
ANALYSIS OF THE IMPACT OF LIQUIDITY ON THE PROFITABILITY IN THE MEDIUM AND LARGE MEAT PROCESSING ENTERPRISES IN THE REPUBLIC OF SERBIA

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ABSTRACT

Liquidity and profitability are closely related economic categories. The issue of constant balancing between liquidity and profitability, in theory known as “liquidity-profitability trade off”, has been the subject of significant interest of the scientific community. There is no consensus on the direction of the impact of liquidity on profitability, but the existence of this impact in practice is confirmed. The aim of this paper is to investigate the impact of liquidity on profitability, based on selected traditional financial indicators, for medium and large enterprises in the group of processing and preserving of meat and meat products of the Republic of Serbia, in the period 2016 to 2019. The findings of a multiple linear regression analysis, show that the ratio of long-term sources and fixed assets in the group of processing and preserving of meat and meat products makes a statistically significant contribution predicting the return on assets.

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Introduction

Profitability and liquidity stand out as basic measures of sustainability and operational flexibility and represent the focus of the management orientation of modern companies. Liquidity is a traditional, primary measure of the survival or disappearance of a company. In our approach, solvency is not equated with liquidity, but is understood as the ability

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of a company to properly settle all its obligations and maintain stable operations in the foreseeable future (Čavlin, 2020; Radić et al., 2020). Liquidity and profitability management requires a platform (Čavlin, 2015; Milojević et al., 2020; Jokić, 2020), which will enable the smooth flow of business operations of the company, both material and financial in a certain harmony without delay, with maximum profitability, and for the lasting benefit of the company. Based on previous theoretical research, it can be concluded that there is no consensus on the direction of the impact of liquidity on profitability, but the existence of this impact in practice is mostly confirmed.

In accordance with the above, the paper has the following goals:

- the ratio analysis of liquidity and profitability of medium and large enterprises in the processing and preserving of meat and meat products of the Republic of Serbia, and
- the analysis of interdependence and the impact of liquidity on the profitability of assets based on traditional indicators.

Our initial hypothesis is that there is an impact of liquidity on profitability, but there is no consensus on the direction of that impact, and the causes of differences are determined by a number of factors, so the focus of research is on medium and large companies from the group- 10.1 in the processing and preserving of meat and meat products of the Republic of Serbia, in order to create a practical basis for a rational analysis of liquidity and profitability based on traditional financial indicators. In order to achieve the goal of the paper, along with the analysis of relevant literature, in theoretical aspects, typical parameters for liquidity and profitability are analyzed, in meat processing activity in the Republic of Serbia, using data from official financial reports of the companies in the Republic of Serbia for the period from 2016 to 2019 and performing an analysis of the impact of traditional liquidity indicators on the profitability. The paper is structured as follows: an overview of the literature on liquidity and profitability is presented below. The research method is then described, followed by results and discussion. The last section contains concluding remarks.

Literature review

The subject of significant interest, in theory and practice, is the issue of optimal balancing between liquidity and profitability so called „liquidity- profitability trade off“ (Smith, 1980). A sustainable compromise between liquidity and profitability, without neglecting one to the detriment of other management values, is crucial for rational business management and the vitality of the company. The choice of a rational management response in practice is not simple, on the contrary, and the results of scientific research that has dealt with the analysis of different modalities of the relationship between liquidity and profitability are not unambiguous. So, the problem of so-called “Liquidity -profitability trade off” is complex, and below we will highlight the main results of certain research in terms of the existence and quality of the relationship between liquidity and profitability. From one aspect, the existence of a negative relationship between liquidity and profitability is indicated by research

findings of: Deloof (2003), Afza et al. (2007), Mohamed and Saad (2007), Samilogu et al. (2008), Bagchi et al. (2012), Saluja et al. (2012), Priya et al. (2013), Ehiedu (2014) and Raykov (2017). Eljelly (2004) confirms the negative relationship between profitability and liquidity on a sample of companies in Saudi Arabia, by applying correlation and regression analysis, but emphasizes the need to respect the differences between different industries. By analyzing 88 companies listed on the New York Stock Exchange, Gill et al. (2010) confirms the negative relationship between profitability (measured by gross operating profit) and the average period of receivables, but also the positive relationship between the duration of the cash cycle and profitability.

From another aspect, the existence of a positive relationship between liquidity and profitability is indicated by research findings of: García-Teruel and Solano (2007), Uyar (2009), Lamberg and Vålming (2009), Maças Nunes et al. (2010), Saleem and Rehman (2011), Makori and Jagongo (2013) and Mohamed and Hazem (2015).

The issue of “liquidity -profitability trade off” in developing countries has also been explored by Ehi-Oshio et al. (2013) on a sample of 40 Nigerian companies in the period 2006-2010, and based on regression analysis, a positive relationship between the size of the company and its profitability as well as between financial leverage and profitability, while a negative relationship was observed between capital structure and liquidity (measure: the sum of cash and cash equivalents) and the profitability of the enterprise. Mamić Sačer et al. (2013), analyze the impact of liquidity on the profitability of medium and large enterprises in the information and communication industry on a sample of 44 enterprises in the period 2007-2009 in the Republic of Croatia, and on the basis of correlation and regression analysis of selected liquidity and profitability indicators, they have determined the existence of a positive correlation, although of low intensity, between the current liquidity ratio and the gross return on assets indicator, from which it follows that the increase in the value of the current liquidity ratio affects the increase in the value of the gross return on assets for the analyzed companies.

The issue of “liquidity profitability trade off” in Serbia has not been sufficiently researched, and in this context research of Lukić (2012), Jovanović et al. (2017), Čavlin and Tepavac (2020) Stevanović et al. (2021). Denčić-Mihajlov (2015) suggests that larger and more liquid companies also show higher profitability, while the findings of Stevanović et al. (2019) show a significant positive relationship between quick ratio of liquidity, operating cash flow margin and cash flow investment margin on profitability measured by return on assets, and the statistically significant ratio of current liquidity indicators, liquidity indicators of operational and financial net cash flow on profitability.

When it comes to the choice for the selection of the relevant indicator of the given categories, it should be noted that it Levin and Travis (1987) pointed out to analyse ROCA instead of ROA and ROE as being deformed by shareholders' decisions to lease company's assets, while an indicator of liquidity to use working capital sufficiency, cash conversion cycle, and current or acid-test liquidity ratio. The quick ratio behaviour and impact on profitability was investigated by Ahmad (2016), Irawan and Faturohman (2015), Khidmat and Rehman (2014) and Kung'u (2017).

Materials and methods

In order to achieve the goal of the paper, typical parameters for liquidity and profitability analysis shall be analyzed, specifically the position of liquidity and profitability of meat processing activity in the Republic of Serbia, using data from official financial reports of the companies in the Republic of Serbia for the period from 2016 to 2019. The authors shall perform an analysis of the quality of the impact of traditional liquidity indicators on the profitability by using descriptive analysis and multiple linear regression analysis of the influence of two or more explanatory variables on the dependent variable will be used.

By applying this type of regression, the authors wanted to determine what percentage of the variability of the dependent variable was explained by a particular set of independent variables and the relative contribution of each independent variable included in the regression analysis (Rosner, 2011; Radović Marković, Hanić, 2018).

$$\ln\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n \quad (1)$$

The assumptions of employed multiple linear regression model are:

1. linearity as the relationship between X and the mean of Y is linear;
2. Y is a random variable, because it represents a function of e and X₁, X₂... X_k, are not random variables;
3. the expected value of the random error is 0;
4. there is no autocorrelation (random errors are mutually independent);
5. homoskedasticity (equality of variances of random errors) - the variance of residual is the same for any value of X;
6. normal distribution of random errors;
7. explanatory variables are not mutually linearly dependent, i.e. there is no problem of multicollinearity.

The sample size is satisfactory as it requires as a minimum at least 20 cases per independent variable in the analysis.

Results and discussion

The sample includes medium and large enterprises from the Group- 101 Processing and preserving of meat and meat products, Division -10 Manufacture of food products and Section - C Manufacturing. According to the published data, medium and large companies that submitted annual financial reports for 2019 generated a total of 96,503,502.00 dinars of operating income, which represents 71.04% of the total turnover in the Group- 101 Processing and preserving of meat and meat products, i.e. which achieved a total of RSD 2,443,100.00 net profit, which represents 74.48% of the net profit of all active companies in the Group- 101 Processing and preserving

of meat and meat products (hereinafter: meat processing activity). The situation is similar throughout the study period. Given this, the results obtained can be considered representative for the adoption of conclusions. The ratio analysis of liquidity and profitability of the observed companies was performed by analyzing:

- the average values of typical liquidity and profitability indicators for enterprises from the sample of meat processing activity, and
- the range of values of individual liquidity and profitability indicators for enterprises from the sample of meat processing activity and their grouping in accordance with the determined limit values.

By analyzing the obtained results, it is possible to point out the following liquidity and solvency parameters in the Table 1, as follows:

- all average values of liquidity indicators for companies show worse values than the desired theoretical norms, but also slightly better outcomes than the average value than those for the entire meat processing industry.
- the representation of companies that have the value of liquidity ratios below the values of the desired theoretical norms is significant, especially in the ratio of cash quick liquidity.
- considering all liquidity indicators, a high representation of companies with lower value of the expressed indicators than the desired theoretical norms is noticeable, which implies an unfavorable assessment of liquidity and unfavorable conditions for financially stable business operations of the company.

Table 1. Average and grouped liquidity ratios 2016-2019

Period	2019			2018			2017			2016		
Liquidity coefficient ranges	Company	%	%	Company	%	%	Company	%	%	Company	%	%
Coefficient of current (cash) liquidity												
0,00-0,09	24	88,89		20	83,33		12	63,16		13	86,67	
0,10-0,29	2	7,41	96,3	2	8,33	95,8	4	21,05	100	1	6,67	100
0,30-0,99	0	0,00		1	4,17		3	15,79		1	6,67	
≥1,00	1	3,70	3,7	1	4,17	4,2	0	0,00		0	0,00	0,00
Total number of companies	27	100	100	24	100	100	19	100	100	15	100	100
Average sample realization	0,16			0,13			0,09			0,08		
Average performance	0,15			0,07			0,05			0,06		
Coefficient of current (general) liquidity												
0,00-0,99	12	44,44		5	20,83		5	26,32		4	26,67	

Period		2019			2018			2017			2016		
Liquidity coefficient ranges	Company	%	%	Company	%	%	Company	%	%	Company	%	%	
1,00-1,39	7	25,93	88,9	10	41,67	75,0	7	36,84	84,2	5	33,33	86,7	
1,40-1,99	5	18,52		3	12,50		4	21,05		4	26,67		
≥2,00	3	11,11	11,1	6	25,00	25,0	3	15,79	15,8	2	13,33	13,3	
Total number of companies	27	100	100	24	100	100	19	100	100	15	100	100	
Average sample realization	1,38			1,6			1,48			1,35			
Average performance	1,08			0,93			0,89			0,94			
Coefficient of solvency (financial stability)													
0,00-0,49	12	44,44		12	50,00		9	47,37		6	40,00		
0,50-0,79	3	11,11	63,0	1	4,17	62,5	2	10,53	63,2	1	6,67	66,7	
0,80-0,99	2	7,41		2	8,33		1	5,26		3	20,00		
1,00-1,49	8	29,63		8	33,33		5	26,32		3	20,00		
1,50-1,99	1	3,70	37,0	1	4,17	37,5	2	10,53	36,8	1	6,67	33,3	
≥2,00	1	3,70		0	0,00		0	0,00		1	6,67		
Total number of companies	27	100	100	24	100	100	19	100	100	15	100	100	
Average sample realization	0,63			0,65			0,58			0,65			
Average performance	0,62			0,59			0,57			0,57			

Source: Authors' calculations

By analyzing the results, it is possible to point out the following parameters of profitability in the Table 2:

- most of the average values of profitability indicators for the companies from the sample, show worse values than the desired norms, but also slightly better results than the average values than those expressed for the entire meat processing activity.
- the representation of companies that have the value of profitability indicators below the values of the desired theoretical norms is dominant, except for the value of indicators of return on capital, where 44.4% of companies are ranked.
- the analysis of profitability indicators shows a significant representation of companies with worse values of the expressed indicators than the desired norms, which implies an unfavorable assessment of the company's profitability in the analyzed sample, and in the observed period.

Table 2. Average and grouped profitability indicators 2016-2019

Period of time		2019			2018			2017			2016		
Range of indicators	Company	%	%	Company	%	%	Company	%	%	Company	%	%	
Net profit margin													
0	5	18,5		10	41,7		5	26,3		5	33,3		
0,01-0,049	18	66,7	85,2	10	41,7	83,3	11	57,9	84,2	6	40,0	73,3	
0,05-0,099	4	14,8	14,8	3	12,5		3	15,8	15,8	4	26,7		
0,10-0,19				1	4,2	14,8				0	0,0	26,7	
Total number of companies	27	100,0	100	24	100	100	19	100,0		15	100	100	
Average sample realization	0,02			0,2			0,2			0,03			
Average performance	0,02			0,04			0,03			0,03			
Gross profit margin													
0	3	11,1		4	16,7		3	15,8		2	13,3		
0,01-0,049	18	66,7	77,8	16	66,7	83,3	13	68,4	84,2	8	53,3	66,7	
0,05-0,099	6	22,2	22,2	3	12,5		2	10,5		4	26,7		
0,10-0,19				1	4,2	16,7	1	5,3	15,8	1	6,7	33,3	
Total number of companies	27	100,0	100	24	100	100	19	100	100	15	100	100	
Average sample realization	0,81			0,8			0,82			0,78			
Average performance	0,79			0,8			0,82			0,79			
Return on assets (ROA)													
0	2	7,4		6	25,0		4	21,1		5	33,3		
0,01-0,049	19	70,4	77,8	8	33,3	58,3	8	42,1	63,2	4	26,7	60,0	
0,05-0,099	5	18,5	18,5	7	29,2		5	26,3		3	20,0		
0,10-0,19	0			3	12,5	41,7	2	10,5	36,8	1	6,7		
0,2	0			0	0		0	0		2	13,3	40,0	
Total number of companies	27	100,0	100	24	100	100	19	100	100	15	100	100	
Average sample realization	0,06			0,04			0,04			0,06			
Average performance	0,03			0,05			0,03			0,04			
Return on equity (ROE)													
-0,01										0			
0	2	7,4		6	25,0		3	15,8		4	26,7		

Period of time		2019			2018			2017			2016	
Range of indicators	Company	%	%	Company	%	%	Company	%	%	Company	%	%
0,01-0,049	10	37,0	44,4	7	29,2	54,2	4	21,1	36,8	3	20,0	46,7
0,05-0,099	8	29,6		4	16,7		7	36,8		3	20,0	
0,10-0,19	4	14,8		6	25,0		3	15,8		2	13,3	
0,2-0,39	1	3,7		1	4,2	45,8	1	5,3		2	13,3	
0,40-0,59	1	3,7		0	0		0	0,0		0	0,0	
0,6	1	3,7	55,6	0	0		1	5,3	63,2	1	6,7	53,3
Total number of companies	27	100,0	100	24	100	100	19	100	100	15	100	100
Average sample realization	0,17			0,12			0,11			0,18		
Average performance	0,06			0,1			0,06			0,08		

Source: Authors' calculations

Thus, the further subject of research focuses on the analysis of interdependence and the impact of the most typical traditional liquidity indicators on one of the most important profitability indicators - ROA. The independent variables taken into analysis for the period from 2016 to 2019 are: Liquidity 1- General liquidity ratio; Liquidity 2- Cash liquidity ratio and Solvency - Relationship between long-term sources and fixed assets. The dependent variable is Profitability - Return on Assets (ROA). In order to fulfill the necessary preconditions for checking the validity of the assumptions, we performed the following checks. Initial correlations between variables in the model are given in the Correlations table (Table 3). Variables with a linear correlation of 0.7 or more should not be included in the same analysis (Pallant, 2010). All three independent variables (LIK1, LIK2, SOL) satisfactorily correlate with the dependent variable (Table 3).

Table 3. Correlation analysis

		Correlations			
		ROA	LIK1	LIK2	SOL
Pearson Correlation	ROA	1,000	,044	,003	,336
	LIK1	,044	1,000	,626	,488
	LIK2	,003	,626	1,000	,182
	SOL	,336	,488	,182	1,000
Sig. (1-tailed)	ROA	.	,345	,488	,001
	LIK1	,345	.	,000	,000
	LIK2	,488	,000	.	,047
	SOL	,001	,000	,047	.

Correlations					
		ROA	LIK1	LIK2	SOL
N	ROA	86	86	86	86
	LIK1	86	86	86	86
	LIK2	86	86	86	86
	SOL	86	86	86	86

Source: Authors' calculations

In the Table 4 we can see that the Tolerance for each independent variable is less than 0.10, so the assumption of the absence of multicollinearity is not violated. This conclusion is also supported by the VIF values that are below the intersection point 10.

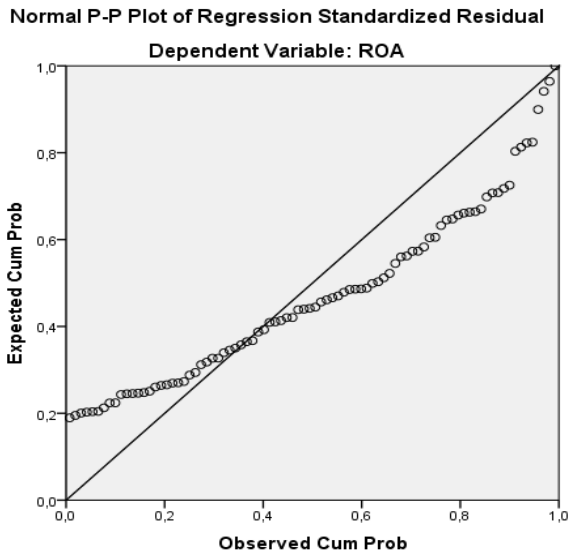
Table 4. Collinearity test

Collinearity Statistics	
Tolerance	VIF
,463	2,160
,587	1,702
,737	1,357

Source: Authors' calculations

On the Figure 1. of normal probability (Normal P-P Plot) we can see that the points lie in an approximately straight diagonal line from the lower left to the upper right corner of the diagram, which indicates that there are no large deviations from normal.

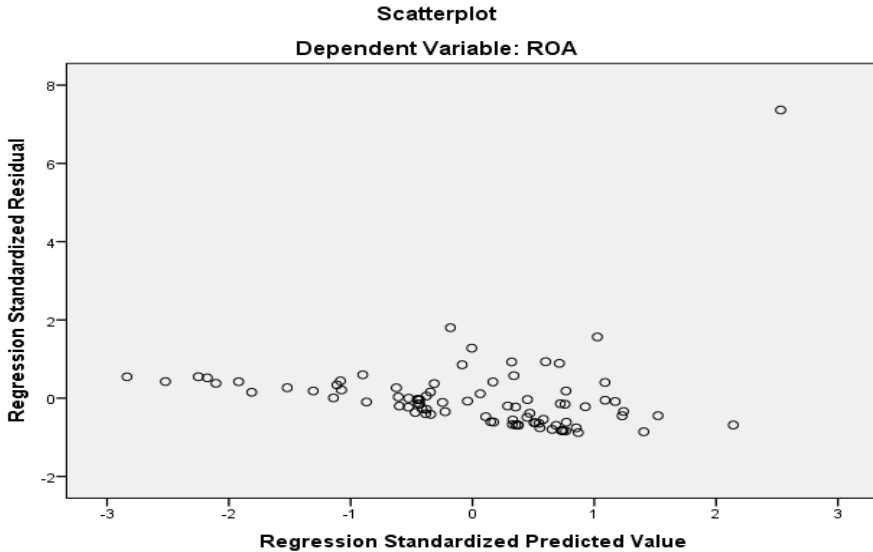
Figure 1. Figure of normal probability



Source: Authors' calculations

In the Figure 2 of scatterplot of standardized residues, the residues are approximately rectangularly distributed and most of the scatter points are accumulated in the center (around point 0).

Figure 2. Scattering diagram



Source: Authors' calculations

In the Table 5, “R” represents the value of the multiple correlation coefficient used to determine the prediction quality of the dependent variable, in this case ROA. A value of 0.36 represents a good level of prediction. The column “R Square” represents the decision coefficient, i.e. the dispersion ratio of the dependent variable that can be explained by independent variables. The value of 0.133 represents 13.3% of the variability of the dependent variable which can be explained by the independent variables.

Table 5. Model evaluation

Model Summary ^b				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,365 ^a	,133	,101	,08781
a. Predictors: (Constant), SOL, LIK2, LIK1				
b. Dependent Variable: ROA				

Source: Authors' calculations

F-value in the Table 6, shown below, tests whether the regression model is good. The table shows that the independent variables statistically predict the dependent variable well (Sig. = .008) and this actually means that our regression model is good $F(3.82) = 4.193, p < 0.05$.

Table 6. Regression model test

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,097	3	,032	4,193	,008 ^b
	Residual	,632	82	,008		
	Total	,729	85			
a. Dependent Variable: ROA						
b. Predictors: (Constant), SOL, LIK2, LIK1						

Source: Authors' calculations

From the Table 7 we arrive at the regression equation which reads $ROA = 0.042 - (0.019 \times LIK1) + (0.012 \times LIK2) + (0.053 \times SOL)$. We then proceed to determine the significance of independent variables $p < 0.05$ and conclude that only one independent variable makes a statistically significant contribution to our research and that is the Ratio of long-term sources and fixed assets (SOL). Neither the variable Current Liquidity Ratio (general liquidity ratio - LIK1) nor the Current Liquidity Ratio (cash liquidity ratio - LIK2) for the period 2016-2019 have provided statistically significant predictions of the variable return on assets (ROA).

Table 7. Estimates of model coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	,042	,020		2,100	,039	,002	,081
	LIK1	-,019	,015	-,190	-1,257	,212	-,050	,011
	LIK2	,012	,035	,046	,342	,733	-,058	,083
	SOL	,053	,015	,420	3,508	,001	,023	,083

Source: Authors' calculations

We can conclude that multiple regression was performed to determine the best linear combination of LIK1, LIK 2 and SOL for ROA prediction. From the Table 7 we see that this combination of variables significantly predicted 13.3% of the variability of the dependent variable ($R^2 = .13$, $F(3.82) = 4.19$, $p < .01$). In our study, we found that only one variable "The ratio of long-term sources to fixed assets" ($\beta = .53$, $p < .001$), in our model, makes a statistically significant contribution to the prediction of the return on assets. If the solvency, i.e. the ratio of long-term sources and fixed assets increases by one unit, the ROA coefficient shall increase by 0.053.

Conclusions

The profit position of a company is influenced by numerous factors and in this paper the authors wanted to additionally explore the impact of liquidity in the meat processing activity in the Republic of Serbia in the period 2006-2019. Previous research has shown the connection of these categories in different economic activities. The analysis of meat processing activity in the Republic of Serbia, in the period 2006-2019, gives a markedly unfavorable assessment of the liquidity position, and a somewhat more favorable assessment of the profit position. The findings of the regression analysis show a statistically significant and positive impact of the selected solvency ratio on the return on assets - ROA, while the impact of general and cash liquidity ratio is not statistically significant. The obtained results justify the process of analysis of “liquidity-profitability trade off” in order to show how a platform for rational management of liquidity and profitability of the company could be created. The further course of research on the issue of “liquidity profitability trade off” on the one hand should be focused on other activities and types of companies, and on the other hand on a wider range of liquidity and profitability indicators.

Conflict of interests

The authors declare no conflict of interest.

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