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789X.2013/6-2/5****DAIRY INDUSTRY IN UKRAINE:  
EVALUATION OF BUSINESS  
EFFICIENCY**

**ABSTRACT.** The paper considers the problem of maintaining priority development of milk processing plants, emphasizing great importance of the formation of evaluation system. The overview of scientific approaches to the definition of the operation of enterprises is done. The importance of the distinction between the effectiveness and efficiency is substantiated. The evaluation of performance on key indicators is developed regarding the main activities of milk processing enterprises in Ukraine, requirements and standards. The areas of company's management to operate successfully under the market conditions are identified.

**JEL Classification:** L66, P2**Keywords:** dairy industry of Ukraine, performance, effectiveness, efficiency, synergistic effect.**Introduction**

The transition of the economy of Ukraine to market relations has led to significant changes in the enterprises activity as a whole. Significant growth in the economy, the dynamics of the external and internal environment requires enterprise transformation at both levels. Ukrainian economic crisis that has affected all sectors of the economy has also affected dairy industry. Dairy industry plays an important role in the economy of any country providing the population with food essentials. Milk and dairy products contain almost all the necessary substances for the human body. They are essential for ensuring public health and balancing diet, as well as for the food market. Therefore milk and milk products are of the huge importance in the diet consumption in Ukraine and the products of social value.

Thus, the operation of dairy enterprises in today's economic development needs deeper reform to improve its efficiency and effectiveness. Attention is drawn to the fact that in the economic literature the studies of performance indicator are done at a theoretical and practical level. However, in modern terms, we would consider other, equally important indicator of success of the company, – its effectiveness. This parameter allows achieving high dynamism of economic growth. Evaluation of the performance of the enterprise is a key element of management and support for business decisions. The experience of the most successful companies shows that the precondition of success of any company is setting the right goals and their performance at the lowest cost of resources.

**Efficiency as a part of effectiveness**

In Ukraine the level of researches of the concept of "effectiveness", unfortunately, lags behind foreign developments since the term is often equated with the term "efficiency". In our opinion, this is an important and urgent problem. It should be noted that despite the increased attention to the problem of identification and evaluation of the effectiveness and efficiency at all levels of the economy, there is no clear interpretation of the essence of these concepts in the economic literature. Mix the concept of outcome and effectiveness, efficiency and impact and effectiveness and efficiency. Since 80-90s of the twentieth century the situation has changed dramatically, and in specialized scientific publications, many scientists prefer to use the term "effectiveness" (Oleksiuk, 2008, p. 132).

In our opinion, the results of the enterprise activity, effectiveness – is an economic category, which includes a set of interrelated parameters that characterize the company from a position of accuracy of the tasks and the efficient use of resources. The accuracy of correct tasks setting is understood as results that satisfy the needs of owners, their employees and consumers. Thus, we define the efficiency as an integral part of effectiveness. The effectiveness in this concept involves comparing the results with the value of the spent resources, acts as a relation between resources and results of economic activity, and is of a technical nature. The company can be efficient but not effective. This statement emphasizes the importance of separating these concepts.

With the purpose of focusing attention on the problems of assessing the effectiveness and efficiency an aggregate analysis was conducted on the basis of the financial statements of five dairy processing enterprises.

Calculations presented below are based on the methodology of Petukhova V. It is an efficient industrial production assessment, namely the technology of index calculations. Special attention is given to the interpretation of the two main analytical indicators – indicator of production efficiency and ration of the efficiency level and cost dynamics (d-coefficient). In this case it is needed to be noted that *Table 1* shows the calculations for net income from sales (Tishchenko, 2005, p. 132).

Table 1. Indexes of efficiency of milk processing enterprises, 2008-2011

Enterprises	2009/2008	2010/2009	2011/2010	Average	Index type
PJSC "Kremenchug City Milk Plant"	0,87	1,29	1,18	1,12	sales
	0,95	1,22	1,08	1,08	production costs
	0,92	1,06	1,09	1,04	efficiency
	0,97	0,87	1	0,96	d koef
PJSC "Kovelmoloko"	0,76	0,74	0,67	0,72	sales
	0,69	0,65	0,78	0,71	costs
	1,1	1,12	0,86	1,02	efficiency
	1,6	1,7	1,1	1,44	d koef
PJSC "Khrystynivka Milk"	1,09	0,65	2,86	1,53	sales
	1,07	0,6	2,9	1,52	costs
	1,02	1,08	0,98	1	efficiency
	0,95	1,8	0,34	0,66	d koef
PJSC "Novovodolazky Milk"	0,79	2,11	1,27	1,39	sales
	0,74	2,16	1,36	1,42	costs
	1,07	0,98	0,93	0,98	efficiency
	1,45	0,45	0,68	0,69	d koef
JSC "Brovary-milk"	1,07	1,1	1,05	1,07	sales

	1,09	1,16	1,08	1,11	costs
	0,98	0,95	0,97	0,96	efficiency
	0,9	0,82	0,9	0,86	d koef

*Source:* compiled by the authors.

As can be seen in the *Table 1*, the company JSC "Novovodolazky Milk" and JSC "Brovary-milk" are developing according to extensive (regressive) scenario, efficiency index and d-coefficient are lower than one, indicating the "eating" of capacity and inefficient use of economic resources. In such enterprises as JSC "Khrystynivka Milk" and PJSC "Kremenchug City Milk Plant" development is also characterized as regressive – d-coefficient is less than 1, but resources are used efficiently. These companies are recommended to change their expenditure policy. PJSC "Kovelmoloko" develops a regressive model, as performance index and d-coefficient is bigger than 1. It should also be noted that almost all companies in the sample have a d-coefficient less than one. This situation indicates a certain irrationality of the development models from the standpoint of communicating the value of dairy products to their end users.

### Methods of assessing the effectiveness

Providing priority development of milk processing requires the solution of complex of problems, and great importance is paid to the improvement of the financial and economic mechanisms to ensure the transparency of funding, increase in economic independence, investment attractiveness and enterprises responsibility for the results.

To diagnose effectiveness the evaluation technique should be developed based on the criteria to mark the changes in the company's activity, to determine the extent of realization of planned tasks and achieving planned results, to choose the most efficient way to improve the business. Assessment of performance should be carried out by key indicators (Tishchenko, 2005, p. 220).

Complexity of problems of analyzing effectiveness is related to their multidimensional nature. It is therefore necessary to identify areas of company's management to operate successfully on the market (Braverman, 1998, p. 203).

Defending the view of including performance indicator to the theory of effectiveness, we applied one of the most common methods of evaluation of management effectiveness – Technology Analysis of Scott Sink D. (Sink, 1989). It should be noted that the author's calculations are amended in accordance with the purposes of analysis and information capabilities (*Figure 1*).

Management of effectiveness is considered as the process of selecting, analyzing and measuring the system of interrelated indicators to achieve effective operation of the business.

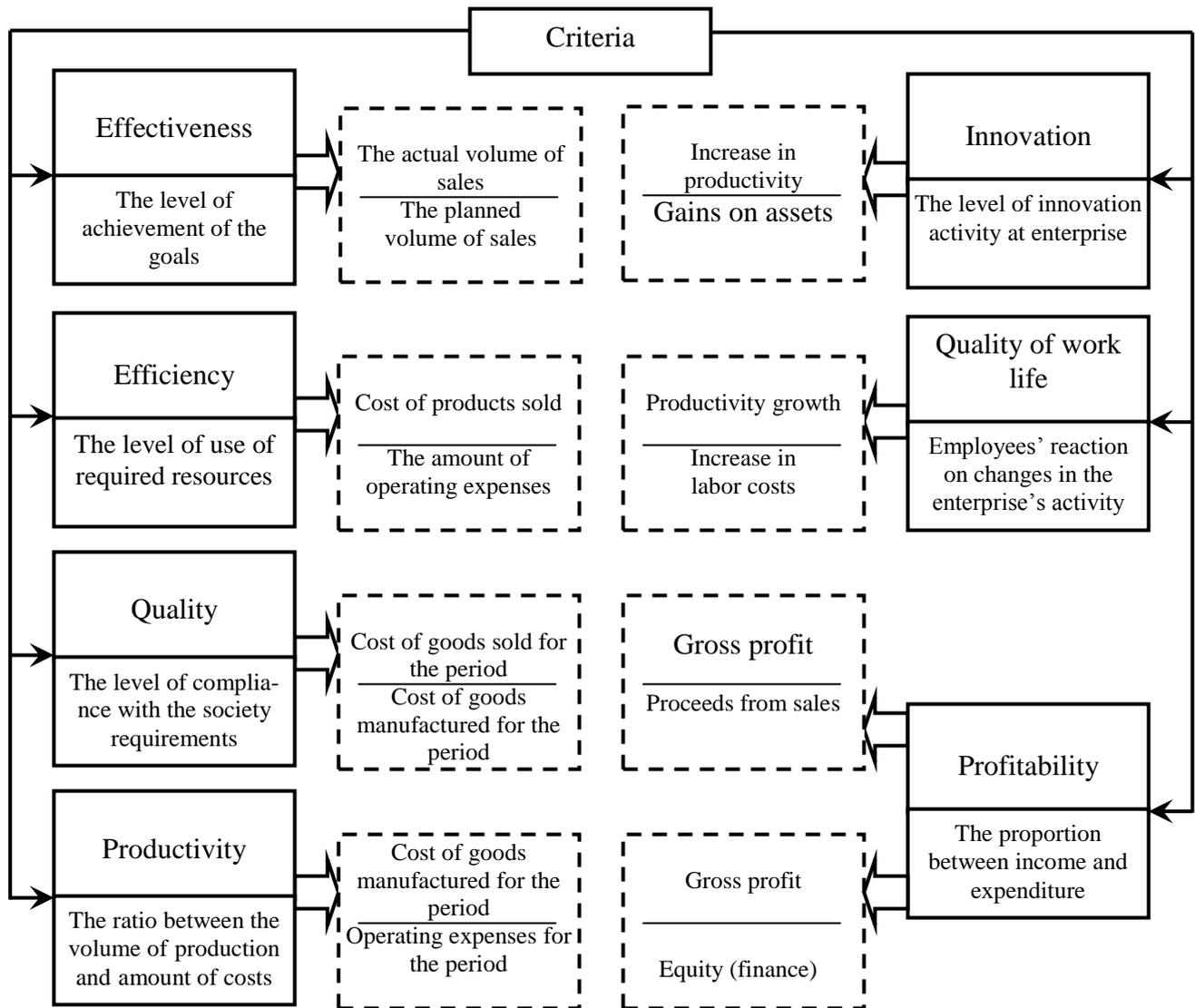


Figure 1. Logics of synthesis of effectiveness indicators based on the model of D. Scott Sink (Sink, 1989)

**Diagnosis of effectiveness**

Logical step of our study is to calculate the indicators presented for each sampling enterprise.

So, the first stage of calculating effectiveness is determination of the efficacy of the enterprises in the sample in 2008-2011. Effectiveness – the level of achievement of the goals.

It should be noted that the planned increase in the volume of sales is determined on the average industry level (*Formula 1*), i.e., a separate company must increase the volume of sales over a period proportionally to the capacity growth of the dairy market (see *Table 2*). These considerations are based on the logic of maintaining a market position; otherwise a decrease in the market share of the enterprise would be expected.

$$\text{Market size} = \text{Net income from sales} + \text{Import} - \text{Export} \tag{1}$$

Table 2. Evaluation of market size of dairy products in Ukraine, 2008-2011

Indicators	2008	2009	2010	2011
Net income from sales of milk-processing enterprises, mln UAH	16500,2	16753,8	20420,3	23740,5
Import, mln UAH	889,7	896,74	904,68	1097,88
Export, mln UAH	5778,4	3388,6	4652,4	5195,04
Market size of dairy products in Ukraine, mln UAH	11611,5	14261,94	16672,58	19643.34

Source: compiled by the authors.

Using the data presented in the table the efficacy index that characterizes the level of implementation of enterprise goals is determined (*Formula 2*).

$$\text{Efficacy} = \frac{\text{Growth in net income from sales}}{\text{Market size index}} \quad (2)$$

Table 3. Calculation of efficacy index, 2008-2011

Enterprise	Indices of growth in sales (by net income from sales)			Efficacy Index		
	2009/2008	2010/2009	2011/2010	2009/2008	2010/2009	2011/2010
PJSC "Kremenchug City Milk Plant"	0,87	1,29	1,18	0,7	1,1	1,0
PJSC "Kovelmoloko"	0,76	0,74	0,67	0,62	0,63	0,57
PJSC "Khrystynivka Milk"	1,07	0,6	2,9	0,87	0,51	2,46
PJSC "Novovodolazky Milk"	0,79	2,11	1,27	0,64	1,8	1,08
JSC "Brovary-milk"	1,07	1,1	1,05	0,9	0,94	0,89
Market size of milk and milk products	1,23	1,17	1,18	-	-	-

Source: compiled by the authors.

Improved market position and exceeding of efficiency index was observed in 2008-2011, at such enterprises as PJSC "Kremenchug City Milk plant", PJSC "Novovodolazky milk" and PJSC "Khrystynivka milk" in 2011. Regarding the activities of other companies they have some delay on the dynamics of the market of milk and milk products.

The next step of our study is a determination of the cost of economic activity for the years of 2008-2011 (*Formula 3*).

The calculations use two major expenditure indicators of economic activity included in financial and statistical reporting – cost of sales and operating expenses. The choice of first index was done because of the availability of its information and relation to the market. Cost of goods sold reflects the resources sold to consumers, reflecting the amount of use of required resources. Total operating expenses characterize the amount of expenses for the period – economic resources consumed by the enterprise for different periods of development. We believe that the comparison of these two economic indicators is important for effectiveness evaluation (see *Table 4*).

If the cost of goods sold is less than the gross expenditure for the same period, it must be assumed that the company consumes more resources than sell on the market. Parameter of cost-effective index is lower than one. In the case of contrary situation, when the value of cost-efficiency is bigger than one, we should talk about the excess of economic resources sold on the market over the consumed resources at the same period of time (this situation is possible when accounting inventories, prepaid expenses, etc.).

$$\text{Economical value} = \frac{\text{Cost of sales}}{\text{Operating expenses for the period}} \quad (3)$$

Table 4. Evaluation of economical effect, 2008-2011

Year	Cost of sales, thsd UAH	Operating expenses for the period, thsd UAH	Economical index
PJSC "Kremenchug City Milk plant"			
2008	217353	215006	1,01
2009	205924	214461	0,96
2010	250443	267322	0,93
2011	270600	302446	0,89
PJSC "Kovelmoloko"			
2008	273677	293450	0,93
2009	187735	202054	0,93
2010	122596	168501	0,73
2011	95397	155397	0,61
PJSC "Khrystynivka Milk"			
2008	71060	99268	0,72
2009	76244	87952	0,87
2010	45582	69658	0,65
2011	131375	144658	0,91
PJSC "Novovodolazky Milk"			
2008	9535	10326	0,92
2009	7033	8114	0,87
2010	15164	15879	0,95
2011	20584	23507	0,88
JSC "Brovary-milk"			
2008	6036	6734	0,9
2009	6580	7203	0,91
2010	7614	8318	0,92
2011	8239	8708	0,95

*Source:* compiled by the authors.

All enterprises have the economical value is less than one, indicating the consumption of economic resources without further marketing to consumers in the structure of production costs. Though it should be noted that the gap between sold and consumed resources is small, most of the economical values are close to 1. The best situation is at such enterprises as JSC "Brovary-milk" and PJSC "Kremenchug City Milk plant".

Further, there is stage of calculating the quality of products planning of the selected five companies (*Formula 4*). The ability to meet customer needs through the implementation of core activities according to established requirements is described.

$$\text{Quality of planning} = \frac{\text{Cost of sales}}{\text{Cost of the goods manufactured for the period}} \quad (4)$$

Table 5. Calculation of Quality index, 2008-2011

Year	Cost of goods sold for the period, thsd UAH	Cost of goods manufactured for the period, thsd UAH	Quality of planning
PJSC "Kremenchug City Milk plant"			
2008	84145	84007	1
2009	97269	85053,5	1,14
2010	153533,9	109042	1,4
2011	321361,49	255184,95	1,26
PJSC "Kovelmoloko"			
2008	220346	227103	0,97
2009	216874	204230	1,06
2010	128704	135643	0,9
2011	67918	66164	1,02
PJSC "Khrystynivka Milk"			
2008	93200,4	93158,2	1
2009	97993,9	82213,4	1,19
2010	57899,24	53370,6	1,08
2011	119785,32	119763,6	1
PJSC "Novovodolazky Milk"			
2008	7450	7327	1,02
2009	7015	7015	1
2010	12675,5	12727,3	0,9
2011	16202,1	16121,26	1,01
JSC "Brovary-milk"			
2008	6890	6100	1,13
2009	6010	5095	1,18
2010	7808	7003,5	1,1
2011	9810	8364	1,2

*Source:* compiled by the authors.

Thus, the volume of sales is determined by the sales value of products shipped, which is mentioned in the settlement documents, and is independent of the actual receipt of cash.

Sales of goods – a communication link between the producer and the consumer. The way products are sold and their demand on the market indicate the quality and competitiveness of products.

It should be emphasized that all of the firms in the sample showed a positive quality score (greater than 1), this indicates that they sell their products more expensive than the costs spent to manufacture them, and these products are in demand. So, all companies produce high-quality and competitive products.

The next stage of the analysis is to determine productivity – index, which reflects the effectiveness and efficiency of human labor (Polishchuk, 2005). Index of labor productivity is analyzed according to the D. Scott Sink model. He understands productivity as capacity of production per unit of used economic resources (*Formula 5*).

$$\text{Productivity} = \frac{\text{Cost of goods sold for the period}}{\text{Operating expenses for the period}} \quad (5)$$

Table 6. Assessment of productivity indicator, 2008-2011

Year	Cost of goods manufactured for the period, thsd UAH	Operating expenses for the period, thsd UAH	Productivity
PJSC "Kremenchug City Milk plant"			
2008	190367	215006	0,88
2009	159844,95	214461	0,74
2010	197182,64	267322	0,73
2011	280423,02	302446	0,92
PJSC "Kovelmoloko"			
2008	227103	293450	0,77
2009	204230	202054	1,01
2010	135643	168501	0,8
2011	66164	155397	0,43
PJSC "Khrystynivka Milk"			
2008	93158,2	99268	0,94
2009	82213,4	87952	0,93
2010	53370,6	69658	0,8
2011	119763,6	144658	0,83
JSC "Novovodolazky Milk"			
2008	7327	10326	0,71
2009	7015	8114	0,86
2010	12727,3	15879	0,8
2011	16121,26	23507	0,7
JSC "Brovary-milk"			
2008	6100	6734	0,9
2009	5095	7203	0,7
2010	7003,5	8318	0,84
2011	8364	8708	0,96

*Source:* compiled by the authors.

The productivity calculated by transaction costs can attest that all the firms in the sample use resources inefficiently.

The next step in determining the effectiveness of five dairy processors is the calculation of the index of innovation activity (*Formula 6*). An important factor in the development of effective long-term operation of enterprises is the successful implementation of innovation. The system of innovation management has a multi-faceted character, embodying the unity of technological, organizational and social tools, which greatly complicates the economic calculations (Petukhova, 2012).

In the table below we determined the rate of innovation based on a comparison of changes in two indicators – productivity, by number of employees (*Formula 7*) and return on assets (*Formula 8*). The first one reflects the level of efficiency of a person as a carrier and an active factor of socio-economic system of the enterprise. The level of productivity for a given period is affected by several major groups of factors – logistical, organizational, social and psychological. The parameter of return on assets reflects the level of progressive technology. When labor productivity is growing at a faster rate than capital productivity (return on assets)

at the enterprise during the same period, we should talk about the use of institutional and socio-psychological factors of growth (technical factors are behind).

$$\text{Innovation} = \frac{\text{Labor productivity index}}{\text{Return on assets}} \quad (6)$$

$$\text{Labor productivity} = \frac{\text{Net income from sales}}{\text{Average number of personnel}} \quad (7)$$

$$\text{Return on assets} = \frac{\text{Cost of the goods manufactured}}{\text{Average annual value of fixed assets}} \quad (8)$$

Table 7. Assessment of innovation index, 2008-2011

Year	Index of changes in labor productivity	Index of changes in fixed-asset turnover	Innovation
PJSC "Kremenchug City Milk plant"			
2009/2008	1,24	1,01	1,23
2010/2009	1,31	1,4	0,94
2011/2010	1,23	1,01	1,22
PJSC "Kovelmoloko"			
2009/2008	0,76	0,7	1,08
2010/2009	0,66	0,75	0,88
2011/2010	0,9	0,7	1,29
PJSC "Khrystynivka Milk"			
2009/2008	1,36	0,76	1,8
2010/2009	0,64	0,54	1,19
2011/2010	2,79	0,93	3
PJSC "Novovodolazky milk"			
2009/2008	0,87	0,71	1,23
2010/2009	1,02	1,83	0,56
2011/2010	1,3	1,44	0,9
JSC "Brovary-milk"			
2009/2008	1,15	0,99	1,16
2010/2009	1,37	1	1,37
2011/2010	1,05	0,95	1,1

Source: compiled by the authors.

Most of the enterprises in the sample are oriented to the use of organizational and psychosocial factors for improving their performance. They experience minimization of investment costs and achieving increased efficiency of their work based on organizational and motivational factors of the staff, as the index of innovation for 2008-2011 mainly exceeds 1. Only PJSC "Novovodolazky milk" significantly improved its technical factors in 2010-2011, as evidenced by the excess of the rate of change of assets turnover over the rate of change in labor productivity.

The next step of effectiveness analysis is calculating quality of working life (*Formula 9*). Quality of work life is characterized by the ability to meet the needs of employees in working conditions. This value reflects the match of the existing conditions and the needs of employees.

For the calculation of this indicator it is assumed that an increase in productivity is higher than the increase in labor costs for the same period, which can be evaluated as improvement of the quality of working life of the companies' employees. Although the methods and assumptions used in determining the quality of working life do not allow formulating definite conclusions, but most of all, in our opinion, it can describe these complicated social and economic characteristics of the personnel of the enterprise.

$$\text{Quality of working life} = \frac{\text{Labor productivity index}}{\text{Labor costs index}} \quad (9)$$

Table 8. Assessment of quality of working life index, 2008-2011

Year	Labor productivity index	Labor costs index	Quality of working life
PJSC "Kremenchug City Milk plant"			
2009/2008	1,24	0,84	1,48
2010/2009	1,31	1,05	1,25
2011/2010	1,23	1,11	1,1
PJSC "Kovelmoloko"			
2009/2008	0,76	0,86	0,88
2010/2009	0,66	1,31	0,5
2011/2010	0,9	0,85	1,06
PJSC "Khrystynivka Milk"			
2009/2008	1,36	0,46	2,9
2010/2009	0,64	1,33	0,48
2011/2010	2,79	1,2	2,3
PJSC "Novovodolazky milk"			
2009/2008	0,87	1,21	0,71
2010/2009	1,02	2,61	0,4
2011/2010	1,3	0,97	1,34
JSC "Brovary-milk"			
2009/2008	1,15	1,15	1
2010/2009	1,37	0,91	1,5
2011/2010	1,05	1,13	0,92

Source: compiled by the authors.

The calculated index is bigger than one at PJSC "Kremenchug City Milk Plant", PJSC "Khrystynivka milk" and JSC "Brovary-milk" for the period of 2008-2011. This suggests that the productivity of the personnel of these companies is growing faster than labor costs. This situation is positive and indicates an effective system of motivation and understanding of employees.

The last indicator of effectiveness evaluation, which was formed on the basis of D. Scott Sink scientific research, is the rate of return (profitability).

Profitability characterizes the company's ability to generate income more than spent costs necessary to obtain it. To calculate the effectiveness criteria we use a rate of return. Profitability – a relative index that characterizes the measure of profitability of costs or assets.

Based on the concept of substantial performance, we believe it is appropriate to calculate the return on sales (*Formula 10*), as this indicator allows assessing the level of income per hryvnia (UAH) of products sold on the market, and return on equity (*Formula 11*), which will assess the level of investment attractiveness of enterprises.

$$\text{Net profit ratio of sales} = \frac{\text{Gross income}}{\text{Revenue from sale of goods}} \quad (10)$$

$$\text{Rate of return on equity} = \frac{\text{Gross income}}{\text{Equity}} \quad (11)$$

Table 9. Assessment of profitability index, 2008-2011

Enterprises	Net profit ratio of sales				Rate of return on equity			
	2008	2009	2010	2011	2008	2009	2010	2011
PJSC "Kremenchug City Milk Plant"	0,14	0,06	0,11	0,19	1,08	0,28	0,65	0,81
PJSC "Kovelmoloko"	0,01	0,13	0,24	0,12	0,2	0,09	0,12	0,04
PJSC "Khrystynivka Milk"	0,07	0,08	0,15	0,15	0,9	1,03	1,25	0,7
PJSC "Novovodolazky milk"	0,09	0,15	0,13	0,07	0,35	0,5	0,48	-1,09
JSC "Brovary-milk"	0,21	0,2	0,16	0,13	1,31	1,18	0,78	0,64

Source: compiled by the authors.

The data in the table shows that the profitability of the five firms varies from 1% to 24%. The highest level of profitability of sales during 2008 – 2011 is recorded at JSC "Brovary-milk". The lowest rates are PJSC "Kremenchug City Milk Plant".

Analysis of profitability of equity shows that an investor can expect to receive from 4% to 81% on invested capital. Note that PJSC "Novovodolazky milk" was recorded with unprofitable activities. However, the negative result was not obtained because of financial losses as a result of 2011, but because of negative equity. This was due to the presence of retained loss for the last year in the structure of the enterprise.

## Conclusions

It should be noted that the separation of the categories of efficiency and effectiveness and their clear understanding is essential for the successful operation of businesses. The analysis of effectiveness shows that almost all companies in our sample have a d-coefficient less than 1. This situation indicates a certain irrationality of the prevailing development models in regards with communicating the value of dairy products to their final consumers. It is known that the effect of any management system is synergistic in nature, i.e. the effect of strengthening cooperation and coordination between elements of the system. Objective basis for the emergence of synergy is real interaction of its elements. Therefore, the proposed methodology of evaluation needs further improvement because it does not offer an overall assessment, but describes each parameter separately. It is only the first step in working out the methodology of managing effectiveness of an enterprise.

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