Meat industry in Serbia: performance analysis of meat-processing and livestock companies

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Abstract

The paper presents results on analysis of the performance of companies in meat industry in Serbia in period 2010-2012. In examination of interactions among participants in the meat industry, companies are divided into two groups, companies in livestock production, which includes farming and breeding of domestic animals, and companies in the meat-processing industry. Research results indicate the low return on investment, profitability, liquidity and high debt of the companies in the meat industry in Serbia. Further analysis evidence that companies in the meat-processing industry have better performances than livestock producers and that this difference is mostly statistically significant.

Keywords: meat industry, financial statements, performance analysis

1. Introduction

Agriculture has always been one of the most important industries in Serbia. The maximum volume of agricultural production in Serbia was reached in the mid-eighties. This

decade ended in a slowdown of production growth, and during the next decade there was a transition recession with a significant decline in agricultural production. During this period, capacity utilization in agricultural production was sharply reduced, and so were the yields per unit area for crop production, per livestock unit for meat production and per cows for milk production. Yields were significantly lower than in more developed countries of the European Union (EU), but also compared to the countries of Central and Eastern Europe (Gajić, Lovre, Zekić, Trkulja, 2003). The situation was not much better in the beginning of twenty-first century since the level of agricultural production in Serbia did not reach the level at the beginning of the transition period (Gajić, Lovre, Zekić, 2007).

In the following years, agricultural production in Serbia showed a tendency of increase with relatively significant annual fluctuations. These fluctuations can be partly explained by domination of crop production in total agricultural production in Serbia, in which grains have an important place mainly in dry farming system. The production structure is unfavorable due to the domination of crop production that takes more than 2/3 of the total agricultural production, which implies a relatively extensive nature of agricultural production in Serbia. Ownership relations in Serbian agriculture are characterized by a high proportion of small property with a semi-subsistence production and unfavorable ratio of primary agricultural resources, which is reflected in low labor supply of land, i.e. low land/labor ratio. These characteristics dominantly determine relatively low level of partial productivity (labor and land productivity) in agriculture of Serbia, which is particularly recognizable in labor productivity. Although Serbia has a positive foreign trade exchange of agricultural products, exports are dominated by products with lower levels of processing, such as grains, fruits, sugar, flour, etc., and with the symbolic participation of animal products (Gajić, Zekić, 2013).

Food-processing industry shared the destiny of agricultural production in previous decades. After stagnation during the eighties, it declined in the nineties. This was most prevalent in the production of animal feed and food products, and much less in the production of beverages and tobacco. These trends were accompanied by the decrease in employment in this sector. At the beginning of twenty-first century, Serbia experienced the production growth in the food-processing sector, accompanied with further downsizing of employment rates and capacity utilization of about 50% (Gajić, Zekić, 2013).

Especially important part of agricultural production in Serbia is the meat industry. It integrates entities that participate at different stages in the chain of meat production: the production of animal feed, livestock production, processing and sale of meat products.

Agricultural production in Serbia is characterized by the existence of a dual production structure, which is part of the legacy from the socialist, centrally-planned economy, and partly a result of the centralization and concentration of capital in agriculture. This means that, in agriculture, there are, on one hand, large companies, which often combine plant and animal production, but may be to some extent specialized for particular lines of production. On the other hand, there is a large number of small individual farms with semi-natural character of production. These private farms are much less involved in a market sale than they participate in the land ownership structure. Meat-processing industry is mostly represented by bigger, market-oriented companies, which are often integrated with meat producers in different production arrangements.

However, between livestock producers and meat-processing companies, there is the ambivalence between necessity for cooperation and struggle in negotiating the prices and terms of sale. The results of this struggle largely depend on the financial strength and market position of the negotiators, so the ability of participants to survive in the meat industry production chain is crucially dependent on their financial preferences.

For the sustainable development of the meat industry, balanced business performance of participants in production chain is highly favorable. If participants have similar financial strengths, price and terms of sale would secure their harmonized development. If their performances are uneven, it would mean that there is a domination of one group of participants in the supply chain, which in the long run may endanger all participants. In the past, occurrences of the rapid reduction of livestock due to the inability of livestock producers to maintain production levels as a result of price disparities were recorded. This caused the disruption in the whole production chain and inflationary pressures in the market in the longer run.

Importance of this issue defined the main goal of this paper, which is to analyze and compare the business performances of participants in livestock production versus companies in meat-processing industry in Serbia in order to determine whether there is a significant difference in their performances which could influence their further cooperation and development.

2. Research Methodology

The methodology for valuation of companies' performances is often based on the analysis of performance indicators calculated from financial statements data (see more: Hall, Beck, Toledo Filho, 2013; Dal Magro, Di Domenico, Klann, Zanin, 2013; Radošević, Carić,

Bejatović, Marković, Matijašević, Jovanović, 2013; Špička, 2013; Vuković, Mijić, 2012; Jakšić, Vuković, Mijić, 2011; Andrić, Vuković, Mijić, 2011).

This approach is accepted as a basis for a research methodology. Preparation of empirical research was carried out in two phases. In the first phase, analytical indicators that will be used for the assessment of performance in the livestock and meat processing sector were selected. In the second phase, data set and adequate statistical methods that will be implemented for the evaluation of analytical parameters were selected.

2.1. Selection of analytical indicators for assessment of the companies' performance

Performance valuation of meat industry companies in Serbia was based on the following categories of indicators:

- Return on investment ratios;
- Profitability ratios;
- Liquidity ratios; and
- Debt ratios.

The objective of the analysis of return on investment is to recognize the ability of companies to return yield from engaged assets/equity in the reported period (Bragg, 2010, p. 120). The level of return on investment of companies engaged in meat-processing and livestock production was measured by four indicators (return on total assets, return on assets, return the equity and return on invested capital). Overview of the used indicators and their referential values is provided in the following table:

Table 1: Return on Investment Ratios

Indicator	Ratio Calculation	Unit	Reference Value
ROTA (Return on Total Assets)	EBIT/A	%	>0, higher preferred
ROA (Return on Assets)	NI / A_{avg}	%	>0, higher preferred
ROE (Return on Equity)	NI / Eq_{avg}	%	>0, higher preferred
ROIC (Return on Invested Capital)	(NI + IE) / IC	%	>0, higher preferred

Source: Authors' illustration (based on Weygandt, Kimmel, Kieso, 2014, p. 726; Žager, Sačer Mamić, Dečman, 2012, p. 378. and Bragg, 2010, p. 121)
Legend:
EBIT - Earnings before Interest and Taxes
A – Total Assets
A_{avg} - Average Total Assets
NI - Net Income
Eq_{avg} - Average Shareholders' Equity
IE - Interest Expense
IC - Invested Capital

In order to assess the profitability of meat-processing and livestock companies, indicators of gross profit margins and net profit margins were applied. Selected profitability ratios try to recognize the relation of profit to total sales of a company. Overview of the used profitability ratios and their referential values is presented in the following table:

Table 2: Profitability Ratios

Indicator	Ratio Calculation	Unit	Reference Value
Gross Margin	(EBIT + IE) / I	%	>0, higher preferred
Net Profit Margin	NI/ I	%	>0, higher preferred

Source: Authors' illustration (based on Kimmel, Weygandt, Kieso, Trenholm, 2009, p. 458-459)
Legend:
EBIT - Earnings before Interest and Taxes
IE - Interest Expense
I - Total Income
NI - Net Income

Liquidity ratios measure the ability of companies to settle due debts and maintain liquidity. In this regard, we observed the possibilities of the companies in the meat industry in terms of settlement of obligations at due date, within one year or unconditionally (Walsh, 2003, p. 116). Overview of the used liquidity ratios and their referential values is presented in the following table:

Table 3: Liquidity Ratios

Indicator	Ratio Calculation	Unit	Reference Value
Cash Asset Ratio	C / CL	Ratio	>1
Quick Ratio	(C + AR) / CL	Ratio	>1
Current Ratio	CA / CL	Ratio	>2
Acid Test Ratio	(CA - IN) / CL	Ratio	>1
Financial Stability Ratio	LA / LL	Ratio	<1
Solvency	A / (CL + LL)	Ratio	>1

Source: Authors' illustration (based on Elliot, Elliot, 2011, p. 709 and Špička, 2013, p. 91)
Legend:
C - Cash
CL – Current Liabilities
AR – Accounts Receivables
CA - Current Assets
IN - Inventory
LA - Long-Term Assets
LL - Lon-Term Liabilities
A - Total Assets

Companies' indebtedness, in terms of level and possibilities of funding from different sources, is examined by ratios of equity to assets and debt factor. The objective of the presented debt analysis is directed towards an assessment of the potential risk of borrowing and investment in the company. Overview of the used debt ratios and their referential values is provided in the following table:

Table 4: Debt Ratios

Indicator	Ratio Calculation	Unit	Reference Value
Equity to Asset Ratio	Eq / A	Ratio	>0,50
Debt Factor	(CL + LL) / NI + D	Ratio	0 < 5

Source: Authors' illustration (Žager, Sačer Mamić, Dečman, 2012, p. 382)
Legend:
Eq - Total Equity
A - Total Assets
CL - Current Liabilities
LL - Long-Term Liabilities
NI - Net income
D - Depreciation

2.2. Research method

In order to assess the state of the meat industry in Serbia, companies in this sector are divided into two groups, the companies in livestock production and companies in the meat-processing industry (Figure 1).
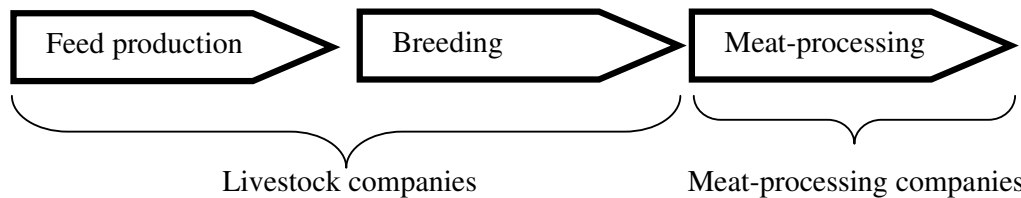

Figure 1: Dominant Activities Structure of Companies in Meat Industry in Serbia.
Source: Authors' illustration

The research is based on a sample of 96 financial statements, i.e. financial statements of 16 meat-processing companies and 16 livestock companies for a three year period (2010-2012). The financial statements have been retrieved from the public register of companies maintained by the Serbian Business Registers Agency (Business Registers Agency, http://www.apr.gov.rs, retrieved: March 22, 2014.)

For the purpose of empirical research analysis, the performance of companies is measured by four ratio categories presented previously (1. return on investment, 2. profitability, 3. liquidity and 4. debt). For each of the categories, research has been constructed in the following steps:

(a) Comparison of meat-processing industry and livestock industry. Comparison of meat-processing and livestock industry is based on summarized financial statements for each industry. These summarized financial statements are derived from individual financial statements of companies from corresponding industries (16 companies in the meat-processing industry and 16 companies in the livestock industry). Analytical ratios were calculated from summarized financial statements, compared and discussed.

(b) Testing the statistical significance of differences in meat-processing and livestock companies. In order to investigate the statistical significance of differences in performances of meat industry companies, following approach has been adopted:

- Each individual ratio for each company has been calculated;

▪ Individual ratios have been grouped and counted according to the following dimensions:

I. Satisfactory level (good or bad - compared to reference value presented in Tables 1 to 4),

II. Indicator category (return on investment, profitability, liquidity or debt),

III. Year (2010, 2011 or 2012),

IV. Industry (meat-processing or livestock);

▪ Statistical significance of the difference between meat-processing and livestock companies has been calculated by the application χ^2 (chi-square) test in order to determine differences between proportions (see more: by: BLACK, 2012, p. 646-649). For the implementation of χ^2 (chi-square) test with significance level of 0.05, statistical package IBM SPSS Statistics Version 20 was used (for details see: Davis, 2013, p. 62-63).

3. Results

3.1. Return on investment analysis

3.1.1. Comparison of meat-processing industry and livestock industry

The analysis of return on investment reveals that companies in meat-processing industry have better return on investment ratios than companies in livestock production (Table 5). Generally, it can be noticed that return on investment of meat-processing companies improved in observed period, while return on investment of livestock companies increased in 2011 compared to 2010 but in 2012 it sharply decreased. The biggest difference between meat-processing companies and livestock companies is observed in ROE ratio, especially in year 2012, since this ratio is considerably high for meat-processing companies (41.77% in 2012) but negative for livestock companies (20.66%).

Table 5: Return on Investment of Companies in Meat Industry in Serbia in Period 2010-2012

Ratio	Meat-processing			Livestock		
	Year 2010	Year 2011	Year 2012	Year 2010	Year 2011	Year 2012
ROTA	7.15%	7.13%	9.96%	1.46%	5.75%	1.60%
ROA	7.84%	6.96%	11.08%	2.08%	4.61%	0.01%
ROE	25.98%	23.64%	41.77%	(0.57%)	4.90%	(20.66%)
ROIC	11.21%	9.83%	15.67%	2.96%	6.59%	0.01%

Source: Authors' calculation

3.1.2. Testing the statistical significance of differences in meat-processing and livestock companies

Analysis of the return on investment of the individual companies indicates that most companies in the meat-processing industry have a good (satisfactory) return on investment ratios (Figure 2). In 2012, 89.10% companies in the meat-processing industry met the criteria of good return on investment, while participation of companies engaged in livestock production with good performance was 45.30%. In the period 2010-2012, a number of companies in the meat-processing industry with good return on investment ratios increased from 85.9% to 89.10%. At the same time, a number of companies in the livestock production with good return on investment dropped from 67.20% to 45.30%.
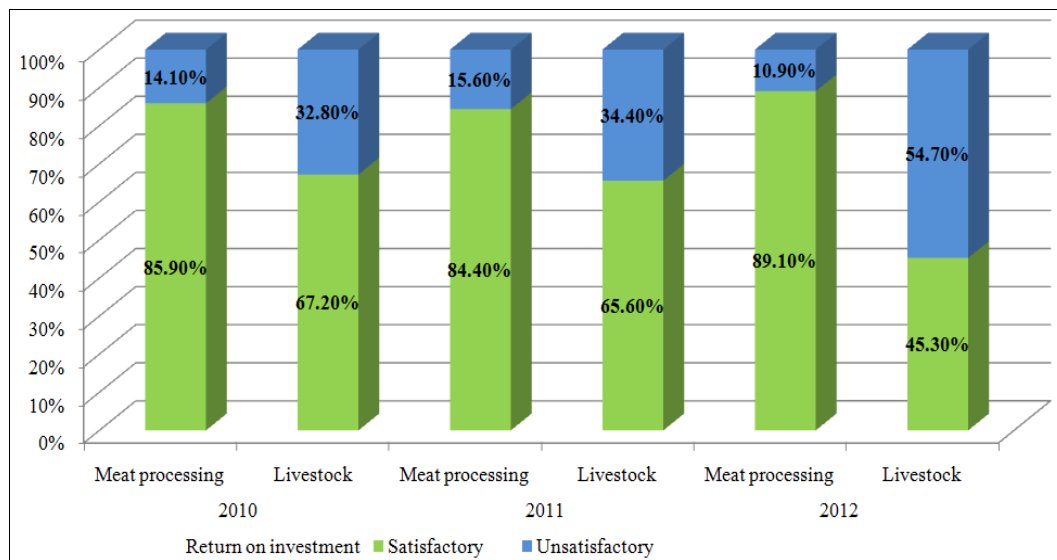

Figure 2: Distribution of Return on Investment Ratios of Meat Industry Companies in Serbia in Period 2010 - 2012
Source: Authors' illustration

In order to determine whether companies in the meat-processing industry have significantly better performance in return on investment compared to the livestock companies during the observed period, the following hypothesis is suggested:

H_0: There is no statistically significant difference in return on investment between meat-processing companies and livestock companies.

The results of χ^2 (chi-square) test are shown in the following table.

Table 6: Result of χ^2 (chi-square) Test on Return on Investment in Period 2010 – 2012

Year	Test	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
2010	Pearson Chi-Square	6.269	1	0.012		
	Continuity Correction	5.268	1	0.022		
	Likelihood Ratio	6.410	1	0.011		
	Fisher's Exact Test				0.021	0.010
	Linear-by-Linear Association	6.220	1	0.013		
2011	Pearson Chi-Square	6.000	1	0.014		
	Continuity Correction	5.042	1	0.025		
	Likelihood Ratio	6.116	1	0.013		
	Fisher's Exact Test				0.024	0.012
	Linear-by-Linear Association	5.953	1	0.015		
2012	Pearson Chi-Square	27.783	1	0.000		
	Continuity Correction	25.834	1	0.000		
	Likelihood Ratio	29.662	1	0.000		
	Fisher's Exact Test				0.000	0.000
	Linear-by-Linear Association	27.566	1	0.000		

Source: Authors' calculation

The results indicate the following (according to Black, 2012, p. 648):

- In 2010 Fisher's Exact Test = 0.021 < p = 0.05, H_0 rejected;
- In 2011 Fisher's Exact Test = 0.024 < p = 0.05, H_0 rejected;
- In 2012 Fisher's Exact Test = 0.000 < p = 0.05, H_0 rejected.

Since 2-sided Fisher's Exact Test values for the observed period are lower than the significance threshold set at 0.05, null hypothesis are rejected and alternative hypothesis are introduced. This means that there is a statistically significant difference in the return on investment between meat-processing and livestock companies.

3.2. Profitability analysis

3.2.1. Comparison of meat-processing industry and livestock industry

Profitability analysis of companies in meat industry in Serbia reveals that these companies have low profitability ratios. Within meat industry, it can be observed that meat-processing companies have better profitability that companies involved in livestock production (

Table 7). Companies in meat-processing industry had lower profitability in 2011 than in 2010 but the profitability increased in 2012 to the highest level in observed period. On the other

hand, livestock companies had better profitability ratios in 2011 than in 2010 but profitability decreased significantly in 2012.

Table 7: Profitability of Companies in Meat Industry in Serbia in Period 2010-2012

Ratio	Meat-processing			Livestock		
	Year 2010	Year 2011	Year 2012	Year 2010	Year 2011	Year 2012
Gross Margin	0.09	0.07	0.10	0.03	0.06	(0.001)
Net Profit Margin	0.08	0.07	0.10	0.03	0.06	0.0001

Source: Authors' calculation

3.2.2. Testing the statistical significance of differences in meat-processing and livestock companies

Profitability analysis of individual companies indicates that most companies in the meat-processing industry have a good (satisfactory) profitability ratios in the observed period (Figure 3). In 2012, 87.50% of the meat-processing companies met the criteria of good profitability, while the participation of livestock companies with good profitability performance was at 56.20%. In period 2010-2012, the number of profitable companies in the meat-processing industry had a very slight tendency of fall from 88.90% to 87.50%. At the same time, a number of profitable companies in the livestock production decreased heavily from 75% in 2010 to 56.20% in 2012.
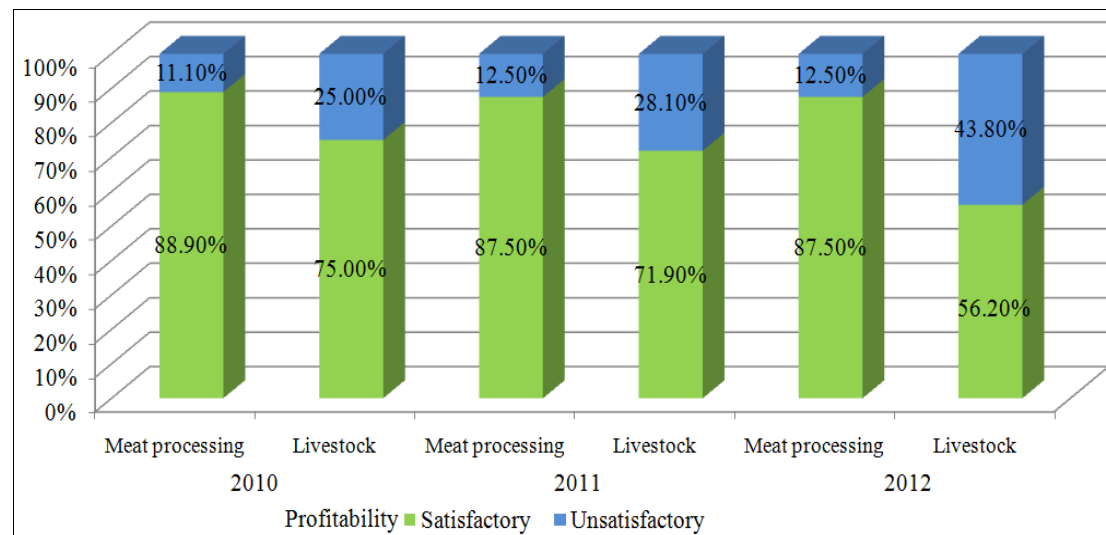

Figure 3: Distribution of Profitability Ratios of Meat Industry Companies in Serbia in Period 2010 - 2012
Source: Authors' illustration

In order to determine whether companies in the meat-processing industry have significantly better profitability compared to the livestock companies during the observed period, the following hypothesis is suggested:

H_0: There is no statistically significant difference in profitability between meat-processing companies and livestock companies.

The results of χ^2 (chi-square) test are shown in the following table.

Table 8: Result of χ^2 (chi-square) Test on Profitability in Period 2010 – 2012

Year	Test	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
2010	Pearson Chi-Square	1.641	1	0.200		
	Continuity Correction	0.923	1	0.337		
	Likelihood Ratio	1.667	1	0.197		
	Fisher's Exact Test				0.337	0.169
	Linear-by-Linear Association	1.615	1	0.204		
2011	Pearson Chi-Square	2.413	1	0.120		
	Continuity Correction	1.544	1	0.214		
	Likelihood Ratio	2.465	1	0.116		
	Fisher's Exact Test				0.213	0.107
	Linear-by-Linear Association	2.376	1	0.123		
2012	Pearson Chi-Square	7.729	1	0.005		
	Continuity Correction	6.261	1	0.012		
	Likelihood Ratio	8.075	1	0.004		
	Fisher's Exact Test				0.011	0.006
	Linear-by-Linear Association	7.609	1	0.006		

Source: Authors' calculation

The results indicate the following:

- In 2010 Fisher's Exact Test = 0.337 > p = 0.05, H_0 accepted;
- In 2011 Fisher's Exact Test = 0.213 > p = 0.05, H_0 accepted;
- In 2012 Fisher's Exact Test = 0.011 < p = 0.05, H_0 rejected.

Since 2-sided Fisher's Exact Tests values for years 2010 and 2011 are higher than the significance threshold set at 0.05, null hypothesis for these years are accepted. For 2012, 2-sided Fisher's Exact Test value is lower than 0.05, so null hypothesis is rejected. That means that in 2010 and 2011, there was no significant difference in profitability between meat-processing and livestock companies, while in 2012 meat-processing companies had significantly better profitability.

3.3. Liquidity analysis
3.3.1. Comparison of meat-processing industry and livestock industry

Liquidity ratios imply low ability of companies in meat industry to pay their debt. Indicators of meat-processing companies are better than those of livestock companies but they show that both industries have serious problems in debt payments (Table 9). Liquidity indicators reveal a mismatch in timing of cash inflows and due dates for settlement of liabilities, since companies have excess of long-term assets to settle short-term liabilities. Above average are only solvency ratios since they are not very rigorous. They only indicate whether companies can pay debt not when it comes due by cash payments but by all available assets, even due to bankruptcy.

Table 9: Liquidity of Companies in Meat Industry in Serbia in Period 2010-2012

Ratio	Meat-processing			Livestock		
	Year 2010	Year 2011	Year 2012	Year 2010	Year 2011	Year 2012
Cash Asset Ratio	0.08	0.08	0.06	0.06	0.01	0.02
Quick Ratio	0.63	0.65	0.60	0.40	0.40	0.45
Current Ratio	1.31	1.32	1.40	0.98	0.79	0.98
Acid Test Ratio	0.81	0.77	0.66	0.51	0.49	0.56
Financial Stability Ratio	0.87	0.88	0.84	1.08	1.09	1.04
Solvency	2.67	2.58	2.33	3.00	2.27	2.18

Source: Authors' calculation

3.3.2. Testing the statistical significance of differences in meat-processing and livestock companies

In period 2010-2012 liquidity of companies in meat-processing and livestock industry oscillated (Figure 4). In year 2011, participation of meat-processing companies with satisfactory liquidity slightly decreased from 37.5% to 36.5% and then in 2012 it increased to 40.6%. On the other hand, participation of livestock companies in year 2011 increased from 22.9% to 26.7% and that in 2012 it decreased to 23.8%.
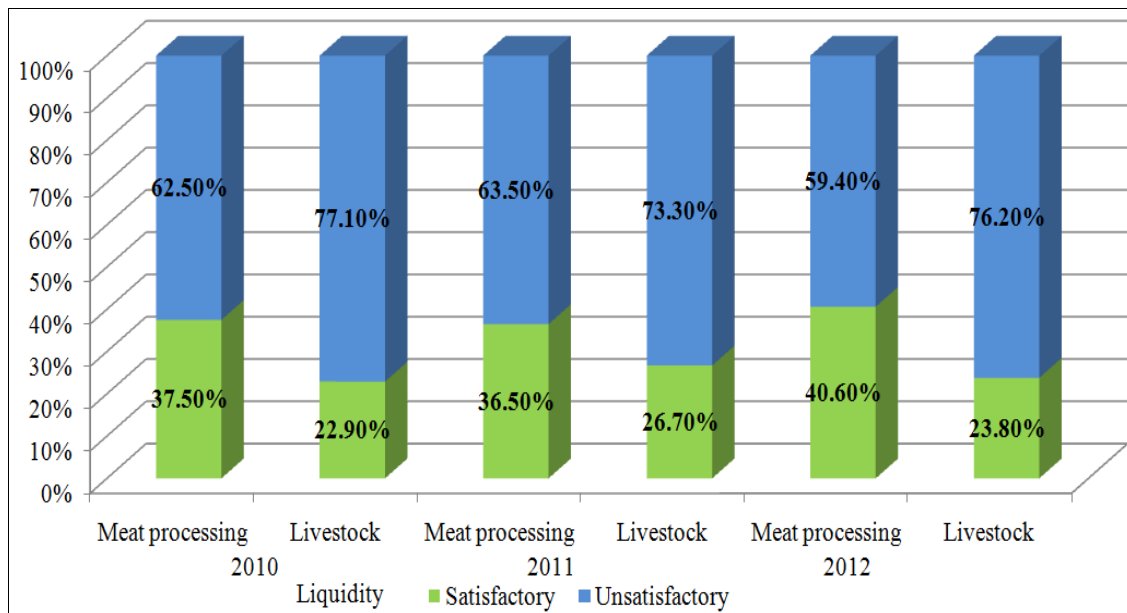

Figure 4: Distribution of Liquidity Ratios of Meat industry Companies in Serbia in Period 2010 - 2012
Source: Authors' illustration

In order to determine whether companies from the meat-processing industry have significantly better liquidity compared to the livestock companies during the observed period, the following hypothesis is suggested:

H_0: There is no statistically significant difference in liquidity between meat-processing companies and livestock companies.

The results of χ^2 (chi-square) test are shown in the following table.

Table 10: Result of χ^2 (chi-square) Test on Liquidity in Period 2010 – 2012

Year	Test	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
2010	Pearson Chi-Square	6.944	1	0.008		
	Continuity Correction	6.151	1	0.013		
	Likelihood Ratio	7.013	1	0.008		
	Fisher's Exact Test				0.013	0.006
	Linear-by-Linear Association	6.908	1	0.009		
2011	Pearson Chi-Square	2.961	1	0.085		
	Continuity Correction	2.447	1	0.118		
	Likelihood Ratio	2.974	1	0.085		
	Fisher's Exact Test				0.117	0.059
	Linear-by-Linear Association	2.945	1	0.086		
2012	Pearson Chi-Square	4.842	1	0.028		
	Continuity Correction	4.175	1	0.041		
	Likelihood Ratio	4.878	1	0.027		
	Fisher's Exact Test				0.041	0.020
	Linear-by-Linear Association	4.817	1	0.028		

Source: Authors' calculation

The results indicate the following:

- In 2010 Fisher's Exact Test = 0.013 < p = 0.05, H_0 rejected;
- In 2011 Fisher's Exact Test = 0.117 > p = 0.05, H_0 accepted;
- In 2012 Fisher's Exact Test = 0.041 < p = 0.05, H_0 rejected.

According to values of 2-sided Fisher's Exact Test, null hypothesis for 2010 and 2012 are rejected and null hypothesis for 2011 is accepted. That means that in 2010 and 2012, meat-processing companies had significantly better liquidity than livestock companies, while in 2011 there was no significant difference in levels of liquidity between observed companies.

3.4. Debt analysis

3.4.1. Comparison of meat-processing industry and livestock industry

Analysis of the indebtedness of companies in the meat industry indicates a low level of funding from their own resources (Table 11). Companies from both meat-processing and livestock industry are dominantly financed by debt. The level of self-financing of companies in the meat-processing industry in the observed period decreased, so in 2012 these companies used

84% of debt to finance operations. The degree of self-financing of livestock companies increased from 17% to 22% but it is still very low.

Debt factor, as the second debt ratio, indicates the number of years required to return the debt from operating inflows (net income plus depreciation). This indicator shows the difficult position of all companies in the meat industry, particularly livestock companies. It is obvious that livestock producers have problems in debt settlement. On the other hand, companies in the meat-processing industry could manage their debts from operating inflows.

Table 11: Debt Ratios of Companies in Meat industry in Serbia in Period 2010-2012

Ratio	Meat-processing			Livestock		
	Year 2010	Year 2011	Year 2012	Year 2010	Year 2011	Year 2012
Equity to Asset Ratio	0.21	0.19	0.16	0.17	0.23	0.22
Debt Factor	1	1	1	4	5	6

Source: Authors' calculation

3.4.2. Testing the statistical significance of differences in meat-processing and livestock companies

Analysis of debt financing of meat industry companies showed that number of companies with satisfactory level of debt decreased in observed period, both in meat-processing and livestock industry (Figure 5). Participation of indebted companies in the meat-processing industry increased from 55.50% in 2010 to 59.40% in 2012, while participation of livestock over-indebted companies increased from 75% to 79.7% in observed period.
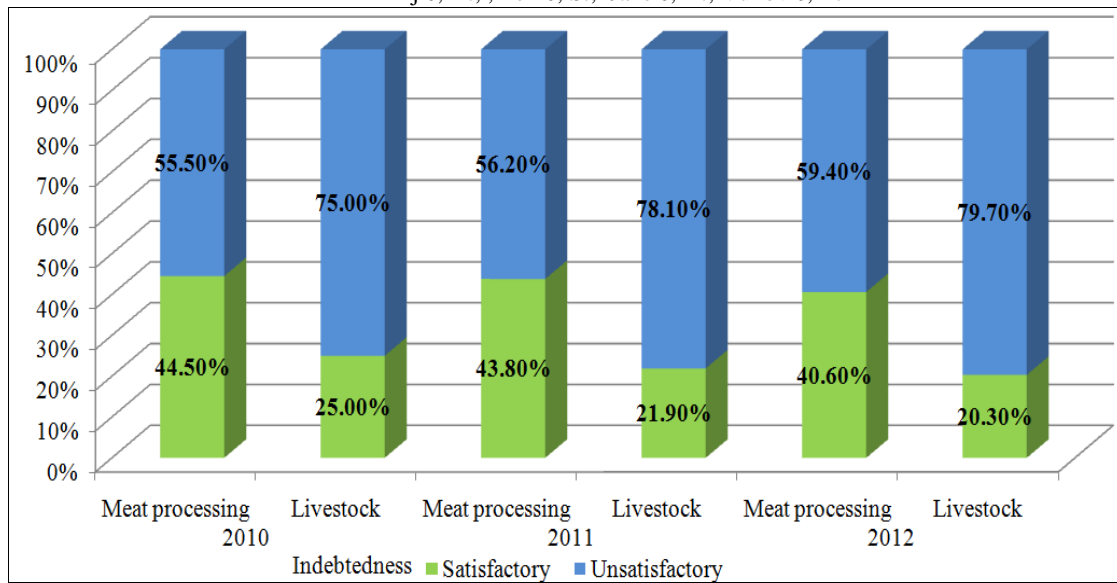
Figure 5: Distribution of Debt Ratios of Meat Industry Companies in Serbia in Period 2010 - 2012
Source: Authors' illustration

In order to determine whether companies in the meat-processing industry have significantly better debt ratios compared to the livestock companies during the observed period, the following hypothesis is suggested:

H_0: There is no statistically significant difference in indebtedness between meat-processing companies and livestock companies.

The results of χ^2 (chi-square) test are shown in the following table.

Table 12: Result of χ^2 (chi-square) Test on Indebtedness in Period 2010 – 2012

Year	Test	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
2010	Pearson Chi-Square	4.987	1	0.026		
	Continuity Correction	4.190	1	0.041		
	Likelihood Ratio	5.035	1	0.025		
	Fisher's Exact Test				0.040	0.020
	Linear-by-Linear Association	4.948	1	0.026		
2011	Pearson Chi-Square	6.946	1	0.008		
	Continuity Correction	5.989	1	0.014		
	Likelihood Ratio	7.046	1	0.008		
	Fisher's Exact Test				0.014	0.007
	Linear-by-Linear Association	6.891	1	0.009		
2012	Pearson Chi-Square	6.232	1	0.013		
	Continuity Correction	5.310	1	0.021		
	Likelihood Ratio	6.323	1	0.012		
	Fisher's Exact Test				0.021	0.010
	Linear-by-Linear Association	6.184	1	0.013		

Source: Authors' calculation

The results indicate the following:

- In 2010 Fisher's Exact Test = 0.040 < p = 0.05, H_0 rejected;
- In 2011 Fisher's Exact Test = 0.014 < p = 0.05, H_0 rejected;
- In 2012 Fisher's Exact Test = 0.021 < p = 0.05, H_0 rejected.

Since 2-sided Fisher's Exact Test values for the observed period are lower than the significance threshold set at 0.05, null hypothesis are rejected and alternative hypothesis are introduced. This means that there is a statistically significant difference in the indebtedness of meat-processing and livestock companies.

4. Discussion

The research results evidence the poor performance of companies in the meat industry in Serbia in period 2010-2012. Indicators of liquidity and debt are very unfavorable in the whole observed period, which indicates a long-term problem of payment settlements a meat industry sector is facing.

Comparative analysis of meat-processing companies and livestock producers indicates a differences in their performances. In all analyzed performance measurements, meat-processing companies showed better results than livestock producers.

However, the statistical significance of these differences varied between different categories of analytical indicators and observed years (Table 13).

Table 13: Summary of Statistical Significance of Differences in Categories of Analytical Indicators in Period 2010-2012 in Serbia

Category of analytical indicators	Year 2010	Year 2011	Year 2012
Return on investment ratios	Significant	Significant	Significant
Profitability ratios	-	-	Significant
Liquidity ratios	Significant	-	Significant
Debt ratios	Significant	Significant	Significant

Source: Author'' illustration

Regarding categories of analytical indicators, the statistical significance of differences is evidenced for return on investment ratios and debt ratios in the whole observed period, liquidity ratios in two years and the profitability ratios in one year. When years are compared, it can be noticed that in year 2012, all categories of analytical indicators are significantly different, in year 2010, three performance measurements are significantly different (return on investment, liquidity and debt) and in year 2011 two (return on investment and debt).

Since statistical significance varies between years and performance indicators, it can be concluded that, although meat-processing companies have proven significantly better performances in observed period, their domination may be challenged in the next period. In order to further investigate the differences in performances of meat-processing companies and livestock companies, time series should be prolonged and reasons for differences in variations should be analyzed.

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