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FACULTY OF AGRICULTURE**



Book of Proceedings

The Seminar

AGRICULTURE AND RURAL DEVELOPMENT - CHALLENGES OF TRANSITION AND INTEGRATION PROCESSES

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DYNAMICS OF LABOUR COSTS OF SERBIAN DAIRY PROCESSING INDUSTRY¹

Saša Muminović², Vladan Pavlović³, Ljubiša Milačić⁴

Summary

Previous research has shown that the dairy industry in Serbia is more profitable than the market average measured by indices of the Belgrade Stock Exchange BELEX15 and BELEXLINE. The labour costs are, after raw milk costs, the second most important group of costs in dairy processing industry. The aim of this paper is to identify changes and adaptations of modern industry market conditions through analysis of labour cost of dairy processing industry in Serbia, by analysis of the trends in the number of employees, average labour cost, and productivity and cost efficiency and through the prism of these changes. In this paper, on qualified sample is proved that there is a strong positive correlation between firm size and productivity and a weaker one between firm size and labour costs. On the other hand, contrary to previous research, relation between the size of companies in the sample and the economic efficiency of labour costs was not confirmed.

Key words: dairy processing industry, labour cost, productivity, cost efficiency

JEL classification: G31, G32, Q14

1. Introduction

Looking at the production capacity data, published in National Agricultural Programme (*Nacionalni program za poljoprivredu*), there are 201 companies in dairy processing industry in Serbia. From total of 201, 29 companies have average daily capacity more than 20.000 litres. 97 companies have daily capacity in range between 20,000 and 3,000 litres and 75 small dairy processing companies have average daily capacity less than 3.000 litres. Of the total raw milk production, up to

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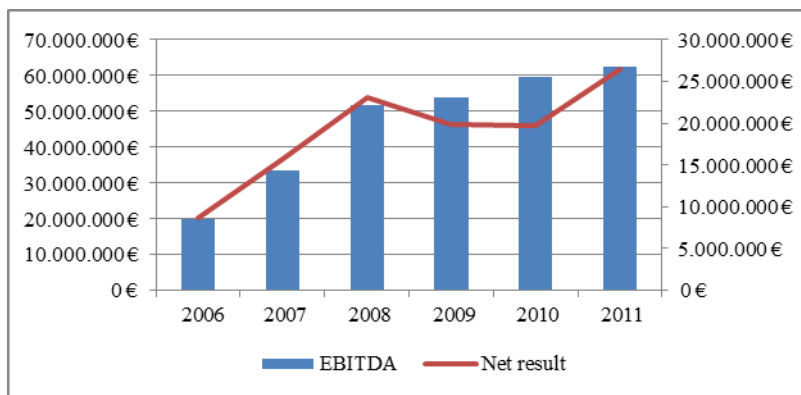
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60% (Vlada Republike Srbije, 2010) ends in buy-out on formal market, while the rest of the milk production *is used by farmers and their families and some of it is sold direct to the customers* (Popović, 2009).

According to the *AgriPolicy Report* data (Van Berkun, 2009) the biggest five dairy processing companies in Serbia buy-out 67% of raw milk of the total buy-out (on formal market), therefore the market is characterised as concentrated. That was also confirmed by value of Herfindahl-Hirshman index, which is more than 2.200 (Petković, 2008).

Previous research Muminović, et.al, 2012 and Muminović and Pavlović 2012 have shown that the dairy processing industry in Serbia is more profitable than the market average, measured by indices of the Belgrade Stock Exchange BELEX15 and BELEXLINE.

Another previous research, Aljinović Barać and Muminović 2013, has shown that capital investments per employee significantly increase productivity measured by EBITDA and personnel costs. Also, statistically significant association of capital investments and foreign ownership was identified. The research proved that capital investments per employee do not significantly affect the profitability of dairy processing companies in Serbia, Croatia and Slovenia, unless they are accompanied by changes in owners' structure and know-how that foreign owners bring. This applied to every country investigated.



Source: authors' calculations

Figure 1 EBITDA and net result of Serbian dairy processing industry 2006-2011

On Figure 1, could be seen that EBITDA (Earnings before Interest, Taxes, Depreciation, and Amortization) has constantly increased in observed period, while net result stagnated only in the years of crises: 2009 and 2010.

The basic raw material in dairy processing industry is the raw milk, and raw milk prices have significant impact on total production cost. However, raw milk prices are subject of (some) regulation and dairy processing companies and there is left little room for some manoeuvres.

On the other hand, labour cost is second the most important cost in dairy processing industry. Their share in total costs in Serbian dairy processing industry in 2009 was in range from 10.7 to 19.5% (Popović and Knežević, 2010), while in Germany that share was from 4 to 10% (Thiele H. 2008). Through various activities labour cost could be managed: through salaries, number of employees or labour productivity.

The aim of this paper was to identify changes and adaptations to modern industry market conditions through analysis of labour cost dynamics of dairy processing industry in Serbia, by analysis of the trends in the number of employees, average labour cost, productivity and cost efficiency through the prism of these changes.

2. Research design

This research is conducted on the sample of financial data of 39 dairy processing companies in period 2006-2011, published on the web pages of Serbian Business Registers Agency (available on: www.apr.gov.rs). The sample is divided in three groups according to the total asset value in 2010: more than 1 billion RSD (5 big companies), total asset value in range from 100 million RSD to 1 billion RSD (19 medium size companies) and less than 100 million RSD (15 small size companies). The sample is representative because total asset of selected companies in years 2010 and 2011 represents 87.81% and 88.65% of total asset of all companies under: C10.5 – *Manufacture of dairy products* of National Classification of Economic Activities. Companies that are in the bankruptcy or liquidation process were excluded from the sample.

According to the methodology found in literature (Popović and Knežević, 2010, pp.11), for labour cost efficiency, the share of labour cost in total operating income was chosen as indicator. While productivity of labour cost was measured by EBITDA divided by average number of employees, which is also widely accepted and used proxy variables for company's productivity (Engelhardt, 2006) (Kale, et.al, 2007).

For this research the following statistical hypotheses have been developed:

H1: ... *The tendency of changes in the number of employees in the dairy processing industry in Serbia is in line with the tendencies of dairy industry in South-Eastern Europe.*

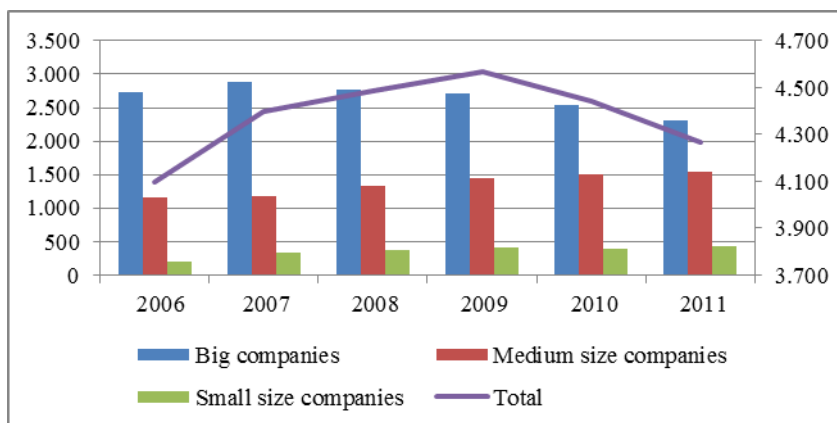
H2: ...*There has been significant increase in productivity and economic efficiency of the labour force costs in dairy processing industry in Serbia*

3. Research results and discussion

3.1. Dynamics of number of employees and average labour cost

The privatisation process of big dairy processing companies in Serbia was finished before the period under observation: 2006-2011. Except one big dairy processing company all big dairy processing companies are in foreign ownership. In the years following the privatisation, some structural changes took place, which could be observed *through changes in competition position and production structure of dairy processing companies* (Popović, 2009, pp.11). The consequence of changes in ownership structure was reorganisation of production which has its effect on decrease of number of employees. That decrease of number of employees was also characteristic for some other East-European transitional countries, i.e. Hungary (Gorton and Guba, 2002) and Slovakia (Mura, et.al, 2012).

The companies in observed sample employ more than 4.000 employees – Figure 2. The highest number was in year 2009 - 4.568 and lowest number was in year 2006 - 4.095 employees. More than 50% of the total number of employees was in big dairy processing companies, where in the observed period the number of employees decreased for 15.47%. Medium size companies increased the total number of employees for 32.22% (mostly as a consequence of entrance of the new companies in the industry). The biggest increase of number of employees was in small companies i.e. 104% (the consequence of entrance of the new companies in the industry and the internal (organic) growth).



Source: authors' calculations

Figure 2 Dynamics of number of employees

Looking at the average labour cost in local currency (per month per employee) in the Table 1, it could be concluded that they have increased. Meanwhile, looking at data in EUR currency we could see that the increase of labour cost was in medium and small size companies, while the labour cost in big dairy processing companies follows local currency (RSD) depreciation.

Table 1: Average labour cost

RSD	2006	2007	2008	2009	2010	2011	Index 2006/2011
Big DPC*	83,423	83,466	97,361	97,655	103,933	108,677	30.27%
Medium DPC	31,719	34,486	39,881	40,189	42,188	47,290	49.09%
Small DPC	19,528	32,294	27,993	31,422	33,325	35,660	82.61%
Average	65,474	66,523	74,477	73,525	76,778	79,261	21.06%
€							
Big DPC	1,059 €	1,044 €	1,195 €	1,039 €	1,009 €	1,066 €	0.68%
Medium DPC	403 €	431 €	490 €	428 €	409 €	464 €	15.22%
Small DPC	248 €	404 €	344 €	334 €	323 €	350 €	41.13%
Average	831 €	832 €	915 €	783 €	745 €	777 €	-6.44%

*DPC - dairy processing companies

Source: authors' calculations

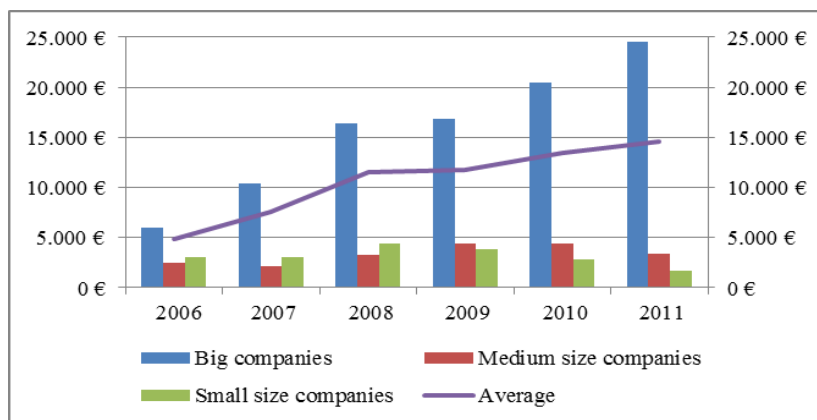
Regression analysis, in table 2, has confirmed medium positive correlation between company size, measured by total assets, and labour cost per employee. It was expected because big companies have more complex organisational structure which includes employees in R&D, marketing and other positions which employ highly educated and consequently better paid labour force.

3.2. Dynamics of productivity

Productivity on industry level, measured by EBITDA / average number of employees, except in 2009, has stable growth – Figure 3 in 2011, compared to the initial year 2006. The increase was 200%. However, if the size of the company is taken into account, this is very much different. The highest increase in productivity was in big companies (307%), far smaller in medium size companies (34.2%), while small dairy processing companies have decreased in productivity (-43%).

The small companies have increased the number of employees more intensively than they have increased their EBITDA.

Although the sample is not the same, the result are similar to data of capacity usage presented in document of Serbian Commission for Protection of Competition (*Komisija za zaštitu konkurencije RS, 2012*). Big companies use 90% of their production capacity, middle size 6% and small only 4%. The lack of capacity usage could be the reason for the differences in productivity on observed sample.



Source: authors' calculations

Figure 3 Dynamics of labour productivity

Regression analysis, Table 2, has confirmed positive correlation between company size, measured by total asset, and EBITDA per employees. This is an expected finding, taking into consideration data of capacity usage and company size.

Table 2: Dependency of EBITDA per employee, labour cost and efficiency of the labour cost and the company size

Company size and	EBITDA / employee	Labour cost	Labour cost efficiency
Multiple R	92.06%	63.31%	2.87%
R Square	84.76%	40.09%	0.08%
Adjusted R Square	84.68%	39.81%	-0.39%
Standard Error	1754.713	218.7046	4.562671
Observations*	215	215	215
Significance F	0.0000	0.0000	0.6755
t Stat	34.4136	11.9379	-0.4192
P-value	0.0000	0.0000	0.6755

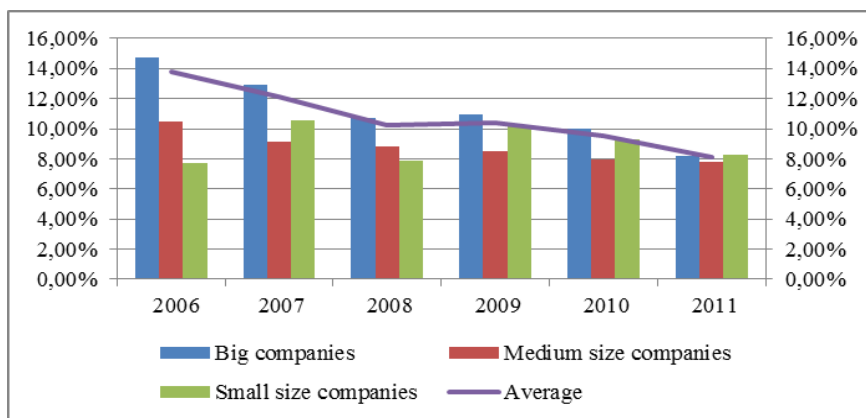
* Companies for which all data was not available were excluded from the calculations.

Source: authors' calculations

3.3. Cost efficiency of labour cost

Cost efficiency means the share of some costs (or some inputs) or total costs in operating income (Popović and Knežević, 2010). Its decrease, in absolute number, means increase in cost efficiency in observed company.

Figure 4 presents the increase in efficiency of labour cost in Serbian dairy processing industry in period 2006-2011. Increase ranged from 13.8% to 8.12% for the whole industry. Also in this case, the big companies have the highest positive change from 14.7% to 8.22%. The labour cost efficiency in medium sized companies increased from 10.47% to 7.78%, while in small companies decreased from 7.74% in 2006 to 8.26% in 2011.



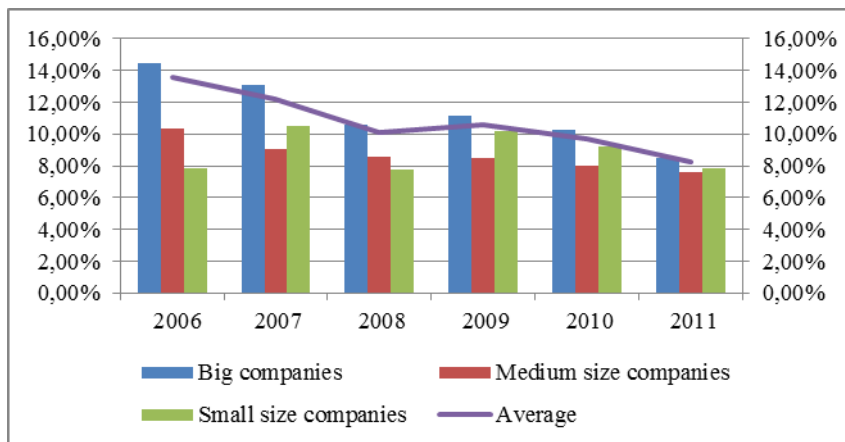
Source: authors' calculations

Figure 4 The labour cost share in operating income

It could be seen that in 2011 cost efficiency of labour cost for large, medium and small companies was very close to the industry average.

Regression analysis, Table 2, has shown very low correlation between company size, measured by total assets, and labour cost efficiency, measured by labour cost share in operating income. That means that also smaller companies achieve good efficiency of labour cost, and that in this cost segment they are not left behind the large companies.

This finding is contrary to the previous research (Popović and Knežević, 2010, p.11) where was concluded that *with increase of capacity exists the decrease of coefficient of labour cost efficiency, or that small companies have weaker labour cost control and consequently lower labour cost efficiency*. The differences in results could be justified with smaller sample (5) and shorter period of time in previous research.



Source: authors' calculations

Figure 5 Share of labour costs in the total cost

It is similar if we look at the share of labour cost in total cost – Figure 5. In 2011 that share decreased for large and medium size companies, while for small companies coefficient returned to the 2006 level. As was already mentioned, according to the research in 2010, the share of labour cost in total cost in Serbian dairy processing industry share in 2009 was in range from 10.7 to 19.5% (Popović and Knežević, 2010). And again, the differences in results could be justified with smaller sample and shorter period of time in previous research.

4. Conclusion

The starting hypothesis regarding the tendency of changes in number of employees was proven partly because it was proven only for big companies. Only in big dairy processing companies' number of employees decreased. This is in accordance with world trend. In medium and small companies number of employees increased. This could be explained by profitability and attractiveness of that industry and new companies which entered the market.

The second hypothesis about the increase of productivity and economic efficiency of labour cost of dairy processing industry in Serbia is confirmed. However, only for the industry as a whole. There was an increase in productivity and economic efficiency and labour costs. However, if we look at companies the size of the hypothesis is only partially confirmed in a sample of large and medium-sized enterprises.

However, if we consider the market share, the market concentration of dominant and position of big companies especially the market leader, we can conclude that both the hypothesis were proved.

The average labour cost tends to grow slowly if observed in the local currency. However, observed in euros only large dairies have kept the costs at the level of 2006. In the others, there was an increase as expected when taking into account large differences in labour cost.

A possible direction for further research is the analysis of the dynamics imposed by labour costs in the region of South-eastern Europe or the wider area covered by the Eastern European transition countries and the comparison with the trends of large multinational corporations engaged in the processing of milk.

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