RELATIONSHIP BETWEEN PERFORMANCE AND LIQUIDITY ON AN EXAMPLE OF SELECTED INDUSTRIES IN SLOVAKIA

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Abstract

Performance and liquidity are the two areas, on which financial analysts most focus. The article dealt with the explanation of potential relationships between performance and liquidity measures and conclusions derived from these relationships. After theoretical analysis computations were performed for two industries – ISIC 28 - Manufacture of fabricated metal products, except machinery and equipment and ISIC 31 - Manufacture of electrical machinery and apparats. The results of these computations in most cases confirm the hypotheses suggested by the theory.

Key words: *Financial analysis of enterprise, performace of enterprise, performance measures, liquidity, liquidity measures, relationships among performance measures, relationship between performance and liquidity measures*

ფინანსური მაჩვენებლებისა და ლიკვიდურობის ურთიერთკავშირი სლოვაკეთის სამრეწველო ფირმების მაგალითზე

ანოტაცია

ფინანსური მაჩვენებელი და ლიკვიდურობა ის ორი ტერმინია, რომლებზეც ფინანსური ანალიტიკოსები ყველაზე მეტად ამახვილებენ ყურადღებას. ნაშრომში გაანალიზებულია ფინანსურ მაჩვენებლებსა და ლიკვიდურობას შორის შესაძლო ურთიერთკავშირი და აღნიშნულის საფუძველზე გამოტანილია დასკვნები. სტატიაში თეორიული ასპექტების განხილვის შედეგად წამოჭრილია ჰიპოთეზები, რომელთა განმტკიცებაც შეეცადეთ 2 სლოვაკურ კომპანიაზე — ISIC 28 — ლითონის პროდუქციის მწარმოებელ (გარდა მანქანებისა და დანადგარებისა) და ISIC 31 — ელექტრომოწყობილობებისა და აპარატურის მწარმოებელ კომპანიებზე კონკრეტული გაანგარიშებების ჩატარებით.

საკვანძო სიტყვები: *ფინანსური ანალიზი, ფირმათა ფინანსური მაჩვენებელი, ლიკვიდურობა, კავშირი ფინანსურ მაჩვენებლებსა და ლიკვიდურობას შორის, ფინანსური მაჩვენ-*

ებლების სეფასების მექანიზმები, ლიკვიდურობის შეფასების მექანიზმები, კავშირი ფინანსური მაჩვენებლებისა და ლიკვიდურობის შეფასების მექანიზმებს შორის

1 Introduction

Every time the financial analysis of the enterprise is done, the major orientation is on the performance of that particular enterprise. The performance of the enterprise is the tool to redistribute gains toward different groups of stakeholders – shareholders, creditors, employees, municipality, local and central government. That is why interested groups of stakeholders pay attention to the performance of enterprise. Also financial managers and analysts focus is on the performance while performing the financial analysis of the enterprise.

The enterprise performance is not the only category on which financial analysis concentrate. Very important to know is how sustainable the performance is, if good performance is only resulting from particular external factors which might change in the future or good performance is a proof of well-managed enterprise and might not change, move over improve in the future? Answering those questions effect how to implement necessary changes in order to adjust future performance of the enterprise.

One of the main conditions that must be fulfilled to ensure sustainable performance is the ability of an enterprise to pay all debts in time. This condition is known as solvency in a long-term period or as liquidity in a short-term period. If an enterprise does not fulfil this requirement, it results in a situation that shareholders and mainly creditors consider their investments as more risky and requires higher interest rates on their loans (creditors) or higher returns on their shares (shareholders). If such situation not solved, it might lead to bankruptcy. That is why ensuring a sustainable and good performance it is not only important to reach high returns, but also to manage the enterprise's debts. Move over, liquidity is also very important part of financial analysis.

The aim of the article is to determine theoretical fundaments of performance and liquidity measures and adjust relations between them in two selected industries – manufacturing of fabricated metal products and manufacturing of electrical machinery and apparats in year 2013 using statistical methods.

Firstly we focus on traditional performance measures and liquidity ratios. Secondly we explain relation between performance and liquidity of enterprises from above mentioned groups determined by statistical characteristics.

2 Performance and liquidity measures

2.1 Performance measures

The purpose of performance measures is to show how effectively an enterprise uses the production factors in order to generate the output. We can differentiate many performance measures based on the way how returns and invested capital are calculated. These measures can be divided into the following groups:

a) based on the way how returns are calculated:

– performance measures based on profit (earnings calculated based on profit),

– performance measures based on cash-flow (earnings calculated based on cash-flow);

b) based on what is considered as invested capital:

– return on assets (all assets are considered as invested capital),

– return on equity (just the owners' share in the invested capital is taken into account),

– return on debt (just the creditors' share in the invested capital is taken into account),

– return on cost (just the value of production factors directly used in the production cycle is taken into account).

The above classification shows that there is a possibility to define many performance measures to analyse the performance of the enterprise. The selection of measures depends on the purpose of analysis. Mostly the following traditional performance measures are used in analyses: two performance measures based on profit (ROE, ROA) and two cash flow performance measures (CFROE, CFROA).

ROE *(Return on Equity)* shows how big profit after taxation was generated by equity capital after interest and taxes are deducted. This profit is only distributed among shareholders, so the profit used for the calculation should not include the interest paid to the creditors.

$$ROE = \frac{EAT}{Owner's\ \ equity} \qquad (1)$$

Where:

EAT - earnings after interest and taxes deducted

ROA *(Return on Assets)* shows how big profit including interest before taxation was generated by company's assets. This profit is distributed among creditors and shareholders and the income taxes are paid. Different profit categories can be used instead of ROA (e.g. profit including

interest after taxation, profit without interest after taxation etc.) to calculate this ratio. While the decision whether to use the profit before taxation or profit after taxation depends on the purpose of the analysis, the profit should include the interest as this measure works with the value of total assets which are financed both by shareholders as well as creditors.

$$ROA = \frac{EBIT}{Total\ \ assets} \qquad (2)$$

Where:

EBIT - earnings before interest and taxes deducted

CFROE (*financial return on equity)* and CFROA *(financial return on assets)* are similar to ROE and ROA. However, the main and very important difference between them is that financial returns calculated are based on the cash flow while ROE and ROA are calculated using profit. Regarding the recommended values of performance measures they depend on the situation in industry in which enterprise operates. It is the cash flow generated by profitability in conjunction with other cash events that enable a company to fund its operations.

Using these performance ratios, the analyst can specifically monitor the production of cash flows from operating activities scaled to equity (formula 3) and assets (formula 4) free of the potential accrual accounting distortions in traditional profitability ratios.

$$CFROE = \frac{Cash\ \ flow}{Total\ \ \ assets} \qquad (3)$$

CFROE represents equity measure of firm's performance. The measure can be adjusted to include only contributed capital if desired. An investor is interested in a true return on equity, not an ambiguous return created via accrual accounting techniques. A firm with an above (below) market average over time provides a clear measure of return to the stockholders. Moreover, this measure may provide a signal to existing and prospective investors as to the future return on equity.

$$CFROA = \frac{Cash\ \ flow\ \ including\ \ interest\ \ and\ \ taxes}{Total\ \ \ assets} \qquad (4)$$

CFROA represents the utilization of assets to create cash flows from operating activities. This ratio directly measures the cash flows from operating activities generated from the firm's assets base, which is a true indicator of performance.

2.2 Liquidity measures, relationships among liquidity measures

Liquidity is measured by cash flow and timeliness of assets conversion. As stated at the beginning of this article liquidity is capability of enterprise to pay all its debts in time. There are several measures to calculate this capability, for example:

$$Cash\ \ radio = \frac{Cash\ \ and\ \ cash\ \ equivalents}{Current\ \ liabilities} \qquad (5)$$

$$Quick\ \ radio = \frac{Cash\ \ and\ \ cash\ \ equivalents + Current\ \ receivables}{Current\ \ liabilities} \qquad (6)$$

$$Current\ \ radio = \frac{Cash\ \ and\ \ cash\ \ equivalents + Current\ \ receivables + Inventory}{Current\ \ liabilities} \qquad (7)$$

$$Liquidity\ \ index = \frac{CCE + CR * (1 - CP) + INV * (1 - CP - IP)}{Current\ \ liabilities * (1 - Settlement\ \ period)} \qquad (8)$$

Where:

CCE – Cash and cash equivalents

CR – Current receivables

CP – Collection period

INV – Inventory

IP – Inventory turnover period

Current liabilities = short-term liabilities

Cash ratio, quick ratio and current ratio differ only in the concept of liquid assets. Cash ratio only works with the most liquid assets, quick ratio also takes into account current receivables (short-term receivables) and current ratio considers cash and its equivalents, current receivables and inventory as liquid assets. The decision on using any of these measures depends mainly on the time frame in which liquidity in measured. If an analyst is interested in very near-term liquid-

ity, cash ratio can be used. However, if long-term liquidity is to be considered, current ratio is the most suitable measure. The recommended values for current ratio, which is most frequently used, are between 1.5 and 2.5.

Regarding cash ratio, quick ratio and current ratio the situation is clear and can be expressed by the inequality: Cash ratio > Quick ratio > Current ratio. Significant deltas between these ratios stand for higher value of current receivables or higher value of inventory and these assets are less liquid than cash and cash equivalents. As for index of liquidity the comparison with other liquidity measures is more complicated.

On the other hand liquidity index represents a more complex liquidity measure. It is similar to current ratio but both liquid assets and current liabilities are weighted by their turnover periods. The longer these periods are the lower values are taken into liquidity index. However, it also can be misleading. Very high values of this ratio can be reached when the settlement period is long. Liquidity index can have negative value in a situation when the settlement period of current liabilities exceeds the accounting period. This generally means that current liabilities are in most cases settled only after the maturity date and such value indicates significant liquidity problems. Therefore, other factors of which the most important is the settlement period have to be considered in the interpretation of the value of the ratio as well.

3 Sample selection and research design on selected industries

3.1 Sample selection

The comparison of performance and liquidity ratios was performed for data from the year 2013 in 2 industries: ISIC 28 – Manufacture of fabricated metal products, except machinery and equipment and ISIC 31 - Manufacture of electrical machinery and apparats. The following measures were calculated and compared:

Performance:	***Liquidity:***
ROE –return on equity	CASH – Cash ratio
ROA –return on assets	QUIK – Quick ratio
CFROE – cash flow ROE	CURR – Current ratio
CFROA – cash flow ROA	LIQIN – Liquidity index

For each industry a sample of companies was selected from those available in the INFIN. For ISIC 28 the sample consisted of 82 companies and for ISIC 31 the sample consisted of 35 companies. For each sample the above mentioned measures were calculated. Subsequently the correlation matrix was calculated for each industry and several charts showing the mutual relationship between selected ratios were created.

The question of the relationship between performance and liquidity ratios is also important as performance and liquidity are the key areas to be analysed. The focus is not only on the relationship between performance and liquidity measures but also on the relationship between different performance ratios or different liquidity ratios. Further possible relationships between several selected ratios will be described.

3.2 Relationships of performance and liquidity measures

3.2.1 Relationship among performance measures

ROA measures the return that both shareholders and creditors have while ROE measures only the return of shareholders. The risk borne by shareholders is higher than the risk borne by creditors as in case of bankruptcy of enterprise any payments to the shareholders are made only after all liabilities have been settled. Therefore the returns required by the shareholders are higher than the returns required by the creditors. Thus ideally ROE should exceed ROA. However, it also should be considered that any interest paid to the creditors is deducted from the profit which can be distributed to the shareholders. Therefore if enterprise does not perform well or is in loss, ROA might be higher than ROE. In case when enterprise is in loss ROE is negative, while ROA might be positive. It depends on the values of EBIT and EAT. It also should be considered that high value of ROE might arise from small value of equity and if equity is negative, ROE calculation has no sense.

Relationship of ROA and ROE on selected industries

This relationship for ISIC 28 of 82 companies and for ISIC 31 of 35 companies is illustrated by the charts 1 and chats 2.

Chart1 - Relationship of ROE and ROA - ISIC 28

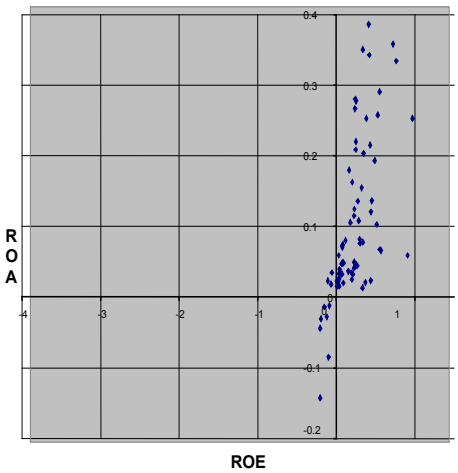
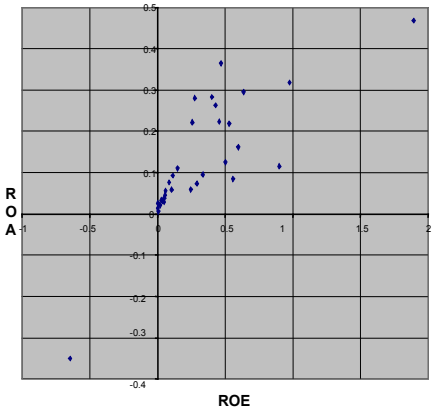


Chart 2 - Relationship of ROE and ROA - ISIC



From the charts we can conclude the following similarities of these industries:

– the required relation ROA > ROE is valid for the big majority of companies;

– ROA and ROE are positively correlated;

– the majority of companies has ROE in the interval <0; 0.5> and ROA in the interval <0;0.15>;

– the variance among the possible ROE values is much higher for the companies with the higher ROA values than for the companies with the lower values of ROA.

3.2.2 Relationships of performance and liquidity measures

In ideal environment the enterprise should have very good performance and very good liquidity. The problem is that these two goals are usually in conflict. Cash and cash equivalents are the most liquid assets but they have no production capability. Therefore an enterprise which all assets are held only in cash and cash equivalents would have perfect liquidity ratios but very low performance. If the enterprise is focused just on the performance and do not pay much attention to liquidity, the most probably would not be able to settle the liabilities on time. Creditors would then require higher interest rates as a compensation for borne higher risk. Higher interest paid to creditors in this case result in decreasing profit or even loss for shareholders. From above mentioned we can sum up that enterprise should have sufficient performance and liquidity measures and maximization of any of these two categories of measures apart from the other category will lead to problems.

Relationship of ROE and current ratio in selected industries

The relationship of ROE and current ratio for ISIC 28 of 82 companies and for ISIC 31 of 35 companies is shown in the chart 3 and chart 4.

Chart 3 - Relationship of ROE and Current ratio - ISIC 28

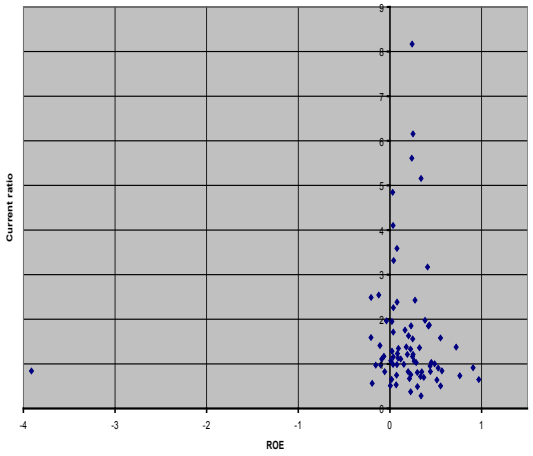
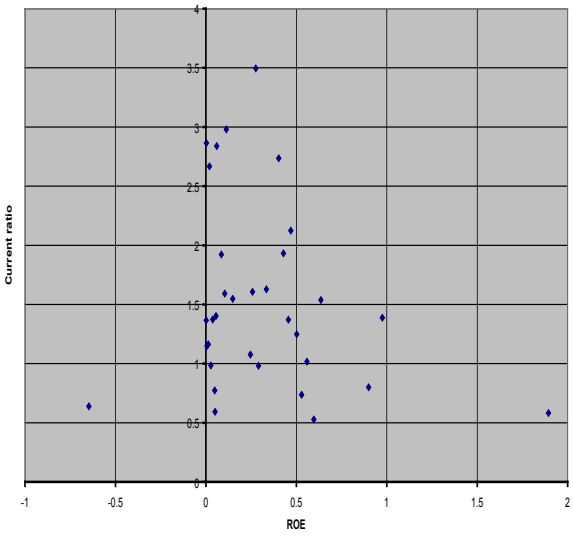


Chart 4 - Relationship of ROE and Current ratio - ISIC 31



In both industries in general we can see a very little or negative correlation between current ratio and ROE. ***This is in accordance with the hypothesis stated above that companies with high liquidity measures usually have lower performance measures***. It seems that we could describe the relationship of these two groups of measures by a hyperbolic function in both industries (not taking into account very few extreme situations).

Relationship of ROA and current ratio in selected industries

The charts 5 and 6 show the relationship of ROA and current ratio. The correlation between these measures is slightly positive in both industries. While in ISIC 28 we can identify a cluster

of companies with ROA between 0 and 0.1 and current ratio between 0.5 and 1.5, no such cluster exists in ISIC 31. Although the correlation is slightly positive in both industries, many other different factors have impact on the values of both measures.

Chart 5 - Relationship of ROA and Current ratio - ISIC 28

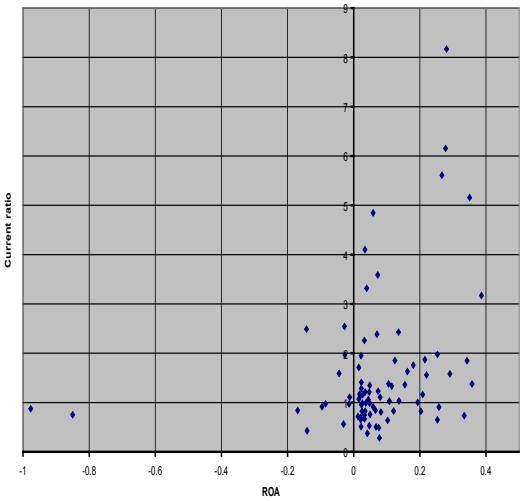
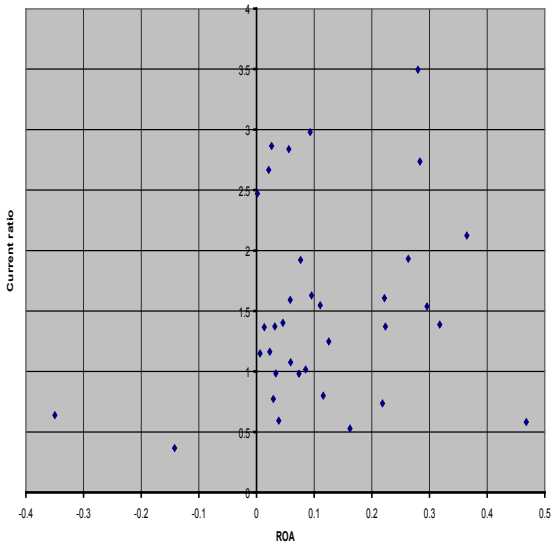


Chart 6 - Relationship of ROA and Current ratio - ISIC 31



Correlation matrices

The correlation matrices for both industries are shown in the table 1 and table 2.

Table 1: Correlation matrix for ISIC 28

	ROE	ROA	CASH	QUIK	CURR	LIQIN	CFROE	CFROA
ROE	1.00	0.53	0.07	0.02	0.01	0.12	0.49	0.41
ROA	0.53	1.00	0.30	0.30	0.29	0.34	0.09	0.59
CASH	0.07	0.30	1.00	0.93	0.82	0.88	-0.01	0.21
QUIK	0.02	0.30	0.93	1.00	0.94	0.94	-0.10	0.17
CURR	0.01	0.29	0.82	0.94	1.00	0.96	-0.12	0.18
LIQIN	0.12	0.34	0.88	0.94	0.96	1.00	-0.04	0.21
CFROE	0.49	0.09	-0.01	-0.10	-0.12	-0.04	1.00	0.57
CFROA	0.41	0.59	0.21	0.17	0.18	0.21	0.57	1.00

Table 2: Correlation matrix for ISIC 31

	ROE	ROA	CASH	QUIK	CURR	LIQIN	CFROE	CFROA
ROE	1.00	0.82	-0.19	-0.16	-0.20	-0.03	0.24	0.11
ROA	0.82	1.00	0.13	0.26	0.21	0.36	0.08	0.19
CASH	-0.19	0.13	1.00	0.70	0.64	0.59	-0.03	0.13
QUIK	-0.16	0.26	0.70	1.00	0.90	0.86	-0.17	0.00
CURR	-0.20	0.21	0.64	0.90	1.00	0.84	-0.27	-0.14
LIQIN	-0.03	0.36	0.59	0.86	0.84	1.00	-0.14	0.06
CFROE	0.24	0.08	-0.03	-0.17	-0.27	-0.14	1.00	0.70
CFROA	0.11	0.19	0.13	0.00	-0.14	0.06	0.70	1.00

ROA and ROE are positively correlated in both industries but the correlation is stronger in ISIC 31. All four liquidity measures are positively correlated and the correlation is much stronger, even providing the reason for linear relationship in ISIC 28. ROE is positively correlated with financial return on equity (FROE) and ROA is positively correlated with financial return on assets (FROA). This correlation is stronger in ISIC 28. On the other hand, the correlations between ROA and financial return on equity and ROE and financial return on assets are minimal, except the correlation between ROE and financial return on assets in ISIC 28. ROE is negatively correlated with liquidity measures in ISIC 31 while in ISIC 28 this correlation is not significant. ROA is positively correlated with all liquidity measures in both industries although this correlation is not strong. Very low negative correlation or almost no correlation appears between financial return on equity and all liquidity measures. The correlation between financial return on assets and liquidity ratios is positive but low in ISIC 28 and almost no correlation appears in ISIC 31.

4 Conclusion

ROA measures the return that both shareholders and creditors have while ROE measures only the return of shareholders. The risk borne by shareholders is higher than the risk borne by creditors as in case of bankruptcy of enterprise any payments to the shareholders are made only after all liabilities have been settled. Therefore the returns required by the shareholders are higher than the returns required by the creditors. Thus, in ideal conditions ROE should exceed ROA. However, it also must be taken into consideration that any interest paid to the creditors is deducted from the profit which can be distributed to the shareholders. Therefore, if enterprise does not perform well or is in loss, ROA might be higher than ROE. In case the enterprise is in loss ROE is negative while ROA might be positive. It depends on the values of EBIT and EAT. It also must be taken into consideration that high value of ROE might arise from small value of equity and if equity is negative, ROE calculation has no sense.

In ideal conditions, the enterprise should have very good performance and very good liquidity. The problem is that these two goals are in conflict. Cash and cash equivalents are the most liquid assets but they have no production capability. Therefore, the enterprise which all assets are only held in cash and cash equivalents would have desirable values of liquidity measures but very low performance. If the enterprise focus was on the performance only and not on liquidity as well, it would not be able to settle the liabilities on time. Creditors would then require higher interest rates as a compensation for bearing higher risk. Higher interest paid to creditors would result in decreasing profit or even in loss for shareholders. From this we can abstract that enterprise should have sufficient performance and liquidity measures and maximization of any of these two categories of measures apart from the other category leads to problems.

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