THE IMPACT OF RATIO ANALYSIS ON THE EVALUATION AND MANAGEMENT OF LIQUIDITY IN AGRO-PROCESSING COMPANIES

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ABSTRACT

Liquidity is a fundamental element of business partnerships, directly influencing the establishment or loss of trust, with emphasis on the dynamics financial interactions. The assessment of liquidity in financial analysis requires the use of predefined metrics or analytical guiding star. The aim of this research is to investigate the contribution of ratio analysis on the valuation and management of liquidity in agro-processing enterprises. The research employs annual financial reports of agroprocessing companies from 2016 to 2023, utilizing regression analysis to identify critical challenges in liquidity management. The findings show that there is a positive correlation between the selected metrics of the static and dynamic basis of liquidity, and their negative correlation with the indebtedness indicator on the example of the agro-processing industry of Serbia. The contribution of this study is that its results can be used in the preparation and implementation of effective liquidity strategies in agroprocessing companies.

Introduction

Liquidity is a crucial determinant of a company's survival or failure, reflecting the overall outcome of its financial operations and significantly impacting business confidence. A company may operate at a loss yet continue functioning due to adequate liquidity. In contrast, a profitable yet illiquid company can face severe operational challenges, potentially leading to bankruptcy, restructuring, acquisition, or, at best,

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continued operations in a modified form. Ultimately, such a company risks losing managerial autonomy, with benefits shifting to investors. Thus, maintaining liquidity alongside profit generation is essential for a company's financial health and its capacity to adapt to changing external and internal business factors (Malešević, Čavlin, 2020).

Liquidity issues remain a central topic in numerous studies, gaining prominence in times of crisis, both locally and globally. Notable domestic research (Orsag, 2012; Malešević, 2014; Belak, 2014; Mikerević, 2015; Milojević, 2016; Žager, Ježovita, 2017) underscores the importance of ratio analysis in assessing and managing liquidity. Similarly, international scholars (Friedlob & Schleifer, 2003; Pantić & Milojević, 2023). Altman, 2019; Shim, Siegel, 2019) emphasize the importance of comprehensive liquidity analysis for a company's sustainability.

One key debate in financial management concerns the use of multiple static and dynamic indicators to assess liquidity comprehensively. Although these indicators are widely applied, they often overlook specific internal and external factors. Research (Anjum, Malik, 2013) highlights a positive correlation between effective liquidity indicators and variables such as board size, board independence, and firm profitability. Likewise, (Mursalini et al., 2017; Pantić et al., 2022) found that, in Turkey's agro-processing industry, the cash conversion cycle and sales growth significantly affect liquidity. Additionally, findings from (Čavlin et al., 2022) indicate that liquidity ratios and dynamic solvency are strong predictors of the variable rentability during and before COVID-19 in agro-industrial companies in Serbia. Moreover, cash flow management is recognized as a key liquidity mechanism. Studies by (Garanina, Belova, 2015) show that operational cash flow significantly explains variations in liquidity, with its positive influence extending to debt, market, productivity, and dividend indicators at different levels of significance (Al-Shubiri, Aburumman, 2013). According to (Vu et al, 2020) findings, based on the analysis of Vietnamese companies from the production sector does not find a statistical relationship among: the cash conversion cycle-rentability and solvency-age of the company. While, he finds a negative statistical relationship among the net business cycle-rentaability and the performance of the company's organizational context.

The impact of Serbian agriculture is significant in generating basic macroeconomic outcomes measured as GDP, employment and similar (Đurić et al, 2019).The agricultural sector represents a promising prospect for Serbia in the process of EU integration; however, it is accompanied by a range of challenges, including a decline in real income, which limits its potential for transformation, including digitalization (Tankosić et al., 2024). Many agro-processing companies, in response to these liquidity challenges, should adopt lean management principles to create value with minimal waste (Pešić et al., 2022). The agro-processing industry is a vital sector in Serbia, with 35,878 companies operating in the Manufacture of Food Products sector in 2023 (APR, http://www.apr. gov.rs), representing 20.64% of the entire processing sector. While, their number in the subsectors represents 31.79% of the entire agro-processing sector, medium and large enterprises have a relatively more significant presence in the subsectors.

The core hypothesis of this study is that the complementary use of static and dynamic liquidity indicators is justified, not only for assessing but also for improving liquidity management in agro-processing companies. The analysis of selected liquidity indicators in agro-processing companies from 2016 to 2023, using descriptive and statistical methods, aims to identify key features of liquidity indicators for more informed decision-making.

The fundamental aim of this research is to evaluate the interdependence of liquidity indicators in agro-processing companies, with the hypothesis that a complementary application of these indicators can provide a comprehensive view of liquidity and enhance the effectiveness of liquidity management practices. The conclusions support the complementary application of static and dynamic basis metrics as a holistic platform for corporate liquidity management.

Materials and methods

As the primary source of data, the financial statements submitted to the Serbian Agency for Economic Registers were used, while the methodology of the Serbian Republic Institute of Statistics was used for the selection of the statistical sample of the acquisition of agro-processing activities.The sample is categorized by sector, for period 2016 to 2023, as follows: Sector – Manufacture of Food Products and its following Subsectors: Meat Processing and Preservation, Processing and Preserving of Fruits and Vegetables and Manufacture of Other Food Products.

The construction of indicators for liquidity ratio analysis relies on analytical standards: (Malešević, Čavlin, 2020):

> Indicator of prospective liquidity = Liquid assets / Current liabilities
>
> Indicator of effective liquidity = (Liquid assets - Inventory) / Current liabilities
>
> Average Days Cash Conversion Cycle = Average Inventory Days + Average Accounts Receivables Days - Average Payable Days
>
> Indicator of Indebtedness = (Liabilities - Capital) / Assets
>
> Indicator of Interest Coverage (Dynamic Solvency) = Operating Profit / Interest Expenses (third parties)

Correlation analysis was applied, where the correlation coefficient for the population uses the symbol ρ, and for the sample r. Correlation analysis was used, where the correlation coefficient for the population uses the symbol ρ, and for the sample r, while (k_i, y_i), i = 1, 2, 3...n is used to illustrate the sample, and the following expression:

$$r = \frac{\sum x_i y_i - n \cdot \bar{x} \cdot \bar{y}}{\sqrt{(\sum x_i^2 - n \cdot \bar{x}^2) \cdot (\sum y_i^2 - n \cdot \bar{y}^2)}}$$

The correlation coefficient r refers to the intensity and orientation of the interdependence of variables, in the spectrum of variable sizes from -1 to 1 (complete or negative correlation). The statistical significance of this coefficient is evaluated based on the t-value, where the resulting r is compared with the given tabular frames.The statistical

significance of this coefficient is evaluated through the t-value, whereby the obtained r is compared with the given tabular value. According to the findings (Radović-Marković, Hanić, 2018), the assessment of the significance of the interdependence of the variables X and I in the context of the research hypothesis is realized by verifying the null premiss, which assumes that the linear correlation coefficient is equal to zero, relying on the subsequent t-test statistic.

$$t = \sqrt{\frac{n-2}{1-r^2}}$$

Results and discussion

Over the past eight years, the sector and subsectors analyzed have demonstrated solid performance, particularly regarding revenue and employment. Revenues in the Sector: Manufacture of Food Products grew nominally by 60.8% between 2016 and 2023, though their share of total processing industry revenues decreased by 17.3%.

In the Subsector: Meat Processing and Preservation, revenues increased by 84.8%, raising their share by 14.8%. In the sub-sector Fruit and vegetable processing and canning: the dynamics of income is developing respectively with a trend of 45.4%, but the decrease in participation in the income structure of the sector by 10.5% is worrying. Similarly,the Subsector: Manufacture of Other Food Products experienced a 43.2% increase in revenues, yet their share dropped by 12.2%.

Employment in the Sector: Manufacture of Food Products grew by 26.5%, reaching 84,225 workers in 2023, contributing 18.2% to total industry employment. The Subsector: Meat Processing and Preservation saw a 26.5% increase in employment, making up 17.8% of the sector's workforce. The analysis of employment for the subsector Processing and Preserving of Fruits and Vegetables reflects an employment increase of 18.3%, contributing 12.4% to the sector's employment structure, while the subsector Manufacture of Other Food Products recorded an employment growth of 19.8%, contributing 14.1%.

Table 1. Overview of Key Liquidity Performance Indicators for Sector A0
in the Period 2016-2023

Categories	2016	2017	2018	2019	2020	2021	2022	2023	AP	M	SD
LP	2,34	2,24	2,24	2,27	2,47	2,55	2,59	2,68	2,42	2,4	0,17
LE	1,57	1,44	1,42	1,42	1,55	1,53	1,48	1,67	1,51	1,5	0,08
GC	117	111	107	102	149	153,3	147,11	143,3	128,7	130,2	21,4
ZAD	1,12	1,14	1,12	1,13	1,11	1,9	1,08	1,05	1,2	1,1	0,28
DS	6,5	6,97	6,7	7,16	11,97	12,73	12,21	7,39	8,9	703	2,79

Source: Authors' calculations

Legend: Sector A0 – Manufacture of Food Products Sector, LP – Prospective Liquidity, LE – Effective Liquidity, GC – Cash Cycle, ZAD – Indebtedness, DS – Dynamic Solvency, AP - Arithmetic Mean , M- Median, SD- Standard Deviation

The results in Table 1 demonstrate stable liquidity throughout the analyzed period.

The above-standard and solid average values of the indicators of prospective and effective liquidity of 2.42 (standard deviation: 0.17) and 1.51 (standard deviation. 0.08), respectively, indicate a persistent static picture of the subsector's financial position. While, based on the average period of the cash cycle of 128.7 (standard deviation of 21.4), a noticeable dynamic intensity of liquidity indicated by COVID-19 can be observed. When it comes to the debt position, the leverage indicator value of 1.2, (standard deviation: 0.28) it is solid except that the steady persistence was ordered in the year of duration of COVID-19. While increased variability in the ability of companies to manage long-term liabilities, especially during COVID-19, is indicated by the average score of the dynamic solvency indicator of 8.9 (standard deviation of 2.79). It can be summarized that the liquidity dynamics of the respective sector is favorable, but caution is required due to the observed negative tendencies caused by COVID-19.

Table 2. Overview of Key Liquidity Performance Indicators for Sector A1
in the Period 2016-2023

Categories	2016	2017	2018	2019	2020	2021	2022	2023	AP	M	SD
LP	2,47	2,46	2,4	2,39	2,8	2,62	2,73	2,87	2,59	2,55	0,18
LE	1,57	1,52	1,46	1,47	1,71	1,58	1,58	1,71	1,58	1,58	0,09
GC	93	83	64	62	103	92,2	98,56	95,43	86,40	92,6	14,54
ZAD	1,07	1,06	1,05	1,08	1,07	1,05	1	1	1,05	1,06	0,03
DS	6,54	7,09	8,69	10,53	12,48	10,64	14,16	9,16	9,91	9,84	2,42

Source: Authors' calculations

Legend: Sector A1 – Meat Processing and Preservation Sector

Stable liquidity is suggested by the results presented in Table 2 throughout the analyzed period.

The enviable dynamics of the average achievements of the perspective liquidity indicator of 2.59 (standard deviation: 0.18), and even slightly better performance of the effective liquidity indicator of 1.58 (standard deviation: 0.09) indicate the sustainability of the static dimension of the analyzed short-term solvency sub-sector. Contributing to this rating is the steady average value of the indebtedness indicator of 1.05 (standard deviation: 0.03), which completes the conditions for financial sustainability through debt management. The dynamic dimension of liquidity expressed by the average realization of 86.4 days of the duration of the cash cycle (standard deviation: 14.5) shows variability, and intensive changes in dynamics during the COVID-19. Variability in the company's capacity to manage long-term liabilities, especially after the COVID-19 crisis reflects an average achievement of the dynamic solvency indicator of 9.9 (standard deviation: 2.2).

In conclusion, liquidity is generally stable, though improvements in working capital and long-term debt management are advisable.

Table 3. Overview of Key Liquidity Performance Indicators for Sector A2
in the Period 2016-2023

Categories	2016	2017	2018	2019	2020	2021	2022	2023	AP	M	SD
LP	2,52	2,57	2,75	3,11	3,22	3,08	3,13	3,15	2,94	3,1	0,28
LE	1,64	1,68	1,86	2,01	1,92	1,76	1,57	1,66	1,76	1,72	0,15
GC	146	156	187	173	214	172,1	218,1	219,2	185,7	180	28,7
ZAD	0,81	0,81	0,79	0,93	0,83	0,88	0,98	1,03	0,88	0,86	0,09
DS	4,43	7,67	7,6	8,69	12,26	13,11	10,09	5,41	8,66	8,18	3,06

Source: Authors' calculations

Legend: Sector A2 – Processing and Preserving of Fruits and Vegetables

Relative stability in liquidity over the period is highlighted by the analysis presented in Table 3.

From the aspect of static analysis of liquidity, expressed by indicators of average values of 2.94 (standard deviation: 0.09) prospective and 1.58 (standard deviation: 0.28) effective liquidity, it can be pointed out the consistency of financial vitality in the short term. While, from the aspect of dynamic analysis of liquidity, the average number of cash cycle days of 185.7 (standard deviation: 28.7) shows important dynamic oscillations that are noticeable with the emergence of COVID-19. Steady at 0.88, indebtedness maintains a low standard deviation of 3.06, signifying a stable debt level. Average dynamic solvency performance of 8.66 (standard deviation: 3.06), indicates heightened volatility in the company's capacity to manage long-term obligations, particularly during the COVID-19 period. In summary, indebtedness and liquidity remain stable, while dynamic solvency and the cash cycle experience significant fluctuations, suggesting some instability in the company's financial situate.

Table 4. Overview of Key Liquidity Performance Indicators for Sector A3
in the Period 2016-2023

Categories	2016	2017	2018	2019	2020	2021	2022	2023	AP	M	SD
LP	2,91	2,57	2,56	2,71	2,81	3,31	3,29	3,38	3,1	2,8	0,3
LE	2,07	1,68	1,69	1,66	1,83	2,05	2,08	2,2	1,91	1,94	0,2
GC	186	183	152	172	232	286,2	206,1	229,1	206,4	196,1	42,4
ZAD	1,02	1,03	0,98	0,99	1,03	0,94	1,03	1,04	1,00	1,02	0,03
DS	16,69	13,88	11,57	10,61	13,03	15,03	16,68	7,03	13,3	13,4	13,39

Source: Authors' calculations

Legend: Sector A3 – Manufacture of Other Food Products

Relative stability in liquidity over the period is highlighted by the analysis presented in Table 4. averaging 3.1 prospective liquidity (standard deviation: 0,3) demonstrates moderate variability. The relative stability of liquidity over the period is highlighted by the analysis shown in Table 4. At an average of 3.1, prospective liquidity shows moderate variability, followed by a standard deviation of 0.3. Whereby, the performance of the effective liquidity expression of 1.91 (standard deviation: 0.2) contributes to the

favorable static assessment of the position of short-term financial trust. The relatively long and dynamic nature of the number of days of the cash cycle is 196.1 (standard deviation: 42.4), which intensified and corresponded with the period of COVID-19. The level of the average point of the indebtedness ratio of 1.02 (standard deviation: 0.3) corresponds to a stable debt position, while the level of the average point of the dynamic solvency ratio of 13.33 (standard deviation: 13.06) indicates intensive dynamics when it comes to capacity settlement of long-term obligations.

Overall, liquidity and indebtedness are stable, while the cash cycle and dynamic solvency exhibit higher variability, pointing to fluctuations in cash management and long-term financial stability. Further research should explore the relevance of traditional liquidity ratios in managing the financial health of agro-processing companies.

Table 5. Correlation analysis parameters for sector A0

Categories	LP	LE	GC	ZAD	DS
Pearson's Correlation Coefficient	1	0,763	0,9164	-0,9458	0,61079
Sig. (2 - tailed) value		0,0349*	0,0026*	0,0012*	0,1218
LP					
Pearson's Correlation Coefficient			1	0,6126	-0,7475	0,1227
Sig. (2 - tailed) value				0,109	0,041*	0,796
LE					
Pearson's Correlation Coefficient				-0,7284	0,8621
Sig. (2 - tailed) value				0,0493*	0,009*
GC					
Pearson's Correlation Coefficient					-0,3575
Sig. (2 - tailed) value					0,4068
ZAD					
Pearson's Correlation Coefficient					1
Sig. (2 - tailed) value					
DS					
N	8	8	8	8	8

Source: Authors' calculations

Legend: Sector A0 – Manufacture of Food Products, N – number of periods

To examine the interdependence of variables within Sector A0 – Manufacture of Food Products from 2016 to 2023, a correlation analysis was performed. This analysis identified the direction of relationships among five variables and evaluated their strength based on numerical parameters.

During the period, statistically significant results were found for Pearson's correlation coefficient for Sector A0 confirming notable correlations among various liquidity and indebtedness metrics. Specifically, significant correlations were established between perspective liquidity and effective liquidity (p=0.0349), perspective liquidity and the cash cycle (p=0.0026), perspective liquidity and indebtedness (p=0.0012), effective liquidity and indebtedness (p=0.041), cash cycle and dynamic solvency (p=0.0493), as

well as the cash cycle and indebtedness (p=0.009).Noteworthy positive correlations were identified, including ratios prospective liquidity and effective liquidity (r=0.744), ratios of prospective liquidity and the cash conversion cycle (r=0.894), and ratios of dynamic solvency and the cash conversion cycle (r=0.841), indicating statistically significant positive linear relationships. On the other hand, there is a negative correlation among ratios of perspective liquidity and indebtedness (r=0.945), ratios effective liquidity and indebtedness (r=0.747) and ratios cash conversion cycles.

These findings emphasize the need for companies to balance borrowing and liquidity management to ensure financial stability and mitigate risk.

Table 6. Correlation analysis parameters for sector A1

Categories	LP	LE	GC	ZAD	DS
Pearson's Correlation Coefficient	1	0,9305	0,8105	-0,6105	0,5324
Sig. (2 - tailed) value		0,0007*	0,0146*	0,1078	0,1742
LP					
Pearson's Correlation Coefficient		1	0,8512	-0,3547	0,2991
Sig. (2 - tailed) value			0,0073*	0,3885	0,04716
LE					
Pearson's Correlation Coefficient			1	-0,3721	0,3243
Sig. (2 - tailed) value				0,3641	0,4333
LE					
Pearson's Correlation Coefficient				1	-0,3335
Sig. (2 - tailed) value					0,4194
LE					
Pearson's Correlation Coefficient					1
Sig. (2 - tailed) value					
LE					
N	8	8	8	8	8

Source: Authors' calculations

Legend: Sector A1 – Meat Processing and Preservation Sector

The further direction of the analysis is oriented towards the diagnosis of the quality of relations between the established variables for Sector A1 - Sector for meat processing and preservation for the period from 2016 to 2023, and a correlation analysis was also performed. The analysis identified the direction of relationships among five variables, and conclusions were drawn regarding the strength of these relationships based on numerical parameters. The Pearson correlation coefficient for Sector A1 - Sector for meat processing and canning in this period confirms the key correlation between: the indicator of prospective liquidity and the indicator of effective liquidity (p=0.0007), the indicator of prospective liquidity and the cash cycle (p=0.0146), and effective liquidity indicator and cash cycle indicator (p=0.0073). A very powerful positive correlation among prospective and effective liquidity (r=0.9305) is the first significant relationship detected. Then the following relationship was detected, the character of which is

reflected by the significant correlation (r = 0.81) between the indicator of prospective liquidity and the days of the cash conversion cycle. While, the third-ranked relationship is characterized by a high degree of significance of correlation (r = 0.85) between the ratio of effective liquidity and days of the cash conversion cycle.

Table 7. Correlation analysis parameters for sector A2

Categories	LP	LE	GC	ZAD	DS
Pearson's Correlation Coefficient	1	0,3084	0,8039	0,6831	0,613
Sig. (2 - tailed) value		0,4805	0,0217*	0,0728	0,1251
LP					
Pearson's Correlation Coefficient		1	-0,0296	-0,2646	0,3488
Sig. (2 - tailed) value			0,9492	0,551	0,4195
LE					
Pearson's Correlation Coefficient			1	0,6309	0,2908
Sig. (2 - tailed) value				0,1068	0,4197
GC					
Pearson's Correlation Coefficient				1	-0,0347
Sig. (2 - tailed) value					0,9597
ZAD					
Pearson's Correlation Coefficient					1
Sig. (2 - tailed) value					
DS					
N	8	8	8	8	8

Source: Authors' calculations

Legend: Sector A2 – Processing and Preserving of Fruits and Vegetables

When it comes to the Subsector: Processing and canning of fruits and vegetables for the period from 2016 to 2023, the assessment is based on the findings of the correlation analysis.

This analysis determined the direction of relationships among five variables and drew conclusions regarding the strength of these relationships based on numerical parameters. In the Subsector: Processing and canning of fruits and vegetables in the period from 2016 to 2023, a significant connection was confirmed between the indicator of prospective liquidity and the indicator of the cash cycle (p=0.0217). Other relationships between variables show moderate or low correlation, and most are not statistically relevant (p-values greater than 0.05).

The first, and the only significant interdependence between potential liquidity and the money cycle reflects a strong positive correlation (r = 0.8039), which indicates that as a result of the analysis, a high-ranking significant relationship of a positive linear nature of the relationship is observable.

In other words, the findings suggest that changes in prospective liquidity strongly influence changes in the cash cycle.

Table 8. Correlation analysis parameters for sector A3

Categories	LP	LE	GC	ZAD	DS
Pearson's Correlation Coefficient	1	0,9385	0,7511	0,0255	0,0084
Sig. (2 - tailed) value		,00143*	0,0395*	0,977	0,9914
LP	8	8	8	8	8
Pearson's Correlation Coefficient		1	0,6095	0,1979	0,0983
Sig. (2 - tailed) value			0,1229	0,6627	0,8416
LE		8	8	8	8
Pearson's Correlation Coefficient			1	-0,2793	0,0954
Sig. (2 - tailed) value				0,5264	0,8472
GC			8	8	8
Pearson's Correlation Coefficient				1	0,0954
Sig. (2 - tailed) value					0,7522
ZAD				8	8
Pearson's Correlation Coefficient					1
Sig. (2 - tailed) value					
DS					
N	8	8	8	8	8

Source: Authors' calculations

Legend: Sector A3 – Manufacture of Other Food Products.

The findings were used to examine, on the basis of correlation analysis, whether there is interdependence among the observed variables within Sector A3 - Production of other food products in the period from 2016-2023. year. This evaluation identified the direction of relationships among five variables, and conclusions regarding their strength were drawn based on numerical parameters. Pearson's correlation coefficient for Sector A3 – Manufacture of Other Food Products during this period confirming a significant association between: prospective liquidity and effective liquidity (p=0.0014), as well as between prospective liquidity and the cash conversion cycle (p=0.0395). A very strong relationship between prospective and effective liquidity is suggested by the strong positive correlation (r=0.9385), indicating a statistically highly significant positive linear association. Similarly, a statistically significant positive linear relationship is confirmed by the powerful positive association between prospective liquidity and the cash cycle (r=0.7511). This implies that changes in prospective liquidity significantly influence changes in the cash conversion cycle, which aligns with expectations.

To summarize, the descriptive analysis results for the Sector – Manufacture of Food Products and its key subsectors for the 2016-2023 period show significant growth in both revenue and employment. While the sector generally demonstrates solid performance, questions arise regarding the sustainability of these results due to a declining relative share in the processing industry. A key limitation of the findings is the lack of detailed data on specific growth factors such as investments and technological advancements, which could impact the precision of the sector's dynamic analysis. It can be concluded that the sector and subsectors experienced growth during the analyzed period, but

a more comprehensive analysis, including performance factors, is necessary for a complete picture.

Summarizing the findings of the analysis of liquidity in the agro-spinning industry, a clear interdependence and positive correlation between: the indicator of prospective or effective liquidity and days of the cash cycle, but days of the cash cycle and indebtedness is observed. Then, on the other hand, establishes is a powerful negative association between the indicator of prospective or effective liquidity and days of cash cycle in relation to the indicator of indebtedness.

Furthermore, the results of the analysis correspond with the research of American authors related to the liquidity of hospital activity (Soumya Upadhyay, Smith, 2016) indicating a significant positive association among the indicator of prospective liquidity and number of days of the cash cycle. Similarly, (Berezhnitska, 2013) highlighted a very strong correlation between dynamic and static liquidity measures in family farms, which is consistent with our findings. This also aligns with previous research by (Čavlin, Tankosić, 2021), indicating a strong positive correlation between selected liquidity indicators in the agricultural and processing sectors, and a powerful negative linear association among relationship: perspective liquidity - indebtedness in the agricultural sector, and days cash conversion cycle - indebtedness in the Serbian trade sector. However, findings from (Žager, Ježovita, 2014) suggest no statistically significant association among the days cash cycle and indicators of liquidity and indebtedness, although there is a moderate positive association among between indicators of prospective liquidity and self-financing, as well as a weak positive relationship with interest coverage. Furthermore, (Bolek, 2013) reported a minimal correlation between indicators of dynamic and static liquidity metrics, but concluded that they are representative for the analyzed Polish, listed companies from non-financial activities. In contrast, (Kamath, 1989) indicates a negative relationship between the classic liquidity metric and cash cycle days, which contradicts the findings of this paper.

One of the key limitations of the correlation analysis conducted is the inability to definitively establish causality between variables, which may limit the reliability of the findings. While the results are consistent with previous studies, differing approaches and timeframes in other research may contribute to variations in findings. In conclusion, this study confirms the decisiveness of metrics for ensuring the balance between liquidity and indebtedness, which warrants the application of selected indicators for liquidity management in agro-processing enterprises.

Conclusions

In evaluating and managing the financial vitality of companies in the agro-processing industry, this research underscores the importance of analyzing liquidity ratios. The correlation analysis of prospective and effective liquidity, the cash cycle, and indebtedness during the period from 2016 to 2023 revealed significant associations among these variables. Strong positive correlations were particularly noted between

liquidity indicators and the cash cycle, while negative correlations were observed between liquidity and indebtedness. These findings clearly indicate that companies effectively managing liquidity can reduce their debt levels, thereby ensuring greater financial stability and long-term sustainability.

The results demonstrate the validity of using selected indicators in liquidity management within the agro-processing sector based on ratio analysis. Establishing a balanced relationship between liquidity and indebtedness enables companies to manage cash flows more efficiently, reducing the risk of insolvency. Additionally, the strong positive correlation between liquidity and the cash cycle emphasizes the importance of managing working capital, a critical factor for maintaining liquidity, especially in the agro-processing sector, which is subject to seasonal variations. The findings of the correlation analysis are statistically significant, providing empirical support for the initial hypothesis.

It should be noted that the limitation of this scientific study is the lack of detailed data on specific growth factors, such as investments and technological advancements, which could significantly impact the dynamics of liquidity and indebtedness. Furthermore, the seven-year period studied, including the COVID-19 crisis, may have partially influenced the results, highlighting the need for further research that incorporates a broader analysis over a longer time frame and additional indicators beyond liquidity.

In conclusion, the findings of the subject research confirm the primacy of effective liquidity management in maintaining the vitality of companies in the agricultural processing sector. Future research could explore a longer time frame and introduce additional variables, such as changes in raw material prices and global economic shocks, to further clarify the causal relationships among financial performances.

Conflict of interests

The authors declare no conflict of interest.

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