LIQUIDITY FORECASTING IN THE SECTOR OF TRADITIONAL AND INNOVATION BASED COMPANIES. IS CCC THE BEST? – THE CASE OF POLAND

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Abstract

Liquidity forecasting is connected to strategic plans and valuation models. There are some liquidity measures that company may take into account in these processes. Authors wanted to prove that cash conversion cycle is the best measure for liquidity forecasting since it is recommended as a dynamic ratio in the literature. The tests didn't confirm the statement but the conclusions shed the light on other interesting problems with liquidity forecasting. Authors divided the sample for the innovative and traditional sectors and found the differences between them in the liquidity context.

Keywords: Liquidity management, forecasting, CCC

Introduction

Operating decisions resulting in the liquidity level are main areas of corporate financial management. Forecasting the liquidity is associated with some aspects that must be taken into account when the goals of a company is planned. Liquidity can be measured by some ratios connected to the "liquidity definition". The first approach to liquidity that is analysed in this paper is the level of liquidity represented by indicators related to working capital and the ability of a company to pay the obligations (i.e. the current ratio) forecasting. The second aspect is related to the liquidity measured by the cash conversion cycle, which reflects the activity of the enterprise and the amount of time it takes to recover the investment in cash operating cycle. The forecasting of cash conversion cycle helps to understand the future condition of a company based on the strategic assumptions. According to the literature and authors of this paper cash conversion cycle is vital for the liquidity assessment. The third aspect is related to the level of cash in the

company. The fourth approach is connected to the cash flow from operations that indicates the liquidity connected to the business performance.

Companies with different profiles of business, representing the traditional sector and innovation-based one are characterized by different liquidity management approaches. We can expect that innovative companies run more efficient liquidity management strategies than companies representing traditional businesses because of the more aggressive marketing strategies connected to the innovative products or services. Probably staff employed in innovative-based companies is better educated and able to use more sophisticated management tools and technics. As an innovative companies authors has chosen those that are in the last quartile of the sample due to the level of the ratio of the intellectual and legal assets to fixed assets indicating high investments in intellectual property. The purpose of this article is to prove that there is a difference between liquidity forecasting in these two groups of companies and moreover we expect that cash conversion cycle, as a fundamental dynamic liquidity measure, is an efficient subject for liquidity forecasting.

1. Liquidity forecasting in literature

The liquidity forecasting is related to the strategic development of the company. Building the strategy for a future managers should take into account two basic problem: will the company be able to pay the obligations and will it generate sufficient cash flow. Company strategy is the document that determines the directions of its activities in all areas. Strategy involves analysing the patterns of the organization and its development in a changing environment, taking into account the imperative guarantee of future performance. It can therefore be concluded that forecasting is a secondary effect in relation to the strategy's crucial goals, but it is also a pattern-based action (Bieniasz, Golas 2008). Thus, identification of the liquidity management strategy, if it is not the result of conscious decisions, is the first step in forecasting procedure.

The distinction for innovative and traditional companies takes into account the goal of the company because of its nature. Innovative companies, which are forced to invest more in the intellectual and legal property, with a short product life cycle should take more risky actions in order to maintain a competitive market. Companies representing the traditional businesses, including mining and energy markets offer homogeneous products. Their work does not therefore rely on risk but the stability of operations resulting in a lower expected rate of return set by investors and lower risk. In this case, the level of current assets held by the company, including inventory, may be higher.

There are some research papers where authors try to verify the forecasting problem. For example Hope (2003), using a sample from 22 countries, investigated the relations between the accuracy of analysts' earnings forecasts and the level of annual report disclosure, and between forecast accuracy and the degree of enforcement of accounting standards. He found out that firm-level disclosures are positively related to forecast accuracy, suggesting that such disclosures provide useful information to analysts. He also constructed a comprehensive measure of enforcement and found that strong enforcement is associated with higher forecast accuracy. This finding is consistent with the hypothesis that enforcement encourages managers to follow prescribed accounting rules, which, in turn, reduces analysts' uncertainty about future earnings. He also found evidence consistent with disclosures being more important when analyst following is low and with enforcement being more important when more choice among accounting methods is allowed. Analysing different liquidity approaches is connected with the data disclosure and will be more efficient for large and developed companies offering clear reporting procedures.

For example Mramor and Valentincic (2003) analysed short-term liquidity of very small private companies. They assumed that cash shortages result in opportunity costs due to delayed payments. They used a publicly available liquidity indicator for 19,627 Slovenian companies as a special, but generalizable case of "credit record" data and financial ratios to predict possible cash shortages. Indicator were predicted and used in lagged form as a predictive variable with/without financial ratios, allowing comparisons. Models, including financial ratios, are less efficient than models based on lagged liquidity indicator alone. Surprisingly, combined models perform only marginally better. Despite high overall accuracy, misclassification of companies experiencing cash shortages is high. This research supports the statement that small companies liquidity is difficult to be forecasted since they do not have strategies and history sufficient to build working models.

In another paper presented by Vanstralean et al. (2003) authors presents evidence that companies across three continental European countries (Belgium, Germany and the Netherlands) provide varying degrees of analyst recommended nonfinancial disclosures to the marketplace. This study was the first to examine the relationship of Jenkins Committee nonfinancial disclosure levels with the accuracy and dispersion of financial analysts' earnings forecasts. Seemingly unrelated regression tests show that larger companies and companies with a global focus voluntarily provide higher levels of both forward looking and historical nonfinancial disclosures. Additionally, higher levels of forward looking nonfinancial disclosures are associated with lower dispersion and higher accuracy in financial analysts' earnings forecasts. Companies listed on the WSE are not small any longer

but they are not very large and so much international as other corporations. Therefore authors of this paper will look for the differences between sectors and liquidity ratios being accurate for forecasting.

Orens and Lybaert (2007) examined whether the use of non-financial information by sell-side financial analysts influences the accuracy of analysts' forecasts. The research findings, based on a survey of Belgian financial analysts, suggest that financial analysts who use more forward-looking information and more internal-structure information offer more accurate forecasts. Furthermore, the listed Belgian firms examined in this study have improved their non-financial information reporting over time. However, neither the frequency nor the quantity of non-financial information mentioned by financial analysts in their reports appeared to have increased over time.

In the paper proposed by Kaka and Price (1993) authors stated that cash flow forecasting and control are essential to the survival of any contractor. The time available for a detailed pre-tender cash flow forecast is often limited. Therefore, contractors require simpler and quicker techniques which would enable them to forecast cash flow with reasonable accuracy. Their paper identified causes behind the inaccuracy of current standard value S-curves (which are often used as an alternative approach for cash flow forecasting) and proposes the use of standard cost commitment models. The process of developing and testing the cost commitment models involved first collecting actual data for 150 completed projects. Several criteria were identified to classify these projects. Tests were conducted to identify which of these criteria affected the shape of the cost commitment curves. Projects were then distributed into different groups and S-curves were fitted into each using the logit transformation technique. Errors incurred when fitting these curves were measured and compared with those associates in fitting individual projects. Results showed that the difference between these errors was not significant. The reliability of selecting the cost commitment curve to model (instead of value curves) was evaluated. Results confirmed the hypothesis that cost commitment models are more accurate and reliable than value models. Finally, the paper outlined some of the practices involved in utilizing the proposed models.

Hsiao, Tahmiscioglu (1997) indicated the issue of financial constraints on company investment using the U.S. panel data of 561 firms from 1971–1992. A number of economically meaningful factors were discovered to partition firms into relatively homogeneous groups. A mixed fixed-and random-coefficients framework was then used to capture unobserved heterogeneity within groups. The prediction criterion was used to select the final specification and evaluate the importance of financial constraints on firm's investment decisions.

DeFond and Hung (2003) investigated the recent trend in analysts disseminating operating cash flow forecasts. They found that analysts tend to forecast cash flows for firms where accounting, operating and financing characteristics suggest that cash flows are useful in interpreting earnings and assessing firm viability. They also found that analysts tend to forecast cash flows for firms with large accruals, more heterogeneous accounting choices relative to their industry peers, high earnings volatility, high capital intensity and poor financial health. These findings are consistent with financial analysts responding to market-based incentives to provide market participants with value-relevant information.

Kaka (1996) stated that further variables are needed to enhance to flexibility of the cash flow profiles produced. In his paper he presented a model designed to use more than fifty variables to calculate the cash flow of individual contracts. In addition, some of the risk associated with construction contracting was incorporated into the cash flow mechanism. This has been achieved by introducing stochastic simulation and extra variables that contribute towards that risk. The testing of the model demonstrated that by merging further variables, the flexibility and reliability of cash flow forecasting are enhanced. The tests also demonstrated that contractors' cash flow is highly sensitive to risk (variations, cost variances, duration overrun and undermeasurement, which further justifies the methodology adopted). It is also important that high rate of inflation highlights the need for closer working relationships between management accountants and operational researchers (Sizer, 1977)

2. Methodology and data

The study includes five different measures of liquidity. Liquidity in the first place is presented as a ratio of current assets to current liabilities. The current ratio is given by the formula:

$$CR = \frac{CA}{CL} \qquad (1)$$

where:

CR – current ratio, CA – current assets, CL – current liabilities.

Since the inventory as the less liquid part of current assets may influence the ability to regulate the obligations the Quick ratiois given by the formula was also taken into account:

$$QR = \frac{CA - I}{CL} \qquad (2)$$

where:

QR – quick ratio, CA – I – current assets minus inventory, CL –current liabilities.

Largay and Stickney (1980) and Aziz and Lawson (1989) found that static analysis of liquidity is not sufficient for management whether a decrease or increase in the value of liquidity has a positive or a negative impact on the profitability of the company. In the model proposed by Richards and Laughlin (1980) cash conversion cycle is defined as the sum of the conversion of receivables and inventory conversion period minus the period of deferred payment of current liabilities:

$$CCC = RCP + ICP - PDP \quad (3)$$

where: RCP = receivables conversion period
ICP = inventory conversion period
PDP = liabilities deferral period

then: $$CCC = (360AR/X) + (360I/Y) - (360CL/Z) \quad (4)$$

where: AR – receivables, I – inventory, CL – short-term liabilities, XYZ the diversity used in the calculation are defined based on the analysis carried out by Bieniasz and Czerwińska-Kayzer (2008) , which compared the approaches in the literature to calculate the cash conversion cycle under Polish accounting standards.. In this study authors decided to use sales as a nominator.

Cash flow is a measure of the liquidity of the company and its positive level allows investment operations and maintenance of external financing involved in the company. Due to the nature of research and the use of financial indicators to forecast cash flows will be calculated in the manner proposed by Moss and Stine (1993) so as to be able to carry out an analysis using the indicators, rather than levels of the variables tested.

$$CF/TA = \frac{NI + D}{TA} \quad (5)$$

where:
CF/TA – net cash flow divided by total assets, NI – income net, D – depreciation, TA – total assets.

Cash indicator is the last one taken into account for the liquidity assessment and was calculated according to the formula:

$$CI = \frac{C}{TA} \quad (6)$$

where:

CI – cash indicator, C – cash, TA – total assets.

The authors of this article have taken into account Ratios were calculated for companies listed on the Warsaw Stock Exchange in the period 1997-2010. Companies have been divided into two groups: innovation and traditional-based, in respect to intangible assets. Companies with the level of the indicator IN / FA above the third quartile of all observations in a given year, were qualified as innovative companies. Other companies were considered as traditional. After discarding observations for which data were missing, or indicators for various reasons were uncountable, the study was carried out on a total of 1737 observations, including 462 companies considered innovative and 1,275 companies considered traditional.

The following hypothesis will be verified: The first hypothesis states that CCC is more predictable than other liquidity ratios because of its unique and vital role in the management of liquidity and therefore, the authors expect that volatility of CCC will be lower than the volatility of CR, QR, CF/TA and CI. The second hypothesis states that there are differences between coefficients of variation of liquidity ratios in each sector of the economy. The third hypothesis states that CCC is better predictable for innovation based than traditional sector.

3. Results

To verify the hypothesis about the CCC as the most predictable liquidity ratio and to find differences between innovative and traditional sectors in liquidity forecasting, there will be three tests run. First of all authors will check if CCC volatility is lower than the volatility of other ratios that will confirm its predictability potential. Moreover they will check if there is a significant difference between rates of change of liquidity ratios in every sector. The test of equality of means will be run additionally to confirm the results. In the end authors will analyse if CCC is more predicable for innovative than traditional companies based on linear models.

Authors calculated ratios for companies listed on the Warsaw Stock Exchange in the period 1997-2010 as it was presented in the methodology part. The sample was divided for two groups based on the level of the ratio intangibles to fixed assets (IN/FA). The innovation based companies where those with the IN/FA ratio in the last quartile of a sample while the traditional business companies were those with this ratio in the three first quartiles. The study was carried out on a total of 1737 observations, including 462 companies.

The first test authors run is related to the hypothesis, that the CCC is more predictable than other liquidity ratios, because of its unique and vital role in the liquidity management. Authors expect that CCC volatility will be lower than the volatility of static liquidity ratios CR, QR, CI and ratio based

on Cash Flow – CFFO/TA. Mean values of the coefficients of variation of percentage changes of CCC and nominal changes of other ratios for innovative companies are presented in table 1. Due to authors assumptions, a lower average value of the coefficient of variation of CCCs rate of change is expected in relation to other indicators.

Table 1. Mean values of coefficients of variation for innovative companies

	(CCC(t)-CCC(t-1))/CCC(t-1)	CR(t)-CR(t-1)	QR(t)-QR(t-1)	CFFO/TA(t)-CFFO/TA(t-1)	CI(t)-CI(t-1)
Mean	28,861	353,519	181,227	-22,523	89,114

Source: Authors' work

Presented results show that the average absolute value of the coefficient of variation of CCC is the second lowest one. Low mean value of coefficients of variation of CCC rate of change suggests that amplitude of fluctuations in the level of CCC is relatively small. This means that the CCC should be better predictable than CR, QR and Cash but less than CFFO. Scale study of variation was repeated also for traditional companies. The results are presented in Table 2.

Table 2. Coefficients of variation for traditional companies

	(CCC(t)-CCC(t-1))/CCC(t-1)	CR(t)-CR(t-1)	QR(t)-QR(t-1)	CFFO/TA(t)-CFFO/TA(t-1)	CI(t)-C/A(t-1)
Mean	-159,927	49,562	47,521	-33,354	418,211

Source: Authors' work.

A comparison of average values of the coefficients of variation for changes in the indicators suggest, that the best predictable is the CFFO, while the CCC (having the second highest absolute value of average coefficient of variation of percentage changes) can be regarded as one of the least predictable one. Therefore the hypothesis about CCC being the best liquidity measure to predict should be rejected in case of traditional companies. This results suggest, that liquidity forecasting in traditional and innovative companies may not bring the same results as authors expected. This could mean that innovative business is less predictable in terms of static liquidity measures. Traditional companies, may be more predictable in terms of managing inventory or generating free cash flow. In comparison, innovative companies due to constant need of investing, are better predictable when we consider dynamic liquidity measure.

The second study is related to the verification of the second hypothesis, where authors expect significant differences between rates of change of liquidity ratios in every sector of the economy. In order to verify

the hypothesis, test for equality of means was run for innovative and traditional companies.

The purpose of this test is to verify the null hypothesis, that assumes equality of the averages of the rates of change in tested liquidity ratios in groups of traditional and innovative companies. In the first step the authors paid attention to the various liquidity ratios statistics. In Table 3 a summary of statistics for the average changes of indicators of liquidity was presented.

Table 3. Statistics for rate of changes of coefficients of liquidity

	Innovative	Mean	Standard deviation	Mean standard error
(CCC(t)-CCC(t-1))/CCC(t-1)	No	-0,118	18,93	0,53
	Yes	0,407	11,75	0,55
CR(t)-CR(t-1)	No	0,209	10,37	0,29
	Yes	0,030	10,45	0,49
QR(t)-QR(t-1)	No	0,218	10,36	0,29
	Yes	0,057	10,40	0,48
CFFO/TA(t)-CFFO/TA(t-1)	No	-0,005	0,17	0,00
	Yes	-0,006	0,14	0,01
CI(t)-CI(t-1)	No	0,000	0,08	0,00
	Yes	0,001	0,10	0,00

Source Authors' work.

The average absolute values of the rate of changes in individual liquidity measures are lower for companies that are considered as innovative for ratios CR and QR. Authors also note that the average value of rate of change of the CCC ratio is higher for innovative companies. For indicators CFFO/TA and CI the average values are almost the same. These results suggest, as it was expected, that volatilities of liquidity measures in various sectors of the economy may be significantly different. It should be also noticed, that the highest average values are those for CCC. This may suggest that CCC ratio may not be considered as the most predictable of the analysed indicators of liquidity as expected in the first hypothesis.

In order to confirm the conclusions suggested by the statistical data, the analysis of equality of means was conducted based on Levene test. The null hypothesis assumes equality of the analysed rates of changes of liquidity indicators. Authors, are expecting that average values will differ from each other. Table 4 presents the results of testing equality of means to confirm the conclusions taken from the analysis of the average value of the rate of change.

Table 4. Results of the equality of means test.

Volatilities of ratios		Levene test		T test for the equality of means				
		F	significance	t	df	significance	Difference of means	Differences standard error
(CCC(t)-CCC(t-1))/CCC(t-1)	Equality of variances assumed	1,13	0,29	-0,56	1735	0,58	-0,5255	0,9404
	equality of variances not assumed			-0,69	1315	0,49	-0,5255	0,7616
CR(t)-CR(t-1)	Equality of variances assumed	0,01	0,91	0,32	1735	0,75	0,1797	0,5644
	equality of variances not assumed			0,32	811	0,75	0,1797	0,5662
QR(t)-QR(t-1)	Equality of variances assumed	0,04	0,84	0,29	1735	0,78	0,1607	0,5633
	equality of variances not assumed			0,28	814	0,78	0,1607	0,5642
CFFO/TA(t)-CFFO/TA(t-1)	Equality of variances assumed	11,57	0,00	0,10	1735	0,92	0,0009	0,0090
	equality of variances not assumed			0,11	1019	0,91	0,0009	0,0081
CI(t)-CI(t-1)	Equality of variances assumed	15,48	0,00	-0,20	1735	0,84	-0,0009	0,0044
	equality of variances not assumed			-0,18	677	0,86	-0,0009	0,0049

Source: Authors' work

Compared to the results in Table 3, results of testing indicators CFFO/TA and CI should be primarily noted. For these indicators, despite minor differences in average values, we should reject the null hypothesis, which assume equality of means (p - value> 0.01) and assume, that these averages are different. This means, that the rate of change of cash and cash flow from operations, in relation to total assets, differs in statistically significant way for innovative and traditional companies. The traditional companies are characterized by greater average rate of change of CFFO/TA level than the innovative companies.

As shown in the tests, the null hypothesis for the other indicators must also be rejected and it should be noted, that the average rates of change of indicators CCC, CR and QR are different for the groups of innovative and traditional companies. In the case of CCC, companies classified by the authors as innovative are characterized by higher volatility. This may be associated with a higher risk of the cash conversion associated with investments in new technologies. For indicators CR and QR greater average rate of change characterizes a traditional company. Innovative companies should maintain a high level of liquid assets to be used for further investments, so volatility of change in level of those ratios is relatively low.

Based on the results of research, the second hypothesis should be confirmed. This means that it can be expected, that there is a significant difference between the rates of change of liquidity in the traditional companies and those based on innovation.

The third study is related to the verification of the hypothesis that the CCC is more predictable for innovation than the traditional sector. As shown in tables 1 and 2, the coefficient of variation of CCC's rate of change is lower in innovative companies. It may suggest that CCC is indeed more predictable for technology-based companies.

Based on the theoretical aspects of the company's liquidity a simple linear regression model has been created, as it is suggested by Mirowska and Lasek (2010). As the exogenous variables used to explain theoretical models, the most relevant variables has been selected from internal and external environment of enterprises. Thus, the independent variables in the models are:

- Inflation (I),
- The rate of change of GDP,
- The ratio of current assets to total assets (CA/TA),
- Nominal change of companies ROE,
- The ratio of current liabilities to total liabilities of the company (CL/TL).

In theory these variables should have a significant impact on the liquidity management policy of the company. It can be expected, that the CCC's rate of change will be explained by these exogenous variables. The goal of the model is to verify the predictions of individual changes and not the actual fit of the model to reality. Results of these models should indicate whether CCC's rate of change is more predictable in innovative or traditional companies. Table 7 provides detailed statistics of model variables explaining the variability of the sample of liquidity for technology companies.

Table 5. Descriptive statistics for a group of innovative companies.

	N	Mean	Standard deviation
(CCC(t)-CCC(t-1))/CCC(t-1)	462	0,407	11,750
ROE(t)-ROE(t-1)	462	-0,043	0,280
CA/TA (t) - CA/TA (t-1)	462	-0,018	0,118
CL/TL (t) – CL/TL (t-1)	462	-0,010	0,158
GDP grow rate	462	0,042	0,017
I rate	462	0,031	0,024

Source: Authors' work

Estimated model parameters explaining the CCC are shown in Table 6.

Table 6. Results of the regression model for a group of innovative companies.

R	R-square	Adjusted R-square	Standard estimation error
0,102	0,010	-0,001	11,75

Source: Authors' work.

R-squared statistics calculated at the level of 0.006 indicates that the model very poorly explains the variation of the CCC. Detailed statistics of coefficients are shown in Table 7.

Table 7. Statistics of the regression model for a group of innovative companies

Model	non-standardized coefficients		T	p-value
	B	Standard error		
Const.	2,96	1,64	0,32	0,07
I rate	-20,56	23,29	-0,88	0,38
GDP grow rate	-42,20	31,86	-1,32	0,19
CA/TA (t) - CA/TA (t-1)	4,32	4,63	0,93	0,35
ROE(t)-ROE(t-1)	2,08	2,03	1,02	0,31
CL/TL (t) – CL/TL (t-1)	-2,66	3,57	-0,74	0,46

Source: Authors' work.

Based on the results presented in table 7, it should be noted that none of the variables used in this model does have any significant impact on the change of CCC.

Table 8 provides detailed statistics of the model variables explaining the variability of liquidity for traditional companies.

Table 8. Descriptive statistics for the traditional group of companies

	N	Mean	Standard deviation
(CCC(t)-CCC(t-1))/CCC(t-1)	1275	-0,118	18,933
ROE(t)-ROE(t-1)	1275	-0,029	2,553
CA/TA (t) - CA/TA (t-1)	1275	-0,005	0,101
CL/TL (t) – CL/TL (t-1)	1275	-0,003	0,177
GDP grow rate	1275	0,041	0,017
I rate	1275	0,037	0,029

Source: Authors' work.

Based on data above, a model explaining the variability of CCC has been created. Table 9 presents a summary of the analysis.

Table 9. Results of the regression model for the traditional group of companies

R	R-square	Adjusted R-square	Standard estimation error
0,075	0,006	0,002	18,92

Source Authors' work

R statistics of presented model is at a slightly higher level than in the case of innovative companies. Nether less the model is very poor likewise in the case of innovative companies. Table 10 shows the detailed statistics of the coefficients of the model.

Table 10. Statistics for the regression model for the traditional group of companies

Model	non-standardized coefficients		T	p-value
	B	Standard error		
Const.	0,43	1,52	0,28	0,78
Inflation rate	18,14	18,33	0,99	0,32
GDP grow rate	-29,71	30,82	-0,96	0,34
CA/TA (t) - CA/TA (t-1)	0,06	5,30	0,01	0,99
ROE(t)-ROE(t-1)	0,48	0,21	2,32	0,02
CL/TL (t) – CL/TL (t-1)	-1,45	3,01	-0,48	0,63

Source: Authors' work.

The results presented in the above table show, that two of the explanatory variables used in the volatility of CCC have relatively significant levels (inflation and the rate of current liabilities / liabilities - at a significance level above 93%). It is worth noting, that this model has much better parameters, than the one made for innovative companies.

Based on the results, we can conclude, that model based on exogenous variables may predict the CCC for traditional companies more efficiently than for innovative companies. This means, that the third hypothesis connected to prediction of the CCC of innovative companies has not been confirmed.

Conclusion

The results of this paper cannot confirm the hypothesis that CCC is the best liquidity ratio for forecasting. For both – traditional and innovative sectors the volatility of this ratio was not the lowest, as we could expect. Unexpectedly cash flow from operations appeared to be characterized by lower volatility, and the ratio was lower for innovative than traditional sector. CCC is not the best indicator for forecasting, as well when we consider the average absolute values of the rate of changes in individual liquidity measures. Moreover , the rate of change of cash and cash flow from operations, in relation to total assets, differs in innovative and traditional companies groups. The traditional companies are characterized by greater average rate of change of CFFO/TA level than the innovative companies. This suggests that the innovative companies are less sensitive to external fluctuations than traditional companies. It should also be noted, that innovative companies are subject to greater volatility in the general level of cash as a result of continuous investing funds in new projects .

It is worth to mention that overall innovative companies are characterized by smaller coefficient of variation of rate of change of CCC. It may suggest that it is easier to predict CCC for innovative companies. Furthermore, CCC as expected, varies less than static liquidity measures in innovative companies. In case of traditional companies, the unique and vital role of CCC, isn't so visible. The level of coefficient of variation of CCC's rate of change is higher than in case of static liquidity measures. Also, as authors expected, rates of changes of all liquidity measures differ in a significant way in innovative and traditional sectors of economy. It is worth to mention that in case of CCC the absolute value of the rate of change is higher for innovative companies. It may suggest that, despite the results of research on the coefficient of variation, innovative companies are characterised by higher rate of changes of CCC than the traditional ones. The verification of the third hypothesis is not conclusive. Linear regression

models, predicting the CCCs rate of change are far from ideal. Although the results may suggest that CCCs rate of change may be more predictable for traditional companies. This results converge with the results of equality of means test.

Liquidity management is composed of many techniques and complex financial knowledge. This paper supports the forecasting problem that may appear in the strategic planning. The difference between innovative based and traditional companies should be taken into account when managing the liquidity of a company.

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