Trade-Off Between Liquidity and Profitability: An Empirical Study of Pharmaceutical Sector in the Republic of North Macedonia

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TRADE-OFF BETWEEN LIQUIDITY AND PROFITABILITY: AN EMPIRICAL STUDY OF PHARMACEUTICAL SECTOR IN THE REPUBLIC OF NORTH MACEDONIA

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ABSTRACT

The relationship between liquidity and profitability is one of the most interesting topics in the corporate finance research. Having in mind that the pharmaceutical industry is one of the most competitive sectors globally and that its substantial investments in research and development make this industry a key asset for a country's economic well-being, this paper examines the liquidity-profitability trade off in pharmaceutical sector of RNM. The empirical research engages the secondary annual financial report data of the two pharmaceutical companies listed on Macedonian Stock Exchange (MSE) over the period from 2006-2016. Current ratio (CR), quick ratio (QR) and cash ratio (CAR) were used as measures of liquidity while return on assets (ROA) and return on equity (ROE) were used to measure profitability as a dependent variable. The statistical tests used to evaluate the effects of liquidity on profitability involved descriptive statistics, correlation and regression analysis. The findings suggest that there is no significant relationship between profitability and liquidity determinants of the listed North Macedonian pharmaceutical firms. Regarding practical implications, these findings can help managers overcome dilemmas with respect to the liquidity and profitability trade-off. Furthermore, this study contributes to the existing research base in this field and represents one of the pioneer attempts in the case of RNM. The results gained from the research are very important for companies themselves, but they can also serve as a starting point for future research to eliminate financial and other corporate issues related to the relationship between profitability and liquidity determinants.

Keywords: **Current ratio, Quick ratio, Cash ratio, Return on assets, Return on equity, Pharmaceutical Firms.**

JEL Classification: **G33, M41.**

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1. Introduction

In the corporate finance literature both liquidity and profitability represent complex phenomena and there is a set of various definitions which describe the terms, according to the context in which they are used or the perspective from which they are analyzed. It is so because profitability and liquidity are major indicators of the firm's financial performance. Thus, 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 and the existence/nonexistence of a trade-off between the indicators while achieving the ultimate goal of the firm. 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-mentioned goal is even a more profound challenge.

Given the importance of the liquidity-profitability trade-off, this paper seeks to study the existing literature for the purpose of comparing existing definitions and findings in relation to liquidity and profitability, to assess the existence of a relationship between select liquidity and profitability variables, its significance and direction, and to come up with recommendations for future research in the domain of performance assessment. The field research is based on the annual audited financial statements of the two pharmaceutical companies listed on Macedonian Stock Exchange (MSE), Alkaloid AD Skopje and Replek AD Skopje. The period subject to review encompasses ten years, from 2006-2016. The statistical analysis employs 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.

This study is intended as a guide to company management regarding the potential trade-off between liquidity and profitability in the process of owner wealth maximization as entities should not have to compromise their survival and manifest a lack of suitable liquidity policies. Although North Macedonia is a relatively small country and the pharmaceutical sector is not developed compared to other countries, this study contributes to existing

literature in different ways. First, this study is the first to measure the profitability and liquidity ratio and determinants within the sector. It contributes to accounting research, since the authors know very little about profitability factors in emerging markets. It constitutes an addition to previous knowledge about the liquidity-profitability trade-off. Second, the Macedonian pharmaceutical sector has been operating more than 15 years and profitability and liquidity creation has never been studied. This, it is expected to enrich the previous literature on the topic with the unique situation of Macedonian companies.

The remainder of this paper is organized in the following manner. In the second section, we provide a literature review on liquidity and profitability by focusing on the measures used by different authors to assess the existence of an association between the variables chosen, which gives us the base for this study. The research objectives and research hypotheses are discussed in the third section. The research methodology and research design are provided in the fourth section. The paper ends with research statistics and results in the sixth section, followed by concluding remarks.

2. Profitability and liquidity concepts defined

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). Thus, the profit is the end result of how effectively are managed and used all the resources which are available on the market. Although, the terms “profitability” and “profit” are very often used as synonyms, there is a difference between their meaning. The profit is the amount of income generated after covering all incurred costs whatever the type of the firm, its size or the industry where it operates. The end result of the calculation of the profit is an absolute number derived when we exclude the total expenses from the total revenues. According to Sivathaasan, Tharanika, Sinthuja and Hanitha (2013), “The ultimate goal of a firm is to earn profit in order to ensure the sustainability of the business in prevailing market conditions for the purpose of being profitable to the highest possible degree.” Similarly, Pandey (1980), with very simple words defined the profitability “as the final outcome of the ability of a business”.

According to other authors, profitability can be defined as: “The final measure of economic success achieved by a company in relation to the capital invested in it for the purpose of achieving an appropriate return over the amount of risk accepted by the shareholders” (Lamberg and Vålming, 2009) From all the above mentioned, the profitability or the profit is what matters at the end of the day but this process is very complex and includes a lot of

activities that need to be undertaken by top management. Some of these specific actions include the following:

- Cost control: The profit is tightly connected with the cost allocation structure of the firm. Therefore, managers must very carefully predict, monitor and measure the money spent or committed by the firm in the following period. High level of manager's expertise is needed because even a small deviation from the prediction can have a very big influence on the profit at the yearend.
- Pricing: The price is a very specific variable. It cannot be too high or too low. Some of the most important decisions made by the firm are around the pricing policy. Its determination is a joint decision of the marketing and finance department.
- Forecasting profit: The profit is mainly predicted by gathering and analyzing relevant past data combined with future expectations and manager's experiences for the possible outcomes.
- Measuring required return: For each unit of capital invested there is a required return. Taking into consideration the risk, the duration and the opportunity cost of the investment, a decision for the expected rate of return must be made before the proposal for investment can be accepted or denied. (Khan, 2016)

Firm's managers see the liquidity as the ease of converting assets into cash while avoiding sales losses or unexpected sales costs (Foucault, Pagano and Roell, 2013). Similarly, Damodaran (2005), describes the liquidity as an antonym of the illiquidity of an asset from the 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".

According to Shim and Siegel (2000), liquidity is the firm's ability to liquidate maturing short-term debt. In other words, the liquidity is not just a firm's goal but a condition which enables the continuity of a business.

Mahavidyalaya, Niranjan, and Suvaran (2010) describe the term liquidity as the capability of a firm to meet short term financial obligations by converting the short term assets into cash without affecting the asset's price. Their statement, under short term assets classifies all the assets which can be converted into cash within less than one accounting period. Similarly, short term financial obligations are the current liabilities which need to be settled down in less than one accounting period. Thus, the firm's liquidity depends on the effective joint structure between the firm's current assets (CA) and current liabilities (CL).

For the purpose of the paper we will use a 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).

The process of planning the firm's liquidity is a truly complex area and includes a lot of functions that need to be carried out. Some of the functions are the following:

- Forecasting cash flows: For enabling successful day-to-day activities the firm must pay its obligations in a timely manner. In other words, this is the matter of matching and timing the firm's cash inflows from customers against cash outflows to suppliers and debtors.
- Raising funds: The financing of the firm's activities may come from a variety of sources. The financial manager is the one responsible for choosing the most desirable source from among the available ones. This is probably the most desirable source in a sense that is will cover all the firm's needs in the particular period while being not too costly to be undertaken.
- Managing the flow of internal funds: All firms especially the big ones, besides the external sources of funding have internal inflow of money as well. First, the decision for investing or saving needs to be made, the manager must choose wisely among the alternatives in order to use the internal inflows with the lowest opportunity cost. (Khan, 2016)

The liquidity management is of crucial importance since the consequences of the liquidity risk are very ''expensive'' for a firm and in some instances can even lead to bankruptcy. The liquidity risk, according to Nikolaou (2009), is defined as "the risk that a business will have insufficient funds to meets its financial commitments in a timely manner". The two key elements included in the liquidity risk are short-term cash flow risk and long-term funding risk. The first element is connected with the shortage of cash or cash equivalents for the settlement of present obligations which obliges the firm to ask for external sources of liquidity. When a firm starts borrowing for liquidity needs it faces the risk of long-term funding risk. This type of risk includes the risk that the loans may not be available when the business requires them or that such funds will not be available for the required term or at acceptable cost. "All businesses need to manage liquidity risk to ensure that they remain solvent" (Nikolaou, 2009). Liquidity risk can arise from a number of areas within the firm such as seasonal fluctuations, unplanned reduction in revenue, increase in operational costs, inadequate management of working capital, future debt repayments, inappropriate matching of the maturity profile of debts with the useful life of the assets which they are funding, inadequate cash flow management etc.

The controversy around the relationship between the firm's liquidity and profitability has resulted in many theoretical and empirical studies which were conducted by authors from all around the world and in different time horizons. Scholars agree that the profit is the

main driver of every business as it ensures that the business continues as a going concern. Liquidity on the other hand, influences the financial costs, the growth, the risk that needs to be undertaken and acts as one of the determinants of the market value of the firm, all factors being crucial for the well-being of the business. 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), the high level of liquidity is a sign of the firm's financial strength but according to Neto (2003) high levels of liquidity can be as undesirable as low levels. Neto explains that having too many current assets for the purpose of being liquid inhibit or lower the opportunity for the firm to invest in fixed assets which are more profitable than the current assets. Thus, money invested in current assets generates lower returns which harm the overall profitability of the firm. On the other hand, Arnold (2008) underlines three crucial functions which can be performed smoothly only if the firm holds enough cash. The first function consists of running daily payments of expenses and monthly payments of salaries, materials and taxes which are mainly settled with cash (Transaction motive of holding cash). The second function is based on the knowledge that the future cash flows are very uncertain and cannot always be predicted with full accuracy. Because of that, having cash eliminates or lowers the problems which may arise if eventual downturns happen in the future (Precautionary motive of holding cash). Lastly, by holding cash the firm is able to undertake profitable investments which demand immediate payment (Speculative motive of holding cash). All the functions mentioned by Arnold in his study were based on the famous Keynesian motives (Keynes, 1936), which are the transaction, the precautionary and the speculative motive of holding cash.

In the economic theory, it is widely known that risk and 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. If a firm has invested lots of money in current assets, it plays on a safe side by eliminating the insolvency risk but it sacrifices profits that could be earned if the money would have been invested in riskier and more profitable assets. Simply said, the risk-return ratio behaves in a way that every single change in the liquidity is followed by an opposite move in the level of profit. Thus, every firm needs to hold an amount of net working capital which is best fit to the firm's risk and profit margins.

Kim, Mauer and Sherman (1998), argue that the optimal level of liquidity will balance the low return of current assets with the benefit of eliminating the need for external sources of

financing which are far more expensive than any kind of internal financing. Some similar thoughts were written down by (Vieira, 2010) inspired by the Hirigoyen Hypothesis. According to these authors, when a firm has high profitability and low liquidity it has to find external sources of financing which means additional financial costs. When a firm increases the amount of external debt at the same time increases the firm's credit risk leading to increased interest rates. The increased indebtedness of a firm additionally is followed by fewer discounts from suppliers because of the delayed payments and penalties for late payments. When the above mentioned process of expensive external financing takes place the liquidity problems would become even worse. The other side of the coin is a firm with high liquidity but low profitability. In this scenario the firm is not able to generate enough own resources to support the growth of the firm, to invest in new fixed assets nor to pay out the outstanding portion of the debt. Simply said it ends up compromising liquidity. Therefore, according to Hirigoyen profitability and liquidity are necessary for the existence of the firm.

3. Research objectives and hypotheses

Shin and Soene (1998), were one of the first who relate the management of working capital with the firm's profitability. In their study, they took a large sample of American firms listed on the US Stock Exchange. They analyzed whether there is a relationship between the cash conversion cycle and the profitability for the chosen firms in the sample. The result was that by reducing the cash conversion cycle to the lowest possible level, the management can increase the profitability and thus create value for the shareholders. The result from the study indicates a strong negative relation between the cash cycle and the profitability.

Vural,Sokmen and Cetenak (2012), collected data on more than 50 manufacturing firms listed on the Istanbul Stock Exchange in order to make a sample which will help them analyze the impact of working capital management on the firm's profitability. From the analysis performed on the sample, Vural, Sokmen and Cetenak concluded that the account receivable's collection period and cash conversion cycle have a negative impact on profitability. This means that the shortening of the receivable collection period and the cash conversion period can lead to improvements in profitability. For all other components included in the working capital structure, the analysis did not show any significant relation with the firm's profitability. In this study the leverage of the firms in the sample was used as a control variable and in order to assess whether it has some influence over profitability. The answer was positive as increased levels of leverage decreased the level of profitability

and the value of the firm, thus indicating the existence of a negative relation between leverage and profitability variables.

Eljelly (2004), tested the relationship between liquidity and profitability using a sample of joint stock companies operating in Saudi Arabia. He used current ratio and cash gap as variables and correlation and regression analysis as tools. The conclusion was that there is a negative relationship between profitability and liquidity for the firms in the sample. Additionally, it was concluded that the cash conversion cycle has greater impact over profitability than the current ratio.

Alipour (2011) analyzed whether profit is influenced by working capital balance for a remarkable sample of more than 1,000 firms listed on the Tehran stock exchange. In the analysis he used multiple regressions and Pearson's correlation and concluded that the firms in the sample manifested a negative relationship between the cash cycle and profitability and an even stronger negative relationship between the collection period of receivables and inventory turnover with profitability.

Mohamad and Noriza (2010) opted for a different set of firms: Bloomberg's 72 listed firms and checked for a possible association between the way working capital was managed and the firms' profitability. In order to assess the effectiveness of working capital management, they employed a set of ratios such as cash conversion cycle, current assets to total assets ratio, debt to assets ratio, current ratio and current liabilities over total assets. For measuring the firm's profitability Tobin's Q ratio, the return on invested capital and the return on assets were used. Multiple regression and Correlation showed a negative relationship between the firm's performance and the management of working capital.

One of the first studies regarding the same topic but for the European market was conducted by Deloof (2003). He collected secondary data for 1,637 Belgian Firms and calculated almost the same ratios as all other authors who analyzed the relationship between working capital and profitability. The conclusion which was reached was very similar as he found a negative relation between the cash conversion cycle and profitability represented by the ROA and ROS (return on sales). What is interesting about this study is that Deloof investigated not only the relation between the aggregate cash conversion cycle and profitability but also the relation between each and every component of the cash conversion cycle and company performance. The end result was that the turnover of accounts receivables, inventories and accounts payables expressed in days is negatively related to company performance. At first sight, it seemed strange that accounts payables are negatively related although they reduce the cash gap. He explained that this is the result of the imperfection of the Pearson's correlation which does not allow causes to be

distinguished from the consequences. In this context, Deloof elaborates that this result complies with the fact that more profitable firms usually have shorter payment periods. Therefore, profitability is driver behind the days in accounts payables outstanding and not vice versa. Soene (1993) studied the relation between the firm's profitability measured by the return on assets (ROA) and the cash conversion cycle as a measurement of the working capital. The sample which was studied consisted of firms from 20 different industries for the period from 1970-1989. The conclusion of the study was that shorter cash conversion cycles correlate to higher profitability and longer cash conversion cycles correlate to lower profitability which implies a positive correlation between the firm's profitability and its cash conversion cycle. Although the correlation was not significant for all 20 industries, a positive and statistically significant relationship was found in 9 industries.

Another similar study was conducted by Shin and Soenen (1998) who formed an outstanding sample of 58,985 firms in order to test whether the efficiency of working capital management has an influence over the firm's profitability. They measured profitability by using risk-adjusted stock returns, return on assets (ROA) and return on sales (ROS) while the working capital is calculated using the net trade credit (NTC). Net trade credit is a replica of the cash conversion calculation expressed in percentages (each cash conversion cycle element is divided by sales). In the test stage, Shin and Soenen applied correlation analysis. The results indicated a statistically significant relationship between working capital and profitability. Thus, they accepted the hypothesis that as the trade cycle shortens, profitability increases.

Deloof (2003) analyzed the same relationship between profitability and working capital by using different measurements such as gross operating income for profitability and cash conversion cycle for working capital. He conducted the research employing a sample of 2,000 most important Belgian firms using the National Bank of Belgium's database. In the sample selection stage, he excluded the firms from the energy and water industry as well as the banking sector from further analyses. At the end, the sample consisted of 1,009 firms analyzed for the period from 1992-1996. The study employed Pearson correlation and regression analysis in the test stage. Deloof found a significant negative relation between profitability and working capital. His explanation was that profitability influences working capital not vice versa under the explanation that as profitability declines the firm needs more time to pay off their payables. In the case of inventory as part of working capital, when profitability declines it is highly probable that sales will decline as well, causing the stock of inventory to increase. The negative relationship between profitability and receivables is not explained yet Deloof states that more profitable firms which are not so eager for cash offer more favorable payment terms.

Having in mind the studies discussed above, we will examine the subsequent research objectives:

1. To provide an ample literature review in order to compare existing definitions and findings in relation to liquidity and profitability,
2. To assess the existence of a relationship between select liquidity and profitability variables,
3. To assess the direction of the relationship between the tested liquidity and profitability measures,
4. To provide advice for future research in the wider field of performance analysis.

Given our research aims and the literature review presented in this section, the following hypotheses will be subject to testing in our empirical study:

HYPOTHESIS 1: There is a relationship between liquidity and profitability of the firms in the RNM pharmaceutical sector.

HYPOTHESIS 2: There is a negative relationship between liquidity and profitability of North Macedonian pharmaceutical companies.

Although a theoretical and empirical consensus around the relation between profitability and liquidity has still not been reached, most of the studies which analyzed this relationship indicated a rather negative association between these two measures. As it can be seen from the studies discussed above, the relation was analyzed for firms which operate in different types of industries but there was no study which related this topic to pharmaceutical sector context. This deficiency leaves space for further analysis of the relationship between liquidity and profitability of firms which operate in the pharmaceutical sector in North Macedonia.

4. Research methodology and design

4.1. Sample selection

In order to do the statistical analysis, the authors gathered secondary data of the pharmaceutical companies on Macedonian Stock Exchange (MSE). The statistical sample is comprised on the audited and consolidated annual reports for the period 2006-2016. The sample is comprised of two most representative companies of the pharmaceutical industry in the RNM, Alkaloid AD Skopje and Replek AD Skopje. The main reason why we decided to narrow down the sample and cover only the firms listed on the MSE stock exchange is because it was easy to access the annual published audited financial reports unlike for unlisted firms. From all the firms which produce medicines in the RNM only three firms are

listed on the local stock exchange. However, the third firm (AD Jaka 80 Radovish-Skopje) was excluded from the sample because this firm was first listed in 2014 and its financial statements before 2013 are not available. Therefore, including the company's financial parameters for 4 years (2013-2016) is considered as inappropriate given the lack of balance in the data sample. Additionally, only unaudited financial statements were available for the third entity which is not in compliance with the national Company law and the stock exchange listing requirements, this making these reports incomparable with the audited financial statements of the other two firms.

This paper will engage a quantitative research approach in order to statistically analyze data and test the hypotheses given the study's focus on financial information. The approach that was pursued during the research was through positive statements based on theories and previous evidence as discussed in the literature review section. After the collecting stage, we conducted a statistical analysis by using SPSS Statistics. 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 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. Table 1 provides the definitions of the variables tested in our study.

Table 1. Definition of the variables used in the statistical modeling

Variables		Variable Name	Variable Definition
Independent	Liquidity	Current Ratio (CR)	Current Assets / Current Liabilities
	Liquidity	Quick Ratio (QR)	(Current Assets – Inventories) / Current Liabilities
	Liquidity	Cash Ratio (CAR)	(Cash and Cash Equivalents) / Current Liabilities
Dependent	Profitability	Return on Assets (ROA)	Net Income / Total Assets
	Profitability	Return on Equity (ROE)	Net Income / Total Equity

Source: Reimers (2011)

4.2. Definition of models

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

Hence, Model 1 tests the effect of current ratio (CR) on return on assets (ROA):

(Model 1) $$ROA_{it} = \alpha + \beta(CR_{it}) + \varepsilon_{it}$$

where *i* = firm, *t* = year, ROA = return on assets (defined in Table 1), CR = current ratio (defined in Table 1), Ɛ = the error term.

Model 2 tests the effect of quick ratio (QR) on return on assets (ROA):

(Model 2) $ROA_{it} = \alpha + \beta(QR_{it}) + \varepsilon_{it}$

where *i* = firm, *t* = year, ROA = return on assets (defined in Table 1), QR = quick ratio (defined in Table 1), Ɛ = the error term.

Model 3 tests the effect of cash ratio (CR) on return on assets (ROA):

(Model 3) $ROA_{it} = \alpha + \beta(CAR_{it}) + \varepsilon_{it}$

where *i* = firm, *t* = year, ROA = return on assets (defined in Table 1), CAR = cash ratio (defined in Table 1), Ɛ = the error term.

Model 4 tests the effect of current ratio (CR) on return on equity (ROE):

(Model 4) $ROE_{it} = \alpha + \beta(CR_{it}) + \varepsilon_{it}$

where *i* = firm, *t* = year, ROE = return on equity (defined in Table 1), CR = current ratio (defined in Table 1), Ɛ = the error term.

Model 5 tests the effect of quick ratio (QR) on return on equity (ROE):

(Model 5) $ROE_{it} = \alpha + \beta(QR_{it}) + \varepsilon_{it}$

where *i* = firm, *t* = year, ROE = return on equity (defined in Table 1), QR = quick ratio (defined in Table 1), Ɛ = the error term.

Model 6 tests the effect of cash ratio (CR) on return on equity (ROE):

(Model 6) $ROE_{it} = \alpha + \beta(CAR_{it}) + \varepsilon_{it}$

where *i* = firm, *t* = year, ROE = return on equity (defined in Table 1), CAR = cash ratio (defined in Table 1), ε = the error term.

5. Research results and discussion

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 2 shows that the arithmetic mean of ROA is 5,46%. Considering the minimum score 4,22% and the maximum score for ROA 7,7% as presented in Table 2, it is noted that the value obtained (M = 5,46%) is closer to the minimum score. Since for North Macedonia an industry average for these 10 years is not publicly available to be compared with the standardized norm for ROA of 10-12%, the US ROA average of 8,24% for this industry will be used for interpretation of the results. The North Macedonian pharmaceutical industry has an average ROA of 5, 46% which is below the norm and indicates an industry with low profitability but because the US pharmaceutical industry is much bigger and very different we will not take this result as a basis for a conclusion that pharmaceutical companies in RNM do not make money by simply analyzing only one single indicator.

The average ROE value is 9,51%, with a minimum score of 7,11% and a maximum score of 13,93%. According to these scores, it can be seen that the Mean is closer to the minimum score. Since for North Macedonia an industry average for these 10 years is not publicly available to be compared with the standardized norm for ROE of 11-13% and the US ROE average for this industry of 11, 3% will be used for interpretation of the results. The pharmaceutical industry in RNM has an average ROE of 9, 51% which is very close to the accepted value of above 11% and even close to the ROE of the US pharmaceutical sector, so we may conclude that pharmaceutical firms in RNM are on a good track by having a very satisfactory profit level. It is interesting to mention that this industry had a ROE value of above 13% in 2008 and depicted a gradual decrease over the analyzed 10-year timeframe. The reason behind this downgrade is not a matter of discussion in this paper. Nonetheless, it is obvious that the firms may include some improvements to catch up with the full potential that this industry can achieve.

Table 2. Mean, standard deviation, minimum and maximum scores for ROA (Return on Assets), ROE (Return on Equity), CR (Current Ratio), QR (Quick Ratio) and CAR (Cash Ratio)

	Valid N	Mean	Minimum	Maximum	Std.Dev.
ROA	10	5,46%	4,22%	7,7%	1,02%
ROE	10	9,51%	7,11%	13,93%	2,12%
Current Ratio	10	4,200395	3,466112	5,537484	0,571352
Quick Ratio	10	1,745897	1,417488	2,307195	0,254765
Cash Ratio	10	0,340962	0,125591	0,640310	0,163611

Regarding the liquidity indicators, the current ratio for the industry is 4,2. The sample has a very high CR since every current ratio which is above 1 is acceptable so the industry can be labelled as a liquid one given that a ratio of 2:1 is mostly desirable. The average quick ratio value is 1,754 and the average cash ratio is 0,34. We can conclude that the pharmaceutical sector is liquid. The current ratio is the brodest liquidity ratio of all the three analyzed ratios and with an average value of 4,2 the pharmaceutical firms in RNM are able to pay off their liabilities using their short-term assets (i.e. cash, marketable securities accounts receivables, inventories). 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. 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 the firms which operate in the pharmaceutical sector in RNM will settle their current liabilities without any trouble by using more of the current assets and not just cash.

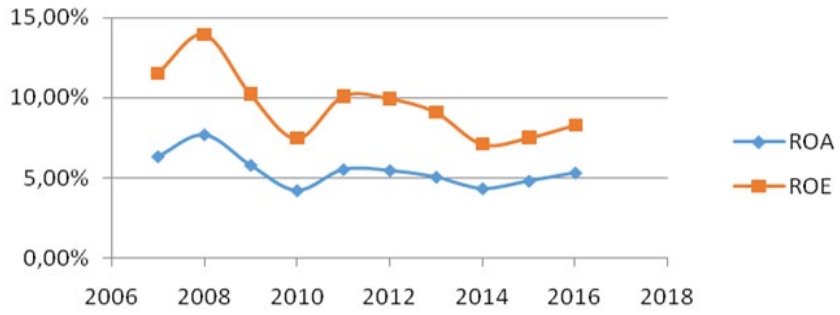

Figure 1. Values for ROA and ROE from 2007-2016 for the sample

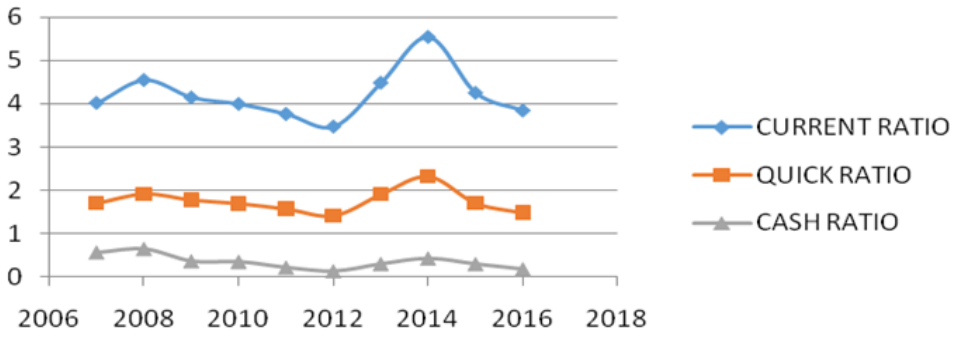

Figure 2. Values for Current Ratio, Quick Ratio and Cash Ratio for 2007-2016 for the sample

The following part of the Research Results and Discussion section examines the relationship between liquidity and profibility 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 3. Pearson correlation between ROA and Current Ratio for the sample

Correlations. Marked correlations are significant at p < ,05000 N=10	
	ROA
Current Ratio	-,1505 p=,678

The correlation between Current Ratio and ROA for the pharmaceutical sector in RNM is negative.
Since r= -0, 1505, as the liquidity in the firms increases the profitability decreases and vice versa profitability increases as the liquidity decreases. The correlation is not statistically significant for p=0,678; p>0, 05.

Table 4. Linear regression analysis for prediction of ROA using Current Ratio

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95,0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	,066	,026		2,499	,037	,005	,127
CR	-,003)	,006	-,150)	-,431)	,678	-,017)	,012
a. Dependent Variable: ROA				R square=0,023			

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

insignificantly decreases on average for 0,003MKD. Only 2,3% of the changes in the profitability can be explained with current ratio as a liquidity determinant.

Table 5. Pearson correlation between ROA and Quick Ratio for the sample

Correlations. Marked correlations are significant at p < ,05000 N=10	
	ROA
Quick Ratio	-,0984
	p=,787

The correlation between Quick Ratio and ROA is negative but not statistically significant, because r= -0, 0984, p=0,787; p>0, 05.

Table 6. Linear regression analysis for prediction of ROA using Quick Ratio

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95,0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	,061	,025		2,483	,038	,004	,119
QR	-,004)	,014	-,098)	-,280)	,787	-,036)	,028
Dependent Variable: ROA				R square=0,01			

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 insignificantly decreases on average for 0,004MKD. Only 1% of the changes in the profitability can be explained with quick ratio as a liquidity determinant.

Table 7. Pearson correlation between ROA and Cash Ratio for the sample

Correlations. Marked correlations are significant at p < ,05000 N=10	
	ROA
Cash Ratio	,5587
	p=0,93

The correlation between cash Ratio and ROA for the pharmaceutical sector in RNM is positive but is not statistically significant, because r= 0, 5587, p=0,093; p>0, 05.

Table 8. Linear regression analyzes for prediction of ROA using Cash Ratio

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95,0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	,043	,007		6,263	,000	,027	,058
CAR	,035	,018	,559	1,905	,093	-,007)	,077
Dependent Variable: ROA				R square=0,312			

In this table, CAR appears as an independent variable. According to the obtained results, in the correlation analysis and the linear regression CAR is the first liquidity indicator which positively correlates with profitability. Thus, when CAR increases for 1MKD, ROA or profitability in the pharmaceutical sector increases insignificantly but nevertheless increases on average for 0,035MKD. From the R squared value we can conclude that 31% of the changes in profitability measured with ROA are explained by the cash Ratio.

Out of all the liquidity indicators which were analyzed independently, the cash ratio was the one which positively correlates with ROA having the lowest p value and highest R square value. This means that when the profitability is calculated through ROA, the cash ratio is the independent predictor which mostly correlates with this dependent variable.

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

Table 9. Pearson correlation between ROE and Current Ratio for the sample

Correlations. Marked correlations are significant at p < ,05000 N=10	
	ROE
Current Ratio	-,1856 p=,608

The correlation between current ratio and ROE for the sample is negative and is not statistically significant, because r= -0, 1856, p=0,608; p>0, 05

Table 10. Linear regression analysis for prediction of ROE using Current Ratio

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95,0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	,124	,055		2,274	,053	-,002)	,250
CR	-,007)	,013	-,186)	-,534)	,608	-,037)	,023
		Dependent Variable: ROE		R square=0,034			

In this table, CR appears as an independent variable. According to the results obtained using correlation analysis and linear regression, the relationship between ROE and CR is insignificantly negative. It means that as the current ratio increases for 1MKD, ROE insignificantly decreases on average by 0,007. Because of the statistical insignificance of this correlation it is expected that only 3, 4% of the changes in profitability of the North Macedonian pharmaceutical firms are explained with the current ratio.

Table 11. Pearson correlation between ROE and Quick Ratio for the sample

Correlations. Marked correlations are significant at p < ,05000 N=10	
	ROE
Quick Ratio	-,0941
	p=,796

The correlation between quick ratio and ROE for the sample is the same as the correlation between current ratio and ROE. As both liquidity determinants increase, profitability decreases or vice versa as liquidity decreases, the profitability in the pharmaceutical sector increases. Nonetheless, the correlation is statistically insignificant with a p>0, 05.

Table 12. Linear regression analyzes for prediction of ROE using Quick Ratio

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95,0% Confidence Interval for B	
	B	**Std. Error**	**Beta**			**Lower Bound**	**Upper Bound**
(Constant)	,109	,052		2,110	,068	-,010)	,228
QR	-,008)	,029	-,094)	-,267)	,796	-,075)	,060
Dependent Variable: ROE				R square=0,009			

In this table, QR appears as an independent variable. According to the obtained results, when quick ratio increases by 1MKD, ROE moves in the opposite direction and decreases on average by 0,008MKD. Only 0, 9% of the changes in ROE can be explained with the quick ratio.

Table 13. Pearson correlation between ROE and Cash ratio for the sample

Correlations. Marked correlations are significant at p < ,05000 N=10	
	ROE
Cash ratio	,5563
	p=,095

The correlation between cash ratio and ROE has the same sign as the correlation between cash ratio and ROA. That means that when the liquidity is determined through cash ratio, it positively correlates with profitability irrespectively of the variable employed (ROA or ROE). The correlation is statistically insignificant, but as the liquidity of the pharmaceutical firm increases, profitability increases respectively.

Table 14. Linear regression analysis for prediction of ROE using Cash Ratio

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95,0% Confidence Interval for B	
	B	**Std. Error**	**Beta**			**Lower Bound**	**Upper Bound**
(Constant)	,071	,014		4,955	,001	,038	,103
CAR	,072	,038	,556	1,893	,095	-,016)	,160
Dependent Variable: ROE				R square=0,309			

In this table, CAR appears as an independent variable. According to the results obtained using correlation analysis and linear regression, CAR is the first liquidity indicator which positively correlates with profitability. Thus, when CAR increases by 1MKD ROE or the profitability in the pharmaceutical sector increases insignificantly but nevertheless increases on average by 0,072MKD. From the R squared value we can conclude that 30,9% of the changes in profitability when measured by ROE are explained with the cash ratio.

Out of all the liquidity indicators which were analyzed independently, the cash ratio was the one which positively correlates with ROE having the lowest p value and highest R square value. This means that when profitability is calculated using ROA, the cash ratio is the independent predictor which mostly correlates with it. It is interesting to note that the same scenario was observed in the correlation between cash ratio and ROE. From the above mentioned we can conclude that cash ratio mostly explains the changes in profitability in the pharmaceutical sector irrespectively whether ROA or ROE are used. The cash ratio will be perceived as a liquidity indicator which explains most of the changes in the profitability level in the pharmaceutical sector in RNM.

From the results obtained on the basis of sample analysis, a close-to-significant correlation was detected between ROA and CAR, and between ROE and CAR. The movements in ROA and ROE are significantly explained using CAR as explanatory variable in the regression models given the R square value of cca.31% in both instances. Given the insignificant correlation between CR, QR and CAR as liquidity indicators and ROA and ROE as profitability indicators, the first hypothesis stating that there is a relationship between liquidity and profitability of the firms in the RNM pharmaceutical sector **is rejected**. Furthermore, the second hypothesis which states that there is a negative correlation between the profitability and liquidity variables will also be rejected because of the insignificance of the positive and negative correlations identified above. Hence, hypothesis 2 stating that there is a negative relationship between liquidity and profitability of the firms in the pharmaceutical sector in the Republic of North Macedonia **is rejected.**

6. Conclusions

From the reviewed studies and papers it can be concluded that most of the authors who analyzed the relationship between the working capital components of a firm and profitability revealed a negative relationship between liquidity and profitability. In other words, as the firm's liquidity increases the profit level decreases. This conclusion is somehow a

contradiction between theory and practice. If a company chooses to invest excessively in current assets it may harm the profitability, but if a firm lowers their investment in current assets, this policy may cause liquidity problems. Therefore, company management must not disregard the trade-off between liquidity and profitability in the process of wealth maximization for the shareholders. On the other hand, firms may compromise their survival without proper liquidity strategies. A firm which has adequate liquidity policies is capable of improving profits and significantly reduces the risk of failure due to unsettled obligations. Additionally, proper levels of liquidity provide a strategic advantage for the firm in a period of economic crises. From the above-mentioned, the overall conclusion would be that firms must identify the optimal level of liquidity in order to avoid liquidation issues while at the same time remaining capable of meeting the desired level of profit. The relationship between the firm's profitability and liquidity is mainly quantified using a set of financial ratios. The return on assets and return on equity are ratios used for expressing the profitability variable while current ratio, quick ratio (also known as acid-test-ratio) and cash ratio are ratios which quantify the liquidity position whereby each of them takes into consideration a different sub-segment of short-term assets.

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 listed pharmaceutical companies in North Macedonia. In order to do this, the research was designed as a correlation study where relationships were tested. The sample was comprised of the two MSE-listed representatives, Alkaloid AD Skopje and Replek AD Skopje. Using secondary annual report data in the correlation analysis, it was noted that there was a lack of significant relationship between liquidity and profitability at the 5% level of significance. The results in this research indicate that liquidity is not a determinant of profitability for the pharmaceutical companies in RNM. The relationship between ROA and CAR, and ROE and CAR is positive but insignificant implying that an increase in liquidity will lead to a negligible increase in profitability. On the other hand, the relationship between ROA and CR, ROA and QR, ROE and CR, and ROE and QR is negative but insignificant implying that an increase in liquidity will lead to a negligible decrease in profitability. Future studies in this area can rely on measuring liquidity and profitability using different indicators and examine the same companies or expand to entities from other industries.

One disadvantage of this research is the size of the sample which was limited to only two companies due to the lack of publicly available and reliable data for the rest of the population. 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 but should be extrapolated to the entire population of listed non-financial entities. 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, data for more than ten years may yield a more irrefutable result. There might be some data that are not publicly available, that could affect the analysis in a significant manner. The study considered only secondary data that is historical in nature which may not necessarily reflect the future of the companies. 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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