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VALUE MAXIMIZING CORPORATE CURRENT ASSETS AND CASH MANAGEMENT IN RELATION TO RISK SENSITIVITY: POLISH FIRMS CASE

Abstract. The paper reports the way of working Financial Liquidity Investment Efficiency Model (FLIEM). It's an author proposed approach to predicts the most accurate from firm maximization point of view cash management and current assets management policy. The novelty of the proposed approach is linked with including the idea of risk sensitivity into model. 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 paper discuss the consequences that can result from operating risk that is related to cash and 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.*

1. Introduction

The situation on the market impacts of the enterprises ability to generate value for its owners, depending on the type of business and individual businesses flexibility and risk sensitivity. Rosca and Moldoeanu (2009) dicuss organizational environment as the independent variable in the management process. Presented paper also (following Rosca and Moldoeanu (2009)) confirms that financial management functions in current assets are flexible and strongly sensitive on business environment. Mentioned sensitivity is risk sensitivity, and it is basis for using unsupervised learning with expected maximization algorithm presented by Ruxanda G., Smeureanu (2012), even the supervised learning is desired and cheaper. Enterprise liquidity management can reduce the impact of risk on the

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performance of the enterprise. Some industries have the comfort of a stable demand for its production, but it is related to the volatility of realized income. Generally it is not for the entire population of companies. Theoretical consequences that may result from the post-crisis changes the operational risk that are associated with the liquidity policy in the context of Polish enterprises are presented in the paper.

The growth of the levels of cash and near cash liquid assets in an enterprise increases both net working capital requirements and the operational current costs of holding and managing financial liquidity. These two factors decrease the value of the enterprise. Almost never it works with the same intensity and in the same way. One from many explanations is dependence on risk sensitivity of the business which differs between branches and individual representatives from each branch. Case study data presents and is a material for discussion about shorter form of general model presented in first part of the paper. The relation between liquid levels and risk sensitivity is also illustrated by data from Polish enterprises empirical data.

Problem of holding high levels of liquid assets is discussed by Riddick (Riddick 2009). But the Riddick research do not tackled directly the issue of the high level of corporate cash holdings, what is more the aim of the paper. For solving the paper problem is used the conception of individual sensitivity on risk of the enterprise (ISRE, щ). That sensitiveness on risk is differ and depend on factors presented in enterprise business environment and also characterizing the internal policy of the managing team preferences and beliefs about future position of the business.

Risky environment impacts of the enterprise readiness to generate added value for its owners. Level of the risk influence depends on the type of business and individual businesses flexibility and risk sensitivity. General rule is known and independent from various economic systems or factors, that higher promised profitability is usually connected with higher risk (Soltes 2004; Zmeskal, Dluhosova 2009; Soltes 2012). One from the factors moderating the risk sensitivity is kind of the demand for the enterprise production. Some industries have the comfort of a stable demand for its production, but it is related to the volatility of realized free cash inflows. Paper uses the conception of individual sensitivity on risk of the enterprise (ISRE, щ). That sensitiveness on risk is different and depends on factors present in enterprise business environment.

2. Risk sensitivity and FLIEM model

Risk sensitiveness characterizes the internal policy of the managing team preferences and beliefs about future position of the business. Individual sensitivity on risk of the enterprise (ISRE, щ) is higher for the enterprises with higher level of the operating cash inflows volatility (σOCFI) and smaller when that volatility is smaller.
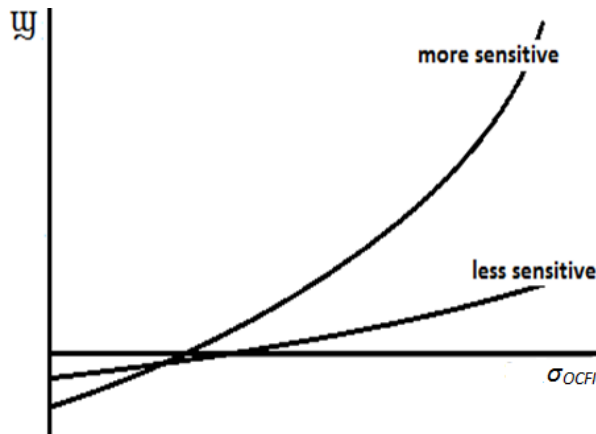
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Figure 1. Individual sensitivity on risk of the enterprise (ISRE, ɰ) as function of the operating cash inflows volatility (σOCFI).

Individual sensitivity on risk of the enterprise (ISRE, ɰ) is also an result of quality and value of total assets. Higher level of total assets real value (TA) characterizes less sensitive enterprises, smaller level of total assets is generally typical for more sensitive enterprises.
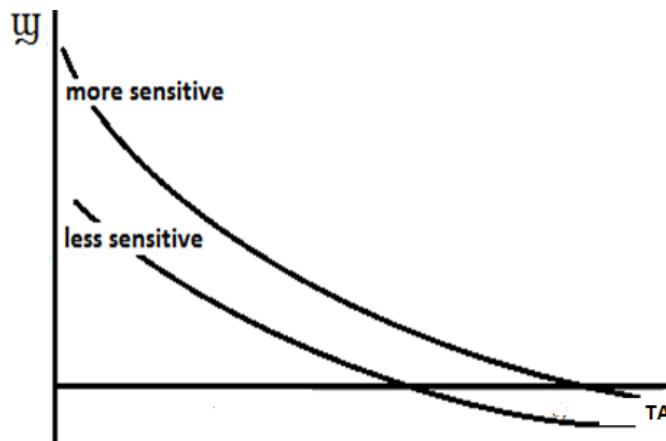

Figure 2. Individual sensitivity on risk of the enterprise (ISRE, ɰ) as function of the level of total assets real value (TA)

Next source of sensitiveness is originality and innovativeness of enterprise product and enterprise product market (OIEP). Individual sensitivity on risk of the enterprise (ISRE, ɰ) is higher when the enterprise issues high technologically or from other perspective more sophisticated products, and is smaller in opposite case.
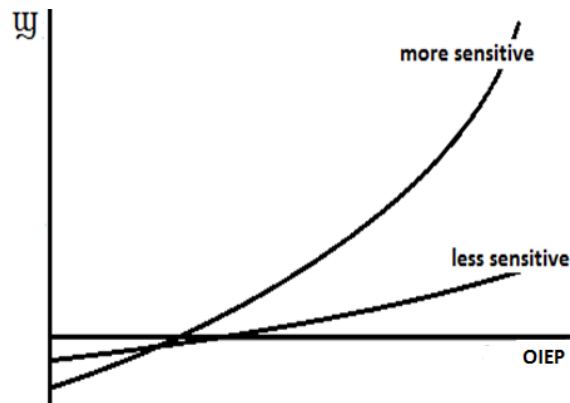
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Figure 3. Individual sensitivity on risk of the enterprise (ISRE, щ) as function of the innovativeness of enterprise product and enterprise product market (OIEP)

Similarly the growth of market absorption of enterprise products (MAEP) causes the individual sensitivity on risk of the enterprise (ISRE, щ) decrease.
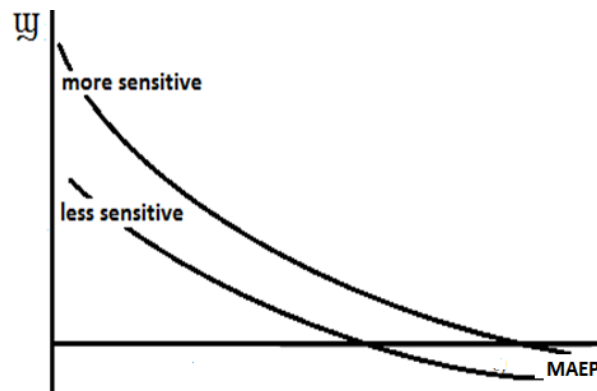

Figure 4. Individual sensitivity on risk of the enterprise (ISRE, щ) as function of the innovativeness of market absorption of enterprise products (MAEP).

Sometimes is believed that bigger enterprises are less risky and smaller have higher risk level. In presented here approach, individual sensitivity on risk of the enterprise (ISRE, щ) is influenced by enterprise size (SIZE), but the size risk is not directly transferred on enterprise but is moderated through the individual sensitivity on risk of the enterprise (ISRE, щ). When the enterprise is greater, the smaller is the sensitivity and the smaller enterprise is more sensitive.
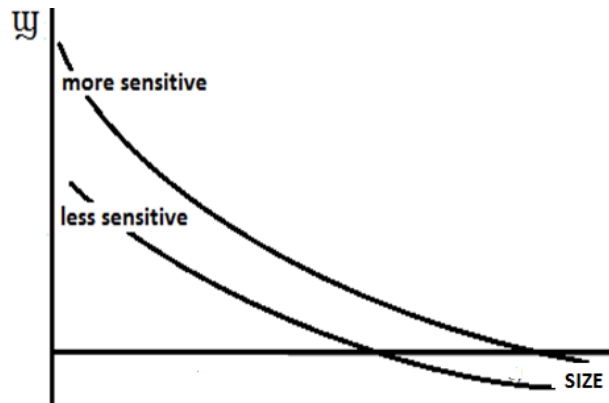
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Figure 5. Individual sensitivity on risk of the enterprise (ISRE, ய) as function of the enterprise size (SIZE).

Enterprise works in actual economic environment (ENV). More sensitive are enterprises operating in more unstable conditions. The hypothesis verified in the paper is presumption about relation of pressure of the general economic environment caused by instability different cycles in surrounding business environment and the financial liquidity policies realized by enterprises. The strength of that influence depends on business sensitiveness on risk. More risk sensitive businesses have higher operating cash inflows OCFI volatility, smaller total assets that average total assets in their sector, more innovative and original product or target group for its products or services, smaller than average market absorption, smaller size, and other parameters which cause higher risk sensitivity. Risk sensitivity depends on position of the enterprise in its business branch (PEBB). 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 enterprise with strong, less sensitive positions can use more restrictive and more aggressive policies to have more enterprise value building results.

Next indicators influencing the enterprise sensitiveness, are linked with short-term financing policy (D_S/D_L) and short-term investment policy (CA/CR). Individual sensitivity on risk of the enterprise (ISRE, ய) is higher in more restrictive policies and smaller in more flexible policies in managing the enterprise financial cash and near cash liquid investments. Financial liquidity policy could be changed faster than previously listed factors, so the short-term financing policy (D_S/D_L) and the short-term investment policy (CA/CR) could be used as anticipative and predictive relations. That relations and linked with them financial liquidity ratios are the answer on and tell some about unmanageable from enterprise perspective general macroeconomic environment. The way to hedge the enterprise risk is to use adequate financial liquidity policy and that role is in enterprise treasurers (Polak, Sirpal, Hamdan 2012). Indicators influencing the enterprise sensitiveness, are linked with financial liquidity short-term financing policy (D_S/D_L) and financial

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liquidity short-term investment policy (CA/CR). Individual sensitivity on risk of the enterprise (ISRE, щ) is greater when the enterprise uses more aggressive policy and smaller when that policy is more conservative.
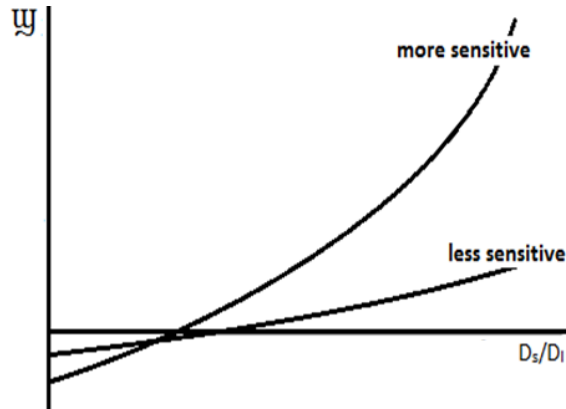

Figure 6. Individual sensitivity on risk of the enterprise (ISRE, щ) as function of the short-term financing policy (D_S/D_L).
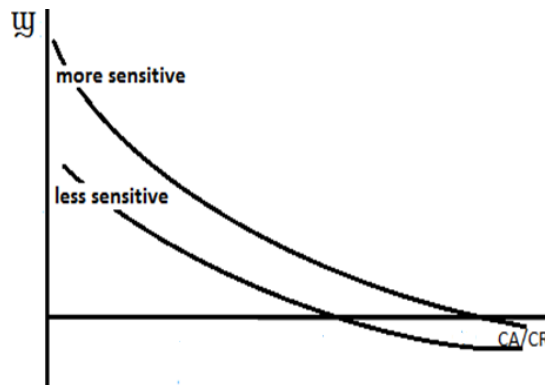
Figure 7. Individual sensitivity on risk of the enterprise (ISRE, щ) as function of the short-term investment policy (CA/CR).

So, finally individual sensitivity on risk of the enterprise (ISRE, щ), could be presented as function of mentioned above indicators:

$$щ = f\ (CA/CR,\ D_S/D_L,\ SIZE,\ MAEP,\ TA,\ \sigma OCFI\ ,\ OIEP,\ ENV,\ PEBB) \quad (1)$$

That indicator is used to estimate cost of capital rate financing the enterpise:

$$CoC = f\ (k_{rf},\ k_m,\ щ,\ \beta,\ kdL,\ kdS), \quad\quad\quad\quad\quad (2)$$

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The way of including the information about the risk sensitivity could be based on CAPM based philosophy or at models using other approaches (Zmeskal, Dluhosova 2009; Dluhosova et.al. 2006). Here is used modified CAPM basing proposal.

According to financial liquidity efficiency model presented by Michalski (Michalski 2012) and adapted here, natural risk sensitivity of the business sector should be linked with its natural liquidity strategy and in the same way natural risk sensitivity of the individual business also should be linked with its natural liquidity strategy. Liquid assets financing has its cost depending on risk linked with financial liquidity strategies used by the financed enterprise. If there is higher risk inn economy, there will also be the higher cost of financing (cost of capital rate go up) and as result enterprise value growth. Enterprise value growth is the driver which is the aim for the managing team of the enterprise, and as the result, the nearest the most effective from enterprise value creation point of view strategy will be realized by the firm. Table 1 presents the influence of financial liquidity financing strategy choice on the key value indicators and the influence of financial liquidity investing strategy choice on the key value indicators.

Table 1. Influence of the financial liquidity financing strategy choice on the key value creating indicators and influence of the financial liquidity investing strategy choice on the key value creating indicators

Aggressive ($D_S/D_L \rightarrow$ max)		Conservative ($D_S/D_L \rightarrow$ min)
↑	RISK	↓
↑↓	CoC	↓↑
↓↑↓	V	↑↓↑
Restrictive ($CA/CR \rightarrow$ min)		**Flexible** ($CA/CR \rightarrow$ max)
↓	CR	↑
↓	CE	↑
↓↑	FCF	↑↓
↑	RISK	↓
↑	CoC	↓
↓↑↓	V	↑↓↑

where: CR – cash revenues, CE – cash expenses, FCF – free cash flows, CoC – cost of capital (rate), V – value of the firm, (Michalski 2008a).

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

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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.

Risk sensitivity depends on position of the enterprise 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 enterprise with strong, less sensitive positions can use more restrictive and more aggressive policies to have more enterprise value building results.

Enterprise's property consists of total assets, i.e. fixed assets and current assets. 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 enterprises 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

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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.

Table 2. The expected change in financial liquidity measures indicators after changes in risk sensitivity and rate of the cost of capital indicators

↓	RISK SENSITIVITY	↑
↓	CoC	↑
↑	CURRAT	↓
↑	QUIRAT	↓
↑	CASRAT	↓
↑	NLB	↓
↑	LNITY	↓
↑	CLI	↓
↑	LAMBDA*	↓

where: CURRAT – current ratio, QUIRAT – quick ratio, CASRAT – cash ratio; NLB – net liquid balance to total assets; LNITY – static liquidity indicator (Nita 2011); CLI - comprehensive liquidity index; Lambda – modified lambda liquidity indicator (Lambda = (Liquidity static reserve + OCF) / (OCF at risk)), (Michalski 2010).

After the risk goes up, at least two sources of change influence enterprise. 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

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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. Enterprise 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.

3. Relation of financial liquidity financing strategy to risk

There is a relationship between the three above mentioned approaches based on the relation between expected benefit and risk.
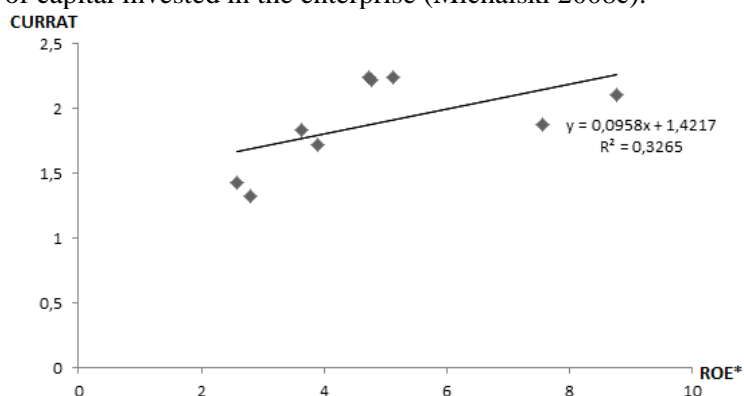
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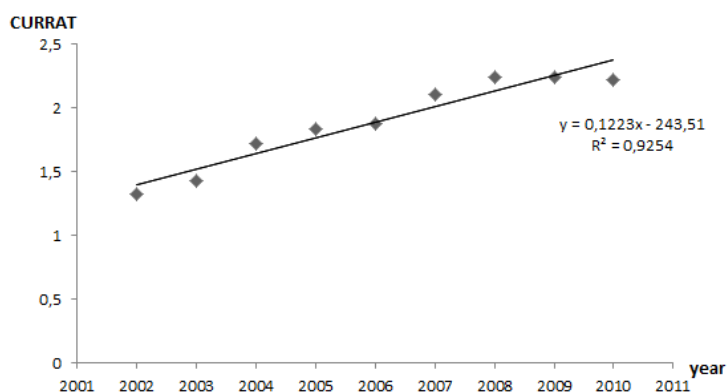
year	2002	2003	2004	2005	2006	2007	2008	2009	2010
CURRAT	1,32	1,43	1,72	1,84	1,88	2,11	2,24	2,24	2,22

Figure 8. CURRAT for Polish enterprises in 2002-2010.
Source: own calculations (Dudycz 2012, MPB 2012).

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 enterprise (Michalski 2008c).

	2002	2003	2004	2005	2006	2007	2008	2009	2010
ROE*	2,79583	2,573692	3,908304	3,644623	7,566957	8,763712	5,132867	4,731909	4,781436
CURRAT	1,32	1,43	1,72	1,84	1,88	2,11	2,24	2,24	2,22

Figure 9. CURRAT in relation to return on equity (ROE) for Polish enterprises
Source: own calculations (Dudycz 2012, MPB 2012).

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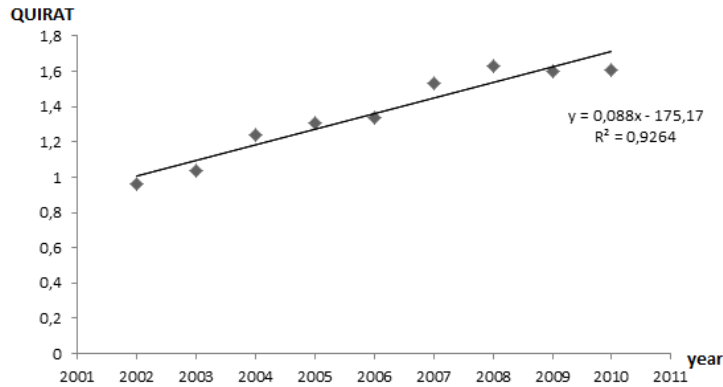
year	2002	2003	2004	2005	2006	2007	2008	2009	2010
QUIRAT	0,96	1,04	1,24	1,31	1,34	1,53	1,63	1,6	1,61

Figure 10. QUIRAT for Polish enterprises in 2002-2010
Source: own calculations (Dudycz 2012, MPB 2012).

The connection of these claims with the chosen way of financing may be insignificant. Nevertheless, it also might be important to such a considerable degree that it will have an effect on the choice of strategy.

In years 2002-2010 was higher risk sensitivity in Polish firms what is illustrated by fact that liquidity indicators are week correlated with ROE and other return measures (see figure 9 and 11).
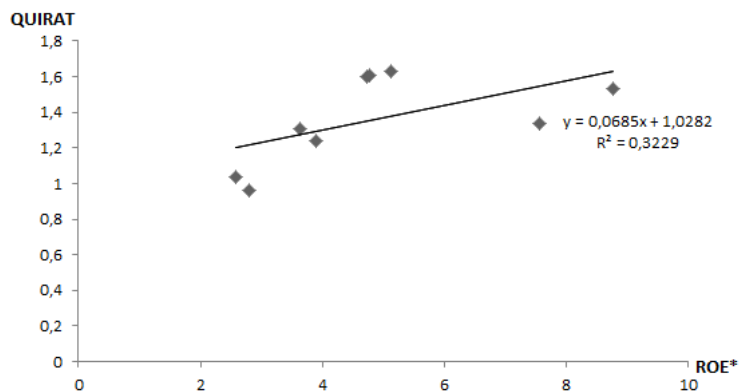
	2002	2003	2004	2005	2006	2007	2008	2009	2010
ROE*	2,79583	2,573692	3,908304	3,644623	7,566957	8,763712	5,132867	4,731909	4,781436
QUIRAT	0,96	1,04	1,24	1,31	1,34	1,53	1,63	1,6	1,61

Figure 11. QUIRAT in relation to return on equity (ROE) for Polish enterprises
Source: own calculations (Dudycz 2012, MPB 2012).

Data used in the paper case study, confirms the model expectations. Presented in table 3 in comparison to results collected in table 4 and presented in figure 12 levels of financial liquidity measures show that expected by FLIEM model relation probably have the possible confirmation.

Table 3. Liquidity indicators for Polish enterprises in 2008-2010

-	CURRAT	QUIRAT	CASRAT	NLB	LNITY	CLI	LAMBDA*
2008 (3611*)	1.47	1.04	0.14	-0.32	0.91	0.54	1.74
2009 (3470*)	1.74	1.28	0.27	-0.18	1	0.85	2.43
2010 (3530*)	1.74	1.28	0.25	-0.19	1	0.82	2.48

where: CURRAT – current ratio, QUIRAT – quick ratio, CASRAT – cash ratio; NLB – net liquid balance to total assets; LNITY – static liquidity indicator (Nita 2011); CLI - comprehensive liquidity index; Lambda – modified lambda liquidity indicator (Lambda = (Liquidity static reserve + OCF) / (OCF at risk)), * - size of population.
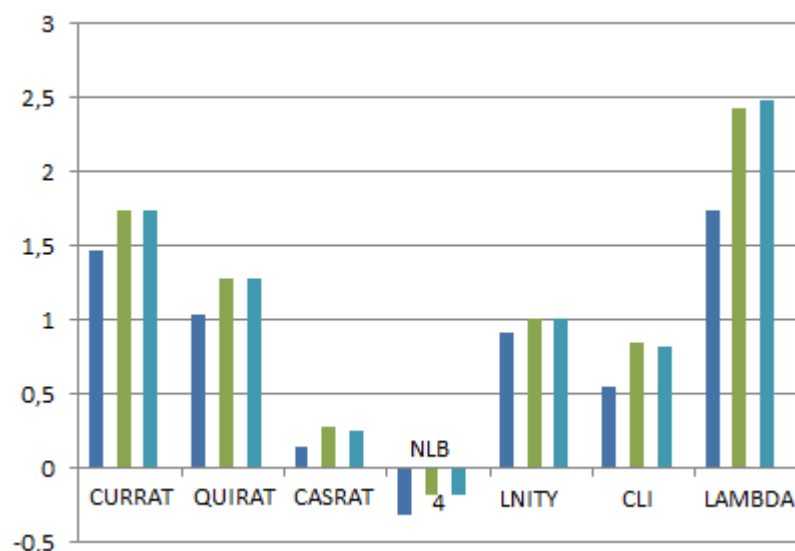Source: own calculations (MPB 2012).

Figure 12. Liquidity indicators for Polish enterprises

Source: own calculations (MPB 2012).

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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 enterprises situation being the reflection of general macroeconomic situation in their environment.

Table 4. Liquidity indicators for whole Polish economy in 2003-2010

General (whole Polish economy)	2003	2004	2005	2006	2007	2008	2009	2010
CURRAT (>30000*)	1.33	1.43	1.52	1.55	1.67	1.74	1.43	1.72
QUIRAT (>30000*)	0.97	1.03	1.07	1.10	1.19	1.23	1.11	1.23
CASRAT (>30000*)	0.17	0.20	0.22	0.23	0.29	0.31	0.30	0.32

Where: CURRAT – current ratio, QUIRAT – quick ratio, CASRAT – cash ratio, * - size of population.
Source: own calculations (Dudycz 2012, MPB 2012).

Table 5. Dynamics of liquidity indicators in Polish enterprises in 2003-2010

General*	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010
CURRAT	7.52%	6.29%	1.97%	7.74%	4.19%	-17.82%	20.28%
QUIRAT	6.19%	3.88%	2.80%	8.18%	3.36%	-9.76%	10.81%
CASHRAT	17.65%	10%	4.55%	26.09%	6.90%	-3.23%	6.67%

* whole Polish economy
Source: own calculations (Dudycz 2012, MPB 2012).

The empirical data from Polish enterprises for 2003-2010 years could suggest that for Polish enterprises managing teams risk sensitivity grows and it is illustrated by growing liquidity indicators, what is linked with model suggestion about greater risk sensitivity influence on more flexible and more conservative solutions.

6. 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

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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 enterprise 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.

Enterprise liquidity management tells many about the general condition of the firms using it. It is because liquidity is held in enterprises not only because of transactions but also because of entrepreneurs fear and hopes about the future. Polish firms faces grooving risk level thru 2002-2010 period. Paper used financial liquidity efficiency model (FLIEM) to diagnose after 2008 world financial crisis changes in general economic conditions modification of Polish enterprises strategies in liquidity management. That changes were present. Next the solved matter was the answer showing the destination change leaded to more flexible and more conservative liquidity management in Polish enterprises. Answer was derived thanks to knowing the way how financial liquidity Polish enterprises indicators like CURRAT, QUIRAT, CASRAT changed after 2008 period. Finally, the financial liquidity indicators as predictive information about general macroeconomic situation, used in the paper Polish for enterprises data for 2008-2010 and from separate set of data for 2003-2010 years, suggest that Polish enterprises face higher risk sensitivity as answer on post-financial crisis situation.

In this paper, was considered that relation between risk and expected benefits from the current assets decision and its results on financing costs for the enterprise. The empirical data from Polish firms for 2003-2010 years confirms the presented financial liquidity investment efficiency model assumptions. Future studies should concern at searching new cases testing the model usefulness and identifying the constraints of that model explanations if that exists.

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