

**STUDY REGARDING THE ANALYSIS OF THE FINANCIAL SITUATION OF THE SOCIETIES FROM THE PHARMACEUTICAL INDUSTRY IN TERMS OF THE CORRELATION BETWEEN THE LIQUIDITY AND THE PROFITABILITY**

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**Abstract**

*The relationship between different rates of liquidity and profitability, is one of the most popular topics of research in the financial management field. In order to demonstrate the correlation between these variables, we used the statistical program SPSS. The analyzed societies are: Zentiva, Biofarm and Antibiotice Iași, listed at the Bucharest Stock Exchange. The research leads to the conclusion that all the societies have sufficient liquidity to cover the payment obligations. Also, using the Pearson correlation coefficient, we demonstrated the fact that the liquidity is one of the indicators that determine the profitability of the analyzed societies.*

**Keywords:** *correlation, liquidity, profitability*

**JEL classification:** *G19, G39*

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**1. Introduction**

The analysis of the financial position of the societies represents a complex process, conducted mainly on the basis of the empirical research. For the analyzed societies, we calculated and interpreted the indicators of the

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financial position. In our research, we also used statistical methods and methods specific to the economic and financial analysis.

## 2. The liquidity analysis of the pharmaceutical societies

The liquidity represents the society's possibility to quickly convert its assets in cash, necessary to cover the current debts (Whitehurst, 2003, p. 22). The traditional liquidity rates are the following (Higgins, 2012, p.52-53):

**The general (current) liquidity ratio:** measures the share of the current assets in the current debts and it is calculated according to the model:

$$Clr = \text{Current assets} / \text{Current debts} \quad (1)$$

**The quick liquidity ratio (Acid Test)** expresses the most accurately the liquidity level, because from the total current assets are eliminated the inventories.

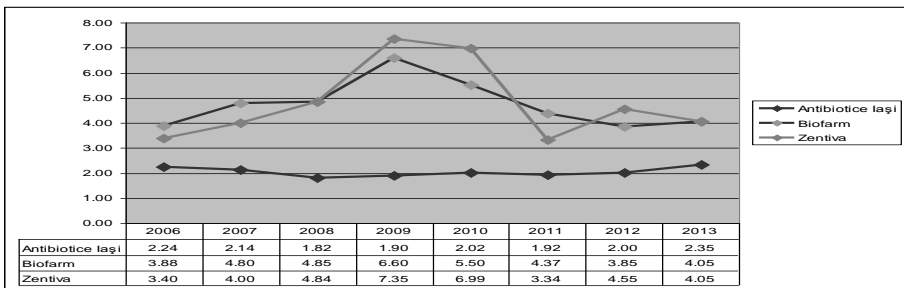
$$Qlr = (\text{Current assets} - \text{Inventories}) / \text{Current debts} \quad (2)$$

**The cash ratio** measures the share of cash and cash equivalents in the short-term debts.

$$Cr = (\text{Cash} + \text{Investment securities}) / \text{Current Debts} \quad (3)$$

During the period 2006-2013, all three ratios were calculated for the analyzed societies.

**Figure 1: The evolution of the Clr during the period 2006-2013, for the analyzed societies**

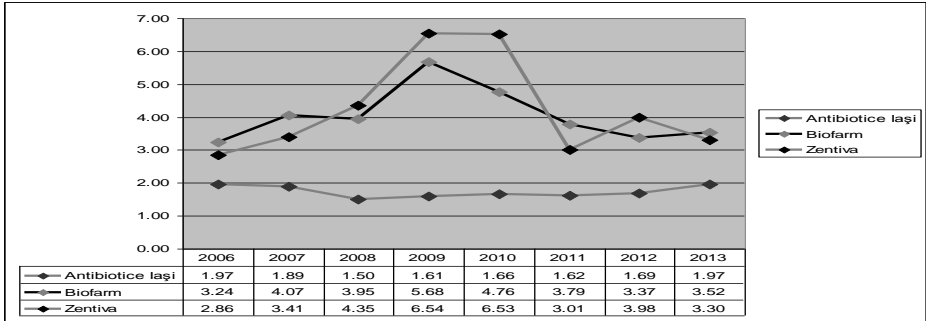


Source: The data was processed by the authors, based on the annual financial statements, available on the website [www.bvb.ro](http://www.bvb.ro)

During the analyzed period, the societies are recording an optimal value of the current liquidity ratio (over 2), which demonstrates the fact that

they managed to pay their outstanding debts. In the case of the societies Biofarm and Zentiva, the level of the current liquidity ratio is high. Antibiotice Iasi has a constant value of the indicator (about 2), during the whole analyzed period. (Minculete; Balteș; Cozma, 2014, p. 279-286).

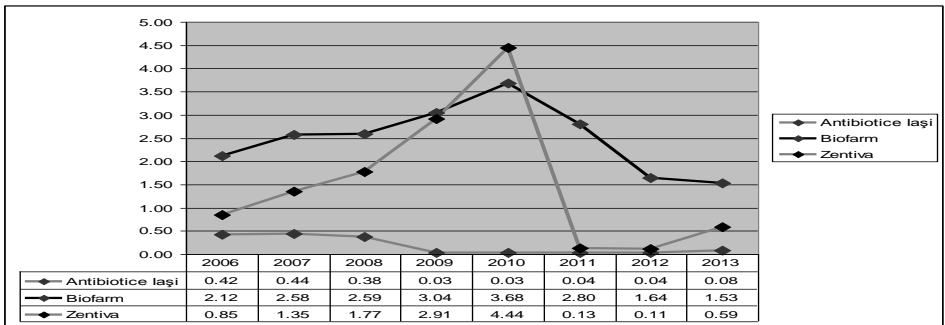
**Figure 2: The evolution of the Qlr during the period 2006-2013, for the analyzed societies**



Source: The data was processed by the authors, based on the annual financial statements, available on the website [www.bvb.ro](http://www.bvb.ro)

It can be noticed the fact that, during the analyzed period, all the societies exceed the recommended values of 0.8 – 1 of the quick liquidity ratio. Therefore, the societies have no problem to cover their current debts from the most liquid current assets (excluding inventories).

**Figure 3: The evolution of the Cr during the period 2006-2013, for the analyzed societies**



Source: The data was processed by the authors, based on the annual financial statements, available on the website [www.bvb.ro](http://www.bvb.ro)

The cash ratio was assessed according to the minimum value of 0.2-0.3 that it is preferable to be recorded by the societies. It can be noticed a high value of the ratio during the period 2006-2013 in the case of Biofarm and Zentiva. Antibiotice Iași, is facing an acute lack of cash since 2009.

In order to determine the average of the liquidity ratios, it was calculated the variation coefficient. The individual values of the liquidity ratios for each analyzed society have a very high variance. The variation coefficient, determined as ratio between the standard deviation and the arithmetic mean (Anghelache; Niculescu, 2001, p. 32), exceeds 100% for all the liquidity ratios calculated, which indicates an unrepresentative arithmetic mean.

In order to notice the dynamics of the liquidity ratios, it was used a scoring model for analyzing the liquidity ratios, similar to the scoring model used by the commercial banks for the analysis of the customer creditworthiness.

**Table 1: The score given for the liquidity ratios**

Current liquidity ratio		Quick liquidity ratio		Cash ratio	
Values	Score	Values	Score	Values	Score
sub 0,5	0	sub 0,5	0	sub 0,2	0
0,5-1	1	0,5-1	1	0,2-0,3	1
1-1,5	2	1-0,8	2	0,3-1	2
1,5-2	3	0,8-1,5	3	1-1,5	3
2-2,5	4	1,5-2,5	4	1,5-2	4
>2,5	5	>2,5	5	>2	5

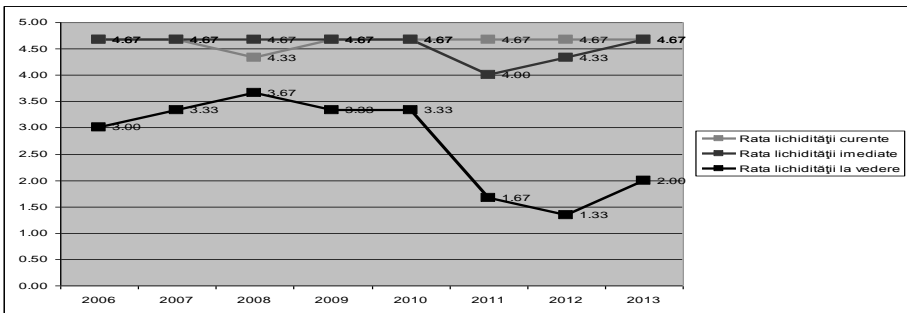
Source: The data was processed by the authors, according to the models for calculating the clients creditworthiness used by the commercial banks

The score of the annual liquidity =  $\sum$  the score given to the societies/number of societies.

The evolution of the average score calculated for the current liquidity ratio of the analyzed societies, is constant over the period under review. Regarding the quick liquidity, the ratio records a constant evolution during the period 2007-2010. In 2011, the ratio decreased and only in 2013 it returned to

the value recorded in 2010. The cash ratio has an oscillating evolution during the analyzed period. Despite the fact that it can be noticed an improvement of the indicator in 2013, its average values did not reached the values from 2006. The ranking of the societies according to the scores given in terms of liquidity is: Biofarm, Zentiva and Antibiotice.

**Figure 4: The evolution of the annual average score, calculated for the liquidity ratios during the period 2006-2013**



Source: The data was processed by the authors, based on the annual financial statements, available on the website [www.bvb.ro](http://www.bvb.ro)

### 3. The relationship between the societies liquidity and profitability

Assuming the fact that the liquidity is one of the ratios that influence the profitability of the analyzed societies, it can be determined the relationship between the current liquidity and the return on assets (ROA), using the simple linear regression. ROA represents the ratio between the net income and the society's assets. In order to determine ROA, it was used a scoring model similar to the one used by the commercial banks for the analysis of the customer creditworthiness.

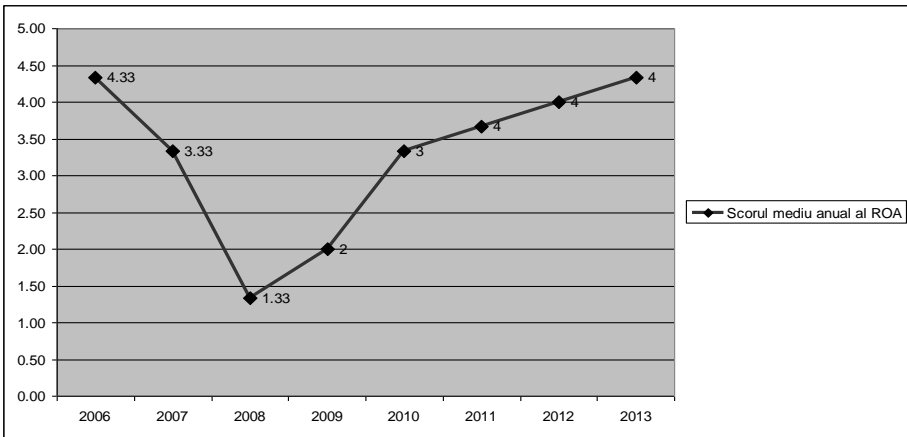
**Table 2: The score given for ROA**

ROA	
Values	Score
< 1	0
1-3,5	1
3,5-6	2

6-8,5	3
8,5-9	4
>9	5

Source: The data was processed by the authors, according to the models for calculating the clients creditworthiness used by the commercial banks

**Figure 5: The evolution of the annual average score, calculated for ROA during the period 2006-2013**



Source: The data was processed by the authors, based on the annual financial statements, available on the website [www.bvb.ro](http://www.bvb.ro)

The evolution of the annual average score was oscillating, recording a decrease until 2008. Since 2009, the indicator's value improves until the end of the analyzed period.

In order to determine if there is a correlation between the liquidity and the ROA's indicator for the analyzed societies, it was used the simple linear regression method, determined on the basis of the model below (Ehiedu, 2014):

$$r = \frac{n \sum xy - (\sum x)(\sum y)}{\sqrt{n(\sum x^2) - (\sum x)^2} \sqrt{n(\sum y^2) - (\sum y)^2}}$$

where:

X - the annual average score for the current liquidity ratio;

Y - the annual average score for ROA

**Table 3: The methodology of calculation necessary to determine the existence of the correlation between the liquidity and the ROA of the analyzed societies**

Year	The annual average score for the current liquidity ratio	The annual average score for ROA	X <sup>2</sup>	Y <sup>2</sup>	XY
	(X)	(Y)			
2006	4.67	4.33	21.81	18.78	20.24
2007	4.67	3.33	21.81	11.11	15.57
2008	4.33	1.33	18.75	1.78	5.77
2009	4.67	2	21.81	4.00	9.34
2010	4.67	3	21.81	11.11	15.57
2011	4.67	4	21.81	13.44	17.12
2012	4.67	4	21.81	16.00	18.68
2013	4.67	4	21.81	18.78	20.24
	ΣX =37.02	ΣY=26.33			
N=8	(ΣX) <sup>2</sup> = 1370.48	(ΣY) <sup>2</sup> = 693.44	ΣX <sup>2</sup> =171.41	ΣY <sup>2</sup> =95	ΣXY=122.52

Source: The data was processed by the authors in the program Excel, based on the annual financial statements, available on the website [www.bvb.ro](http://www.bvb.ro)

The correlation coefficient records a value of 0,72 that shows a positive and close correlation between the two variables. Thus, the fluctuations of the current liquidity ratio influence the ROA's evolution. In order to highlight the correlation between the two analyzed variables, we used the SPSS statistical program. Firstly, we calculated the annual average score for ROA.

	N	Minimum	Maximum	Mean	Std. Deviation
ROA	8	1.33	4.33	3.2488	1.08046
Valid N (listwise)	8				

It can be noticed a minimum value of the indicator of 1.33 in 2008, due to the reduction of the liquidity indicator and a maximum value of 4.33 in 2013. There is no data missing.

**Statistics**

**ROA**

<b>N</b>	Valid	8
	Missing	0
<b>Mean</b>		3.2488
<b>Median</b>		3.6650
<b>Mode</b>		4.00

**Correlations**

		<b>Lichiditate</b>	<b>ROA</b>
<b>Lichiditate</b>	Pearson Correlation	1	0.718 <sup>*</sup>
	Sig. (2-tailed)		0.045
	N	8	8
<b>ROA</b>	Pearson Correlation	0.718 <sup>*</sup>	1
	Sig. (2-tailed)	0.045	
	N	8	8

\*. Correlation is significant at the 0.05 level (2-tailed).

The analysis through the SPSS program also revealed the fact that the correlation between the two indicators is 0,72, which indicates a close correlation. In the tables below, we analyzed the correlation between the variables through the simple linear regression.

**Variables Entered/Removed<sup>a</sup>**

<b>Model</b>	<b>Variables Entered</b>	<b>Variables Removed</b>	<b>Method</b>
1	Lichiditate <sup>b</sup>		Enter

a. Dependent Variable: ROA

b. All requested variables entered.

**Model Summary**

<b>Model</b>	<b>R</b>	<b>R Square</b>	<b>Adjusted R Square</b>	<b>Std. Error of the Estimate</b>
1	0.718 <sup>a</sup>	0.515	0.434	0.81283

a. Predictors: (Constant), Liquidity

**ANOVA<sup>a</sup>**

<b>Model</b>		<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
1	<b>Regression</b>	4.208	1	4.208	6.368	0.045 <sup>b</sup>
	<b>Residual</b>	3.964	6	0.661		



<b>Total</b>	8.172	7			
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a. Dependent Variable: ROA

b. Predictors: (Constant), Liquidity

### Coefficients<sup>a</sup>

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
1 (Constant)	-26.597	11.830		-2.248	0.066	-55.544	2.351
Lichiditate	6.450	2.556	0.718	2.524	0.045	0.196	12.703

a. Dependent Variable: ROA

Source: The data was processed by the authors in the program SPSS

X represents the independent variable (the liquidity), and Y the dependent one (ROA). The unstandardized coefficient of the regression is 6,450, which means that, for each increase of the liquidity variable with 1, the value of ROA increases with 6,450. The regression standardized coefficient is 0,718, which is basically the Pearson correlation coefficient and indicates a close and direct correlation between the two variables.

### 4. Conclusions

The analysis conducted leads to the conclusion that all three societies have sufficient liquidity to cover their payment obligations during the whole analyzed period. Using the Pearson correlation coefficient, we proved the fact that the liquidity is one of the indicators that influence the profitability of the analyzed societies. Therefore, it was demonstrated the existence of a positive and close correlation between the two indicators, the fluctuations of the current liquidity ratio influencing the ROA's evolution.

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