THE RELATIONSHIP BETWEEN LIQUIDITY AND PROFITABILITY: AN EMPIRICAL STUDY FOR THE CASE OF ALKALOID

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ABSTRACT

The relationship between liquidity and profitability is one of the most popular topics of research in the financial management field but still not exhaustively examined and documented for the industries in the Republic of North Macedonia. Taking into account the importance of the pharmaceutical industry for every country's well-being, the purpose of this paper is to examine the relationship between liquidity and profitability in the pharmaceutical sector in the Republic of North Macedonia. This paper analyzes the biggest and the most influential pharmaceutical producer and seller in the RNM, listed on the Macedonian Stock Exchange. For its purpose, this empirical research has used secondary annual financial data over the period 2010 – 2019. Current ratio (CR), quick ratio (QR) and cash ratio (CAR) were used to measure the liquidity position while return on assets (ROA) and return on equity (ROE) were used to measure the company's profitability. The statistical tests performed, primarily involved were descriptive statistics, correlation and regression analysis. The findings suggest that there is negative relationship between profitability and liquidity determinants of the biggest North Macedonian pharmaceutical firm. This study contributes to the existing literature in this field and represents one of the pioneer attempts in the case of RNM.

KEYWORDS

current ratio, quick ratio, cash ratio, return on assets, return on equity, pharmaceutical firms

JEL CLASSIFICATION CODES

G30 M20

1. INTRODUCTION

In the corporate finance literature, profitability and liquidity are terms which represent one of the most prominent issues as they are major indicators of the firm's financial performance. An ultimate goal for any firm is to maximize profitability while being optimally liquid. Too much attention on profitability may lead the firm into bankruptcy by underestimating the liquidity needs. On the other hand, holding too much liquid assets in order to overcome possible liquidity problems may harm the profit level (Niresh, 2012). Manager's expertise plays crucial role in determining the optimal level of liquidity and profitability for enabling the best possible scenario for the firm. Their main concern is a set of financial metrics which explains the relationship between profitability and liquidity. Maintaining a profit level which would be supported at the same time by long-term interest and high liquidity is even harder in a volatile and complex industry. In the case of pharmaceutical companies which operate in an environment with stiff competition and strict regulations the accomplishment of the above mention goal is even a

bigger challenge. Globally many authors have analyzed the financial performance of the pharmaceutical sector but the financial performance of this industry in the Republic of North Macedonia is still not well known and that allows for further research.

This paper aims to study the relationship between liquidity and profitability variables, its significance and direction. The research is based on the annual audited financial statements of the biggest pharmaceutical company listed on Macedonian Stock Exchange (MSE), Alkaloid AD Skopje. The period subject to review in this study includes ten years, from 2010-2019. The statistical analysis is performed using current ratio (CR), quick ratio (QR) and cash ratio (CAR) as independent liquidity measures while return on assets (ROA) and return on equity (ROE) were used to measure profitability as a dependent variable. Although the pharmaceutical sector in North Macedonia is not so developed compared to other countries, this study contributes to the existing literature in different ways since this study is one of the first to measure the profitability and liquidity ratio within the sector since it represents continuation of a broader research for the whole pharmaceutical industry (Hristova, Srbinovska, Mileva & Zafirova, 2019). The remainder of this paper includes a literature review on liquidity and profitability and the existence of an association between the variables chosen, the research hypotheses, research methodology and research design, research statistics and results, followed by concluding remarks.

2. LITERATURE REVIEW

2.1 Theoretical literature

2.1.1 Profitability

The profit is the end result of how effectively are used all available resources. The profitability can be explained as the capability of making profit out of all the business activities which are undertaken by an organization, firm or an enterprise (Njure, 2014). Although, very different in their meaning, the terms “profitability” and “profit” very often, are used as synonyms. The profit is the amount of income generated after covering all incurred costs no matter of the type of the firm, its size or the industry where it operates, while profitability is a measure of the efficiency of the firm within the specific industry. The biggest difference between the terms “profitability” and “profit”, and the reason why both cannot be used interchangeably in every given situation, is the fact that although a firm makes profit at the yearend it does not mean that it is a profitable firm. Two firms which operate in a same or similar industry and have same amount of profit may vary in terms of profitability. In this sense, Kim, Mauer and Sherman (1998) said “Profit in two separate business entities may be identical, yet, many a times, it usually happens that their profitability varies when measured in terms of size of investment.” In this paper, we are mainly concerned about the firm’s profitability, and the term profitability will be used very intensively while the profit will be used as an explanatory term in a sense that a profitable firm makes a profit not vice versa.

2.1.2 Liquidity

In the financial literature both liquidity and profitability represent very complex phenomenon and there is a set of various definitions which are describing the terms, according to the context in which they are used or the perspective from which they are seen. Firm’s managers see the liquidity as the ease of converting the assets into cash since the assets which are hard to be sold become very expensive since they are sold with a loss incurring additional unexpected costs for the firm (Foucault, Pagano and Roell, 2013). Similarly, Damodaran (2005), describes the liquidity as an antonym of the illiquidity of an asset from a perspective of an investor, “When you buy a stock, bond, real asset or a business, you sometimes face buyer's remorse, where you want to reverse your decision and sell what you just bought. The cost of illiquidity is the cost of this remorse”. For the purpose of the paper we will use much simpler definition of

liquidity: "A firm is liquid when it can pay bills on time without undue cost", or defined in other words: "A firm is considered liquid when its assets exceed its liabilities" Maness and Zietlow (2005).

2.1.3 Financial ratios

Financial analysis is one of the best tools for the assessment of the firm's performance. The performance evaluation of a firm is mainly related to how well the firm can invest the capital and use its assets and revenues in the process of covering the expenses and paying off the liabilities (Hossan and Habib, 2010). The evaluation is generally done by analyzing items of the financial statements (mainly between balance sheets and income statements). The analysis of the financial statements can be best done by different numerical and percentage ratios.

In the article by Thachappilly (2009) all the ratios are divided in few categories such as profitability ratios, liquidity ratios, debt ratios, performance ratios and evaluation ratios.

For the purpose of this research the main focus will be put on the profitability and liquidity ratios which are applicable for the firms in the pharmaceutical sector.

2.2 Empirical literature

2.2.1 Relationship between profitability and liquidity

The influence and the importance of both liquidity and profitability as independent factors cannot be denied but the relationship between these two factors is still a very debatable subject and no theoretical consensus has been reached yet (Umobong, 2015). Indeed, it is questionable whether there is a relationship between the liquidity and the profitability of a firm at all, and if there is a relationship is it positive or negative?!

According to Chandra (2001), high level of liquidity is a sign of firm's financial strength but according to Neto (2003) high level of liquidity can be as undesirable as a low level.

The economic theory, on the other hand, implies that the risk and the profit are strongly positively related. It means that riskier investments require higher return and vice versa, investments which bear little or no risk are less profitable. In our case it means that higher the liquidity the lower the risk for the company and lower the profit would be.

The controversy around the relationship between firm's liquidity and profitability is yet not settled, therefore many theoretical and empirical studies from all around the world were conducted.

Eljelly (2004), tested the relationship between liquidity and profitability over a sample of joint stock companies operating in Saudi Arabia. He used the current ratio and the cash gap as liquidity determinants. The conclusion was that there is a negative relationship between profitability and liquidity for the sampled firms in Saudi Arabia.

Shin and Soene (1998), were one of the first who relate the management of working capital with the firm's profitability. They took a large sample of American firms listed on the US Stock Exchange and analyzed whether there is a relationship between the cash conversion cycle and the profitability for the chosen firms in the sample. The study resulted in concluding a very strong negative relation between the cash cycle and the profitability.

Rehman (2015) have chosen a different set of firms, Bloomberg's 72 listed firms and checked for possible relation between the way of managing the working capital and the firm's profitability. Multiple regression analysis performed on a given set of ratios, measuring the efficiency in managing the working capital, showed negative relationship between firm's performance and the management of working capital.

Deloof (2003), has done one of the first studies regarding the abovementioned relationship for the European market. He formed a sample of 1,637 Belgian Firms. The conclusion which was reached was

very similar, he found a negative relation between the cash conversion cycle and the profitability represented by the ROA and ROS.

Theoretical and empirical consensus around the relation between the profitability and the liquidity is still not reached almost all studies which analyzed this relationship had a same conclusion of existence of negative relation between the profitability and the liquidity. As it can be seen from all studies cited above, the relation is analyzed for firms which operate in different types of industries but there was not such study which relates to the discussed topic but for the pharmaceutical sector. This deficiency leaves space for further analysis of the relationship between the liquidity and the profitability in the firms which operate in the pharmaceutical sector in the Republic of North Macedonia. The analysis for North Macedonia has started with the empirical study of the relationship between the profitability and liquidity for the pharmaceutical sector (Hristova, Srbinoska, Mileva, & Zafirova, 2019), now continued and improved in this paper.

3. RESEARCH METHODOLOGY

3.1 Research problem

The study of profits is very important because it provides information about the health of the firm, the health of the sector in which the firm operates and about the health of the economy as a whole in a given year. Changes in profitability determine the existence and the growth of a firm. A profitable firm contributes to the economic development of a country by offering excess employment and additional tax return to the governmental budget.

On the other hand, we know about lot of examples of corporate failures caused by liquidity problems. If the firm which is faced with a liquidity problem is big and influential for the economy and it goes bankrupt it will cause a financial distress for the other firms in that particular country or sector. Even if the firm is not so influential, its failure will compromise supplier relations and the consistency in the supplies for that sector. If this happens in sector where the stable supply of product is of crucial importance, the consequences may be even worse. One sector of such kind is the pharmaceutical sector where a failure of a big firm supplier of medicines may lead to a deficit of very important medicines which cannot be substituted immediately by the competition. Based on the above-mentioned facts, it is worth investigating the effect of liquidity on profitability of the firms in the pharmaceutical sector with a special attention to the biggest supplier in the pharmaceutical sector in the Republic of North Macedonia.

3.2 Hypothesis

For the purpose of analyzing the research problem one general research question is raised so far:

1) Does a relationship between liquidity and profitability exist and whether it is significantly negative, taking into consideration the biggest supplier in the pharmaceutical sector in the Republic of North Macedonia?

In order to try to answer the above stated question and based on the reviewed literature, we build the hypothesis that will be tested in this research:

HYPOTHESIS:

- There is a negative and significant relationship between liquidity and profitability determinants of the biggest supplier in the pharmaceutical sector in the Republic of North Macedonia.

3.3 The data

In order to do the statistical analysis, we gathered secondary data of the biggest pharmaceutical company in North Macedonia, listed on Macedonian Stock Exchange (MSE), Alkaloid AD Skopje. The data were primarily collected from the audited and consolidated annual report for the period 2010-2019.

The main reason why we decided to narrow down the research and cover only one firm in the given industry, listed on the MSE stock exchange, is because that firm is the biggest one, the most influential, has the biggest market share and exports its products abroad.

After the collecting stage, we conducted a statistical analysis by using SPSS statistical software package. The purpose of the statistical analysis is to test whether the profitability of a firm measured by ROA (return on assets) and ROE (return on equity) relates to company liquidity strategies whereby its efficiency was measured with the use of three liquidity measures: CR (current ratio), QR (quick ratio) and CAR (cash ratio). The statistical tools that were used in this research are Descriptive Statistics, Pearson correlation (Shapiro-Wilk test of normality) and regression analysis.

3.4 The model

For this study, we define two linear regression models in order to test the effect of independent variables measuring liquidity on the dependent variables measuring company's profitability.

$$ROA_t = \alpha + \beta(Xt) + \varepsilon t \quad (1)$$

$$ROE_t = \alpha + \beta(Xt) + \varepsilon t \quad (2)$$

where ROA and ROE represent two dependent variables, determinants of the profitability, α represents unobserved, invariant, fixed company factor i; X represents a vector of the liquidity determinants, as independent variables employed by the company in period *t*; ε is the error term; β is the parameter to be estimated; t is the year.

4. DATA ANALYSIS AND RESULTS

This part summarizes all results regarding the profitability and the liquidity position of Alkaloid.

At first the descriptive analysis is conducted. Then we proceed with the correlation and linear regression analyses to examine the relationship between liquidity and profitability and to draw conclusions.

Table 1. Mean, Standard deviation, minimum and maximum scores, for ROA (return on assets), ROE (return on equity), current ratio, quick ratio and cash ratio.

	VALID N	MEAN	MINIMUM	MAXIMUM	STD. DEV
ROA	10	6,872%	6,291%	7,468%	0,388%
ROE	10	8,683%	7,955%	9,851%	0,61%
CURRENT RATIO	10	2,565	2,144	2,789	0,186
QUICK RATIO	10	1,461	1,0361	1,793	0,202
CASH RATIO	10	0,158	0,1001	0,271	0,064

Source: Author's calculations

From the results obtained in Table 1 it can be noted that the arithmetic mean (M), or the average ROA value is 6,9% with a minimum score of 6,3% and the maximum score for ROA 7,5%. For North Macedonia an industry average for these 10 years is not publicly available to be compared with.

Average ROE value is 8,7%, minimum score is 8% and maximum score is 9,9%. For North Macedonia an industry average for these 10 years is not publicly available to be compared with.

Liquidity is comprised of three subscales The first one is distinguished by a score of the arithmetic mean of M = 2,6. A current ratio above 1 means that the company is well positioned to cover its current liabilities although a ratio of 2:1 is widely accepted as a good indicator. Alkaloid has a high CR

and with an average value of 2,6 Alkaloid is able to pay off its liabilities using its short-term assets (i.e. cash, marketable securities accounts receivables, inventories).
The arithmetic mean of the second subscale (QR) is 1,5 with a maximum score of 1.8 and a minimum score of 1. Positive quick ratios show that the entities are able to repay the upcoming short-term liabilities only with the most liquid assets which are readily convertible into cash without a cost by having a ratio higher then 1:1.

Average CAR value is 0,158. Minimum score is 0,1 and maximum score is 0,27. As for the CAR ratio, an acceptable value is a ratio of at least 1:1, although CAR value lower than 1 is not necessarily alarming. The CAR ratio is a better indicator when analyzed for the whole industry. The difference between CAR and quick ratio is that CAR is taking into consideration only cash and cash equivalents ignoring receivables and inventories. Having a current and quick ratio above 1 means that Alkaloid will settle its current liabilities without any trouble by using more of the current assets and not just cash.

The following part of the research results examines the relationship between liquidity and probability in order to assess whether liquidity influences profitability, in which way, and to what extent using correlation coefficients and regression analysis. The analysis starts by analyzing the relationship between liquidity and profitability when profitability is determined using ROA (return on assets).

Table 2. Pearson correlation between ROA and current ratio

Correlations. Market correlations are significant at p < 0,0500 N =10	
Current Ratio	ROA
	-0,663
	p = 0,037

Source: Author's calculations

The correlation between current ratio and ROA for Alkaloid is negative. Since r= -0,663, as the liquidity in the firms increases the profitability decreases and vice versa profitability increases as the liquidity decreases. The correlation is statistically significant for p=0,037 (see Table 2).

Table 3. Linear regression analysis for prediction of ROA using current ratio

Model	**Unstandardized Coefficients**		**Standardized Coefficients**				**95% Confidence Interval for B**	
	B	**Std. Error**	**Beta**		**T**	**Sig**	**Lower Bound**	**Upper Bound**
(Constant)	,0104	,014			7,340	,000	,071	,137
CR	-,014)	,006		-,663)	-2,503)	,037	-,027)	-,001)
a. Dependent Variable: ROA				**R square=0,439**				

Source: Author's calculations

In this analysis, CR appears as an independent variable. According to the results obtained, CR and ROA are negatively correlated: as current ratio increases for 1MKD the profitability decreases on average for 0,014MKD. Almost 44% of the changes in the profitability can be explained with the current ratio as a liquidity determinant (see Table 3).

Table 4. Pearson correlation between ROA and quick ratio

Correlations. Market correlations are significant at p < 0,0500 N =10	
Quick Ratio	ROA
	-0,687
	p = 0,028

Source: Author's calculations

The correlation between quick ratio and ROA for Alkaloid is negative. Since r= -0,687, as the liquidity in the firms increases the profitability decreases and vice versa profitability increases as the liquidity decreases. The correlation is statistically significant for p=0,028 (see Table 4).

Table 5. Linear regression analysis for prediction of ROA using quick ratio

Model	**Unstandardized Coefficients**		**Standardized Coefficients**					**95% Confidence Interval for B**	
	B	**Std. Error**		**Beta**		**T**	**Sig**	**Lower Bound**	**Upper Bound**
(Constant)	,088	,007				12,121	,000	,071	,105
QR	-,013)	,005		-,687)		-2,677)	,028	-,025)	-,002)
a. Dependent Variable: ROA					**R square=0,473**				

Source: Author's calculations

In this analysis, QR appears as an independent variable. According to the obtained results, QR and ROA are negatively correlated. When QR increases for 1MKD ROA decreases on average for 0,013MKD. Almost 50% (47,3%) of the changes in the profitability can be explained with this liquidity determinant quick ratio (see Table 5).

Table 6. Pearson correlation between ROA and cash ratio

Correlations. Market correlations are significant at p < 0,0500 N =10	
Cash Ratio	ROA
	-0,403
	p = 0,248

Source: Author's calculations

The correlation between cash ratio and ROA for Alkaloid is negative but is not statistically significant, because r= -0,403, p=0,248; p>0, 05 (see Table 6).

Table 7. Linear regression analysis for prediction of ROA using cash ratio

Model	**Unstandardized Coefficients**		**Standardized Coefficients**					**95% Confidence Interval for B**	
	B	**Std. Error**		**Beta**		**T**	**Sig**	**Lower Bound**	**Upper Bound**
(Constant)	,073	,003				21,937	,000	,065	,080
CAR	-,024)	,020		-,403)		-1,245)	,248	-,069)	-,021)
a. Dependent Variable: ROA					**R square=0,162**				

Source: Author's calculations

In this analysis, cash ratio appears as an independent variable. According to the obtained results, the cash ratio and ROA are negatively correlated but the relation is not statistically significant since p = 0,248. Only 16% of the changes in the profitability can be explained with cash ratio as a liquidity determinant (see Table 7).

The following part analyzes the relationship between liquidity and profitability when profitability is determined using ROE (return on equity).

Table 8. Pearson correlation between ROE and current ratio

Correlations. Market correlations are significant at p < 0,0500 N =10	
Current Ratio	ROE
	-0,828
	p = 0,003

Source: Author's calculations

The correlation between current ratio and ROE for Alkaloid is negative. Since r= -0,828, as the liquidity in the firms increases the profitability decreases and vice versa profitability increases as the liquidity decreases. The correlation is statistically significant for p=0,003, p < 0,05 (see Table 8).

Table 9. Linear regression analysis for prediction of ROE using current ratio

Model	**Unstandardized Coefficients Standardized Coefficients**							**95% Confidence Interval for B**	
	B	**Std. Error**		**Beta**		**T**	**Sig**	**Lower Bound**	**Upper Bound**
(Constant)	,156	,017				9,352	,000	,118	,195
CR	-,027)	,007		-,828)		-4,171)	,003	-,042)	-,012)
a. Dependent Variable: ROE						**R square=0,685**			

Source: Author's calculations

In this analysis, CR appears as an independent variable. According to the obtained results, CR and ROE are negatively correlated. When CR increases for 1MKD ROE decreases on average for 0,027MKD. Even 68,5% of the changes in the profitability can be explained with this liquidity determinant Current ratio (see Table 9).

Table 10. Pearson correlation between ROE and quick ratio

Correlations. Market correlations are significant at p < 0,0500 N =10	
Quick Ratio	ROE
	-0,797
	p = 0,006

Source: Author's calculations

The correlation between quick ratio and ROE is negative. Since r= -0,797, as the liquidity in the firms increases the profitability decreases and vice versa profitability increases as the liquidity decreases if taking into consideration the quick ratio as a liquidity indicator and return on equity as a profitability indicator. The correlation is statistically significant for p=0,006 (see Table 10).

Table 11. Linear regression analysis for prediction of ROE using quick ratio

Model	**Unstandardized Coefficients Standardized Coefficients**							**95% Confidence Interval for B**	
	B	**Std. Error**		**Beta**		**T**	**Sig**	**Lower Bound**	**Upper Bound**
(Constant)	,122	,010				12,834	,000	,100	,144
QR	-,024)	,006		-,797)		-3,728)	,006	-,039)	-,009)
a. Dependent Variable: ROE						**R square=0,635**			

Source: Author's calculations

In this analysis, QR appears as an independent variable. According to the obtained results, QR and ROE are negatively correlated. When QR increases for 1MKD ROE decreases on average for 0,024MKD. Even 63,5% of the changes in the profitability can be explained with this liquidity determinant quick ratio (see Table 11).

Table 12. Pearson correlation between ROE and cash ratio

Correlations. Market correlations are significant at p < 0,0500 N =10	
Cash Ratio	ROE
	-0,487
	p = 0,154

Source: Author's calculations

The correlation between cash ratio and ROE for Alkaloid is negative but is not statistically significant, because r= -0,487, p=0,154; p>0, 05 (see Table 12).

Table 13. Linear regression analysis for prediction of ROE using cash ratio

Model	**Unstandardized Coefficients**		**Standardized Coefficients**			**95% Confidence Interval for B**	
	B	**Std. Error**	**Beta**	**T**	**Sig**	**Lower Bound**	**Upper Bound**
(Constant)	,094	,005		18,948	,000	,083	,106
CAR	-,046)	,029	-,487)	-1,575)	,154	-,114)	021
a. Dependent Variable: ROE			**R square=0,237**				

Source: Author's calculations

In this analysis, cash ratio appears as an independent variable. According to the obtained results, the cash ratio and ROE are negatively correlated but the relation is not statistically significant since p = 0,154. Only 24% of the changes in the profitability can be explained with cash ratio as a liquidity determinant (see Table 13).

5. INTERPREATITON OF THE RESULTS

From the results obtained on the basis of regression analysis, a significant negative correlation was detected between return on assets (ROA) and current ratio (CR), between ROA and quick ratio (QR), between return on equity (ROE) and CR and between ROE and QR. The movements in ROA are significantly explained using CR and QR as explanatory variable in the regression models given the R square value of around cca.45% in both instances. In addition, the movements in ROE are significantly explained using CR and QR as explanatory variable in the regression models given the R square value of around cca.65% in both instances. Given the significant correlation between CR and QR as liquidity indicators and ROA and ROE as profitability indicators, the hypothesis stating that there is a negative and significant relationship between liquidity and profitability of the biggest supplier in the pharmaceutical sector in the RNM **is accepted**, because of the significant negative correlations identified above.

The research conducted by Siame (2012), whose goal was to determine whether there is a relationship between liquidity and profitability and to further describe the nature of the possible relationship between liquidity and profitability of South African firms listed on the Johannesburg Stock Exchange (JSE), resulted in a significant negative relationship between operating profitability and the cash conversion cycle of the firm. The findings of this paper are also in line with (Eljelly, 2004 according to Siame, 2012)), (Deloof, 2003 according to Siame, 2012) and (Raheman & Nasr, 2007 according to Siame, 2012) who found a strong negative relationship between measures of working capital management and operating profitability.

The results of this paper are in line with the above-mentioned studies, as with most of the studies that deal with this topic, although they all analyze very different and locally very distant countries.

Ljubich (2017), has a very similar study regarding the relationship between liquidity and profitabily in 40 firm in Croatia. Alhtough the firms operate in different idustries then the pharmaseutical industry, Croatia is a Balkan country as it is Macedonia and they are much more similar in many aspects then all other Asian and American countries. Ljubich made a sample of 40 Croatian countries which have

publicly available financial statements. The firms are operating in four different industries since the purpose of the study is to analyze the relationship between the liquidity and the profitability in a broder sence not just in one industry. He analyzed the period between 2012-2015. The main hypothesis in this study was that there is a positive relationship between the current liquidity and the profitability in a firm measured by ROA. This hypothesis is totally opposite to the hypothesis stated in this study but the end result was that Ljubich actualy find a negative relationship between liquidity and profitability so he rejected all the previously assumed hypothesis.

6. CONCLUSION

From the reviewed studies and papers, it can be concluded that most of the authors who analyzed the relationship between liquidity and profitability, indeed revealed a negative relationship between liquidity and profitability. In other words, as the firm's profitability increases the liquidity level decreases. This paper intended to determine the relationship between liquidity as measured by current ratio, quick ratio and cash ratio and profitability as measured by ROA (return of assets) and ROE (return on equity) of the biggest pharmaceutical company in North Macedonia. In order to do this, the research was designed as a correlation study where relationships were tested. The analyses were performed on the financial data of the most influential MSE-listed representative from the pharmaceutical industry in RNM, Alkaloid AD Skopje. The conclusion of this study is that there is a negative relationship between profitability and liquidity at the 5% level of significance, and that the liquidity is one of the determinants of profitability when taking into account the operations of Alkaloid AD Skopje.

Future studies in this area can rely on measuring liquidity and profitability using different indicators and expand it to entities from other industries.

7. LIMITATIONS

One disadvantage of this research is the number of observations which was limited to 10 years and not more, due to the lack of publicly available and reliable data for the rest of the period. This may have affected the results of the study and thus the findings should not be universally applied to every company from the pharmaceutical sector for each given period. Moreover, as the study was done only in North Macedonia, the results may not be applicable to other countries with a different environment. The uniqueness of the operating environment may hinder the application of these results in other countries where the macro and micro environments are substantially different. Furthermore, there might be some data that are not publicly available, that could affect the analysis in a significant manner. Since there are other factors that affect profitability of companies, therefore the results may be different if the relationship between the liquidity and the profitability was not studied in isolation of those other factors.

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