159	$\nearrow$	<b>4184</b>	$\searrow$	4174

Source: Hypothetical data (Michalski 2011).



As it is shown in table 3, taking into consideration the risk premium resulting from implementation of a certain current assets financing strategy has an additional impact on the enterprise financing capital. Enterprise financing capital cost rates are different for different approaches to current assets financing. In this variant, the lowest level is observed in aggressive strategy. As a consequence, the highest enterprise value growth is characteristic for this type of strategy.

**3. LIQUID ASSETS INVESTMENT STRATEGIES AND COST OF FINANCING**

Next it is necessary to consider the influence of each strategy of investment in the current assets on the rate of cost of capital financing enterprise and that influence on the enterprise value.

In the first variant, one must assume that capital providers seriously consider while defining their claims to rates of return the current assets investment strategy chosen by the company they invested in.

Let us also assume that the correction SZ function graph connected with strategy choice could be even and linear (Figure 8).

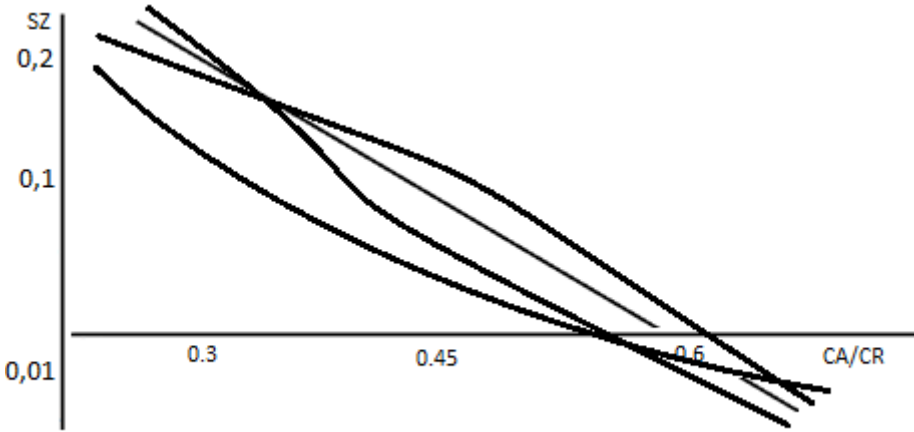


Figure 8. The hypothetical shape of line of correction SZ as a function of CA/CR in the SZ1 variant. Source: Hypothetical data (Michalski 2012).

**SZ1 variant.** We assume here that capital providers take into consideration the company’s current assets investment strategy while defining their claims as regards the rates of return. Of course, **restrictive** strategy is perceived as more risky and therefore depending on investors risk sensitivity level, they tend to ascribe to the financed company applying restrictive strategy an additional expected risk premium. The additional risk premium for applied current assets investment strategy is reflected in the value of  $\beta$  risk coefficient. For each strategy, the  $\beta$  risk coefficient will be corrected by the corrective coefficient SZ corresponding to that specific strategy in relation to the CA/CR situation.

Estimation the equity cost rate that is financing that enterprise in case of each of the three strategies in the SZ1 variant is presented in the table 4.

Table 4. Cost of capital and changes in enterprise value depending on the choice of current assets investment strategy, the best restrictive case.

Current assets investment strategy	Restrictive	$\Delta$	Moderate	$\Delta$	Flexible
Cash Revenues (CR)	1000	$\nearrow$	1050	$\nearrow$	1113
Fixed assets (FA)	800	$\nearrow$	832	$\nearrow$	872
Current assets (CA)	300	$\nearrow$	472,5	$\nearrow$	667,8
Total assets (TA) = Total liabilities (TL)	1100	$\nearrow$	1304,5	$\nearrow$	1539,7
Accounts payable (AP)	150	$\nearrow$	236,3	$\nearrow$	333,9
Capital invested (E+D <sub>l</sub> +D <sub>s</sub> )	950	$\nearrow$	1068,3	$\nearrow$	1205,8
Equity (E)	380	$\nearrow$	427,3	$\nearrow$	482,3
Long-term debt (D <sub>l</sub> )	190	$\nearrow$	213,7	$\nearrow$	241,2
Short-term debt (D <sub>s</sub> )	380	$\nearrow$	427,3	$\nearrow$	482,3
EBIT share in CR	0,5	$\searrow$	0,45	$\searrow$	0,4
Earnings before interests and taxes (EBIT)	500	$\searrow$	472,5	$\searrow$	445,2
Net operating profit after taxes (NOPAT)	405	$\searrow$	382,7	$\searrow$	360,6
Free Cash Flows in 1 to n periods (FCF <sub>1..n</sub> )	405	$\searrow$	382,7	$\searrow$	360,6
Initial Free Cash Flows in year 0 (FCF <sub>0</sub> )	-950	$\searrow$	-1068,3	$\searrow$	-1206
SZ risk Premium correction	0,18	$\searrow$	0,09	$\searrow$	-0,009
Leveraged and corrected complete risk coefficient $\beta_l$	0,91	$\searrow$	0,8393	$\searrow$	0,763
Cost of equity rate (k <sub>e</sub> )	9,91%	$\searrow$	9,46%	$\searrow$	8,96%
Long-term debt rate (k <sub>dl</sub> )	8,43%	$\searrow$	8,09%	$\searrow$	7,72%
Short-term debt rate (k <sub>ds</sub> )	7,69%	$\searrow$	7,41%	$\searrow$	7,10%
Cost of capital (CC)	7,82%	$\searrow$	7,49%	$\searrow$	7,14%
Firm value growth ( $\Delta V$ )	<b>4229</b>	$\searrow$	4038	$\searrow$	3847,7

Source: Hypothetical data (Michalski 2011).

As it is shown in the table, rates of the cost of capital financing the firm are different for different approaches to current assets investment. The lowest rate is observed in flexible strategy because that strategy is linked with the smallest level of risk but the highest firm value growth is linked with restrictive strategy of investment in net current assets.

**In the next, SZ2 variant,** we will also assume that capital providers while defining their claims to rates of return take into consideration the company's net working investment strategy to a lesser extent. Obviously, the restrictive strategy is perceived as more risky than moderate and flexible. Depending on their risk sensitivity, they tend to ascribe an additional risk premium for an enterprise that implemented this type of strategy. As presented on Figure 9., investors in SZ2 variant, have stronger risk sensitivity than in SZ1 situation.

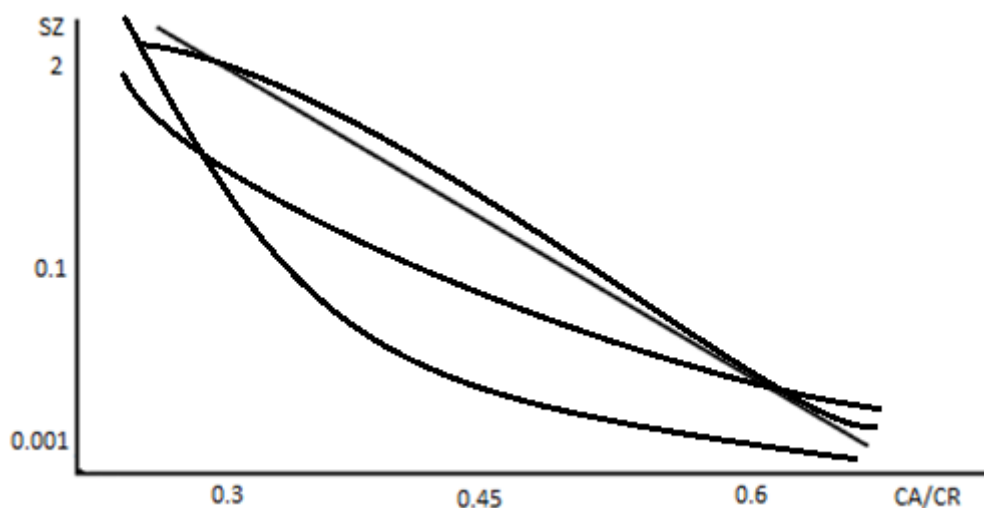


Figure 9. The hypothetical shape of line of correction SZ as a function of CA/CR in the SZ2 variant.  
Source: Hypothetical data.

In the table 5. There are calculations for variant SZ2. For each strategy the cost of capital rate CC will be on another level.

Table 5. Cost of capital and changes in enterprise value depending on the choice of strategy of investment in current assets in variant SZ2, the best moderate case.

Current assets investment strategy	Restrictive	$\Delta$	Moderate	$\Delta$	Flexible
Cash Revenues (CR)	1000	$\nearrow$	1050	$\nearrow$	1113
Fixed assets (FA)	800	$\nearrow$	832	$\nearrow$	872
Current assets (CA)	300	$\nearrow$	473	$\nearrow$	668
Total assets (TA) = Total liabilities (TL)	1100	$\nearrow$	1305	$\nearrow$	1540
Accounts payable (AP)	150	$\nearrow$	236,3	$\nearrow$	334
Capital invested (E+D <sub>l</sub> +D <sub>s</sub> )	950	$\nearrow$	1068,3	$\nearrow$	1206
Equity (E)	380	$\nearrow$	427,3	$\nearrow$	482,3
Long-term debt (D <sub>l</sub> )	190	$\nearrow$	213,7	$\nearrow$	241,2
Short-term debt (D <sub>s</sub> )	380	$\nearrow$	427,3	$\nearrow$	482,3
EBIT share in CR	0,5	$\searrow$	0,45	$\searrow$	0,4
Earnings before interests and taxes (EBIT)	500	$\searrow$	473	$\searrow$	445,2
Net operating profit after taxes (NOPAT)	405	$\searrow$	383	$\searrow$	361
Free Cash Flows in 1 to n periods (FCF <sub>1...n</sub> )	405	$\searrow$	383	$\searrow$	361
Initial Free Cash Flows in year 0 (FCF <sub>0</sub> )	-950	$\searrow$	-1068,3	$\searrow$	-1206
SZ risk Premium correction	2,2	$\searrow$	0,11	$\searrow$	0
Leveraged and corrected Complete risk coefficient $\beta_l$	2,464	$\searrow$	0,86	$\searrow$	0,77
Cost of equity rate (k <sub>e</sub> )	20%	$\searrow$	9,56%	$\searrow$	9,01%
Long-term debt rate (k <sub>dl</sub> )	16%	$\searrow$	8,17%	$\searrow$	7,76%
Short-term debt rate (k <sub>ds</sub> )	14%	$\searrow$	7,47%	$\searrow$	7,13%
Cost of capital (CC)	15,14%	$\searrow$	7,57%	$\searrow$	7,17%
Firm value growth ( $\Delta V$ )	1725	$\nearrow$	<b>3990</b>	$\searrow$	3825

Source: Hypothetical data (Michalski 2011).

As it is shown in table 5, taking into consideration the risk premium resulting from implementation of a certain current assets strategy has an additional impact on the enterprise financing capital and its rate. Enterprise financing capital cost rates are different for different approaches to current assets investment. In this variant SZ2,

similarly as to the variant SZ1 presented in table 4., the lowest level of cost of capital is observed in flexible strategy. But, the highest enterprise value growth is characteristic for moderate strategy.

**In the third, SZ3 variant.** The restrictive and moderate strategies are more risky than flexible. Depending on their risk sensitivity, they tend to ascribe an additional risk premium for an enterprise that implemented this type of strategy. As presented on Figure 10., investors in SZ3 variant, have stronger risk sensitivity than in SZ1 and SZ2 situations.

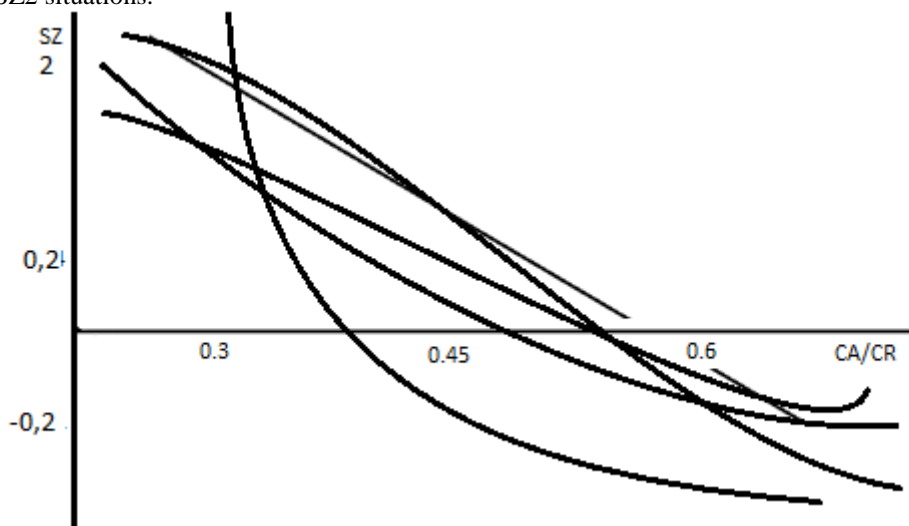


Figure 10. The hypothetical shapes of line of correction SZ as a function of CA/CR in the SZ3 variant. Source: Hypothetical data (Michalski 2012).

In the table 6. There are calculations for variant SZ3. For each strategy the cost of capital rate  $CC$  will be on another level.

Table 6. Cost of capital and changes in enterprise value depending on the choice of strategy of investment in current assets in the SZ3 variant, the best flexible case.

Current assets investment strategy	Restrictive	$\Delta$	Moderate	$\Delta$	Flexible
Cash Revenues (CR)	1000	$\nearrow$	1040	$\nearrow$	1071
Fixed assets (FA)	800	$\nearrow$	826	$\nearrow$	845
Current assets (CA)	300	$\nearrow$	468	$\nearrow$	643
Total assets (TA) = Total liabilities (TL)	1100	$\nearrow$	1294	$\nearrow$	1488
Accounts payable (AP)	150	$\nearrow$	234	$\nearrow$	321
Capital invested (E+D <sub>l</sub> +D <sub>s</sub> )	950	$\nearrow$	1060	$\nearrow$	1167
Equity (E)	380	$\nearrow$	424	$\nearrow$	467
Long-term debt (D <sub>l</sub> )	190	$\nearrow$	212	$\nearrow$	233
Short-term debt (D <sub>s</sub> )	380	$\nearrow$	424	$\nearrow$	467
EBIT share in CR	0,5	$\searrow$	0,45	$\searrow$	0,4
Earnings before interests and taxes (EBIT)	500	$\searrow$	468	$\searrow$	429
Net operating profit after taxes (NOPAT)	405	$\searrow$	379,1	$\searrow$	347
Free Cash Flows in 1 to n periods (FCF <sub>1..n</sub> )	405	$\searrow$	379,1	$\searrow$	347
Initial Free Cash Flows in year 0 (FCF <sub>0</sub> )	-950	$\searrow$	-1060	$\searrow$	-1167
SZ risk Premium correction	1,25	$\searrow$	0,125	$\searrow$	-0,125
Leveraged and corrected Complete risk coefficient $\beta_l$	1,73	$\searrow$	0,87	$\searrow$	0,67
Cost of equity rate (k <sub>e</sub> )	15,26%	$\searrow$	9,63%	$\searrow$	8,38%
Long-term debt rate (k <sub>dl</sub> )	12,45%	$\searrow$	8,22%	$\searrow$	7,29%
Short-term debt rate (k <sub>ds</sub> )	11,04%	$\searrow$	7,52%	$\searrow$	6,74%
Cost of capital (CC)	11,70%	$\searrow$	7,62%	$\searrow$	6,72%

Firm value growth ( $\Delta V$ )

2512  $\nearrow$  3914  $\nearrow$  **4002**

Source: Hypothetical data (Michalski 2011).

As it is shown in table 6, taking into consideration the risk premium resulting from implementation of a certain current assets investment strategy has an additional impact on the cost of capital. Enterprise financing capital cost rates are different for different approaches to current assets investment strategy. In this SZ3 variant, the lowest level of the cost of capital is observed in flexible strategy. But as a consequence, the highest enterprise value growth is characteristic also for this type of strategy, what is differ to results from variants SZ1 and SZ2. Here we have the highest level of risk sensitivity and as consequence the firm management wanting to maximize the firm value need to prefer more safe solution like flexible strategy.

#### 4. LIQUID ASSETS INVESTMENT-FINANCING STRATEGIES AND COST OF FINANCING

Last part of our consideration is influence of each current assets strategy both from investment and financing perspective and their influence on cost of financing and that influence on the enterprise value.

**SZCZ1 variant.** In the first SZCZ1 variant, capital suppliers risk sensitivity is on the smallest level. That situation is presented in table 7.

Table 7. Cost of capital and changes in enterprise value depending on the choice of current assets investment and financing strategies, the best restrictive-conservative case.

Current assets investment and financing strategy	Res-Agg	$\Delta$	Res-Con	$\Delta$	Fle-Agg	$\Delta$	Fle-Con
Cash Revenues (CR)	1000	-	1000	$\nearrow$	1113	-	1113
Fixed assets (FA)	800	-	800	$\nearrow$	872	-	872
Current assets (CA)	300	-	300	$\nearrow$	668	-	668
Total assets (TA) = Total liabilities (TL)	1100	-	1100	$\nearrow$	1540	-	1540
Accounts payable (AP)	150	-	150	$\nearrow$	334	-	334
Capital invested (E+D <sub>l</sub> +D <sub>s</sub> )	950	-	950	$\nearrow$	1206	-	1206
Equity (E)	380	-	380	$\nearrow$	482	-	482
Long-term debt (D <sub>l</sub> )	190	$\nearrow$	518	$\searrow$	241,2	$\nearrow$	658
Short-term debt (D <sub>s</sub> )	380	$\searrow$	52	$\nearrow$	482,3	$\searrow$	66
EBIT share in CR	0,5	-	0,5	$\searrow$	0,40	-	0,40
Earnings before interests and taxes (EBIT)	500	-	500	$\searrow$	445,2	-	445,2
Net operating profit after taxes (NOPAT)	405	-	405	$\searrow$	361	-	361
Free Cash Flows in 1 to n periods (FCF <sub>1..n</sub> )	405	-	405	$\searrow$	361	-	361
Initial Free Cash Flows in year 0 (FCF <sub>0</sub> )	-950	-	-950	$\searrow$	-1206	-	-1206
CZ+SZ risk Premium correction	0,27	$\searrow$	0,18	$\nearrow$	0,2	$\searrow$	0,014
Leveraged and corrected Complete risk coefficient $\beta_l$	0,98	$\searrow$	0,91	$\nearrow$	0,92	$\searrow$	0,78
Cost of equity rate (k <sub>e</sub> )	10,35%	$\searrow$	9,91%	$\nearrow$	10%	$\searrow$	9,07%
Long-term debt rate (k <sub>dl</sub> )	8,77%	$\searrow$	8,43%	$\nearrow$	8,51%	$\searrow$	7,81%
Short-term debt rate (k <sub>ds</sub> )	7,97%	$\searrow$	7,69%	$\nearrow$	7,76%	$\searrow$	7,17%
Cost of capital (CC)	8,14%	$\searrow$	8,03%	$\searrow$	7,89%	$\searrow$	7,39%
Firm value growth ( $\Delta V$ )	4023	$\nearrow$	<b>4095</b>	$\searrow$	3362	$\nearrow$	3671

Source: Hypothetical data (Michalski 2011)

As it is shown in the table 7, rates of the cost of capital financing the firm are different for different approaches to current assets investment. The lowest CC rate is observed in flexible-conservative strategy because that strategy is linked with the smallest level of risk but the highest firm value growth is linked with restrictive-aggressive strategy because in variant CZSZ1 we have the firm with the smallest level of risk sensitivity.

**In the next, CZSZ2 variant,** capital suppliers risk sensitivity is on the moderate level. That situation is presented in table 8.

Table 8. Cost of capital and changes in enterprise value depending on the choice of current assets investment and financing strategies, the best flexible-aggressive case.

Current assets investment and financing strategy	Res-Agg	$\Delta$	Res-Con	$\Delta$	Fle-Agg	$\Delta$	Fle-Con
Cash Revenues (CR)	1000	-	1000	$\nearrow$	1113	-	1113
Fixed assets (FA)	800	-	800	$\nearrow$	872	-	872
Current assets (CA)	300	-	300	$\nearrow$	668	-	668
Total assets (TA) = Total liabilities (TL)	1100	-	1100	$\nearrow$	1540	-	1540
Accounts payable (AP)	150	-	150	$\nearrow$	334	-	334
Capital invested (E+D <sub>l</sub> +D <sub>s</sub> )	950	-	950	$\nearrow$	1206	-	1206
Equity (E)	380	-	380	$\nearrow$	483	-	483
Long-term debt (D <sub>l</sub> )	190	$\nearrow$	518	$\searrow$	241	$\nearrow$	658
Short-term debt (D <sub>s</sub> )	380	$\searrow$	52	$\nearrow$	483	$\searrow$	66
EBIT share in CR	0,5	-	0,5	$\searrow$	0,40	-	0,40
Earnings before interests and taxes (EBIT)	500	-	500	$\searrow$	445	-	445
Net operating profit after taxes (NOPAT)	405	-	405	$\searrow$	361	-	361
Free Cash Flows in 1 to n periods (FCF <sub>1..n</sub> )	405	-	405	$\searrow$	361	-	361
Initial Free Cash Flows in year 0 (FCF <sub>0</sub> )	-950	-	-950	$\searrow$	-1206	-	-1206
CZ+SZ risk premium correction	2,2	$\searrow$	2,2	$\searrow$	0,009	$\searrow$	0,0045
Leveraged and corrected Complete risk coefficient $\beta$	2,46	$\searrow$	2,46	$\searrow$	0,78	$\searrow$	0,77
Cost of equity rate (k <sub>e</sub> )	20%	$\searrow$	20%	$\searrow$	9,05%	$\searrow$	9,03%
Long-term debt rate (k <sub>dl</sub> )	16%	$\searrow$	16%	$\searrow$	7,79%	$\searrow$	7,77%
Short-term debt rate (k <sub>ds</sub> )	14%	$\searrow$	14%	$\searrow$	7,16%	$\searrow$	7,14%
Cost of capital (CC)	15,14%	$\nearrow$	15,7%	$\searrow$	7,20%	$\nearrow$	7,36%
Firm value growth ( $\Delta V$ )	1725	$\searrow$	1629	$\nearrow$	<b>3802</b>	$\searrow$	3693

Source: Hypothetical data (Michalski 2011).

As it is shown in the table 8, rates of the cost of capital financing the firm are different for different approaches to current assets investment. The lowest CC rate is observed in flexible-aggressive strategy because that strategy is linked with the smallest level of risk and highest level of cheaper short term debt also the highest firm value growth is linked with flexible-aggressive strategy because in variant CZSZ2 we have the firm with the moderate level of risk sensitivity so previously noted as better restrictive-aggressive is here too risky.

## 5. EMPIRICAL DATA FROM POLISH FIRMS

Polish risk free rate in 2008 was 6,4%, in 2009 was 4,66% and in 2010 was 4,0% [MONEY]. The average difference between rate of return on market portfolio and risk free rate (ERP) in 2008 was 7,40; in 2009 was 6,08% and for 2010 that difference was 6,5% [DAMODARAN]. Leveraged beta for total Polish market were 1,03 in 2008; 0,78 in 2009 and 0,77 in 2010. Higher risk shown by beta coefficient, should results with more flexible and more conservative current assets strategies. Average cost of capital rate in 2008 was 11,36%; in 2009 was 7,97% and for 2010 it was 7,6%.

Table 10. Cash and current assets relations to key indicators in Polish firms in 2008.

2008	Revenues	Earnings before interests and taxes (EBIT)	Cash Ratio	Cash	Cash conversion cycle
Size of population	2719	2719	2719	2719	2719
Arithmetic mean	77423584,22	3166127,21	1,14	4353722,47	73,99
Standard deviation	90822360,09	12790927,28	12,09	9078518,64	1050,18
median	46073924,77	1450504,73	0,13	1314422,28	31,63
winsorized mean	<b>55266997,69</b>	<b>2144712,88</b>	<b>0,23</b>	<b>1995958,68</b>	<b>37,02</b>
Truncated mean	160257409,10	8137585,83	0,97	7567094,40	122,04
skewness	<b>3,20</b>	<b>9,68</b>	<b>39,39</b>	<b>5,04</b>	<b>9,96</b>
Maximum	883283679,11	392139454,23	3174,58	97900970,24	1460,00
Minimum	<b>44680,00</b>	<b>-170971530,00</b>	<b>0,00</b>	<b>10103,15</b>	<b>-25729,34</b>

2008	Ds./DI	CA/REV	CASH/CA	CASH/EBIT	CASH/TA
Size of population	1918	2719	2717	2719	2719
Arithmetic mean	54,57	1,28	0,19	923,52	0,11
Standard deviation	229,40	16,93	0,45	9547,22	0,30
median	4,81	0,34	0,09	0,40	0,04
winsorized mean	<b>9,77</b>	<b>0,36</b>	<b>0,13</b>	<b>0,67</b>	<b>0,06</b>
Truncated mean	50,70	0,80	0,42	2,97	0,22
skewness	<b>10,47</b>	<b>28,44</b>	<b>20,97</b>	<b>10,29</b>	<b>23,55</b>
Maximum	4761,09	627,48	14,24	100000,00	11,14
Minimum	<b>0,00</b>	<b>-0,12</b>	<b>-1,97</b>	<b>-1370,58</b>	<b>0,00</b>

Source: own calculations (Michalski 2011, MPB 2012).

Table 11. Cash and current assets relations to key indicators in Polish firms in 2009.

2009	Revenues	Earnings before interests and taxes (EBIT)	Cash Ratio	Cash	Cash conversion cycle
Size of population	2697	2697	2697	2697	2697
Arithmetic mean	68078561,84	3376674,42	1,26	5029506,30	7,49
Standard deviation	84760036,29	8364020,55	10,81	9419337,71	2991,54
median	39581044,93	1625668,51	0,26	1764998,98	43,12
winsorized mean	<b>47088930,70</b>	<b>2164458,46</b>	<b>0,42</b>	<b>2548336,78</b>	<b>48,36</b>
Truncated mean	134910695,52	7650393,72	1,73	9372237,47	146,06
skewness	<b>3,77</b>	<b>2,86</b>	<b>41,71</b>	<b>4,40</b>	<b>-51,19</b>
Maximum	995013062,06	101837719,57	1785,74	99858536,54	1460,00
Minimum	<b>48756,70</b>	<b>-84914093,10</b>	<b>0,00</b>	<b>10132,83</b>	<b>-154536,89</b>

2009	Ds./DI	CA/REV	CASH/CA	CASH/EBIT	CASH/TA
Size of population	1800	2697	2697	2697	2697
Arithmetic mean	116,66	0,74	1,84	591,49	0,17
Standard deviation	1313,15	9,18	71,38	7619,06	2,10
median	5,00	0,34	0,15	0,67	0,06
winsorized mean	<b>9,59</b>	<b>0,35</b>	<b>0,19</b>	<b>1,06</b>	<b>0,08</b>
Truncated mean	48,78	0,81	0,58	4,34	0,28
skewness	<b>24,47</b>	<b>42,60</b>	<b>50,65</b>	<b>12,89</b>	<b>51,02</b>
Maximum	41461,33	440,10	3673,70	100000,00	108,66
Minimum	<b>0,00</b>	<b>0,00</b>	<b>0,00</b>	<b>-4670,47</b>	<b>0,00</b>

Source: own calculations (Michalski 2011, MPB 2012).

According to the model discussed in previous part of the paper, the liquidity strategies changes should be connected with general level of risk in Polish firms situation.

Table 12. Cash and current assets relations to key indicators in Polish firms in 2010.

2010	Revenues	Earnings before interests and taxes (EBIT)	Cash Ratio	Cash	Cash conversion cycle
Size of population	2735	2735	2735	2735	2735
Arithmetic mean	71040887,13	6387177,20	1,65	5291761,89	91,72
Standard deviation	89632797,70	117331648,17	20,41	9904757,43	779,90
median	41444394,35	1678061,94	0,25	1856305,27	41,81
winsorized mean	<b>48991763,58</b>	<b>2210425,81</b>	<b>0,41</b>	<b>2660918,88</b>	<b>48,93</b>
Truncated mean	139024215,66	8028824,04	1,73	10192913,66	152,98
skewness	<b>3,78</b>	<b>49,38</b>	<b>38,92</b>	<b>4,35</b>	<b>28,95</b>
Maximum	992536916,54	6010543074,00	1956,47	99960653,72	1460,00
Minimum	<b>87931,00</b>	<b>-168002474,00</b>	<b>0,00</b>	<b>10813,00</b>	<b>-4928,75</b>

2010	Ds./DI	CA/REV	CASH/CA	CASH/EBIT	CASH/TA
Size of population	1818	2735	2734	2735	2735
Arithmetic mean	103,88	0,70	0,70	805,50	0,31
Standard deviation	1226,27	7,49	12,42	8936,14	6,62
median	5,30	0,35	0,14	0,72	0,06
winsorized mean	<b>10,60</b>	<b>0,37</b>	<b>0,18</b>	<b>1,19</b>	<b>0,08</b>
Truncated mean	53,30	0,82	0,56	5,07	0,27
skewness	<b>31,47</b>	<b>39,76</b>	<b>30,88</b>	<b>11,01</b>	<b>36,31</b>
Maximum	46010,80	342,56	481,32	100000,00	256,46
Minimum	<b>0,00</b>	<b>-0,39</b>	<b>-0,07</b>	<b>-9656,18</b>	<b>0,00</b>

Source: own calculations (Michalski 2011, MPB 2012).

The empirical data from Polish firms for 2008-2010 years suggests that for Polish managing teams risk sensitivity has stronger influence on current assets investment policy than cost of capital.



2008	Indicator	$\Delta$	2009	$\Delta$	2010
1,03	$\beta$	$\searrow$	0,78	$\searrow$	0,77
11,36%	CC	$\searrow$	7,97%	$\searrow$	7,6%
0,34	CA/REV	--	0,34	$\nearrow$	0,35
4,81	Ds/DI	$\nearrow$	5,0	$\nearrow$	5,3
0,4	CASH/EBIT	$\nearrow$	0,67	$\nearrow$	0,72
0,04	CASH/TA	$\nearrow$	0,06	--	0,06

Figure 12. The empirical change in cash and current assets indicators after changes in risk indicators in Polish enterprises.

Source: own calculation (Michalski 2011, MPB 2012).

The illustration of that influence is presented in Figure 12.

## SUMMARY AND CONCLUSIONS

Depending on the business type that the given enterprise is doing, sensibility to current assets financing method risk might vary a lot. Character of business also determines the best strategy that should be chosen whether it will be the conservative strategy (situation closer to the first variant) or aggressive one (situation closer to the first variant) or maybe some of the transitional variants similar to the Compromise strategy. The best choice is that with the adequate cost of financing and highest enterprise value growth. This depends on the structure of financing costs. The lower the financing cost, the higher effectiveness of enterprises activity measured by the growth of its value. The firm choosing between various solutions in current assets needs to decide what level of risk is acceptable for her owners and capital suppliers. It was shown in solutions presented in that paper. If the risk sensitivity is higher, will be preferred more safe solution. That choice results with cost of financing consequences. In this paper, we considered that relation between risk and expected benefits from the current assets decision and its results on financing costs for the firm. The empirical data from Polish firms for 2009-2010 years suggests that for Polish managing teams risk sensitivity has stronger influence on current assets investment policy than cost of capital.

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